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# 1.1 micronaut-groovy 3.0.0

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# 1.3 junit-jupiter-junit-jupiter-engine 5.7.1

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# 1.4 apache-httpcomponents-core 4.4.13

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Found in path(s):
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* /opt/cola/permits/1162862871_1620923716.86/0/rfc3986-uri-0-8-sources-1-jar/org/dmfs/rfc3986/encoding/utils/PercentEncodingOutputStream.java
* /opt/cola/permits/1162862871_1620923716.86/0/rfc3986-uri-0-8-sources-1-jar/org/dmfs/rfc3986/parameters/valuetypes/IntegerValueType.java

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* /opt/cola/permits/1162862871_1620923716.86/0/rfc3986-uri-0-8-sources-1-jar/org/dmfs/rfc3986/uris/Text.java

# 1.9 opentelemetry-java---io.opentelemetry:opentelemetry-sdk-metrics 1.12.0-alpha

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# 1.10 micronaut-aws 3.0.0

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* /opt/cola/permits/1355678727_1656718623.9901483/0/netty-transport-native-unix-common-4-1-78-final-sources-2-jar/netty_unix_util.c
* /opt/cola/permits/1355678727_1656718623.9901483/0/netty-transport-native-unix-common-4-1-78-final-sources-2-jar/io/netty/channel/unix/LimitsStaticallyReferencedJniMethods.java
* /opt/cola/permits/1355678727_1656718623.9901483/0/netty-transport-native-unix-common-4-1-78-final-sources-2-jar/netty_unix_limits.c

No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1355678727_1656718623.9901483/0/netty-transport-native-unix-common-4-1-78-final-sources-2-jar/io/netty/channel/unix/PreferredDirectByteBufAllocator.java
* /opt/cola/permits/1355678727_1656718623.9901483/0/netty-transport-native-unix-common-4-1-78-final-sources-2-jar/io/netty/channel/unix/Buffer.java
* /opt/cola/permits/1355678727_1656718623.9901483/0/netty-transport-native-unix-common-4-1-78-final-sources-2-jar/netty_unix_buffer.h
* /opt/cola/permits/1355678727_1656718623.9901483/0/netty-transport-native-unix-common-4-1-78-final-sources-2-jar/netty_unix_buffer.c

# 1.13 scala 2.12.8

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<div class="version-notice">This is the specification of a previous version of Scala. See the <a href="{{ site.baseurl}}/../{{ site.latestScalaVersion }}/">Scala {{ site.latestScalaVersion }} spec</a>.</div>
{% endif %}
class C {
 val x: ((Int, Int) => Int) = (((a, b)) => a)
 val y: ((Int, Int, Int) => Int) = (((a, !!)) => a)
 val z: ((Int, Int, Int) => Int) = (((a, NotAPatternVariableName, c)) => a)
}
```

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```
not-a-legal-formal-parameter-tuple.scala:2: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
      Either create a single parameter accepting the Tuple2,
      or consider a pattern matching anonymous function: `{ case (a, b) => ... }
  val x: ((Int, Int) => Int) = (((a, b)) => a)
                                 ^
not-a-legal-formal-parameter-tuple.scala:3: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
      Either create a single parameter accepting the Tuple2,
      or consider a pattern matching anonymous function: `{ case (param1, param2) => ... }
  val y: ((Int, Int, Int) => Int) = (((a, !!)) => a)
                                      ^
not-a-legal-formal-parameter-tuple.scala:4: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
      Either create a single parameter accepting the Tuple3,
      or consider a pattern matching anonymous function: `{ case (param1, ..., param3) => ... }
  val z: ((Int, Int, Int) => Int) = (((a, NotAPatternVariableName, c)) => a)
                                      ^
three errors found
```

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Eclipse - in third_party/eclipse
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package org.jetbrains.idl2k.util

import org.xml.sax.InputSource
import java.io.File
import javax.xml.xpath.XPathFactory

fun readCopyrightNoticeFromProfile(copyrightProfile: File): String {
  val template = copyrightProfile.reader().use { reader ->
      XPathFactory.newInstance().newXPath().evaluate("/component/copyright/option[@name='notice']/@value",
InputSource(reader))
  }
  val yearTemplate = "&#36;today.year"
  val year = java.time.LocalDate.now().year.toString()
  assert(yearTemplate in template)

  return template.replace(yearTemplate, year).lines().joinToString("", prefix = "/*\n", postfix = " */\n") { " * $it\n" }
}
```

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Version 2.1, February 1999

[This is the first released version of the Lesser GPL.  It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

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# 1.19 jackson-annotations 2.13.2

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* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/ForwardingSink.kt

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* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/commonMain/okio/internal/ByteString.kt
* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/commonMain/okio/-Platform.kt
* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/-Platform.kt
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* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/commonMain/okio/ByteString.kt
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* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/-DeprecatedUpgrade.kt
* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/-DeprecatedUtf8.kt
* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/commonMain/okio/PeekSource.kt
* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/-DeprecatedOkio.kt
* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/Throttler.kt
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* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/commonMain/okio/-Base64.kt
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* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/HashingSink.kt
* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/Pipe.kt

* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/jvmMain/okio/HashingSource.kt
* /opt/cola/permits/1274700344_1645235023.94/0/okio-2-8-0-sources-jar/commonMain/okio/Options.kt

# 1.21 evo-inflector 1.2.2

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# 1.22 junit-platform-junit-platform-engine 1.7.0

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* /opt/cola/permits/1089224571_1611250185.24/0/android-json-0-0-20131108-vaadin1-sources-jar/org/json/JSONTokener.java
* /opt/cola/permits/1089224571_1611250185.24/0/android-json-0-0-20131108-vaadin1-sources-jar/org/json/JSONStringer.java
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# 1.26 ktor-http-jvm 1.2.6

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## 1.27 ktor-network 1.2.6

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# 1.29 io.grpc:grpc-bom 1.38.0

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# 1.30 appdynamics-java-agent-api 4.5.13.27526

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* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/overview-tree.html
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/com/appdynamics/agent/api/package-tree.html
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* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/com/appdynamics/instrumentation/sdk/logging/package-tree.html
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/com/appdynamics/instrumentation/sdk/logging/package-summary.html
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-

jar/com/appdynamics/agent/api/AppdynamicsAgent.html
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/com/appdynamics/instrumentation/sdk/logging/ISDKLogger.html
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/com/appdynamics/agent/api/EventPublisher.html
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* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/constant-values.html
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/com/appdynamics/agent/api/package-summary.html
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-javadoc-jar/index-all.html
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Found in path(s):
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* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/impl/NoOpExitCall.java
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/AppdynamicsAgent.java
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/ExitCall.java

* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/EventPublisher.java
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/MetricPublisher.java
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/Transaction.java

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Found in path(s):
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/bootstrap/NoOpTransactionDelegate.java
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/ExitTypes.java
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/EntryTypes.java
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/bootstrap/IApiBootstrapFacade.java
* /opt/cola/permits/1337070300_1654792344.40951/0/java-agent-api-4-5-13-27526-zip/agent-api-sources-jar/com/appdynamics/agent/api/bootstrap/IApiTransactionDelegate.java

# 1.31 kotlinx-coroutines-bom 1.5.1

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```
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         xmlns="http://maven.apache.org/POM/4.0.0"
         xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/maven-v4_0_0.xsd">

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        <artifactId>kafka-schema-registry-parent</artifactId>
        <version>6.2.1</version>
    </parent>

    <licenses>
        <license>
            <name>Apache License 2.0</name>
            <url>http://www.apache.org/licenses/LICENSE-2.0.html</url>
            <distribution>repo</distribution>
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    </licenses>

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    <name>kafka-schema-registry-client</name>

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        <dependency>
            <groupId>org.apache.commons</groupId>
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  <artifactId>powermock-module-junit4</artifactId>
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</dependency>
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  <artifactId>swagger-annotations</artifactId>
</dependency>
<dependency>
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  <artifactId>swagger-core</artifactId>
  <version>1.6.2</version>
  <exclusions>
    <exclusion>
      <groupId>javax.validation</groupId>
      <artifactId>validation-api</artifactId>
    </exclusion>
    <exclusion>
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                <groupId>com.google.guava</groupId>
                <artifactId>guava</artifactId>
            </exclusion>
        </exclusions>
    </dependency>
    <dependency>
        <groupId>com.google.guava</groupId>
        <artifactId>guava</artifactId>
        <version>${guava.version}</version>
    </dependency>
  </dependencies>
</project>
```

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* /opt/cola/permits/1340031511_1654757594.2991207/0/kafka-schema-registry-client-6-2-1-jar/META-INF/maven/io.confluent/kafka-schema-registry-client/pom.xml

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# 1.40 junit-platform-junit-platform-commons 1.7.2

## 1.40.1 Available under license :

import java.io.File
import java.net.URI

data class License(val name: String, val url: URI, val headerFile: File)
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# 1.41 antlr 3.5.2

## 1.41.1 Available under license :

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```
@outputFile.imports() ::= <<
<@super.imports()>

<if(!TREE_PARSER)>
<! tree parser would already have imported !>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

parserCtorBody() ::= <%
<super.parserCtorBody()><\n>
TreeAdaptor =
<if(actions.(actionScope).treeAdaptorInitializer)>
 <actions.(actionScope).treeAdaptorInitializer>
<else>
 new <actions.(actionScope).treeAdaptorType; null="CommonTreeAdaptor">()
<end>
;
%>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
private <treeAdaptorType()> adaptor;

public <treeAdaptorType()> TreeAdaptor
{
 get
 {
  return adaptor;
 }

 set
 {
  this.adaptor = value;
  <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
 }
}
>>

treeAdaptorType() ::= <<
<actions.(actionScope).treeAdaptorType; null="ITreeAdaptor">
>>

ruleReturnBaseType() ::= <%
Ast<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<ASTLabelType>, <labelType>>
%>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0 = default(<ASTLabelType>);<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|<ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);}; separator="\n">
<ruleDescriptor.tokenListLabels:{it|<ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);};
separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = (<ASTLabelType>)adaptor.Nil();
<endif>
<endif>
<endif>
>>
```

```
// Tracking Rule Elements

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule.name>.Add(<label>.Tree);
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule>.Add(<label>.Tree);
>>

/** ^(x+=rule ...) rewrite */
```

```
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

// Rewrite

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::= <<
<\n>{
// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if (<actions.(actionScope).synpredgate>) {
<endif>
<prevRuleRootRef()>.Tree = root_0;
<rewriteCodeLabels()>
root_0 = (<ASTLabelType>)adaptor.Nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER&&rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
if (<prevRuleRootRef()>.Tree != null)
 input.ReplaceChildren(adaptor.GetParent(retval.Start), adaptor.GetChildIndex(retval.Start),
adaptor.GetChildIndex(_last), retval.Tree);
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER||!rewriteMode)>
<prevRuleRootRef()>.Tree = root_0;
<endif>
<if(backtracking)>
}
<endif>
}
```

```
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
   :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
   separator="\n"
>
<referencedTokenListLabels
   :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
   separator="\n"
>
<referencedWildcardLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
 separator="\n"
>
<referencedWildcardListLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
 separator="\n"
>
<referencedRuleLabels
   :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.Tree:null);};
   separator="\n"
>
<referencedRuleListLabels
   :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
   separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if (<referencedElementsDeep:{el | stream_<el>.HasNext}; separator="||">)
{
 <alt>
}
<referencedElementsDeep:{el | stream_<el>.Reset();<\n>}>
>>
```

```
rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if (!(<referencedElements:{el | stream_<el>.HasNext}; separator="||">))
{
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
 <a.alt>
}
<else>
{
 <a.alt>
}
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"
```

```
rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <%
<@pregen()>
DebugLocation(<e.line>, <e.pos>);<\n>
<e.el>
%>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);<\n>
>>
```

```
rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<rule>.NextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<rule>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteNodeAction(action) ::= <<
adaptor.AddChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
```

```
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
%>

createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.NextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.Create(<token>, <args; separator=", ">)
<else>
stream_<token>.NextNode()
<endif>
<endif>
%>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp2/AST.stg
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Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python3/Dbg.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/AST.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/Dbg.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python3/AST.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/ASTParser.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/serialize.g
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ActionScript/ASTParser.stg
No license file was found, but licenses were detected in source scan.

```
*/
scalaTypeInitMap ::= [
 "Int":"0",
 "Long":"0",
 "Float":"0.0f",
 "Double":"0.0",
 "Boolean":"false",
 "Byte":"0",
 "Short":"0",
 "Char":"0",
 default:"null" // anything other than an atomic type
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
           docComment, recognizer,
           name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
import org.antlr.runtime._
<if(TREE_PARSER)>
import org.antlr.runtime.tree._
<endif>
<@end>

<docComment>
<recognizer>
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
     superClass="Lexer") ::= <<
object <grammar.recognizerName> {
   <tokens:{it | val <it.name> = <it.type>}; separator="\n">

   <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
}

class <grammar.recognizerName>(input: CharStream, state<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>: RecognizerSharedState) extends <@superClassName><superClass><@end>(input,
state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
   import <grammar.recognizerName>._
   <actions.lexer.members>

   // delegates
   <grammar.delegates:
        {g|<g.recognizerName> <g:delegateName()>}; separator="\n">
   // delegators
   <grammar.delegators:
        {g|<g.recognizerName> <g:delegateName()>}; separator="\n">
   <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

   <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>

   def this(input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>: CharStream) =
       this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)

<if(memoize)>
<if(grammar.grammarIsRoot)>
       state.ruleMemo = new Array[java.util.Map[_,_]](<numRules>+1)<\n> <! index from 1..n !>
<endif>
<endif>
       <grammar.directDelegates:
        {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this)}; separator="\n">
       <grammar.delegators:
        {g|this.<g:delegateName()> = <g:delegateName()>}; separator="\n">
       <last(grammar.delegators):{g|gParent = <g:delegateName()>}>

   override def getGrammarFileName = "<fileName>"

<if(filterMode)>
   <filteringNextToken()>
<endif>
   <rules; separator="\n\n">

   <synpreds:{p | <lexerSynpred(p)>}>
   <cyclicDFAs:{dfa | private val dfa<dfa.decisionNumber> = new
<grammar.recognizerName>.DFA<dfa.decisionNumber>(this)}; separator="\n">
}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
```

```
filteringNextToken() ::= <<
override def nextToken(): Token = {
   while (true) {
       if ( input.LA(1)==CharStream.EOF ) {
           var eof: Token = new CommonToken((CharStream)input,Token.EOF,
                                         Token.DEFAULT_CHANNEL,
                                         input.index(),input.index())
           eof.setLine(getLine())
           eof.setCharPositionInLine(getCharPositionInLine())
           return eof
       }
       state.token = null
 state.channel = Token.DEFAULT_CHANNEL
       state.tokenStartCharIndex = input.index()
       state.tokenStartCharPositionInLine = input.getCharPositionInLine()
       state.tokenStartLine = input.getLine()
 state.text = null
       try {
           val m = input.mark()
           state.backtracking=1 <! means we won't throw slow exception !>
           state.failed=false
           mTokens()
           state.backtracking=0
           <! mTokens backtracks with synpred at backtracking==2
              and we set the synpredgate to allow actions at level 1. !>
           if ( state.failed ) {
               input.rewind(m)
               input.consume() <! advance one char and try again !>
           }
           else {
               emit()
               return state.token
           }
       }
       catch {
           case re: RecognitionException =>
           // shouldn't happen in backtracking mode, but...
           reportError(re)
           recover(re)
       }
   }
}

override def memoize(input: IntStream,
  ruleIndex: Int,
  ruleStartIndex: Int) = {
if ( state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex)
}
```

```
override def alreadyParsedRule(input: IntStream, ruleIndex: Int):Boolean {
if ( state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex)
return false
}
>>

actionGate() ::= "state.backtracking==0"

filteringActionGate() ::= "state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, inputStreamType, superClass,
            labelType, members, rewriteElementType,
            filterMode, ASTLabelType="Object") ::= <<
object <grammar.recognizerName> {
<if(grammar.grammarIsRoot)>
  val tokenNames = Array(
      "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
  )<\n>
<endif>

  <tokens:{it | val <it.name> = <it.type>}; separator="\n">

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

  <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
                 words64=it.bits)>}>
}

class <grammar.recognizerName>(input: <inputStreamType>, state<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>: RecognizerSharedState) extends <@superClassName><superClass><@end>(input, state) {
  import <grammar.recognizerName>._
  // delegates
  <grammar.delegates:
      {g|public <g.recognizerName> <g:delegateName()>}; separator="\n">
  // delegators
  <grammar.delegators:
      {g|public <g.recognizerName> <g:delegateName()>}; separator="\n">
  <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

  <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>

  <@members>
  <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
  def this(input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>: <inputStreamType>) =
      this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
```

```
        <parserCtorBody()>
        <grammar.directDelegates:
         {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this)}; separator="\n">
        <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>};
separator="\n">
        <last(grammar.delegators):{g|gParent = <g:delegateName()>}>
    <@end>

    override def getTokenNames: Array[String] = tokenNames
    override def getGrammarFileName = "<fileName>"

    <members>

    <rules; separator="\n\n">

<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
    // Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
    @throws(classOf[RecognitionException])
    def <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>): <returnType()> = \{
<if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope.attribut
es:{a|<a.name>}; separator=", ">) \}}; separator="\n">

    <synpreds:{p | <synpred(p)>}>

    <cyclicDFAs:{dfa | private val dfa<dfa.decisionNumber> = new
<grammar.recognizerName>.DFA<dfa.decisionNumber>(this)}; separator="\n">
}
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new Array[java.util.Map[_,_]](<length(grammar.allImportedRules)>+1)<\n> <! index from
1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
       ASTLabelType="Object", superClass="Parser", labelType="Token",
       members={<actions.parser.members>}) ::= <<
```

```
<genericParser(inputStreamType="TokenStream", rewriteElementType="Token", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
          numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>}
          ) ::= <<
<genericParser(inputStreamType="TreeNodeStream", rewriteElementType="Node", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
@throws(classOf[RecognitionException])
def <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>): Unit = {
   <ruleLabelDefs()>
<if(trace)>
   traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
   try {
       <block>
   }
   finally {
       traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
   }
<else>
   <block>
<endif>
}
// $ANTLR end <ruleName>
>>

synpred(name) ::= <<
final def <name>(): Boolean = {
   state.backtracking+=1
   <@start()>
   val start = input.mark()
   try {
       <name>_fragment() // can never throw exception
   } catch {
       case re: RecognitionException =>
       System.err.println("impossible: "+re)
   }
   val success = !state.failed
   input.rewind(start)
   <@stop()>
   state.backtracking-=1
   state.failed=false
   success
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) { return <ruleReturnValue()> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) return <ruleReturnValue()><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; return <ruleReturnValue()>}<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
// <fileName>:<description>
@throws(classOf[RecognitionException])
final def <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>): <returnType()> = {
   <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>)<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
```

```
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
  <@preamble()>
  try {
    <ruleMemoization(name=ruleName)>
    <block>
    <ruleCleanUp()>
    <(ruleDescriptor.actions.after):execAction()>
  }
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  catch {
    case re: RecognitionException =>
    reportError(re)
    recover(input,re)
 <@setErrorReturnValue()>
  }<\n>
<endif>
<endif>
<endif>
  finally {
    <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
    <memoize()>
    <ruleScopeCleanUp()>
    <finally>
  }
  <@postamble()>
  return <ruleReturnValue()>
}
// $ANTLR end "<ruleName>"
>>

catch(decl,action) ::= <<
catch (<e.decl>) {
  <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
val retval = new <returnType()>()
retval.start = input.LT(1)<\n>
<else>
```

```
<ruleDescriptor.returnScope.attributes:{ a |
var <a.name>: <a.type> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>
}>
<endif>
<if(memoize)>
val <ruleDescriptor.name>_StartIndex = input.index()
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | <it>_stack.push(new <it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | <it.name>_stack.push(new <it.name>_scope())}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | <it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | <it.name>_stack.pop()}; separator="\n">
>>



ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it | var <it.label.text>: <labelType> = null}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it | var list_<it.label.text>: java.util.List=null}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|var <ll.label.text>: RuleReturnScope = null}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it | var <it.label.text>: <labelType>=null}; separator="\n"
>
<ruleDescriptor.charLabels:{it | int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | var list_<it.label.text>: java.util.List=null}; separator="\n"
>
>>

ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
```

```
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
>>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = input.LT(-1)<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( state.backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex) }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
@throws(classOf[RecognitionException])
final def m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>): Unit = {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>)<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  try {
<if(nakedBlock)>
    <ruleMemoization(name=ruleName)>
    <lexerRuleLabelDefs()>
    <ruleDescriptor.actions.init>
    try <block><\n>
<else>
    var _type = <ruleName>
    var _channel = BaseRecognizer.DEFAULT_TOKEN_CHANNEL
    <ruleMemoization(name=ruleName)>
    <lexerRuleLabelDefs()>
    <ruleDescriptor.actions.init>
    try <block>
    <ruleCleanUp()>
    state.`type` = _type
    state.channel = _channel
    <(ruleDescriptor.actions.after):execAction()>
<endif>
  }
  finally {
    <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>)<endif>
    <ruleScopeCleanUp()>
    <memoize()>
  }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
@throws(classOf[RecognitionException])
def mTokens(): Unit = {
  <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
alt<decisionNumber> match {
  <alts:{a | <altSwitchCase(i,a)>}>
  case _ =>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber> = <maxAlt>
<decls>
```

```
<@predecision()>
<decision>
<@postdecision()>
alt<decisionNumber> match {
   <alts:{a | <altSwitchCase(i,a)>}>
   case _ =>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
var cnt<decisionNumber>: Int = 0
<decls>
<@preloop()>
var loop<decisionNumber>_quitflag = false
while (!loop<decisionNumber>_quitflag) {
   var alt<decisionNumber>:Int = <maxAlt>
   <@predecision()>
   <decision>
   <@postdecision()>
   alt<decisionNumber> match {
       <alts:{a | <altSwitchCase(i,a)>}>
  case _ =>
     if ( cnt<decisionNumber> >= 1 ) loop<decisionNumber>_quitflag = true
     else {
     <ruleBacktrackFailure()>
           val eee = new EarlyExitException(<decisionNumber>, input)
           <@earlyExitException()>
           throw eee
     }
   }
   cnt<decisionNumber>+=1
}
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
var loop<decisionNumber>_quitflag = false
while (!loop<decisionNumber>_quitflag) {
   var alt<decisionNumber>:Int = <maxAlt>
   <@predecision()>
   <decision>
   <@postdecision()>
   alt<decisionNumber> match {
       <alts:{a | <altSwitchCase(i,a)>}>
 case _ => loop<decisionNumber>_quitflag = true
   }
}
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum, alt) ::= <<
case <altNum> =>
   <@prealt()>
   <alt>
>>
```

```
/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label>=<endif>`match`(input,<token>,FOLLOW_<token>_in_<ruleName><elementIndex>)<if(label)>
.asInstanceOf[<labelType>]<endif>
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new java.util.ArrayList()
list_<label>.add(<elem>)<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
`match`(<char>)
```

```
<checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1)<\n>
<else>
<label>=input.LT(1).asInstanceOf[<labelType>]<\n>
<endif>
<endif>
if ( <s> ) {
  input.consume()
  <postmatchCode>
<if(!LEXER)>
  state.errorRecovery=false<\n>
<endif>
  <if(backtracking)>state.failed=false<endif>
}
else {
  <ruleBacktrackFailure()>
  val mse = new MismatchedSetException(null,input)
  <@mismatchedSetException()>
<if(LEXER)>
  recover(mse)
  throw mse
<else>
  throw mse
  <! use following code to make it recover inline; remove throw mse;
  recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>)
  !>
<endif>
}<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
```

```
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
val <label>Start = getCharIndex()
`match`(<string>)
<checkRuleBacktrackFailure()>
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL, <label>Start, getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
`match`(<string>)
<checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=input.LT(1).asInstanceOf[<labelType>]<\n>
<endif>
matchAny(input)
<checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
matchAny()
<checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>
```

```
/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">)<\n>
state._fsp-=1
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
val <label>Start<elementIndex> = getCharIndex()
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<checkRuleBacktrackFailure()>
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>
```

```
/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
val <label>Start<elementIndex> = getCharIndex()
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
`match`(EOF)
<checkRuleBacktrackFailure()>
val <label> = new <labelType>(input, EOF, Token.DEFAULT_CHANNEL, <label>Start<elementIndex>,
getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
`match`(EOF)
<checkRuleBacktrackFailure()>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                       ::= "int <recRuleArg()>"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
   `match`(input, Token.DOWN, null)
   <checkRuleBacktrackFailure()>
   <children:element()>
   `match`(input, Token.UP, null)
   <checkRuleBacktrackFailure()>
}
<else>
`match`(input, Token.DOWN, null)
<checkRuleBacktrackFailure()>
<children:element()>
`match`(input, Token.UP, null)
<checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
  <ruleBacktrackFailure()>
  throw new FailedPredicateException(input, "<ruleName>", "<description>")
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
<edges; separator="\nelse ">
else {
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  val nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input)<\n>
  <@noViableAltException()>
  throw nvae<\n>
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt> <! if no edges, don't gen ELSE !>
```

```
<else>
else {
  alt<decisionNumber>=<eotPredictsAlt>
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
  <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
<edges; separator="\n">
case _ =>
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  val nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input)<\n>
  <@noViableAltException()>
  throw nvae<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
  <edges; separator="\n">
  case _ =>
}<\n>
>>
```

```
dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
<edges; separator="\n"><\n>
case _ =>
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
case <labels:{it | <it>}; separator=" | "> =>
  {
  <targetState>
  }
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = dfa<decisionNumber>.predict(input)
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
val DFA<dfa.decisionNumber>_eotS =
  "<dfa.javaCompressedEOT; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_eofS =
  "<dfa.javaCompressedEOF; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_minS =
  "<dfa.javaCompressedMin; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n    \"">}>"
```

```
val DFA<dfa.decisionNumber>_transitionS: Array[String] = Array(
    <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
)

val DFA<dfa.decisionNumber>_eot: Array[Short] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eotS)
val DFA<dfa.decisionNumber>_eof: Array[Short] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eofS)
val DFA<dfa.decisionNumber>_min: Array[Char] =
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS)
val DFA<dfa.decisionNumber>_max: Array[Char] =
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS)
val DFA<dfa.decisionNumber>_accept: Array[Short] =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_acceptS)
val DFA<dfa.decisionNumber>_special: Array[Short] =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_specialS)
val DFA<dfa.decisionNumber>_transition = new
Array[Array[Short]](DFA<dfa.decisionNumber>_transitionS.length)

for (i \<- DFA<dfa.decisionNumber>_transition.indices) {
  DFA<dfa.decisionNumber>_transition(i) =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_transitionS(i))
}

class DFA<dfa.decisionNumber> extends DFA {

  def this(recognizer: BaseRecognizer) = {
    this()
    this.recognizer = recognizer
    this.decisionNumber = <dfa.decisionNumber>
    this.eot = DFA<dfa.decisionNumber>_eot
    this.eof = DFA<dfa.decisionNumber>_eof
    this.min = DFA<dfa.decisionNumber>_min
    this.max = DFA<dfa.decisionNumber>_max
    this.accept = DFA<dfa.decisionNumber>_accept
    this.special = DFA<dfa.decisionNumber>_special
    this.transition = DFA<dfa.decisionNumber>_transition
  }
  override def getDescription = "<dfa.description>"
  <@errorMethod()>
<if(dfa.specialStateSTs)>
  @throws(classOf[NoViableAltException])
  override def specialStateTransition(s: Int, _input: IntStream):Int = {
    <if(LEXER)>
    val input = _input
    <endif>
    <if(PARSER)>
    val input = _input.asInstanceOf[TokenStream]
    <endif>
    <if(TREE_PARSER)>
```

```
        val input = _input.asInstanceOf[TreeNodeStream]
        <endif>
    val _s = s
        s match {
        <dfa.specialStateSTs:{state |
        case <i0> => <! compressed special state numbers 0..n-1 !>
            <state>}; separator="\n">
        case _ =>
        }
<if(backtracking)>
        if (state.backtracking>0) {state.failed=true; return -1}<\n>
<endif>
        val nvae = new NoViableAltException(getDescription(), <dfa.decisionNumber>, _s, input)
        error(nvae)
        throw nvae
    }<\n>
<endif>
}<\n>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber>: Int = input.LA(1)<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
val index<decisionNumber>_<stateNumber>: Int = input.index()
input.rewind()<\n>
<endif>
s = -1
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if ( s>=0 ) return s
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
```

```
s = <targetStateNumber><\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred,\"\")>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
>>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(input.LA(<k>) >=<lower>
&& input.LA(<k>) \<= <upper>)"

setTest(ranges) ::= "<ranges; separator=\"||\">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
class <scope.name>_scope {
   <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
}
val <scope.name>_stack = new collection.mutable.Stack[<scope.name>_scope]<\n>
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
class <scope.name>_scope {
   <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
}
```

```
val <scope.name>_stack = new collection.mutable.Stack[<scope.name>_scope]<\n>
<endif>
>>

returnStructName(r) ::= "<r.name>_return"

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
Unit
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
Unit
<endif>
<endif>
>>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<scalaTypeInitMap.(typeName)>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
var <label.label.text>: <ruleLabelType(referencedRule=label.referencedRule)> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))><\n>
```

```
>>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*  TODO(matthewlloyd): make this static
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
final class <ruleDescriptor:returnStructName()> extends
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope {
  <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
  <@ruleReturnMembers()>
}
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{it | <it.name>: <it.type>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack(<scope>_stack.size-<negIndex>-1).<attr.name>
<else>
<if(index)>
<scope>_stack(<index>).<attr.name>
<else>
<scope>_stack.top.<attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack(<scope>_stack.size-<negIndex>-1).<attr.name> = <expr>
<else>
<if(index)>
<scope>_stack(<index>).<attr.name> = <expr>
<else>
<scope>_stack.top.<attr.name> = <expr>
<endif>
<endif>
%>
```

```
/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(if (<scope>!=null) <scope>.<attr.name> else <initValue(attr.type)>)
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>
<else>
<attr.name> =<expr>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(if (<scope>!=null) <scope>.getText() else null)"
tokenLabelPropertyRef_type(scope,attr) ::= "(if (<scope>!=null) <scope>.getType() else 0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(if (<scope>!=null) <scope>.getLine() else 0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(if (<scope>!=null) <scope>.getCharPositionInLine() else 0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(if (<scope>!=null) <scope>.getChannel() else 0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(if (<scope>!=null) <scope>.getTokenIndex() else 0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(if (<scope>!=null) Integer.valueOf(<scope>.getText()) else 0)"
```

```
ruleLabelPropertyRef_start(scope,attr) ::= "(if (<scope>!=null) <scope>.start.asInstanceOf[<labelType>] else null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(if (<scope>!=null) <scope>.stop.asInstanceOf[<labelType>] else null)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(if (<scope>!=null) <scope>.tree.asInstanceOf[<ASTLabelType>] else
null)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(if (<scope>!=null) (input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
 input.getTreeAdaptor().getTokenStopIndex(<scope>.start))) else null)
<else>
(if (<scope>!=null) input.toString(<scope>.start,<scope>.stop) else null)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "(if (<scope>!=null) <scope>.st else null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getType() else 0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getLine() else 0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getCharPositionInLine() else -1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getChannel() else 0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getTokenIndex() else 0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getText() else null)"
lexerRuleLabelPropertyRef_int(scope,attr) ::=
   "(if (<scope>!=null) Integer.valueOf(<scope>.getText()) else 0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(retval.start.asInstanceOf[<labelType>])"
rulePropertyRef_stop(scope,attr) ::= "(retval.stop.asInstanceOf[<labelType>])"
rulePropertyRef_tree(scope,attr) ::= "(retval.tree.asInstanceOf[<ASTLabelType>])"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
>>
```

```
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "Integer.valueOf(<scope>.getText())"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
<action>
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
val <name> = new BitSet(Array[Long](<words64:{it | <it>L};separator=",">))<\n>
>>

codeFileExtension() ::= ".scala"

true_value() ::= "true"
false_value() ::= "false"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Scala/Scala.stg
No license file was found, but licenses were detected in source scan.

```
/*
```

```
@outputFile.imports() ::= <<
<@super.imports()>
<if(!TREE_PARSER)><! tree parser would already have imported !>
import org.antlr.runtime.tree.*;<\n>
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
protected var adaptor:TreeAdaptor = new CommonTreeAdaptor();<\n>
override public function set treeAdaptor(adaptor:TreeAdaptor):void {
   this.adaptor = adaptor;
   <grammar.directDelegates:{g|<g:delegateName()>.treeAdaptor = this.adaptor;}>
}
override public function get treeAdaptor():TreeAdaptor {
   return adaptor;
}
>>

@returnScope.ruleReturnMembers() ::= <<
<ASTLabelType> tree;
public function get tree():Object { return tree; }
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var root_0:<ASTLabelType> = null;<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it |var <it.label.text>_tree:<ASTLabelType>=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it |var <it.label.text>_tree:<ASTLabelType>=null;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
   :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
   :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = <ASTLabelType>(adaptor.nil());<\n>
<endif>
<endif>
<endif>
>>

// Tracking Rule Elements

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
```

```
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.tree);
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(label, {<label>.tree})>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.tree);
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(label, {<label>.tree})>
>>

// R e w r i t e
```

```
rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
   referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = <ASTLabelType>(adaptor.nil());
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = <ASTLabelType>(adaptor.rulePostProcessing(root_0));
input.replaceChildren(adaptor.getParent(retval.start),
                   adaptor.getChildIndex(retval.start),
                   adaptor.getChildIndex(_last),
                   retval.tree);
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>
```

```
rewriteCodeLabels() ::= <<
<referencedTokenLabels
   :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
   separator="\n"
>
<referencedTokenListLabels
   :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
   separator="\n"
>
<referencedWildcardLabels
   :{it |var  stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"wildcard
<it>",<it>);};
   separator="\n"
>
<referencedWildcardListLabels
   :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"wildcard
<it>",list_<it>);};
   separator="\n"
>
<referencedRuleLabels
   :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.tree:null);};
   separator="\n"
>
<referencedRuleListLabels
   :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"token
<it>",list_<it>);};
   separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | stream_<el>.hasNext}; separator="||"> ) {
   <alt>
}
<referencedElementsDeep:{el | stream_<el>.reset();<\n>}>
```

```
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.hasNext}; separator="||"> ) {
   <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if ( !(<referencedElements:{el | stream_<el>.hasNext}; separator="||">) ) {
   throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext}; separator="||"> ) {
   <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
   <a.alt>
}<\n>
<else>
{
   <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
```

```
{
var root_<treeLevel>:<ASTLabelType> = <ASTLabelType>(adaptor.nil());
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>));<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, <createImaginaryNode(token,terminalOptions,args)>);<\n>
>>
```

```
rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<createImaginaryNode(token,terminalOptions,args)>, root_<treeLevel>));<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>));<\n>
>>

rewriteNodeAction(action) ::= <<
adaptor.addChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<action>, root_<treeLevel>));<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>
```

```
/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>



createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
<ASTLabelType>(adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>))
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ActionScript/AST.stg
No license file was found, but licenses were detected in source scan.

```
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(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
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*/

/** How to generate rules derived from left-recursive rules.
*  These rely on recRuleDefArg(), recRuleAltPredicate(),
*  recRuleArg(), recRuleSetResultAction(), recRuleSetReturnAction()
*  templates in main language.stg
*/
group LeftRecursiveRules;

recRuleName(ruleName) ::= "<ruleName>_"
recPrimaryName(ruleName) ::= "<ruleName>_primary"

recRuleStart(ruleName, minPrec, userRetvals, userRetvalAssignments) ::= <<
<ruleName><if(userRetvals)> returns [<userRetvals>]<endif>
 : <recRuleName(...)>[<minPrec>]
   <if(userRetvals)>
   {
      <userRetvalAssignments; separator="\n">
   }
   <endif>
 ;
>>

recRule(ruleName, precArgDef, argName, alts, setResultAction, buildAST,
      userRetvals, userRetvalAssignments) ::= <<
<recRuleName(...)>[<precArgDef>]<if(userRetvals)> returns [<userRetvals>]<endif>
   :   <recPrimaryName(...)>
      <if(buildAST)>
      {
         <setResultAction>
      }
      <endif>
      <if(userRetvals)>
      {
```

```
      <userRetvalAssignments; separator="\n">
    }
    <endif>
    ( options {backtrack=false;}
    : ( options {backtrack=false;}
     : <alts; separator="\n         | ">
     )
    )*
  ;
>>

recPrimaryRule(ruleName, alts, userRetvals) ::= <<
<recPrimaryName(...)><if(userRetvals)> returns [<userRetvals>]<endif>
options {backtrack=true;}
  : <alts; separator="\n    | ">
  ;
>>

recRuleAlt(alt, pred) ::= "{<pred>}?=> <alt>"

recRuleRef(ruleName, arg) ::= "<recRuleName(...)>[<arg>]"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/LeftRecursiveRules.stg
No license file was found, but licenses were detected in source scan.

```
/** Template overrides to add debugging to normal Java output;
*  If ASTs are built, then you'll also get ASTDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr.Runtime.Debug;
using IOException = System.IO.IOException;
>>

@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
public static readonly string[] ruleNames =
 new string[]
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n ", separator=", ">
 };<\n>
<endif>
<if(grammar.grammarIsRoot)><! grammar imports other grammar(s) !>
int ruleLevel = 0;
public virtual int RuleLevel { get { return ruleLevel; } }
public virtual void IncRuleLevel() { ruleLevel++; }
public virtual void DecRuleLevel() { ruleLevel--; }
<if(profile)>
<ctorForProfilingRootGrammar()>
<else>
<ctorForRootGrammar()>
<endif>
<ctorForPredefinedListener()>
<else><! imported grammar !>
public int RuleLevel { get { return <grammar.delegators:{g| <g:delegateName()>}>.RuleLevel; } }
public void IncRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.IncRuleLevel(); }
public void DecRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.DecRuleLevel(); }
<ctorForDelegateGrammar()>
<endif>
<if(profile)>
public override bool AlreadyParsedRule( IIntStream input, int ruleIndex )
{
 int stopIndex = GetRuleMemoization(ruleIndex, input.Index);
 ((Profiler)dbg).ExamineRuleMemoization(input, ruleIndex, stopIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 return base.AlreadyParsedRule(input, ruleIndex);
}<\n>
public override void Memoize( IIntStream input, int ruleIndex, int ruleStartIndex )
{
 ((Profiler)dbg).Memoize(input, ruleIndex, ruleStartIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 base.Memoize(input, ruleIndex, ruleStartIndex);
}<\n>
<endif>
protected virtual bool EvalPredicate( bool result, string predicate )
{
 dbg.SemanticPredicate( result, predicate );
 return result;
}<\n>
>>

ctorForRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<! Same except we add port number and profile stuff if root grammar !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, DebugEventSocketProxy.DefaultDebuggerPort, new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, int port,
RecognizerSharedState state )
 : base( input, state )
{
 <createListenerAndHandshake()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>

ctorForProfilingRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, new Profiler(null), new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state )
 : base( input, dbg, state )
{
 Profiler p = (Profiler)dbg;
 p.setParser(this);
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state, this<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}
<\n>
>>

/** Basically we don't want to set any dbg listeners are root will have it. */
ctorForDelegateGrammar() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
 : base( input, dbg, state )
{
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, this, this.state<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
}<\n>
>>

ctorForPredefinedListener() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg
)
 <@superClassRef>: base( input, dbg, new RecognizerSharedState() )<@end>
{
<if(profile)>
 Profiler p = (Profiler)dbg;
 p.setParser(this);
<endif>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>

createListenerAndHandshake() ::= <<
<if(TREE_PARSER)>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, input.TreeAdaptor );<\n>
<else>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, null );<\n>
<endif>
DebugListener = proxy;
try
```

```
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>

@genericParser.superClassName() ::= "Debug<@super.superClassName()>"

/*
* Much of the following rules were merged into CSharp3.stg.
*/

@rule.preamble() ::= <<
if (RuleLevel == 0)
 DebugListener.Commence();
IncRuleLevel();
>>
//@rule.preamble() ::= <<
//try
//{
// dbg.EnterRule( GrammarFileName, "<ruleName>" );
// if ( RuleLevel == 0 )
// {
//  dbg.Commence();
// }
// IncRuleLevel();
// dbg.Location( <ruleDescriptor.tree.line>, <ruleDescriptor.tree.charPositionInLine> );<\n>
//>>

@rule.postamble() ::= <<
DecRuleLevel();
if (RuleLevel == 0)
 DebugListener.Terminate();
>>
//@rule.postamble() ::= <<
//dbg.Location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);<\n>
//}
//finally
//{
// dbg.ExitRule( GrammarFileName, "<ruleName>" );
// DecRuleLevel();
// if ( RuleLevel == 0 )
// {
//  dbg.Terminate();
// }
//}<\n>
//>>

//@insertSynpreds.start() ::= "dbg.BeginBacktrack( state.backtracking );"
//@insertSynpreds.stop() ::= "dbg.EndBacktrack( state.backtracking, success );"

// Common debug event triggers used by region overrides below

//enterSubRule() ::= <<
//try
//{
// dbg.EnterSubRule( <decisionNumber> );<\n>
//>>

//exitSubRule() ::= <<
//}
//finally
//{
// dbg.ExitSubRule( <decisionNumber> );
//}<\n>
//>>

//enterDecision() ::= <<
//try
//{
// dbg.EnterDecision( <decisionNumber> );<\n>
//>>

//exitDecision() ::= <<
//}
//finally
//{
// dbg.ExitDecision( <decisionNumber> );
//}<\n>
//>>

//enterAlt(n) ::= "dbg.EnterAlt( <n> );<\n>"

// Region overrides that tell various constructs to add debugging triggers

//@block.predecision() ::= "<enterSubRule()><enterDecision()>"

//@block.postdecision() ::= "<exitDecision()>"

//@block.postbranch() ::= "<exitSubRule()>"

//@ruleBlock.predecision() ::= "<enterDecision()>"
```

```
//@ruleBlock.postdecision() ::= "<exitDecision()>"

//@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

//@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

//@positiveClosureBlock.predecision() ::= "<enterDecision()>"

//@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

//@positiveClosureBlock.earlyExitException() ::=
// "dbg.RecognitionException( eee<decisionNumber> );<\n>"

//@closureBlock.preloop() ::= "<enterSubRule()>"

//@closureBlock.postloop() ::= "<exitSubRule()>"

//@closureBlock.predecision() ::= "<enterDecision()>"

//@closureBlock.postdecision() ::= "<exitDecision()>"

//@altSwitchCase.prealt() ::= "<enterAlt(n=i)>"

//@element.prematch() ::=
// "dbg.Location( <it.line>, <it.pos> );"

//@matchSet.mismatchedSetException() ::=
// "dbg.RecognitionException( mse );"

//@dfaState.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//@dfaStateSwitch.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//dfaDecision(decisionNumber,description) ::= <<
//try
//{
// isCyclicDecision = true;
// <super.dfaDecision(...)>
//}
//catch ( NoViableAltException nvae )
//{
// dbg.RecognitionException( nvae );
// throw nvae;
//}
```

```
//>>

//@cyclicDFA.errorMethod() ::= <<
//public override void Error( NoViableAltException nvae )
//{
// ((DebugParser)recognizer).dbg.RecognitionException( nvae );
//}
//>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
EvalPredicate(<pred>, "<description>")
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp3/Dbg.stg

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```
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
```

```
*/

@outputFile.imports() ::= <<
<@super.imports()>
import org.stringtemplate.v4.*;
import java.util.HashMap;
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
/* ST returnScope.ruleReturnMembers -- empty */
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturn.memvars() ::= <<
ST *st;
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturn.properties() ::= <<
@property (retain) ST *st;
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturn.methodsDecl() ::= <<
- (ST *)getTemplate;
- (NSString *)toString;
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturn.synthesize() ::= <<
@synthesize st;
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturn.methods() ::= <<
- (ST *)getTemplate { return st; }
- (NSString *)toString { return st==nil?nil:[st render]; }
>>

@genericParser.members() ::= <<
<@super.members()>
STGroup *templateLib = [STGroup newSTGroup];

- (void)setTemplateLib:(STGroup *)aTemplateLib
{
   self.templateLib = aTemplateLib;
}
```

```
- (STGroup *)getTemplateLib
{
  return templateLib;
}
>>

@genericParserHeaderFile.memVars() ::= <<
<@super.memVars()>
/* ST genericParserHeaderFile.memVars -- empty now */
STGroup *templateLib; /* ST -- really a part of STAttrMap */
>>

@genericParserHeaderFile.properties() ::= <<
<@super.properties()>
/* ST genericParser.properties */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
>>

@genericParserHeaderFile.methodsDecl() ::= <<
<@super.methodsDecl()>
/* ST genericParser.methodsDecl */
- init;
- (STGroup *) getTemplateLib;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
@end
>>

@genericParser.synthesize() ::= <<
<@super.synthesize()>
/* ST genericParserImplementation.synthesize */
@synthesize templateLib;
>>

@genericParser.methods() ::= <<
<@super.methods()>
/* ST genericParser.methods */

- (STGroup *)getTemplateLib
{
  return templateLib;
}

- (void) setTemplateLib:(STGroup *)aTemplateLib
{
  templateLib = aTemplateLib;
}
```

```
>>

@genericParser.members() ::= <<
<@super.members()>
STGroup *templateLib = [STGroup newSTGroup];

- (STGroup *) getTemplateLib
{
 return templateLib;
}

- (void) setTemplateLib:(STGroup *) templateLib
{
 this.templateLib = templateLib;
}

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, { [<label> getTemplate]; })>
>>

rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>

replaceTextInLine() ::= <<
<if(TREE_PARSER)>
   [([(TokenRewriteStream)input getTokenStream])
   replaceFromIndex:[[input getTreeAdaptor] getTokenStartIndex:retval.start]
   ToIndex:[[input getTreeAdaptor] getTokenStopIndex:retval.start]
   Text:[retval.st render]];
<else>
   [((TokenRewriteStream)input)
   replaceFromIndex:[((Token)retval.start) getTokenIndex]
   ToIndex:[input LT:-1] getTokenIndex]
   Text:[retval.st render]];
<endif>
```

```
>>

rewriteTemplateAlt(alt) ::= <<
// <alt.description>
<if(alt.pred)>
if (<alt.pred>) {
   retval.st = <alt.alt>;
}<\n>
<else>
{
   retval.st = <alt.alt>;
}<\n>
<endif>
>>

rewriteEmptyTemplate(alts) ::= <<
nil;
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <%
<if(args)><args:{a | [}><endif>
[templateLib getInstanceOf:@"<name>"]
 <if(args)><args:{a | add:@"<a.name>" value:<a.value>]}><endif>;
%>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
<if(args)><args:{a | [}><endif>
[templateLib getInstanceOf:<expr>];
<if(args)><args:{a | add:@"<a.name>" value:<a.value>]}><endif>;
%>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
<if(args)><args:{a | [}><endif>
[ST newST:templateLib template:"<template>"]
 <if(args)><args:{a |  add:@"<a.name>" <a.value>]}><endif>;
%>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
```

```
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
[(<st>) setAttribute:@"<attrName>" value:<expr>];
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
[ST newST:templateLib template:<stringExpr>];
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/ST4ObjC.stg
No license file was found, but licenses were detected in source scan.

```
dfa(decisionRanks,states,edges,rankdir,startState,useBox) ::= <<
digraph NFA {
<if(rankdir)>rankdir=<rankdir>;<endif>
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

nfa(decisionRanks,states,edges,rankdir,startState) ::= <<
digraph NFA {
rankdir=LR;
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

decision-rank(states) ::= <<
{rank=same; rankdir=TB; <states; separator="; ">}
>>

edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7, label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

action-edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7, label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

epsilon-edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontname="Times-Italic", label = "e"];
>>

state(name,useBox) ::= <<
node [fontsize=11, shape = <if(useBox)>box<else>circle, fixedsize=true, width=.4<endif>]; <name>
>>

stopstate(name,useBox) ::= <<
node [fontsize=11, shape = <if(useBox)>polygon,sides=4,peripheries=2<else>doublecircle, fixedsize=true, width=.6<endif>]; <name>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/templates/dot/dot.stg

No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
*  Copyright (c) 2012 Terence Parr
*  Copyright (c) 2012 Sam Harwell
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*
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*  1. Redistributions of source code must retain the above copyright
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*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/ToolSTGroupFile.java
No license file was found, but licenses were detected in source scan.

```
/*
[The "BSD license"]
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http://www.temporal-wave.com
http://www.linkedin.com/in/jimidle

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modification, are permitted provided that the following conditions
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1. Redistributions of source code must retain the above copyright
   notice, this list of conditions and the following disclaimer.
```

```
/** Templates for building ASTs during tree parsing.
 *
 *  Deal with many combinations.  Dimensions are:
 *  Auto build or rewrite
 *    no label, label, list label  (label/no-label handled together)
 *    child, root
 *    token, set, rule, wildcard
 *
 *  Each combination has its own template except that label/no label
 *  is combined into tokenRef, ruleRef, ...
 */
/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> _last;<\n>
<ASTLabelType> _first_0;<\n>
>>

/** Add a variable to track last element matched */
ruleInitializations() ::= <<
<super.ruleInitializations()>
_last = NULL;<\n>
_first_0 = NULL;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
```

```
<if(rewriteMode)>
retval.tree = (<ASTLabelType>)_first_0;
if ( ADAPTOR->getParent(ADAPTOR, retval.tree) != NULL && ADAPTOR->isNilNode(ADAPTOR,
ADAPTOR->getParent(ADAPTOR, retval.tree) ) )
{
  retval.tree = (<ASTLabelType>)ADAPTOR->getParent(ADAPTOR, retval.tree);
}
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
_last = (<ASTLabelType>)LT(1);
{
<ASTLabelType> _save_last_<treeLevel>;
<ASTLabelType> _first_<treeLevel>;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel>;
<endif>
_save_last_<treeLevel> = _last;
_first_<treeLevel>     = NULL;
<if(!rewriteMode)>
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel> == NULL ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel> == NULL ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<if(backtracking)>}<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( LA(1)==ANTLR3_TOKEN_DOWN ) {
  MATCHT(ANTLR3_TOKEN_DOWN, NULL);
  <children:element()>
  MATCHT(ANTLR3_TOKEN_UP, NULL);
}
<else>
MATCHT(ANTLR3_TOKEN_DOWN, NULL);
<children:element()>
```

```
MATCHT(ANTLR3_TOKEN_UP, NULL);
<endif>
<if(!rewriteMode)>
ADAPTOR->addChild(ADAPTOR, root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif>
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else>
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
if ( _first_<treeLevel> == NULL ) _first_<treeLevel> = <label>;
<if(backtracking)>}<endif>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
```

```
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING == 0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupTree(ADAPTOR, <label>);
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING == 0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif><\n>
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}
,...)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ){<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif>
root_<treeLevel> = (<ASTLabelType>)ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )
{
<endif>
<if(!rewriteMode)>
 ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>.tree);
<else>
 if ( _first_<treeLevel> == NULL ) _first_<treeLevel> = <label>.tree;
<endif>
<if(backtracking)>}<endif>
>>
```

```
/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<super.listLabelAST(elem=label,...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( ( <actions.(actionScope).synpredgate> ) ) <endif>root_<treeLevel> =
(<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>.tree, root_<treeLevel>));
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<super.listLabelAST(elem=label,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefTrackAndListLabel(...)>
>>
/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>


/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
```

```
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(stream_<token>->nextNode(stream_<token>))
<else>
stream_<token>->nextNode(stream_<token>)
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp(...)>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<if(!ruleDescriptor.isSynPred)>
 retval.stop = LT(-1);<\n>
<endif>
 retval.tree = (<ASTLabelType>)ADAPTOR->rulePostProcessing(ADAPTOR, root_0);
<if(backtracking)>
}
<endif>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
   :{if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
   :{if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

```
/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/

@rule.setErrorReturnValue() ::= <<
retval.tree = (<ASTLabelType>)(ADAPTOR->errorNode(ADAPTOR, INPUT, retval.start, LT(-1), EXCEPTION));
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
ADAPTOR->addChild(ADAPTOR, root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
```

```
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_0));
<if(backtracking)>}<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>



/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>



/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )
<endif>ADAPTOR->addChild(ADAPTOR, root_0, <createNodeFromToken(...)>);},...)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
>>
```

```
matchSetBang(s,label,elementIndex,terminalOptions,postmatchCode) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(label)>
<label>=(<labelType>)LT(1);<\n>
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_0 =
(<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <createNodeFromToken(...)>, root_0));},...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>ADAPTOR->addChild(ADAPTOR, root_0,
<label>.tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_0 = (<ASTLabelType>)(ADAPTOR-
>becomeRoot(ADAPTOR, <label>.tree, root_0));
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelAST(...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabelAST(...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabelAST(...)>
```

```
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
ADAPTOR->addChild(ADAPTOR, root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

wildcardBang(token,label,elementIndex,terminalOptions) ::= "<super.wildcard(...)>"

wildcardRuleRoot(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
root_0 = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_0));
<if(backtracking)>}<endif>
>>

createNodeFromToken(label,terminalOptions) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(<label>) <! new MethodNode(IDLabel) !>
<else>
(<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>))
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> )
{<\n>
<endif>
<if(!ruleDescriptor.isSynPred)>
 retval.stop = LT(-1);<\n>
<endif>
 retval.tree = (<ASTLabelType>)(ADAPTOR->rulePostProcessing(ADAPTOR, root_0));
 ADAPTOR->setTokenBoundaries(ADAPTOR, retval.tree, retval.start, retval.stop);
   <ruleDescriptor.allTokenRefsInAltsWithRewrites
   :{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
   <ruleDescriptor.allRuleRefsInAltsWithRewrites
   :{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
<if(backtracking)>
}<\n>
<endif>
```

>>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/ASTParser.stg
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```
/*
New style messages. This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

group antlr;

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "(<id>) <text>"

report(location, message, type) ::= "<type>(<message.id>): <location> <message.text>"
```

```
wantsSingleLineMessage() ::= "false"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/templates/messages/formats/antlr.stg
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```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/
parserMembers() ::= <<
DebugTreeAdaptor *adaptor = [DebugTreeAdaptor newTreeAdaptor:(id)dbg Adaptor:[CommonTreeAdaptor
newTreeAdaptor]];

// fix this
- (void) setTreeAdaptor:(id<TreeAdaptor>)anAdaptor
{
   adaptor = [DebugTreeAdaptor newTreeAdaptor:dbg Adaptor:anAdaptor];
<if(grammar.grammarIsRoot)>
   adaptor = [DebugTreeAdaptor newTreeAdaptor:adaptor withDBG:dbg];
<else>
   adaptor = (DebugTreeAdaptor *)adaptor; // delegator sends dbg adaptor
<endif><\n>
   <grammar.directDelegates:{g|[<g:delegateName()> setTreeAdaptor:adaptor];}>
}

- (id<TreeAdaptor>)getTreeAdaptor
{
   return adaptor;
}<\n>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy =
   [DebugEventSocketProxy newDebugEventSocketProxy:self, port, <if(TREE_PARSER)>[input
getTreeAdaptor]<else>adaptor<endif>];
[self setDebugListener:proxy];
[self set<inputStreamType>:[Debug<inputStreamType> newDebug<inputStreamType>:input with:proxy]];
try {
   [proxy handshake];
}
@catch (IOException *ioe) {
   [self reportError:ioe];
}
>>

@ctorForRootGrammar.finally() ::= <<
CommonTreeAdaptor *adap = [CommonTreeAdaptor newTreeAdaptor];
[self setTreeAdaptor:adap];
[proxy setTreeAdaptor:adap];
>>

@ctorForProfilingRootGrammar.finally() ::=<<
CommonTreeAdaptor *adap = [CommonTreeAdaptor newTreeAdaptor];
[self setTreeAdaptor:adap];
[proxy setTreeAdaptor:adap];
>>

@ctorForPredefinedListener.superClassRef() ::= @"super(input, dbg);"

@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)> <! don't create new adaptor for delegates !>
CommonTreeAdaptor *adap = [CommonTreeAdaptor newTreeAdaptor];
[self setTreeAdaptor:adap];<\n>
```

```
<endif>
>>

@treeParserHeaderFile.superClassName ::= "DebugTreeParser"

@rewriteElement.pregen() ::= "[debugListener locationLine:<e.line> column:<e.pos>];"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/ASTDbg.stg
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

```
@genericParserHeaderFile.memVars() ::= <<
/* AST parserHeaderFile.memVars */
NSInteger ruleLevel;
NSArray *ruleNames;
<@super.memVars()>  /* AST super.memVars */
<parserMemVars()>   /* AST parserMemVars */
>>

@genericParserHeaderFile.properties() ::= <<
```

```
/* AST parserHeaderFile.properties */
<@super.properties()>  /* AST super.properties */
<parserProperties()>   /* AST parserproperties */
>>

@genericParserHeaderFile.methodsDecl() ::= <<
/* AST parserHeaderFile.methodsDecl */
<@super.methodsDecl()>  /* AST super.methodsDecl */
<parserMethodsDecl()>   /* AST parsermethodsDecl */
>>

@genericParser.synthesize() ::= <<
/* AST genericParser.synthesize */
<@super.synthesize()>
<parserSynthesize()>
>>

@genericParser.methods() ::= <<
/* AST genericParser.methods */
<@super.methods()>
<parserMethods()>
>>

/* additional init code for tree support */
@genericParser.init() ::= <<
/* AST genericParser.init */
<@super.init()>
[self setTreeAdaptor:[[CommonTreeAdaptor newTreeAdaptor] retain]];
>>

@genericParser.dealloc() ::= <<
/* AST genericParser.dealloc */
[self setTreeAdaptor:nil];
<@super.dealloc()>
>>

/* Add an adaptor property that knows how to build trees */
parserMemVars() ::= <<
/* AST parserMemVars */
id\<TreeAdaptor> treeAdaptor;
>>

/* Add an adaptor property that knows how to build trees */
parserProperties() ::= <<
/* AST parserProperties */
@property (retain, getter=getTreeAdaptor, setter=setTreeAdaptor:) id\<TreeAdaptor> treeAdaptor;
>>
```

```
/** Declaration of additional tree support methods - go in interface of parserHeaderFile() */
parserMethodsDecl() ::= <<
/* AST parserMethodsDecl */
- (id\<TreeAdaptor>) getTreeAdaptor;
- (void) setTreeAdaptor:(id\<TreeAdaptor>)theTreeAdaptor;
>>

/* Add an adaptor property that knows how to build trees */
parserSynthesize() ::= <<
/* AST parserProperties */
@synthesize treeAdaptor;
>>

/** Definition of addition tree support methods - go in implementation of genericParser() */
parserMethods() ::= <<
/* AST parserMethods */
- (id\<TreeAdaptor>) getTreeAdaptor
{
 return treeAdaptor;
}

- (void) setTreeAdaptor:(id\<TreeAdaptor>)aTreeAdaptor
{
 if (aTreeAdaptor != treeAdaptor) {
  treeAdaptor = aTreeAdaptor;
 }
}
>>

/** addition memVars for returnscopes */
@returnScopeInterface.memVars() ::= <<
/* AST returnScopeInterface.memVars */
<recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** the interface of returnScope properties */
@returnScopeInterface.properties() ::= <<
/* AST returnScopeInterface.properties */
@property (retain, getter=getTree, setter=setTree:) <recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** the interface of returnScope methodsDecl */
@returnScopeInterface.methodsDecl() ::= <<
/* AST returnScopeInterface.methodsDecl */
- (<recognizer.ASTLabelType; null="CommonTree"> *)getTree;<\n>
- (void) setTree:(<recognizer.ASTLabelType; null="CommonTree"> *)aTree;<\n>
>>
```

```
/** the implementation of returnScope synthesize */
@returnScopeImplementation.synthesize() ::= <<
/* AST returnScope.synthesize */
@synthesize tree;
>>

/** the implementation of returnScope methods */
@returnScopeImplementation.methods() ::= <<
/* AST returnScope.methods */
- (<ASTLabelType> *)getTree
{
   return tree;
}

- (void) setTree:(<ASTLabelType> *)aTree
{
   if (tree != aTree) {
       if (tree != nil) [tree release];
       if (aTree != nil) [aTree retain];
       tree = aTree;
   }
}

- (void) dealloc
{
   self.tree = nil;
   [super dealloc];
}

>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
/* AST ruleDeclarations */
<super.ruleDeclarations()>
<ASTLabelType> *root_0 = nil;<\n>
>>

ruleLabelDefs() ::= <<
/* AST ruleLabelDefs */
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it | <ASTLabelType> *<it.label.text>_tree=nil;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> *<it.label.text>_tree = nil;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites:{it | RewriteRuleTokenStream *stream_<it> =
   [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
                                                 description:@"token <it>"] retain];}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites:{it | RewriteRuleSubtreeStream *stream_<it> =
   [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
                                                   description:@"rule <it>"] retain];}; separator="\n">
>>

ruleCleanUp() ::= <<
/* AST ruleCleanUp */
<super.ruleCleanUp()>
<[ruleDescriptor.allTokenRefsInAltsWithRewrites,ruleDescriptor.allRuleRefsInAltsWithRewrites]:{it |
[stream_<it> release];}; separator="\n">
<!
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(backtracking)>if ( state.backtracking == 0 ) {<\n>
<endif>
   [<prevRuleRootRef()> setTree:(<ASTLabelType> *)[treeAdaptor rulePostProcessing:root_0]];<\n>
   [treeAdaptor setTokenBoundaries:[<prevRuleRootRef()> getTree]
                          From:[<prevRuleRootRef()> getStart]
                            To:[<prevRuleRootRef()> getStop]];<\n>
<if(backtracking)>}<\n>
<endif>
<endif>
[root_0 release];
!>
>>

rewriteCodeLabelsCleanUp() ::= <<
/* AST rewriteCodeLabelsCleanUp */
<referencedTokenLabels:{it | [stream_<it> release];}; separator="\n">
<referencedTokenListLabels:{it | [stream_<it> release];}; separator="\n">
<referencedRuleLabels:{it | [stream_<it> release];}; separator="\n">
<referencedRuleListLabels:{it | [stream_<it> release];}; separator="\n">
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];<\n>
<endif>
<endif>
<endif>
>>

// Tracking Rule Elements
```

```
/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex) ::= <<
<! <super.tokenRef(...)> !>
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) <endif>
   [stream_<token> addElement:<label>];<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex) ::= <<
<! <super.tokenRef(...)> !>
<tokenRefBang(...)>
<if(backtracking)>
if ( !<actions.(actionScope).synpredgate> ) <endif>
   [stream_<token> addElement:<label>];<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
[stream_<rule.name> addElement:[<label> getTree]];
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem={[<label> getTree]},...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
```

```
<! <super.ruleRefRuleRoot(...)> !>
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
   [stream_<rule.name> addElement:[<label> getTree]];<\n>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem={[<label> getTree]},...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<prevRuleRootRef()>.tree = root_0;<\n>
<rewriteCodeLabels()>
root_0 = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];<\n>
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = (<ASTLabelType>)[treeAdaptor rulePostProcessing:root_0];
[input replaceChildren:[treeAdaptor getParent:retval.start]
                From:[treeAdaptor getChildIndex:retval.start]
                  To:[treeAdaptor getChildIndex:_last]
                With:retval.tree];
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;<\n>
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;<\n>
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{it | RewriteRule<rewriteElementType>Stream *stream_<it> =
  [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
description:@"token <it>" element:<it>] retain];};
  separator="\n"
>
<referencedTokenListLabels:{it | RewriteRule<rewriteElementType>Stream *stream_<it> =
  [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
      description:@"token <it>" elements:list_<it>] retain];};
  separator="\n"
>
<referencedWildcardLabels:{it | RewriteRuleSubtreeStream stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
      description:"wildcard <it>" element:<it>] retain];};
  separator="\n"
>
<referencedWildcardListLabels:{it | RewriteRuleSubtreeStream stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
      descriptor:"wildcard <it>" elements:list_<it>] retain];};
  separator="\n"
>
<referencedRuleLabels:{it | RewriteRuleSubtreeStream *stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
      description:@"token <it>" element:<it>!=nil?[<it> getTree]:nil] retain];};
  separator="\n"
>
<referencedRuleListLabels:{it | RewriteRuleSubtreeStream *stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
      description:@"token <it>" elements:list_<it>] retain];};
  separator="\n"
>
>>
```

```
/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | [stream_<el> hasNext]}; separator="||"> ) {
 <alt>
}
<referencedElementsDeep:{el | [stream_<el> reset];<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | [stream_<el> hasNext]}; separator="||"> ) {
   <alt>
}
<referencedElements:{el | [stream_<el> reset];<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
{
if ( !(<referencedElements:{el | [stream_<el> hasNext]}; separator=" || ">) ) {
   @throw [RewriteEarlyExitException newException];
}
while ( <referencedElements:{el | [stream_<el> hasNext]}; separator=" || "> ) {
   <alt>
}
<referencedElements:{el | [stream_<el> reset];<\n>}>
}
>>
```

```
rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
   <a.alt>
}<\n>
<else>
{
   <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = nil;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
   <ASTLabelType> *root_<treeLevel> = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];
   <root:rewriteElement()>
   <children:rewriteElement()>
   [treeAdaptor addChild:root_<treeLevel> toTree:root_<enclosingTreeLevel>];
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
// TODO: args: <args; separator=", ">
[treeAdaptor addChild:<createRewriteNodeFromElement(...)> toTree:root_<treeLevel>];<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
[treeAdaptor addChild:[stream_<label> nextNode] toTree:root_<treeLevel>];<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
[treeAdaptor addChild:[stream_<label> nextNode] toTree:root_<treeLevel>];<\n>
>>
```

```
/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<createRewriteNodeFromElement(...)>
old:root_<treeLevel>];<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
[treeAdaptor addChild:<createImaginaryNode(tokenType=token, ...)> toTree:root_<treeLevel>];<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<createImaginaryNode(tokenType=token, ...)>
old:root_<treeLevel>];<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
[treeAdaptor addChild:[stream_<rule> nextTree] toTree:root_<treeLevel>];<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:(id\<Tree>)[stream_<rule> nextNode]
old:root_<treeLevel>];<\n>
>>

rewriteNodeAction(action) ::= <<
[treeAdaptor addChild:<action> toTree:root_<treeLevel>];<\n>
```

```
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<action> old:root_<treeLevel>];<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
  [<terminalOptions.node> new<terminalOptions.node>:<tokenType> <if(args)>, <args; separator=", "><endif>]
<else>
  <if(args)>
     [[treeAdaptor createTree:<tokenType> <if(first(args))>FromToken:<first(args)><endif>
<if(first(rest(args)))>Text:<first(rest(args))><else>Text:@"<tokenType>"<endif>] retain]
  <else>
     [[treeAdaptor createTree:<tokenType> Text:@"<tokenType>"] retain]
  <endif>
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
  [<terminalOptions.node> new<terminalOptions.node>:[stream_<token> nextToken]<if(args)>, <args;
separator=", "><endif>]
<else>
   <if(args)> <! must create new node from old !>
      [[treeAdaptor createTree:<token> Text:<first(rest(args))> <args; separator=", ">] retain]
   <else>
      [stream_<token> nextNode]
   <endif>
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/AST.stg

No license file was found, but licenses were detected in source scan.

```
@outputFile.imports() ::= <<
<@super.imports()>
```

```
<if(!TREE_PARSER)>
<! tree parser would already have imported !>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
<treeAdaptorType()> treeAdaptor = default(<treeAdaptorType()>);
CreateTreeAdaptor(ref treeAdaptor);
TreeAdaptor = treeAdaptor<if(!actions.(actionScope).treeAdaptorType)> ?? new CommonTreeAdaptor()<endif>;
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
// Implement this function in your helper file to use a custom tree adaptor
partial void CreateTreeAdaptor(ref <treeAdaptorType()> adaptor);

private <treeAdaptorType()> adaptor;

public <treeAdaptorType()> TreeAdaptor
{
 get
 {
  return adaptor;
 }

 set
 {
  this.adaptor = value;
  <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
 }
}
>>

treeAdaptorType() ::= <<
<actions.(actionScope).treeAdaptorType; null="ITreeAdaptor">
>>

ruleReturnBaseType() ::= <%
Ast<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<ASTLabelType>, <labelType>>
```

```
%>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0 = default(<ASTLabelType>);<\n>
>>

ruleLabelDefs(ruleDescriptor, labelType, ASTLabelType, rewriteElementType) ::= <%
<super.ruleLabelDefs(...)>
<if(!ruleDescriptor.isSynPred)>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|<\n><ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);}>
<ruleDescriptor.tokenListLabels:{it|<\n><ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);}>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it|<\n>RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}>
<ruleDescriptor.allRuleRefsInAltsWithRewrites
 :{it|<\n>RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");}>
<endif>
%>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST && outerAlt && !rewriteMode && !ruleDescriptor.isSynPred)>
root_0 = (<ASTLabelType>)adaptor.Nil();
<endif>
>>

// T r a c k i n g  R u l e  E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>
```

```
/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule.name>.Add(<label>.Tree);
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule>.Add(<label>.Tree);
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::= <<
<\n>{
// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if (<actions.(actionScope).synpredgate>) {
<endif>
<prevRuleRootRef()>.Tree = root_0;
<rewriteCodeLabels()>
root_0 = (<ASTLabelType>)adaptor.Nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER&&rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
if (<prevRuleRootRef()>.Tree != null)
 input.ReplaceChildren(adaptor.GetParent(retval.Start), adaptor.GetChildIndex(retval.Start),
adaptor.GetChildIndex(_last), retval.Tree);
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER||!rewriteMode)>
<prevRuleRootRef()>.Tree = root_0;
<endif>
<if(backtracking)>
}
<endif>
}

>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
 :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
 separator="\n"
>
<referencedTokenListLabels
 :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
 separator="\n"
>
<referencedWildcardLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
 separator="\n"
```

```
>
<referencedWildcardListLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
 separator="\n"
>
<referencedRuleLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.Tree:null);};
 separator="\n"
>
<referencedRuleListLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
 separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if (<referencedElementsDeep:{el | stream_<el>.HasNext}; separator="||">)
{
 <alt>
}
<referencedElementsDeep:{el | stream_<el>.Reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if (!(<referencedElements:{el | stream_<el>.HasNext}; separator="||">))
{
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
 <a.alt>
}
<else>
{
 <a.alt>
}
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <%
<@pregen()>
DebugLocation(<e.line>, <e.pos>);<\n>
```

```
<e.el>
%>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);<\n>
>>

rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<rule>.NextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<rule>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteNodeAction(action) ::= <<
adaptor.AddChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
```

```
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
%>

createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.NextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.Create(<token>, <args; separator=", ">)
<else>
stream_<token>.NextNode()
<endif>
<endif>
%>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp3/AST.stg
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```
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
import stringtemplate3
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnInit() ::= <<
self.st = None
>>

@returnScope.ruleReturnMembers() ::= <<
def getTemplate(self):
    return self.st

def toString(self):
    if self.st is not None:
        return self.st.toString()
    return None
__str__ = toString

>>

@genericParser.init() ::= <<
<@super.init()>
self.templateLib = stringtemplate3.StringTemplateGroup(
    '<name>Templates', lexer='angle-bracket'
    )

>>

@genericParser.members() ::= <<
<@super.members()>
def setTemplateLib(self, templateLib):
    self.templateLib = templateLib

def getTemplateLib(self):
    return self.templateLib

>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
<ruleRef(...)>
<listLabel(label, {<label>.st})>
>>

rewriteTemplate(alts) ::= <<
# TEMPLATE REWRITE
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
  <first(alts):rewriteTemplateAltFirst()>
  <rest(alts):{it | el<rewriteTemplateAlt(it)>}>
  <if(rewriteMode)><replaceTextInLine()><endif>

<else>
<first(alts):rewriteTemplateAltFirst()>
<rest(alts):{it | el<rewriteTemplateAlt(it)>}>
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>

replaceTextInLine() ::= <<
<if(TREE_PARSER)>
self.input.getTokenStream().replace(
  self.input.getTreeAdaptor().getTokenStartIndex(retval.start),
  self.input.getTreeAdaptor().getTokenStopIndex(retval.start),
  retval.st
  )
<else>
self.input.replace(
  retval.start.getTokenIndex(),
  self.input.LT(-1).getTokenIndex(),
  retval.st
  )
<endif>
>>

rewriteTemplateAltFirst(alt) ::= <<
<if(alt.pred)>
if <alt.pred>:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<else>
# <alt.description>
retval.st = <alt.alt>
<\n>
<endif>
>>
```

```
rewriteTemplateAlt(alt) ::= <<
<if(alt.pred)>if <alt.pred>:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<else>se:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<endif>
>>

rewriteEmptyTemplate(alts) ::= <<
None
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <%
self.templateLib.getInstanceOf("<name>"<if(args)>, attributes={<args:{a | "<a.name>": <a.value>}; separator=",
">}<endif>)
%>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
self.templateLib.getInstanceOf(<expr><if(args)>, attributes={<args:{a | "<a.name>": <a.value>}; separator=",
">}<endif>)
%>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
stringtemplate3.StringTemplate("<template>", group=self.templateLib<if(args)>, attributes={<args:{a |
"<a.name>": <a.value>}; separator=", ">}<endif>)
%>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>)["<attrName>"] = <expr>
>>
```

```
/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
stringtemplate3.StringTemplate(<stringExpr>, group=self.templateLib)
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/ST.stg

No license file was found, but licenses were detected in source scan.

```
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*/
/** Template overrides to add debugging to normal Java output;
*  If ASTs are built, then you'll also get ASTDbg.stg loaded.
*/

@outputFile.debugPreprocessor() ::= "#define ANTLR_DEBUG"

@outputFile.imports() ::= <<
<@super.imports()>
```

```
using Antlr.Runtime.Debug;
using IOException = System.IO.IOException;
>>

@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
public static readonly string[] ruleNames =
 new string[]
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n ", separator=", ">
 };<\n>
<endif>
<if(grammar.grammarIsRoot)><! grammar imports other grammar(s) !>
int ruleLevel = 0;
public virtual int RuleLevel { get { return ruleLevel; } }
public virtual void IncRuleLevel() { ruleLevel++; }
public virtual void DecRuleLevel() { ruleLevel--; }
<if(profile)>
<ctorForProfilingRootGrammar()>
<else>
<ctorForRootGrammar()>
<endif>
<ctorForPredefinedListener()>
<else><! imported grammar !>
public int RuleLevel { get { return <grammar.delegators:{g| <g:delegateName()>}>.RuleLevel; } }
public void IncRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.IncRuleLevel(); }
public void DecRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.DecRuleLevel(); }
<ctorForDelegateGrammar()>
<endif>
<if(profile)>
public override bool AlreadyParsedRule( IIntStream input, int ruleIndex )
{
 int stopIndex = GetRuleMemoization(ruleIndex, input.Index);
 ((Profiler)dbg).ExamineRuleMemoization(input, ruleIndex, stopIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 return base.AlreadyParsedRule(input, ruleIndex);
}<\n>
public override void Memoize( IIntStream input, int ruleIndex, int ruleStartIndex )
{
 ((Profiler)dbg).Memoize(input, ruleIndex, ruleStartIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 base.Memoize(input, ruleIndex, ruleStartIndex);
}<\n>
<endif>
protected virtual bool EvalPredicate( bool result, string predicate )
{
 dbg.SemanticPredicate( result, predicate );
 return result;
}<\n>
>>

ctorForRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<! Same except we add port number and profile stuff if root grammar !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, DebugEventSocketProxy.DefaultDebuggerPort, new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, int port,
RecognizerSharedState state )
 : base( input, state )
{
 <createListenerAndHandshake()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>

ctorForProfilingRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, new Profiler(null), new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state )
 : base( input, dbg, state )
{
 Profiler p = (Profiler)dbg;
 p.setParser(this);
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state, this<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}
<\n>
>>

/** Basically we don't want to set any dbg listeners are root will have it. */
ctorForDelegateGrammar() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
 : base( input, dbg, state )
```

```
{
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, this, this.state<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
}<\n>
>>

ctorForPredefinedListener() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg
)
 <@superClassRef>: base( input, dbg, new RecognizerSharedState() )<@end>
{
<if(profile)>
 Profiler p = (Profiler)dbg;
 p.setParser(this);
<endif>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>

createListenerAndHandshake() ::= <<
<if(TREE_PARSER)>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, input.TreeAdaptor );<\n>
<else>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, null );<\n>
<endif>
DebugListener = proxy;
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>

@genericParser.superClassName() ::= "Debug<@super.superClassName()>"

/*
* Many of the following rules were merged into CSharp2.stg.
*/

@rule.preamble() ::= <<
```

```
if (RuleLevel == 0)
 DebugListener.Commence();
IncRuleLevel();
>>
//@rule.preamble() ::= <<
//try
//{
// dbg.EnterRule( GrammarFileName, "<ruleName>" );
// if ( RuleLevel == 0 )
// {
//  dbg.Commence();
// }
// IncRuleLevel();
// dbg.Location( <ruleDescriptor.tree.line>, <ruleDescriptor.tree.charPositionInLine> );<\n>
//>>

@rule.postamble() ::= <<
DecRuleLevel();
if (RuleLevel == 0)
 DebugListener.Terminate();
>>
//@rule.postamble() ::= <<
//dbg.Location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);<\n>
//}
//finally
//{
// dbg.ExitRule( GrammarFileName, "<ruleName>" );
// DecRuleLevel();
// if ( RuleLevel == 0 )
// {
//  dbg.Terminate();
// }
//}<\n>
//>>

//@insertSynpreds.start() ::= "dbg.BeginBacktrack( state.backtracking );"
//@insertSynpreds.stop() ::= "dbg.EndBacktrack( state.backtracking, success );"

// Common debug event triggers used by region overrides below

//enterSubRule() ::= <<
//try
//{
// dbg.EnterSubRule( <decisionNumber> );<\n>
//>>

//exitSubRule() ::= <<
//}
```

```
//finally
//{
// dbg.ExitSubRule( <decisionNumber> );
//}<\n>
//>>

//enterDecision() ::= <<
//try
//{
// dbg.EnterDecision( <decisionNumber> );<\n>
//>>

//exitDecision() ::= <<
//}
//finally
//{
// dbg.ExitDecision( <decisionNumber> );
//}<\n>
//>>

//enterAlt(n) ::= "dbg.EnterAlt( <n> );<\n>"

// Region overrides that tell various constructs to add debugging triggers

//@block.predecision() ::= "<enterSubRule()><enterDecision()>"

//@block.postdecision() ::= "<exitDecision()>"

//@block.postbranch() ::= "<exitSubRule()>"

//@ruleBlock.predecision() ::= "<enterDecision()>"

//@ruleBlock.postdecision() ::= "<exitDecision()>"

//@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

//@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

//@positiveClosureBlock.predecision() ::= "<enterDecision()>"

//@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

//@positiveClosureBlock.earlyExitException() ::=
// "dbg.RecognitionException( eee<decisionNumber> );<\n>"
```

```
//@closureBlock.preloop() ::= "<enterSubRule()>"

//@closureBlock.postloop() ::= "<exitSubRule()>"

//@closureBlock.predecision() ::= "<enterDecision()>"

//@closureBlock.postdecision() ::= "<exitDecision()>"

//@altSwitchCase.prealt() ::= "<enterAlt(n=i)>"

//@element.prematch() ::=
// "dbg.Location( <it.line>, <it.pos> );"

//@matchSet.mismatchedSetException() ::=
// "dbg.RecognitionException( mse );"

//@dfaState.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//@dfaStateSwitch.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//dfaDecision(decisionNumber,description) ::= <<
//try
//{
// isCyclicDecision = true;
// <super.dfaDecision(...)>
//}
//catch ( NoViableAltException nvae )
//{
// dbg.RecognitionException( nvae );
// throw nvae;
//}
//>>

//@cyclicDFA.errorMethod() ::= <<
//public override void Error( NoViableAltException nvae )
//{
// ((DebugParser)recognizer).dbg.RecognitionException( nvae );
//}
//>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
EvalPredicate(<pred>, "<description>")
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-

jar/org/antlr/codegen/templates/CSharp2/Dbg.stg
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```
/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/
@rule.setErrorReturnValue() ::= <<
/* ASTParser rule.setErrorReturnValue */
retval.tree = (<ASTLabelType> *)[treeAdaptor errorNode:input From:retval.start To:[input LT:-1] Exception:re];
<! System.out.println("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>
```

```
// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token, label, elementIndex, terminalOptions) ::= <<
/* ASTParser tokenRef */
<super.tokenRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = <createNodeFromToken(...)>;
[treeAdaptor addChild:<label>_tree  toTree:root_0];
<if(backtracking)>}<endif>
>>

/* ID! and output=AST (same as plain tokenRef) */
/* ASTParser tokenRefBang */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_0];
<if(backtracking)>}<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser tokenRefBangAndListLabel */
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser tokenRefAndListLabel */
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
/* ASTParser tokenRefRuleRootAndListLabel */
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST
// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <%
/* ASTParser matchSet */
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
  [treeAdaptor addChild:<createNodeFromToken(...)> toTree:root_0 ];}, ...)>
%>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
/* ASTParser matchRuleBlockSet */
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,terminalOptions, postmatchCode) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
/* ASTParser matchSetRuleRoot */
<if(label)>
<label>=(<labelType> *)[input LT:1]; /* matchSetRuleRoot */<\n>
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<createNodeFromToken(...)> old:root_0];}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRef */
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
[treeAdaptor addChild:[<label> getTree] toTree:root_0];
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"
```

```
/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefRuleRoot */
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:[<label> getTree] old:root_0];
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefAndListLabel */
<ruleRef(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefBangAndListLabel */
<ruleRefBang(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefRuleRootAndListLabel */
<ruleRefRuleRoot(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser wildcard */
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
   [treeAdaptor addChild:[[treeAdaptor create:<label>] retain] toTree:root_0];
<if(backtracking)>}<endif>
>>

wildcardBang(token,label,elementIndex,terminalOptions) ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser wildcardRuleRoot */
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
   <label>_tree = [[treeAdaptor create:<label>] retain]
   root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_0];
<if(backtracking)>}<endif>
>>

createNodeFromToken(label,terminalOptions) ::= <<
/* ASTParser createNodeFromToken */
<if(terminalOptions.node)>
[<terminalOptions.node> new<terminalOptions.node>:<label>] <! new MethodNode(IDLabel) !>
<else>
(<ASTLabelType> *)[[treeAdaptor create:<label>] retain]
<endif>
>>

// straight from java cleanup ///
ruleCleanUp() ::= <<
/* ASTParser ruleCleanUp */
<super.ruleCleanUp()>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
  retval.tree = (<ASTLabelType> *)[treeAdaptor rulePostProcessing:root_0];
  [treeAdaptor setTokenBoundaries:retval.tree From:retval.start To:retval.stopToken];
<if(backtracking)>}<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/ASTParser.stg
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```
*/
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@returnScopeInterface.memVars() ::= <<
<@super.memVars()>
/* ST returnInterface.memVars */
ST *st;
>>

@returnScopeInterface.properties() ::= <<
<@super.properties()>
/* ST returnScope.properties */
@property (retain, getter=getST, setter=setST:) ST *st;
>>

@returnScopeInterface.methodsDecl() ::= <<
<@super.methodsDecl()>
/* ST AST returnScopeInterface.methodsDecl */
- (id) getTemplate;
- (NSString *) toString;
- (NSString *) description;
>>

@returnScopeInterface() ::= <<
/* ST returnScopeInterface */
@interface <returnScopeInterface.name> : ReturnScope {
<returnScopeInterface.memVars()>
}
<returnScopeInterface.properties()>

<returnScopeInterface.methods()>
@end
>>

@returnScopeImplementation.synthesize() ::= <<
<@super.synthesize()>
/* ST returnScope.synthesize */
@synthesize st;
>>

@returnScopeImplementation.methods() ::= <<
```

```
<@super.methods()>
/* ST returnScope.methods */
- (id) getTemplate { return st; }
- (NSString *) toString { return st==nil?nil:[st toString]; }
- (NSString *) description { [self toString]; }
>>

@returnScopeImplementation() ::= <<
@implementation <returnScopeImplementation.name>
<returnScopeImplementation.synthesize()>

<returnScopeImplementation.methods()>
@end
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
<@super.ruleReturnMembers()>
/* ST returnScope.ruleReturnMembers -- empty */
>>

@genericParserHeaderFile.memVars() ::= <<
<@super.memVars()>
/* ST genericParserHeaderFile.memVars -- empty now */
STGroup *templateLib; /* ST -- really a part of STAttrMap */
>>

@genericParserHeaderFile.properties() ::= <<
<@super.properties()>
/* ST genericParser.properties */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
>>

@genericParserHeaderFile.methodsDecl() ::= <<
<@super.methodsDecl()>
/* ST genericParser.methodsDecl */
- init;
- (STGroup *) getTemplateLib;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
@end
>>

@genericParser.synthesize() ::= <<
<@super.synthesize()>
/* ST genericParserImplementation.synthesize */
@synthesize templateLib;
>>
```

```
@genericParser.methods() ::= <<
<@super.methods()>
/* ST genericParser.methods */

- (STGroup *)getTemplateLib
{
   return templateLib;
}

- (void) setTemplateLib:(STGroup *)aTemplateLib
{
   templateLib = aTemplateLib;
}

>>

@genericParser.members() ::= <<
<@super.members()>
STGroup *templateLib = [STGroup  newSTGroup:@"<name>Templates"];

- (STGroup *) getTemplateLib
{
 return templateLib;
}

- (void) setTemplateLib:(STGroup *) templateLib
{
 this.templateLib = templateLib;
}

/** allows convenient multi-value initialization:
*  "new STAttrMap().put(...).put(...)"
*/
/* REPLACE THIS STATIC CLASS
static class STAttrMap extends HashMap {
- (STAttrMap *) setObject:(id)aValue forKey:(NS*)String attrName
{
   [super setObject:value forKey:attrName];
   return self;
}
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName
{
   [super setObject:[NSNumber numberWithInteger:value] forKey:attrName];
   return self;
 }
}
*/
>>
```

```
@STAttrMap() ::= <<
/* -------- ST start STAttrMap ------------ */
<@STAttrMap.interface()>
<@STAttrMap.implementation()>
/* -------- ST end STAttrMap ------------ */
>>

@STAttrMap.interface() ::= <<
/* -------- ST start STAttrMap.interface ------------ */
@interface STAttrMap : HashMap {
/*    <@STAttrMap.memVars()> */
   STGroup *templateLib;
}

/*    <@STAttrMap.properties()> */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
/* <@STAttrMap.methodsDecl()> */
- (id) init;
- (STAttrMap *) setObject:(id)value forKey:(NSString *)attrName;
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
- (STGroup *) getTemplateLib;
@end
/* -------- ST end STAttrMap.interface ------------ */
>>

@STAttrMap.implementation() ::= <<
/* -------- ST start STAttrMap.implementation ------------ */
/** allows convenient multi-value initialization:
*  "new STAttrMap().put(...).put(...)"
*/
@implementation STAttrMap
@synthesize templateLib;

<@STAttrMap.methods()>
@end
/* -------- ST end STAttrMap.implementation ------------ */
>>

@STAttrMap.memVars() ::= <<
/* -------- ST start STAttrMap.memVars ------------ */
   STGroup *templateLib;
/* -------- ST end STAttrMap.memVars ------------ */
>>

@STAttrMap.properties() ::= <<
/* -------- ST start STAttrMap.properties ------------ */
```

```
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
/* -------- ST end STAttrMap.properties ------------ */
>>

@STAttrMap.methodsDecl() ::= <<
/* -------- ST start STAttrMap.methodsDecl ------------ */
- (id) init;
- (STAttrMap *) setObject:(id)value forKey:(NSString *)attrName;
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
- (STGroup *) getTemplateLib;
/* -------- ST end STAttrMap.methodsDecl ------------ */
>>

@STAttrMap.methods() ::= <<
/* -------- ST start STAttrMap.methods ------------ */
- (id) init
{
   self = [super initWithLen:16];
   if ( self != nil ) {
      templateLib = [STGroup newSTGroup:"<name>Templates"];
   }
   return self;
}

- (STAttrMap *) setObject:(id)aValue forKey:(NSString *)aAttrName
{
   [super setObject:aValue forKey:aAttrName];
   return self;
}

- (STAttrMap *) setObjectWithInt:(NSInteger)aValue forKey:(NSString *)aAttrName
{
   [super setObject:[NSNumber numberWithInteger:aValue] forKey:aAttrName];
   return self;
}
- (void) setTemplateLib:(STGroup *)aTemplateLib
{
   templateLib = aTemplateLib;
}

- (STGroup *)getTemplateLib
{
   return templateLib;
}
/* -------- ST end STAttrMap.methods ------------ */
>>
```

```
/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ST ruleRefAndListLable */
<ruleRef(...)>
<listLabel(elem=[label getTemplate,...]>
>>

rewriteTemplate(alts) ::= <<
/* -------- ST start rewriteTemplate ------------ */
// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
   <alts:rewriteTemplateAlt(); separator="else ">
   <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
/* -------- ST end rewriteTemplate ------------ */
>>

replaceTextInLine() ::= <<
/* -------- ST start replaceTextInLine ------------ */
<if(TREE_PARSER)>
[[(TokenRewriteStream *)input getTokenStream]
   replaceFromIndex:[[input getTreeAdaptor] getTokenStartIndex:retval.start]
            ToIndex:[[input getTreeAdaptor] getTokenStopIndex:retval.start]
               Text:retval.st];
<else>
[(TokenRewriteStream *)input)
       replaceFromIndex:[((CommonToken *)retval.start) getTokenIndex]
                ToIndex:[[input LT:-1] getTokenIndex]
                   Text:retval.st];
<endif>
/* -------- ST end replaceTextInLine ------------ */
>>

rewriteTemplateAlt() ::= <<
/* -------- ST start rewriteTemplateAlt ------------ */
/* ST <it.description> */
<if(it.pred)>
if (<it.pred>) {
   retval.st = <it.alt>;
}<\n>
<else>
{
   retval.st = <it.alt>;
}<\n>
<endif>
/* -------- ST end rewriteTemplateAlt ------------ */
>>

rewriteEmptyTemplate(alts) ::= <<
nil;
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <<
/* -------- ST start rewriteExternalTemplate ------------ */
[templateLib getInstanceOf:@"<name>"
<if(args)>[[STAttrMap newSTAttrMap] <args:{a | setObject:<a.value> forKey:@"<a.name>"]}><endif>]
/* -------- ST end rewriteExternalTemplate ------------ */
>>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <<
/* -------- ST start rewriteIndirectTemplate ------------ */
[templateLib getInstanceOf:<expr>
<if(args)> [[STAttrMap newSTAttrMap]<args:{a | setObject:<a.value> forKey:@"<a.name>"]}>]
<else>]<endif>
/* -------- ST end rewriteIndirectTemplate ------------ */
>>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <<
/* -------- ST start rewriteInlineTemplate ------------ */
STGroup *templateLib;
templateLib.templates = [STAttrMap newSTAttrMap];
<if(args)> [templateLib.templates <args:{a | setObject:<a.value> forKey:@"<a.name>"];}><endif>
[ST newST:templateLib template:@"<template>"];
/* -------- ST end rewriteInlineTemplate ------------ */
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
/* -------- ST start rewriteAction ------------ */
<action>
/* -------- ST end rewriteAction ------------ */
>>
```

```
/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
/* -------- ST start actionSetAttribute ------------ */
[[ST attributes] setObject:<expr> forKey:@"<attrName>"];
<![<st> setAttribute:<expr> name:@"<attrName>"];!>
/* -------- ST end actionSetAttribute ------------ */
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
/* -------- ST start actionStringConstructor ------------ */
[ST newSTWithTemplate:<stringExpr>]
/* -------- ST end actionStringConstructor ------------ */
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/ST.stg

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```
javaTypeInitMap ::= [
 "int":"0",
 "long":"0",
 "float":"0.0f",
 "double":"0.0",
 "boolean":"false",
 "byte":"0",
 "short":"0",
 "char":"0",
 default:"null" // anything other than an atomic type
]

// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
 "True":"true",
 "False":"false",
 "true":"true",
 "false":"false",
 default:"false"
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
           docComment, recognizer,
           name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
import org.antlr.runtime.*;
<if(TREE_PARSER)>
import org.antlr.runtime.tree.*;
<endif>
import java.util.Stack;
import java.util.List;
import java.util.ArrayList;
<if(backtracking)>
import java.util.Map;
import java.util.HashMap;
<endif>
<@end>
```

```
<docComment>
@SuppressWarnings("all")
<recognizer>

>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
     superClass="Lexer") ::= <<
public class <grammar.recognizerName> extends <@superClassName><superClass><@end> {
 <tokens:{it | public static final int <it.name>=<it.type>;}; separator="\n">
 <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
 <actions.lexer.members>

 // delegates
 <grammar.delegates:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 // delegators
 <grammar.delegators:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>
 public <superClass>[] getDelegates() {
  return new <superClass>[] {<grammar.delegates: {g|<g:delegateName()>}; separator = ", ">};
 }

 public <grammar.recognizerName>() {} <! needed by subclasses !>
 public <grammar.recognizerName>(CharStream input<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>) {
  this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>);
 }
 public <grammar.recognizerName>(CharStream input, RecognizerSharedState state<grammar.delegators:{g|,
<g.recognizerName> <g:delegateName()>}>) {
  super(input,state);
<if(memoize)>
<if(grammar.grammarIsRoot)>
  state.ruleMemo = new HashMap[<numRules>+1];<\n><! index from 1..n !>
<endif>
<endif>
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
  <grammar.delegators:
   {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
 }
 @Override public String getGrammarFileName() { return "<fileName>"; }

<if(filterMode)>
```

```
 <filteringNextToken()>
<endif>
 <rules; separator="\n\n">

 <synpreds:{p | <lexerSynpred(p)>}>

 <cyclicDFAs:{dfa | protected DFA<dfa.decisionNumber> dfa<dfa.decisionNumber> = new
DFA<dfa.decisionNumber>(this);}; separator="\n">
 <cyclicDFAs:cyclicDFA(); separator="\n\n"><! dump tables for all DFA !>

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
@Override
public Token nextToken() {
 while (true) {
  if ( input.LA(1)==CharStream.EOF ) {
   Token eof = new CommonToken(input,Token.EOF,
          Token.DEFAULT_CHANNEL,
          input.index(),input.index());
   eof.setLine(getLine());
   eof.setCharPositionInLine(getCharPositionInLine());
   return eof;
  }
  state.token = null;
 state.channel = Token.DEFAULT_CHANNEL;
  state.tokenStartCharIndex = input.index();
  state.tokenStartCharPositionInLine = input.getCharPositionInLine();
  state.tokenStartLine = input.getLine();
 state.text = null;
  try {
   int m = input.mark();
   state.backtracking=1; <! means we won't throw slow exception !>
   state.failed=false;
   mTokens();
   state.backtracking=0;
   <! mTokens backtracks with synpred at backtracking==2
    and we set the synpredgate to allow actions at level 1. !>
   if ( state.failed ) {
    input.rewind(m);
    input.consume(); <! advance one char and try again !>
   }
   else {
    emit();
    return state.token;
   }
  }
  catch (RecognitionException re) {
   // shouldn't happen in backtracking mode, but...
   reportError(re);
   recover(re);
  }
 }
}

@Override
public void memoize(IntStream input,
  int ruleIndex,
  int ruleStartIndex)
{
if ( state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

@Override
public boolean alreadyParsedRule(IntStream input, int ruleIndex) {
if ( state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>

actionGate() ::= "state.backtracking==0"

filteringActionGate() ::= "state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass,
              labelType, members, rewriteElementType,
              filterMode, ASTLabelType="Object") ::= <<
public class <grammar.recognizerName> extends <@superClassName><superClass><@end> {
<if(grammar.grammarIsRoot)>
 public static final String[] tokenNames = new String[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ", wrap="\n\t\t">
 };
<endif>
 <tokens:{it |public static final int <it.name>=<it.type>;}; separator="\n">

 // delegates
 <grammar.delegates: {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 public <superClass>[] getDelegates() {
  return new <superClass>[] {<grammar.delegates: {g|<g:delegateName()>}; separator = ", ">};
 }

 // delegators
 <grammar.delegators:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

 <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<@members>
 <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
 public <grammar.recognizerName>(<inputStreamType> input<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>) {
  this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>);
 }
 public <grammar.recognizerName>(<inputStreamType> input, RecognizerSharedState
state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
  super(input, state);
  <parserCtorBody()>
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
  <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
 }
<@end>

 @Override public String[] getTokenNames() { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; }
 @Override public String getGrammarFileName() { return "<fileName>"; }

 <members>

 <rules; separator="\n\n">

<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
 // Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 public <returnType(ruleDescriptor)> <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>)
throws <ruleDescriptor.throwsSpec; separator=", "> { <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)><ru
leDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>); \}}; separator="\n">

 <synpreds:{p | <synpred(p)>}>
 <cyclicDFAs:{dfa | protected DFA<dfa.decisionNumber> dfa<dfa.decisionNumber> = new
DFA<dfa.decisionNumber>(this);}; separator="\n">
 <cyclicDFAs:cyclicDFA(); separator="\n\n"><! dump tables for all DFA !>

 <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
       words64=it.bits)>}; separator="\n">
}
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new HashMap[<length(grammar.allImportedRules)>+1];<\n><! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
 {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
      ASTLabelType="Object", superClass="Parser", labelType="Token",
      members={<actions.parser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TokenStream", superClass,
            labelType, members, "Token",
            false, ASTLabelType)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
         numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>}
         ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TreeNodeStream", superClass,
            labelType, members, "Node",
            filterMode, ASTLabelType)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
public final void <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>) throws
<ruleDescriptor.throwsSpec:{x|<x>}; separator=", "> {
 <ruleLabelDefs()>
<if(trace)>
 traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
 try {
  <block>
 }
 finally {
  traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
 }
<else>
 <block>
<endif>
}
// $ANTLR end <ruleName>
>>

synpred(name) ::= <<
public final boolean <name>() {
 state.backtracking++;
 <@start()>
 int start = input.mark();
 try {
  <name>_fragment(); // can never throw exception
 } catch (RecognitionException re) {
  System.err.println("impossible: "+re);
 }
 boolean success = !state.failed;
 input.rewind(start);
 <@stop()>
 state.backtracking--;
 state.failed=false;
 return success;
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
```

```
if ( state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) {
<returnStatement(({<ruleReturnValue()>}))> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) <returnStatement(({<ruleReturnValue()>}))><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true;
<returnStatement(({<ruleReturnValue()>}))>}<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
// <fileName>:<description>
<if(isPredefinedRewriteRule.(ruleName) && filterMode && buildAST)>
@Override
<endif>
public final <returnType(ruleDescriptor)> <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>) throws
<ruleDescriptor.throwsSpec:{x|<x>}; separator=", "> {
 <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 <ruleLabelDefs()>
 <ruleDescriptor.actions.init>
 <@preamble()>
 try {
  <ruleMemoization(name=ruleName)>
  <block>
  <ruleCleanUp()>
  <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch (RecognitionException re) {
  reportError(re);
  recover(input,re);
  <@setErrorReturnValue()>
 }
<endif>
<endif>
<endif>
 finally {
  // do for sure before leaving
  <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
 }
 <@postamble()>
 <returnStatement(({<ruleReturnValue()>}), false)>
}
// $ANTLR end "<ruleName>"
>>

returnStatement(returnValue, force=true) ::= <%
<if(!isEmptyString.(returnValue))>
 return <returnValue>;
<elseif(force)>
 return;
<endif>
%>

catch(decl,action) ::= <<
catch (<e.decl>) {
 <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new <returnType(ruleDescriptor)>();
retval.start = input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.index();
<endif>
```

```
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.push(new <it>_scope());}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.push(new <it.name>_scope());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.pop();}; separator="\n">
>>


ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it |<labelType> <it.label.text>=null;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it |List\<Object> list_<it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|RuleReturnScope <ll.label.text> = null;}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
 :{it |<labelType> <it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
 :{it |List\<Object> list_<it.label.text>=null;}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
```

```
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( state.backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
public final void m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>) throws RecognitionException
{
 <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 try {
<if(nakedBlock)>
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
<else>
  int _type = <ruleName>;
  int _channel = DEFAULT_TOKEN_CHANNEL;
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
  <ruleCleanUp()>
  state.type = _type;
  state.channel = _channel;
  <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally {
  // do for sure before leaving
  <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeCleanUp()>
  <memoize()>
 }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
@Override
public void mTokens() throws RecognitionException {
 <block>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
}
>>
```

```
ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
loop<decisionNumber>:
while (true) {
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
 default :
  if ( cnt<decisionNumber> >= 1 ) break loop<decisionNumber>;
  <ruleBacktrackFailure()>
  EarlyExitException eee = new EarlyExitException(<decisionNumber>, input);
  <@earlyExitException()>
  throw eee;
 }
 cnt<decisionNumber>++;
}
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
```

```
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
loop<decisionNumber>:
while (true) {
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
 default :
  break loop<decisionNumber>;
 }
}
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum> :
 <@prealt()>
 <alt>
 break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label>=(<labelType>)<endif>match(input,<token>,FOLLOW_<token>_in_<ruleName><elementIndex
>); <checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new ArrayList\<Object>();
list_<label>.add(<elem>);
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);
<endif>
match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>
```

```
/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=<castToLabelType("input.LT(1)")>;
<endif>
<endif>
if ( <s> ) {
 input.consume();
 <postmatchCode>
<if(!LEXER)>
 state.errorRecovery=false;
<endif>
 <if(backtracking)>state.failed=false;<endif>
}
else {
 <ruleBacktrackFailure()>
 MismatchedSetException mse = new MismatchedSetException(null,input);
 <@mismatchedSetException()>
<if(LEXER)>
 recover(mse);
 throw mse;
<else>
 throw mse;
 <! use following code to make it recover inline; remove throw mse;
 recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
 !>
<endif>
}
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
int <label>Start = getCharIndex();
match(<string>); <checkRuleBacktrackFailure()>
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
```

```
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL, <label>Start,
getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
match(<string>); <checkRuleBacktrackFailure()>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label>=<castToLabelType("input.LT(1)")>;
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label, label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);
<endif>
matchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);
state._fsp--;
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
```

```
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
match(EOF); <checkRuleBacktrackFailure()>
<labelType> <label> = new <labelType>(input, EOF, Token.DEFAULT_CHANNEL, <label>Start<elementIndex>,
getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
match(EOF); <checkRuleBacktrackFailure()>
<endif>
```

```
>>

// used for left-recursive rules
recRuleDefArg()                       ::= "int <recRuleArg()>"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
 match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
 <children:element()>
 match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(pred,description)>) ) {
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
<edges; separator="\nelse ">
<if((!isTrue.(last(edges).labelExpr)) && (!last(edges).predicates))>
else {
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 <(nvaExceptionWrapperMap.(k))({NoViableAltException nvae =
 new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);
<@noViableAltException()>
throw nvae;})>
<endif>
}
<endif>
>>

nvaExceptionWrapperMap ::= [
 "1":"wrapNvaExceptionForK1",
 "2":"wrapNvaExceptionForK2",
 default:"wrapNvaExceptionForKN"
]

wrapNvaExceptionForK1(exceptionCode) ::= <<
<exceptionCode>
>>

wrapNvaExceptionForK2(exceptionCode) ::= <<
int nvaeMark = input.mark();
try {
 input.consume();
 <exceptionCode>
} finally {
 input.rewind(nvaeMark);
}
>>

wrapNvaExceptionForKN(exceptionCode) ::= <<
int nvaeMark = input.mark();
try {
 for (int nvaeConsume = 0; nvaeConsume \< <k> - 1; nvaeConsume++) {
  input.consume();
 }
 <exceptionCode>
} finally {
 input.rewind(nvaeMark);
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
```

```
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
<edges; separator="\nelse ">
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
 alt<decisionNumber>=<eotPredictsAlt>;
}
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
 <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
<else>
```

```
 <ruleBacktrackFailure()>
 <(nvaExceptionWrapperMap.(k))({NoViableAltException nvae =
 new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);
<@noViableAltException()>
throw nvae;})>
<endif>
}
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
 <edges; separator="\n">
}
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
 alt<decisionNumber>=<eotPredictsAlt>;
 break;
<endif>
}
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
 {
 <targetState>
 }
 break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = dfa<decisionNumber>.predict(input);
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
static final String DFA<dfa.decisionNumber>_eotS =
 "<dfa.javaCompressedEOT; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_eofS =
 "<dfa.javaCompressedEOF; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_minS =
 "<dfa.javaCompressedMin; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_maxS =
 "<dfa.javaCompressedMax; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_acceptS =
 "<dfa.javaCompressedAccept; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_specialS =
 "<dfa.javaCompressedSpecial; wrap="\"+\n\t\"">}>";
static final String[] DFA<dfa.decisionNumber>_transitionS = {
  <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
};

static final short[] DFA<dfa.decisionNumber>_eot =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eotS);
static final short[] DFA<dfa.decisionNumber>_eof =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eofS);
static final char[] DFA<dfa.decisionNumber>_min =
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
static final char[] DFA<dfa.decisionNumber>_max =
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
static final short[] DFA<dfa.decisionNumber>_accept =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
static final short[] DFA<dfa.decisionNumber>_special =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_specialS);
static final short[][] DFA<dfa.decisionNumber>_transition;

static {
 int numStates = DFA<dfa.decisionNumber>_transitionS.length;
 DFA<dfa.decisionNumber>_transition = new short[numStates][];
 for (int i=0; i\<numStates; i++) {
  DFA<dfa.decisionNumber>_transition[i] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
 }
}

protected class DFA<dfa.decisionNumber> extends DFA {

 public DFA<dfa.decisionNumber>(BaseRecognizer recognizer) {
  this.recognizer = recognizer;
  this.decisionNumber = <dfa.decisionNumber>;
  this.eot = DFA<dfa.decisionNumber>_eot;
  this.eof = DFA<dfa.decisionNumber>_eof;
  this.min = DFA<dfa.decisionNumber>_min;
  this.max = DFA<dfa.decisionNumber>_max;
  this.accept = DFA<dfa.decisionNumber>_accept;
  this.special = DFA<dfa.decisionNumber>_special;
  this.transition = DFA<dfa.decisionNumber>_transition;
 }
 @Override
 public String getDescription() {
  return "<dfa.description>";
 }
 <@errorMethod()>
<if(dfa.specialStateSTs)>
 @Override
 public int specialStateTransition(int s, IntStream _input) throws NoViableAltException {
  <if(LEXER)>
  IntStream input = _input;
  <endif>
  <if(PARSER)>
  TokenStream input = (TokenStream)_input;
  <endif>
  <if(TREE_PARSER)>
  TreeNodeStream input = (TreeNodeStream)_input;
  <endif>
  int _s = s;
  switch ( s ) {
  <dfa.specialStateSTs:{state |
  case <i0> : <! compressed special state numbers 0..n-1 !>
   <state>}; separator="\n">
  }
<if(backtracking)>
  if (state.backtracking>0) {state.failed=true; return -1;}
<endif>
  NoViableAltException nvae =
   new NoViableAltException(getDescription(), <dfa.decisionNumber>, _s, input);
  error(nvae);
  throw nvae;
 }
<endif>
}
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(1);
```

```
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
int index<decisionNumber>_<stateNumber> = input.index();
input.rewind();
<endif>
s = -1;
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);
<endif>
if ( s>=0 ) return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred,{})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
```

```
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(input.LA(<k>) >= <lower>
&& input.LA(<k>) \<= <upper>)"

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
 <scope.attributes:{it |<it.decl>;}; separator="\n">
}
protected Stack\<<scope.name>_scope> <scope.name>_stack = new Stack\<<scope.name>_scope>();
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
protected static class <scope.name>_scope {
 <scope.attributes:{it |<it.decl>;}; separator="\n">
}
protected Stack\<<scope.name>_scope> <scope.name>_stack = new Stack\<<scope.name>_scope>();
<endif>
<endif>
>>

returnStructName(r) ::= "<r.name>_return"

returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
%>

/** Generate the Java type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <%
```

```
<if(referencedRule.hasMultipleReturnValues)>
<returnScopeBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
%>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;
%>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public static class <ruleDescriptor:returnStructName()> extends <returnScopeBaseType()> {
 <if(scope)><scope.attributes:{it |public <it.decl>;}; separator="\n"><endif>
 <@ruleReturnMembers()>
};
<endif>
>>

returnScopeBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope
%>

parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
```

```
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>;"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1).<attr.name>
<else>
<if(index)>
<scope>_stack.elementAt(<index>).<attr.name>
<else>
<scope>_stack.peek().<attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1).<attr.name> =<expr>;
<else>
<if(index)>
<scope>_stack.elementAt(<index>).<attr.name> =<expr>;
<else>
<scope>_stack.peek().<attr.name> =<expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>
```

```
returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>;
<else>
<attr.name> =<expr>;
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.getText():null)"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.getType():0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.getLine():0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.getCharPositionInLine():0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.getChannel():0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.getTokenIndex():0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?Integer.valueOf(<scope>.getText()):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?(<castToLabelType({<scope>.start})>):null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?(<castToLabelType({<scope>.stop})>):null)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>!=null?((<ASTLabelType>)<scope>.getTree()):null)"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
 input.getTreeAdaptor().getTokenStopIndex(<scope>.start))):null)
<else>
(<scope>!=null?input.toString(<scope>.start,<scope>.stop):null)
<endif>
%>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?((StringTemplate)<scope>.getTemplate()):null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
 "(<scope>!=null?<scope>.getType():0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
 "(<scope>!=null?<scope>.getLine():0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
 "(<scope>!=null?<scope>.getCharPositionInLine():-1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
 "(<scope>!=null?<scope>.getChannel():0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::=
 "(<scope>!=null?<scope>.getTokenIndex():0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::=
 "(<scope>!=null?<scope>.getText():null)"
lexerRuleLabelPropertyRef_int(scope,attr) ::=
 "(<scope>!=null?Integer.valueOf(<scope>.getText()):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(<castToLabelType(\"retval.start\")>)"
rulePropertyRef_stop(scope,attr) ::= "(<castToLabelType(\"retval.stop\")>)"
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "Integer.valueOf(<scope>.getText())"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
```

```
<else>
<action>
<endif>
%>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static final BitSet <name> = new BitSet(new long[]{<words64:{it |<it>L};separator=",">});
>>

codeFileExtension() ::= ".java"

true_value() ::= "true"
false_value() ::= "false"

isEmptyString ::= [
 "" : true,
 default : false
]

isTrue ::= [
 "true" : true,
 default : false
]

isDefaultLabelType ::= [
 "Token" : true,
 default : false
]

isPredefinedRewriteRule ::= [
 "topdown" : true,
 "bottomup" : true,
 default : false
]

castToLabelType(value) ::= <%
<if(!isDefaultLabelType.(labelType))>
(<labelType>)
<endif>
<value>
%>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/Java.stg
No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
* Copyright (c) 2011 Terence Parr
* All rights reserved.
*
* Conversion to C#:
* Copyright (c) 2011 Sam Harwell, Pixel Mine, Inc.
* All rights reserved.
*
* Redistribution and use in source and binary forms, with or without
* modification, are permitted provided that the following conditions
* are met:
* 1. Redistributions of source code must retain the above copyright
*    notice, this list of conditions and the following disclaimer.
* 2. Redistributions in binary form must reproduce the above copyright
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*    documentation and/or other materials provided with the distribution.
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*    derived from this software without specific prior written permission.
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* OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
* IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,
* INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
* NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
* DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
* THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
* (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

csharpVisibilityMap ::= [
 "private":"private",
 "protected":"protected",
 "public":"public",
 "fragment":"private",
 default:"private"
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,PARSER,TREE_PARSER, actionScope, actions,
   docComment, recognizer,
  name, tokens, tokenNames, rules, cyclicDFAs,
  bitsets, buildTemplate, buildAST, rewriteMode, profile,
  backtracking, synpreds, memoize, numRules,
  fileName, ANTLRVersion, generatedTimestamp, trace,
  scopes, superClass, literals) ::=
<<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------

// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

// The variable 'variable' is assigned but its value is never used.
#pragma warning disable 219
// Unreachable code detected.
#pragma warning disable 162
// Missing XML comment for publicly visible type or member 'Type_or_Member'
#pragma warning disable 1591
// CLS compliance checking will not be performed on 'type' because it is not visible from outside this assembly.
#pragma warning disable 3019

<actions.(actionScope).header>

<@imports>
using System.Collections.Generic;
using Antlr.Runtime;
using Antlr.Runtime.Misc;
<if(TREE_PARSER)>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
<@end>
<if(actions.(actionScope).namespace)>
namespace <actions.(actionScope).namespace>
{
<endif>
<docComment>
<recognizer>
<if(actions.(actionScope).namespace)>

} // namespace <actions.(actionScope).namespace>
<endif>
```

```
>>

lexerInputStreamType() ::= <<
<actions.(actionScope).inputStreamType; null="ICharStream">
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Lexer
<endif>},
   rewriteElementType={}, ASTLabelType={}) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">
 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.lexer.members>

 // delegates
 <grammar.delegates:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 // delegators
 <grammar.delegators:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>()<! needed by subclasses !>
 {
  OnCreated();
 }

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
  : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
 {
 }

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
  : base(input, state)
 {
<if(memoize)>
<if(grammar.grammarIsRoot)>
  state.ruleMemo = new System.Collections.Generic.Dictionary\<int, int>[<numRules>+1];<\n><! index from 1..n !>
<endif>
<endif>
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, this.state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this);}; separator="\n">
  <grammar.delegators:
   {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>

  OnCreated();
 }
 public override string GrammarFileName { get { return "<fileName>"; } }

<if(grammar.hasDelegates)>
 public override <lexerInputStreamType()> CharStream
 {
  get
  {
   return base.CharStream;
  }
  set
  {
   base.CharStream = value;
   <grammar.directDelegates:
    {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
   <grammar.delegators:
    {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
   <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
  }
 }

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }
<endif>

<endif>
<if(filterMode)>
 <filteringNextToken()>
<endif>



 partial void OnCreated();
 partial void EnterRule(string ruleName, int ruleIndex);
 partial void LeaveRule(string ruleName, int ruleIndex);

 <rules; separator="\n">
 <insertLexerSynpreds(synpreds)>

 #region DFA
 <cyclicDFAs:{dfa | DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">

 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>(this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif>);}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
 #endregion

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public override IToken NextToken()
{
 while (true)
 {
  if (input.LA(1) == CharStreamConstants.EndOfFile)
  {
   IToken eof = new CommonToken((ICharStream)input, CharStreamConstants.EndOfFile, TokenChannels.Default,
input.Index, input.Index);
   eof.Line = Line;
   eof.CharPositionInLine = CharPositionInLine;
   return eof;
  }
  state.token = null;
  state.channel = TokenChannels.Default;
  state.tokenStartCharIndex = input.Index;
  state.tokenStartCharPositionInLine = input.CharPositionInLine;
  state.tokenStartLine = input.Line;
  state.text = null;
  try
  {
   int m = input.Mark();
   state.backtracking=1;<! means we won't throw slow exception !>
   state.failed=false;
   mTokens();
   state.backtracking=0;
   <! mTokens backtracks with synpred at backtracking==2
      and we set the synpredgate to allow actions at level 1. !>
   if (state.failed)
   {
    input.Rewind(m);
    input.Consume();<! advance one char and try again !>
   }
   else
   {
    Emit();
    return state.token;
   }
  }
  catch (RecognitionException re)
  {
   // shouldn't happen in backtracking mode, but...
   ReportError(re);
   Recover(re);
  }
 }
}

public override void Memoize(IIntStream input, int ruleIndex, int ruleStartIndex)
{
 if (state.backtracking > 1)
  base.Memoize(input, ruleIndex, ruleStartIndex);
}

public override bool AlreadyParsedRule(IIntStream input, int ruleIndex)
{
 if (state.backtracking > 1)
  return base.AlreadyParsedRule(input, ruleIndex);

 return false;
}
>>

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass,
              labelType, members, rewriteElementType,
            filterMode, ASTLabelType="object") ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
<if(grammar.grammarIsRoot)>
 internal static readonly string[] tokenNames = new string[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
 };
<endif>
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">

<if(grammar.delegates)>
 // delegates
 <grammar.delegates:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<if(grammar.delegators)>
 // delegators
 <grammar.delegators:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>
<endif>

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }

<if(TREE_PARSER)>
 public override void SetTreeNodeStream(ITreeNodeStream input)
 {
  base.SetTreeNodeStream(input);
  <grammar.delegates:{g|<g:delegateName()>.SetTreeNodeStream(input);}; separator="\n">
 }
<endif>
<endif>

 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <@members()>

 public override string[] TokenNames { get { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; } }
 public override string GrammarFileName { get { return "<fileName>"; } }
 <members>

 partial void OnCreated();
 partial void EnterRule(string ruleName, int ruleIndex);
 partial void LeaveRule(string ruleName, int ruleIndex);

 #region Rules
 <rules; separator="\n">
 #endregion Rules

<if(grammar.delegatedRules)>
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
 #region Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 <ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)>
<ruleDescriptor.name; format="id">(<ruleDescriptor.parameterScope:parameterScope()>)<!throws
RecognitionException !>{ <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name;
format="id">(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.name;
format="id">}; separator=", "><endif>); \}}; separator="\n">
 #endregion Delegated rules
<endif>

 <insertSynpreds(synpreds)>

<if(cyclicDFAs)>
 #region DFA
 <cyclicDFAs:{dfa | private DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">

 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>( this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif> );}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
 #endregion DFA
<endif>

<if(bitsets)>
 #region Follow sets
 private static class Follow
 {
  <bitsets:{it|<bitset(name={_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}; separator="\n">
 }
 #endregion Follow sets
```

```
<endif>
}
>>

@genericParser.members() ::= <<
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
{
}
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : base(input, state)
{
<if(grammar.directDelegates)>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
<endif>
<if(grammar.indirectDelegates)>
 <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
<endif>
<if(grammar.delegators)>
 <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
<endif>
 <parserCtorBody()>
 OnCreated();
}
>>

// imported grammars are 'public' (can't be internal because their return scope classes must be accessible)
parserModifier(grammar, actions) ::= <<
<if(grammar.grammarIsRoot)><actions.(actionScope).modifier; null="public"><else>public<endif>
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new System.Collections.Generic.Dictionary\<int,
int>[<length(grammar.allImportedRules)>+1];<\n><! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>
```

```
parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
      ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Parser
<endif>}, labelType="IToken",
      members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="IToken", filterMode=false, ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
         numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Tree.<
if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif><endif>},
         members={<actions.treeparser.members>}) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<

partial void EnterRule_<ruleName>_fragment();
partial void LeaveRule_<ruleName>_fragment();

// $ANTLR start <ruleName>
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>)
{
 <ruleLabelDefs(...)>
 EnterRule_<ruleName>_fragment();
 EnterRule("<ruleName>_fragment", <ruleDescriptor.index>);
 TraceIn("<ruleName>_fragment", <ruleDescriptor.index>);
 try
 {
  <block>
 }
 finally
 {
  TraceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule_<ruleName>_fragment();
 }
}
// $ANTLR end <ruleName>
>>

insertLexerSynpreds(synpreds) ::= <<
<insertSynpreds(synpreds)>
>>

insertSynpreds(synpreds) ::= <<
<if(synpreds)>
#region Synpreds
private bool EvaluatePredicate(System.Action fragment)
{
 bool success = false;
 state.backtracking++;
 <@start()>
 try { DebugBeginBacktrack(state.backtracking);
 int start = input.Mark();
 try
 {
  fragment();
 }
 catch ( RecognitionException re )
 {
  System.Console.Error.WriteLine("impossible: "+re);
 }
 success = !state.failed;
 input.Rewind(start);
 } finally { DebugEndBacktrack(state.backtracking, success); }
 <@stop()>
 state.backtracking--;
 state.failed=false;
 return success;
}
#endregion Synpreds
<endif>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if (state.backtracking > 0 && AlreadyParsedRule(input, <ruleDescriptor.index>)) { <returnFromRule()> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
```

```
<if(backtracking)>if (state.failed) <returnFromRule()><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; <returnFromRule()>}<endif>
>>

ruleWrapperMap ::= [
 "bottomup":{<ruleWrapperBottomup()>},
 "topdown":{<ruleWrapperTopdown()>},
 default:""
]

ruleWrapperBottomup() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Bottomup() { <if(buildAST)>return
<endif>bottomup(); }
<endif>
>>

ruleWrapperTopdown() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Topdown() { <if(buildAST)>return
<endif>topdown(); }
<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(ruleDescriptor.returnScope)>
partial void EnterRule_<ruleName>();
partial void LeaveRule_<ruleName>();
<ruleWrapperMap.(ruleName)>
// $ANTLR start "<ruleName>"
// <fileName>:<description>
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)> <ruleName;
format="id">(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 <ruleLabelDefs(...)>
 <ruleDescriptor.actions.init>
 try { DebugEnterRule(GrammarFileName, "<ruleName>");
 DebugLocation(<ruleDescriptor.tree.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 <@preamble()>
 try
 {
  <ruleMemoization(name=ruleName)>
  <block>
  <ruleCleanUp()>
  <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch (RecognitionException re)
 {
  ReportError(re);
  Recover(input,re);
  <@setErrorReturnValue()>
 }
<endif>
<endif>
<endif>
 finally
 {
  TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
 }
 DebugLocation(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 } finally { DebugExitRule(GrammarFileName, "<ruleName>"); }
 <@postamble()>
 <returnFromRule()><\n>
}
// $ANTLR end "<ruleName>"
>>

// imported grammars need to have internal rules
ruleModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
```

```
null="private"><else>internal<endif>
>>

// imported grammars need to have public return scopes
returnScopeModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>public<endif>
>>

catch(decl,action) ::= <<
catch (<e.decl>)
{
 <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new
<returnType(ruleDescriptor)>(<if(ruleDescriptor.returnScope.attributes)>this<endif>);
retval.Start = (<labelType>)input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name; format="id"> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.Index;
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_stack.Push(new <it>_scope(this));<it>_scopeInit(<it>_stack.Peek());};
separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_stack.Push(new
<it.name>_scope(this));<it.name>_scopeInit(<it.name>_stack.Peek());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_scopeAfter(<it>_stack.Peek());<it>_stack.Pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_scopeAfter(<it.name>_stack.Peek());<it.name>_stack.Pop();};
separator="\n">
>>

ruleLabelDefs(ruleDescriptor, labelType, ASTLabelType, rewriteElementType) ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wil
dcardTreeListLabels]
 :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
```

```
>
<ruleDescriptor.tokenListLabels
 :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<[ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|List\<<ASTLabelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:ruleLabelDef(); separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
 :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<[ruleDescriptor.charListLabels,
 ruleDescriptor.charLabels]
 :{it|int <it.label.text> = 0;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
 :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.charListLabels:{it|List\<int> list_<it.label.text> = null;}; separator="\n"
>
>>

returnFromRule() ::= <%
return
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<! This comment is a hack to make sure the following
  single space appears in the output. !> <ruleDescriptor.singleValueReturnName>
<else>
<!!> retval
<endif>
<endif>
<endif>
;
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.Stop = (<labelType>)input.LT(-1);
```

```
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) { Memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<

partial void EnterRule_<ruleName>();
partial void LeaveRule_<ruleName>();

// $ANTLR start "<ruleName>"
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 try
 {
<if(nakedBlock)>
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
<else>
  int _type = <ruleName>;
  int _channel = DefaultTokenChannel;
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
  <ruleCleanUp()>
  state.type = _type;
  state.channel = _channel;
  <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally
 {
  TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
  <ruleScopeCleanUp()>
  <memoize()>
 }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<

public override void mTokens()
{
 <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterSubRule(<decisionNumber>);
try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
} finally { DebugExitSubRule(<decisionNumber>); }
<@postbranch()>
>>

/** A rule block with multiple alternatives */
```

```
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  if (cnt<decisionNumber> >= 1)
   goto loop<decisionNumber>;

  <ruleBacktrackFailure()>
  EarlyExitException eee<decisionNumber> = new EarlyExitException( <decisionNumber>, input );
  DebugRecognitionException(eee<decisionNumber>);
  <@earlyExitException()>
  throw eee<decisionNumber>;
 }
 cnt<decisionNumber>++;
}
loop<decisionNumber>:
 ;

} finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch ( alt<decisionNumber> )
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  goto loop<decisionNumber>;
 }
}
```

```
loop<decisionNumber>:
 ;

} finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
 <@prealt()>
 DebugEnterAlt(<altNum>);
 <alt>
 break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
```

```
element(it) ::= <%
<@prematch()>
DebugLocation(<it.line>, <it.pos>);<\n>
<it.el><\n>
%>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label>=(<labelType>)<endif>Match(input,<token>,Follow._<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

listLabel(label,elem) ::= <<
#error The listLabel template should not be used with this target.<\n>
>>

listLabelElem(label,elem,elemType) ::= <<
if (list_<label>==null) list_<label>=new List\<<elemType; null={<labelType>}>\>();
list_<label>.Add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
Match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<matchSetLabel()>
<endif>
```

```
if (<s>)
{
 input.Consume();
 <postmatchCode>
 <if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
}
else
{
 <ruleBacktrackFailure()>
 MismatchedSetException mse = new MismatchedSetException(null,input);
 DebugRecognitionException(mse);
 <@mismatchedSetException()>
<if(LEXER)>
 Recover(mse);
 throw mse;
<else>
 throw mse;
 <! use following code to make it recover inline; remove throw mse;
 recoverFromMismatchedSet(input,mse,Follow._set_in_<ruleName><elementIndex>);
 !>
<endif>
}<\n>
>>

matchSetUnchecked(s,label,elementIndex,postmatchCode=false) ::= <%
<if(label)>
<matchSetLabel()><\n>
<endif>
input.Consume();<\n>
<if(postmatchCode)>
<postmatchCode><\n>
<endif>
<if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
%>

matchSetLabel() ::= <%
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=(<labelType>)input.LT(1);
<endif>
%>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
```

```
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <%
<if(label)>
int <label>Start = CharIndex;<\n>
Match(<string>); <checkRuleBacktrackFailure()><\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start, CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
%>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
MatchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
```

```
ruleRef(rule,label,elementIndex,args,scope) ::= <<
PushFollow(Follow._<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name; format="id">(<args;
separator=", ">);
PopFollow();
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem=label,elemType={<ASTLabelType>},...)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()><\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
%>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
Match(EOF); <checkRuleBacktrackFailure()><\n>
<labelType> <label> = new <labelType>(input, EOF, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
%>

// used for left-recursive rules
recRuleDefArg()                       ::= "int <recRuleArg()>"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0=$<ruleName>_primary.tree;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down)
{
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if (!(<evalPredicate(...)>))
{
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)
```

```
dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
else
{
<if(eotPredictsAlt)>
 alt<decisionNumber> = <eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
 DebugRecognitionException(nvae);
 <@noViableAltException()>
 throw nvae;
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt>;<! if no edges, don't gen ELSE !>
<else>
else
{
 alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
```

```
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
 <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<else>
 {
  <ruleBacktrackFailure()>
  NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, 
input, <k>);
  DebugRecognitionException(nvae);
  <@noViableAltException()>
  throw nvae;
 }
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
}<\n>
>>
```

```
dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it|case <it>:}; separator="\n">
 {
 <targetState>
 }
 break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
try
{
 alt<decisionNumber> = dfa<decisionNumber>.Predict(input);
}
catch (NoViableAltException nvae)
{
 DebugRecognitionException(nvae);
 throw;
}
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
```

```
private class DFA<dfa.decisionNumber> : DFA
{
 private const string DFA<dfa.decisionNumber>_eotS =
  "<dfa.javaCompressedEOT; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_eofS =
  "<dfa.javaCompressedEOF; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_minS =
  "<dfa.javaCompressedMin; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n\t\t\"">}>";
 private static readonly string[] DFA<dfa.decisionNumber>_transitionS =
  {
   <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
  };

 private static readonly short[] DFA<dfa.decisionNumber>_eot =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eotS);
 private static readonly short[] DFA<dfa.decisionNumber>_eof =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eofS);
 private static readonly char[] DFA<dfa.decisionNumber>_min =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
 private static readonly char[] DFA<dfa.decisionNumber>_max =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
 private static readonly short[] DFA<dfa.decisionNumber>_accept =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
 private static readonly short[] DFA<dfa.decisionNumber>_special =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_specialS);
 private static readonly short[][] DFA<dfa.decisionNumber>_transition;

 static DFA<dfa.decisionNumber>()
 {
  int numStates = DFA<dfa.decisionNumber>_transitionS.Length;
  DFA<dfa.decisionNumber>_transition = new short[numStates][];
  for ( int i=0; i \< numStates; i++ )
  {
   DFA<dfa.decisionNumber>_transition[i] =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
  }
 }

 public DFA<dfa.decisionNumber>( BaseRecognizer recognizer<if(dfa.specialStateSTs)>,
SpecialStateTransitionHandler specialStateTransition<endif> )
<if(dfa.specialStateSTs)>
  : base(specialStateTransition)
```

```
<endif>
 {
  this.recognizer = recognizer;
  this.decisionNumber = <dfa.decisionNumber>;
  this.eot = DFA<dfa.decisionNumber>_eot;
  this.eof = DFA<dfa.decisionNumber>_eof;
  this.min = DFA<dfa.decisionNumber>_min;
  this.max = DFA<dfa.decisionNumber>_max;
  this.accept = DFA<dfa.decisionNumber>_accept;
  this.special = DFA<dfa.decisionNumber>_special;
  this.transition = DFA<dfa.decisionNumber>_transition;
 }

 public override string Description { get { return "<dfa.description>"; } }

 public override void Error(NoViableAltException nvae)
 {
  DebugRecognitionException(nvae);
 }
}<\n>
<if(dfa.specialStateSTs)>
private int SpecialStateTransition<dfa.decisionNumber>(DFA dfa, int s, IIntStream _input)<! throws
NoViableAltException!>
{
 <if(LEXER)>
 IIntStream input = _input;
 <endif>
 <if(PARSER)>
 ITokenStream input = (ITokenStream)_input;
 <endif>
 <if(TREE_PARSER)>
 ITreeNodeStream input = (ITreeNodeStream)_input;
 <endif>
 int _s = s;
 s = -1;
 <! pull these outside the switch cases to save space on locals !>
 int LA<dfa.decisionNumber>_1 = input.LA(1);
 int index<dfa.decisionNumber>_1 = input.Index;
 switch (_s)
 {
 <dfa.specialStateSTs:{state |case <i0>:<! compressed special state numbers 0..n-1 !>
 <state>}; separator="\n">

 default:
  break;
 }

 if (s >= 0)
```

```
  return s;

<if(backtracking)>
 if (state.backtracking > 0) {state.failed=true; return -1;}
<endif>
 NoViableAltException nvae = new NoViableAltException(dfa.Description, <dfa.decisionNumber>, _s, input);
 dfa.Error(nvae);
 throw nvae;
}
<endif>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
<if(semPredState)>
 <! get next lookahead symbol to test edges, then rewind !>
 input.Rewind();
<endif>
 <edges; separator="\nelse ">
<if(semPredState)>
 <! return input cursor to state before we rewound !>
 input.Seek(index<decisionNumber>_1);
<endif>
 break;
}
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"
```

```
orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "EvaluatePredicate(<pred>_fragment)"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<k>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<k><ge()><lower> && LA<decisionNumber>_<k><le()><upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::=
"(input.LA(<k>)<ge()><lower> && input.LA(<k>)<le()><upper>)"

le() ::= "\<="
ge() ::= ">="

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

attributeScope(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
protected sealed partial class <scope.name>_scope
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">

 public <scope.name>_scope(<grammar.recognizerName> grammar) { OnCreated(grammar); }
 partial void OnCreated(<grammar.recognizerName> grammar);
}
<if(scope.actions.scopeinit)>
protected void <scope.name>_scopeInit( <scope.name>_scope scope )
{
 <scope.actions.scopeinit>
}
<else>
```

```
partial void <scope.name>_scopeInit( <scope.name>_scope scope );
<endif>
<if(scope.actions.scopeafter)>
protected void <scope.name>_scopeAfter( <scope.name>_scope scope )
{
 <scope.actions.scopeafter>
}
<else>
partial void <scope.name>_scopeAfter( <scope.name>_scope scope );
<endif>
protected readonly ListStack\<<scope.name>_scope> <scope.name>_stack = new
ListStack\<<scope.name>_scope>();
<endif>
<endif>
>>

globalAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

ruleAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

returnStructName(it) ::= "<it.name>_return"

returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.returnScope.attributes && ruleDescriptor.hasMultipleReturnValues)>
 <ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(ruleDescriptor.hasSingleReturnValue)>
 <ruleDescriptor.singleValueReturnType>
<else>
 void
<endif>
%>

/** Generate the C# type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
 <referencedRule.singleValueReturnType>
<else>
 void
```

```
<endif>
%>

delegateName(it) ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
default(<typeName>)
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(label.referencedRule)> <label.label.text> = <initValue(ruleLabelType(label.referencedRule))>;
%>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(scope.attributes && ruleDescriptor.hasMultipleReturnValues)>
<returnScopeModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> sealed partial class
<ruleDescriptor:returnStructName()> : <ruleReturnBaseType()><@ruleReturnInterfaces()>
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
 <@ruleReturnMembers()>
}
<endif>
>>

ruleReturnBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<labelType>>
%>

@returnScope.ruleReturnMembers() ::= <<
public <ruleDescriptor:returnStructName()>(<grammar.recognizerName> grammar) {OnCreated(grammar);}
partial void OnCreated(<grammar.recognizerName> grammar);
>>

parameterScope(scope) ::= <<
<scope.attributes:{it|<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= <<
```

```
<attr.name; format="id">
>>

parameterSetAttributeRef(attr,expr) ::= <<
<attr.name; format="id"> =<expr>;
>>

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id">
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id">
<else>
<scope>_stack.Peek().<attr.name; format="id">
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id"> = <expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id"> = <expr>;
<else>
<scope>_stack.Peek().<attr.name; format="id"> = <expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.Count>0 && $function::name.Equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name; format="id">:<initValue(attr.type)>)
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
```

```
retval.<attr.name; format="id">
<else>
<attr.name; format="id">
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id"> =<expr>;
<else>
<attr.name; format="id"> =<expr>;
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.Text:default(string))"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.Type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.Line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.CharPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.Channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.TokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int.Parse(<scope>.Text):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Start):default(<labelType>))"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Stop):default(<labelType>))"
ruleLabelPropertyRef_tree(scope,attr) ::=
"(<scope>!=null?((<ASTLabelType>)<scope>.Tree):default(<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(<scope>.Start),
 input.TreeAdaptor.GetTokenStopIndex(<scope>.Start))):default(string))
<else>
(<scope>!=null?input.ToString(<scope>.Start,<scope>.Stop):default(string))
<endif>
%>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?<scope>.Template:null)"
```

```
/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
  "(<scope>!=null?<scope>.Type:0)"

lexerRuleLabelPropertyRef_line(scope,attr) ::=
  "(<scope>!=null?<scope>.Line:0)"

lexerRuleLabelPropertyRef_pos(scope,attr) ::=
  "(<scope>!=null?<scope>.CharPositionInLine:-1)"

lexerRuleLabelPropertyRef_channel(scope,attr) ::=
  "(<scope>!=null?<scope>.Channel:0)"

lexerRuleLabelPropertyRef_index(scope,attr) ::=
  "(<scope>!=null?<scope>.TokenIndex:0)"

lexerRuleLabelPropertyRef_text(scope,attr) ::=
  "(<scope>!=null?<scope>.Text:default(string))"

lexerRuleLabelPropertyRef_int(scope,attr) ::=
  "(<scope>!=null?int.Parse(<scope>.Text):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.Start"
rulePropertyRef_stop(scope,attr) ::= "retval.Stop"
rulePropertyRef_tree(scope,attr) ::= "retval.Tree"
rulePropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start))
<else>
input.ToString(retval.Start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr) ::= "retval.Template"

lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int.Parse(<scope>.Text)"
```

```
// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.Tree = <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.Template =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)<\n>
{<\n>
<@indentedAction()><\n>
}
<else>
<action>
<endif>
%>

@execAction.indentedAction() ::= <<
 <action>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static readonly BitSet <name> = new BitSet(new ulong[]{<words64:{it|<it>UL};separator=",">});
>>

codeFileExtension() ::= ".cs"

true_value() ::= "true"
false_value() ::= "false"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp3/CSharp3.stg
No license file was found, but licenses were detected in source scan.

```
/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/

finishedBacktracking(block) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
   <block>
<else>
<block>
<endif>
<endif>
>>

@ruleBody.setErrorReturnValue() ::= <<
retval.tree = self._adaptor.errorNode(self.input, retval.start, self.input.LT(-1), re)
>>
```

```
// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
self._adaptor.addChild(root_0, <label>_tree)
})>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <%
<super.matchSet(postmatchCode={<finishedBacktracking({self._adaptor.addChild(root_0,
<createNodeFromToken(...)>)})>}, ...)>
%>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
<super.matchSet(postmatchCode={<finishedBacktracking({root_0 =
self._adaptor.becomeRoot(<createNodeFromToken(...)>, root_0)})>}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({self._adaptor.addChild(root_0, <label>.tree)})>
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({root_0 = self._adaptor.becomeRoot(<label>.tree, root_0)})>
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
```

```
<listLabel(label, {<label>.tree})>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(label, {<label>.tree})>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
self._adaptor.addChild(root_0, <label>_tree)
})>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<terminalOptions.node>(<label>) <! new MethodNode(IDLabel) !>
<else>
self._adaptor.createWithPayload(<label>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
self._adaptor.setTokenBoundaries(retval.tree, retval.start, retval.stop)
})>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python3/ASTParser.stg

No license file was found, but licenses were detected in source scan.

/*
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/
parserMembers() ::= <<
protected DebugTreeAdaptor adaptor =
   new DebugTreeAdaptor(null,new CommonTreeAdaptor());
public void setTreeAdaptor(TreeAdaptor adaptor) {
   this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
}
```

```
public TreeAdaptor getTreeAdaptor() {
   return adaptor;
}<\n>
>>

parserCtorBody() ::= <<
>>

createListenerAndHandshake() ::= <<
<super.createListenerAndHandshake()>
>>

ctorForPredefinedListener() ::= <<
>>

@rewriteElement.pregen() ::= ""
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/ASTDbg.stg
No license file was found, but licenses were detected in source scan.

*/

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/Dbg.stg
No license file was found, but licenses were detected in source scan.

```
/*
*  Template group file for the Objective C code generator.
*  Heavily based on Java.stg
*
*  Written by Kay Roepke <kroepke(at)classdump.org>
*  Modified by Alan Condit <acondit(at)ipns.com>
*
*  This file is part of ANTLR and subject to the same license as ANTLR itself.
*/

objcTypeInitMap ::= [
   "int"          : "0",            // Integers     start out being 0
   "long"          : "0",            // Longs        start out being 0
   "float"         : "0.0",          // Floats       start out being 0
```

```
  "double"      : "0.0",         // Doubles     start out being 0
  "BOOL"        : "NO",          // Booleans    start out being Antlr ObjC for false
  "byte"        : "0",           // Bytes       start out being 0
  "short"       : "0",           // Shorts      start out being 0
  "char"        : "0",           // Chars       start out being 0
  "id"          : "nil",         // ids         start out being nil
  default       : "nil"          // anything other than an atomic type
]

// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
 "True":"true",
 "False":"false",
 "true":"YES",
 "false":"NO",
 default:"NO"
]



className() ::= "<name><!<if(LEXER)>Lexer<else><if(TREE_PARSER)>Tree<endif>Parser<endif>!>"
leadIn(type) ::=
<<
/** \file
*  This <type> file was generated by $ANTLR version <ANTLRVersion>
*
*     -  From the grammar source file : <fileName>
*     -                            On : <generatedTimestamp>
<if(LEXER)>
*     -                 for the lexer : <name>Lexer
<endif>
<if(PARSER)>
*     -                for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
*     -           for the tree parser : <name>TreeParser
<endif>
*
* Editing it, at least manually, is not wise.
*
* ObjC language generator and runtime by Alan Condit, acondit|hereisanat|ipns|dotgoeshere|com.
*
*
>>

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
```

```
outputFile( LEXER,
          PARSER,
          TREE_PARSER,
          actionScope,
          actions,
          docComment,
          recognizer,
          name,
          tokens,
          tokenNames,
          rules,
          cyclicDFAs,
          bitsets,
          buildTemplate,
          buildAST,
          rewriteMode,
          profile,
          backtracking,
          synpreds,
          memoize,
          numRules,
          fileName,
          ANTLRVersion,
          generatedTimestamp,
          trace,
          scopes,
          superClass,
          literals
          ) ::=
<<
<leadIn("OBJC source")>
*/
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<! <if(actions.(actionScope).header)>
/* =============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* =============================================================================
*/
<endif> !>

/* -----------------------------------------
* Include the ANTLR3 generated header file.
*/
#import "<name><!<if(LEXER)>Lexer<else><if(TREE_PARSER)>Tree<endif>Parser<endif>!>.h"
```

```
<actions.(actionScope).postinclude>
/* ----------------------------------------- */

<docComment>

<if(literals)>
/** String literals used by <name> that we must do things like MATCHS() with.
*  C will normally just lay down 8 bit characters, and you can use L"xxx" to
*  get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
*  we perform this little trick of defining the literals as arrays of UINT32
*  and passing in the address of these.
*/
<literals:{it | static ANTLR3_UCHAR  lit_<i>[]  = <it>;}; separator="\n">

<endif>

/* ============================================================================= */
/* =============================================================================
* Start of recognizer
*/
<recognizer>
>>
headerFileExtension() ::= ".h"

headerFile( LEXER,
     PARSER,
     TREE_PARSER,
     actionScope,
     actions,
     docComment,
     recognizer,
     name,
     tokens,
     tokenNames,
     rules,
     cyclicDFAs,
     bitsets,
     buildTemplate,
     buildAST,
     rewriteMode,
     profile,
     backtracking,
     synpreds,
     memoize,
     numRules,
     fileName,
     ANTLRVersion,
     generatedTimestamp,
            trace,
            scopes,
            superClass,
            literals
          ) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
<actions.(actionScope).preincludes>
/* =============================================================================
* Standard antlr OBJC runtime definitions
*/
#import \<Cocoa/Cocoa.h>
#import \<ANTLR/ANTLR.h>
/* End of standard antlr3 runtime definitions
* =============================================================================
*/
<actions.(actionScope).includes>
<@end>

<if(LEXER)>
<lexerHeaderFile(...)>
<endif>
<if(PARSER)>
<parserHeaderFile(...)>
<endif>
<if(TREE_PARSER)>
<treeParserHeaderFile(...)>
<endif>
<docComment>
>>

lexerHeaderFile( LEXER,
            PARSER,
            TREE_PARSER,
            actionScope,
            actions,
            docComment,
            recognizer,
            name,
            tokens,
            tokenNames,
            rules,
            cyclicDFAs,
            bitsets,
            buildTemplate,
            profile,
            backtracking,
            synpreds,
            memoize,
            numRules,
            fileName,
            ANTLRVersion,
            generatedTimestamp,
            trace,
            scopes,
            superClass="Lexer"
            ) ::=
<<

<if(actions.(actionScope).header)>
/* =============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* =============================================================================
*/
<endif>

/* Start cyclicDFAInterface */
<cyclicDFAs:cyclicDFAInterface()>

#pragma mark Rule return scopes Interface start
<rules:{rule |
<rule.ruleDescriptor:{ruleDescriptor | <returnScopeInterface(scope=ruleDescriptor.returnScope)>}>}>
#pragma mark Rule return scopes Interface end
#pragma mark Tokens
#ifndef TOKENLISTAlreadyDefined
#define TOKENLISTAlreadyDefined 1
#ifdef EOF
#undef EOF
#endif
<tokens:{it | #define <it.name> <it.type>}; separator="\n">
#endif
/* interface lexer class */
@interface <className()> <@superClassName>: <superClass><@end> { // line 283
<cyclicDFAs:{dfa | DFA<dfa.decisionNumber> *dfa<dfa.decisionNumber>;}; separator="\n">
<synpreds:{pred | SEL <pred>Selector;}; separator="\n">
/* ObjC start of actions.lexer.memVars */
<actions.lexer.memVars>
/* ObjC end of actions.lexer.memVars */
}
+ (void) initialize;
+ (<className()> *)new<className()>WithCharStream:(id\<CharStream>)anInput;
```

```
/* ObjC start actions.lexer.methodsDecl */
<actions.lexer.methodsDecl>
/* ObjC end actions.lexer.methodsDecl */
<rules:{rule |
- (<rule.ruleDescriptor:{ruleDescriptor|<returnType()>}>)
<if(!rule.ruleDescriptor.isSynPred)>m<rule.ruleName><else><rule.ruleName>_fragment<endif>
<if(rule.ruleDescriptor.parameterScope)><rule.ruleDescriptor.parameterScope:parameterScope()><endif>; };
separator="\n"><\n>
@end /* end of <className()> interface */<\n>
>>

headerReturnScope(ruleDescriptor) ::= "<returnScopeInterface(...)>"
headerReturnType(ruleDescriptor) ::= <<
<if(LEXER)>
<if(!r.ruleDescriptor.isSynPred)>
void
<else>
<ruleDescriptor:returnType()>
<endif>
<else>
<ruleDescriptor:returnType()>
<endif>
>>
// Produce the lexer output
lexer(  grammar,
    name,
    tokens,
    scopes,
    rules,
    numRules,
    filterMode,
    labelType="CommonToken",
    superClass="Lexer"
    ) ::= <<
<cyclicDFAs:cyclicDFA()>

/** As per Terence: No returns for lexer rules! */
<!
#pragma mark Rule return scopes start
<rules:{rule | <rule.ruleDescriptor:{ruleDescriptor |
<returnScopeImplementation(scope=ruleDescriptor.returnScope)>}>
}>
#pragma mark Rule return scopes end
!>
@implementation <grammar.recognizerName> // line 330

+ (void) initialize
{
  [BaseRecognizer setGrammarFileName:@"<fileName>"];
}

+ (NSString *) tokenNameForType:(NSInteger)aTokenType
{
  return [[self getTokenNames] objectAtIndex:aTokenType];
}

+ (<grammar.recognizerName> *)new<grammar.recognizerName>WithCharStream:(id\<CharStream>)anInput
{
  return [[<grammar.recognizerName> alloc] initWithCharStream:anInput];
}

- (id) initWithCharStream:(id\<CharStream>)anInput
{
  self = [super initWithCharStream:anInput State:[RecognizerSharedState
newRecognizerSharedStateWithRuleLen:<numRules>+1]];
  if ( self != nil ) {
<if(memoize)>
    if ( state.ruleMemo == nil ) {
      state.ruleMemo = [[RuleStack newRuleStackWithSize:<numRules>+1] retain];
    }
    if ( [state.ruleMemo count] == 0 ) {
      // initialize the memoization cache - the indices are 1-based in the runtime code!
      <! [state.ruleMemo addObject:[NSNull null]];     /* dummy entry to ensure 1-basedness. */ !>
      for (NSInteger i = 0; i \< <numRules>; i++) {
        [state.ruleMemo addObject:[HashRule newHashRuleWithLen:17]];
      }
    }
<endif>
    <synpreds:{pred | <lexerSynpred(name=pred)>};separator="\n">
    <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = [DFA<dfa.decisionNumber>
newDFA<dfa.decisionNumber>WithRecognizer:self];}; separator="\n">
    <actions.lexer.init>
  }
  return self;
}

- (void) dealloc
{
  <cyclicDFAs:{dfa | [dfa<dfa.decisionNumber> release];}; separator="\n">
<actions.lexer.dealloc>
  [super dealloc];
}

/* ObjC Start of actions.lexer.methods */
<actions.lexer.methods>
/* ObjC end of actions.lexer.methods */
/* ObjC start methods() */
<@methods()>
/* ObjC end methods() */

<if(actions.lexer.reset)>
- (void) reset
{
   <actions.lexer.reset>
   [super reset];
}
<endif>

<if(filterMode)>
<filteringNextToken()>
<endif>
/* Start of Rules */
<rules; separator="\n">

@end /* end of <grammar.recognizerName> implementation line 397 */
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
- (id\<Token>) nextToken
{
   while (YES) {
       if ( [input LA:1] == CharStreamEOF ) {
           return [<labelType> eofToken];
       }
       state.token = nil;
       state.channel = TokenChannelDefault;
       state.tokenStartCharIndex = input.index;
       state.tokenStartCharPositionInLine = input.charPositionInLine;
       state.tokenStartLine = input.line;
       state.text = nil;
       @try {
           NSInteger m = [input mark];
           state.backtracking = 1; /* means we won't throw slow exception */
           state.failed = NO;
           [self mTokens];
           state.backtracking = 0;
           /* mTokens backtracks with synpred at backtracking==2
              and we set the synpredgate to allow actions at level 1. */
```

```
      if ( state.failed ) {
        [input rewind:m];
        [input consume]; /* advance one char and try again */
      } else {
        [self emit];
        return state.token;
      }
    }
    @catch (RecognitionException *re) {
      // shouldn't happen in backtracking mode, but...
      [self reportError:re];
      [self recover:re];
    }
  }
}

- (void)memoize:(id\<IntStream\>)anInput
    RuleIndex:(NSInteger)ruleIndex
   StartIndex:(NSInteger)ruleStartIndex
{
  if ( state.backtracking > 1 ) [super memoize:anInput RuleIndex:ruleIndex StartIndex:ruleStartIndex];
}

- (BOOL)alreadyParsedRule:(id\<IntStream\>)anInput RuleIndex:(NSInteger)ruleIndex
{
  if ( state.backtracking > 1 ) return [super alreadyParsedRule:anInput RuleIndex:ruleIndex];
  return NO;
}
>>

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"

parserHeaderFile( LEXER,
      PARSER,
      TREE_PARSER,
      actionScope,
      actions,
      docComment,
      recognizer,
      name,
      tokens,
      tokenNames,
      rules,
      cyclicDFAs,
      bitsets,
      buildTemplate,
      profile,
      backtracking,
      synpreds,
      memoize,
      numRules,
      fileName,
      ANTLRVersion,
      generatedTimestamp,
      trace,
      scopes,
      literals,
      superClass="Parser"
      ) ::= <<
/* parserHeaderFile */
<genericParserHeaderFile(inputStreamType="id\<TokenStream>",...)>
>>

treeParserHeaderFile( LEXER,
      PARSER,
      TREE_PARSER,
      actionScope,
      actions,
      docComment,
      recognizer,
      name,
      tokens,
      tokenNames,
      rules,
      cyclicDFAs,
      bitsets,
      buildTemplate,
      profile,
      backtracking,
      synpreds,
      memoize,
      numRules,
      fileName,
      ANTLRVersion,
      generatedTimestamp,
      trace,
      scopes,
      literals,
      superClass="TreeParser"
      ) ::= <<
/* treeParserHeaderFile */
<genericParserHeaderFile(inputStreamType="id\<TreeNodeStream>",...)>
>>
```

```
genericParserHeaderFile( LEXER,
          PARSER,
          TREE_PARSER,
          actionScope,
          actions,
          docComment,
          recognizer,
          name,
          tokens,
          tokenNames,
          rules,
          cyclicDFAs,
          bitsets,
          buildTemplate,
          profile,
          backtracking,
          synpreds,
          memoize,
          numRules,
          fileName,
          ANTLRVersion,
          generatedTimestamp,
          trace,
          scopes,
          superClass,
          literals,
          inputStreamType
          ) ::=
<<
<if(actions.(actionScope).header)>
/* =============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* =============================================================================
*/
<endif>

#ifndef ANTLR3TokenTypeAlreadyDefined
#define ANTLR3TokenTypeAlreadyDefined
typedef enum {
   ANTLR_EOF = -1,
   INVALID,
   EOR,
   DOWN,
   UP,
   MIN
} ANTLR3TokenType;
#endif

<cyclicDFAs:cyclicDFAInterface()>
#pragma mark Tokens
#ifndef TOKENLISTAlreadyDefined
#define TOKENLISTAlreadyDefined 1
#ifdef EOF
#undef EOF
#endif
<tokens:{it | #define <it.name> <it.type>}; separator="\n">
#endif
#pragma mark Dynamic Global Scopes globalAttributeScopeInterface
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeInterface(scope=it)><endif>}>
#pragma mark Dynamic Rule Scopes ruleAttributeScopeInterface
<rules:{rule |
<rule.ruleDescriptor:{ ruleDescriptor | <ruleAttributeScopeInterface(scope=ruleDescriptor.ruleScope)>}>}>
#pragma mark Rule Return Scopes returnScopeInterface
<rules:{rule |<rule.ruleDescriptor:{ ruleDescriptor |
<returnScopeInterface(scope=ruleDescriptor.returnScope)>}>}>

/* Interface grammar class */
@interface <className()> <@superClassName> : <superClass><@end> { /* line 572 */
#pragma mark Dynamic Rule Scopes ruleAttributeScopeDecl
<rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScopeDecl(scope=rule.ruleDescriptor.ruleScope)>}>
#pragma mark Dynamic Global Rule Scopes globalAttributeScopeMemVar
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeMemVar(scope=it)><endif>}><\n>
/* ObjC start of actions.(actionScope).memVars */
<actions.(actionScope).memVars>
/* ObjC end of actions.(actionScope).memVars */
/* ObjC start of memVars */
<@memVars()>
/* ObjC end of memVars */

<cyclicDFAs:{dfa | DFA<dfa.decisionNumber> *dfa<dfa.decisionNumber>;}; separator="\n">
<synpreds:{pred | SEL <pred>Selector;}; separator="\n">
}

/* ObjC start of actions.(actionScope).properties */
<actions.(actionScope).properties>
/* ObjC end of actions.(actionScope).properties */
/* ObjC start of properties */
<@properties()>
/* ObjC end of properties */

+ (void) initialize;
+ (<className()> *) new<className()>:(<inputStreamType>)aStream;
/* ObjC start of actions.(actionScope).methodsDecl */
```

```
<actions.(actionScope).methodsDecl>
/* ObjC end of actions.(actionScope).methodsDecl */

/* ObjC start of methodsDecl */
<@methodsDecl()>
/* ObjC end of methodsDecl */

<rules:{rule |
-
(<rule.ruleDescriptor:{ruleDescriptor|<returnType()>}>)<if(!rule.ruleDescriptor.isSynPred)><rule.ruleName><else
><rule.ruleName>_fragment<endif><if(rule.ruleDescriptor.parameterScope)><rule.ruleDescriptor.parameterScope:
parameterScope()><endif>; }; separator="\n"><\n>

@end /* end of <className()> interface */<\n>
>>

parser( grammar,
    name,
    scopes,
    tokens,
    tokenNames,
    rules,
    numRules,
    bitsets,
    ASTLabelType="CommonTree",
    superClass="Parser",
    labelType="CommonToken",
    members={<actions.parser.members>}
    ) ::= <<
<genericParser(inputStreamType="id\<TokenStream>", rewriteElementType="Token", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser( grammar,
    name,
    scopes,
    tokens,
    tokenNames,
    globalAction,
    rules,
    numRules,
    bitsets,
    filterMode,
    labelType={<ASTLabelType>},
    ASTLabelType="CommonTree",
    superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
    members={<actions.treeparser.members>}
    ) ::= <<
<genericParser(inputStreamType="id\<TreeNodeStream>", rewriteElementType="Node", ...)>
>>

/** How to generate a parser */
genericParser(  grammar,
    name,
    scopes,
    tokens,
    tokenNames,
    rules,
    numRules,
    cyclicDFAs,         // parser init -- initializes the DFAs
    bitsets,
    labelType,
    ASTLabelType,
    superClass,
    members,
    filterMode,
    rewriteElementType,
    inputStreamType
    ) ::= <<
<cyclicDFAs:cyclicDFA()>

#pragma mark Bitsets
<bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}>

#pragma mark Dynamic Global globalAttributeScopeImplementation
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeImplementation(scope=it)><endif>}>

#pragma mark Dynamic Rule Scopes ruleAttributeScopeImplementation
<rules:{rule |
<rule.ruleDescriptor:{ ruleDescriptor | <ruleAttributeScopeImplementation(scope=ruleDescriptor.ruleScope)>}>}>

#pragma mark Rule Return Scopes returnScopeImplementation
<rules:{rule | <rule.ruleDescriptor:{ ruleDescriptor |
<returnScopeImplementation(scope=ruleDescriptor.returnScope)>}>}>

@implementation <grammar.recognizerName>  // line 637

/* ObjC start of ruleAttributeScope */
#pragma mark Dynamic Rule Scopes ruleAttributeScope
<rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScope()>}>
/* ObjC end of ruleAttributeScope */
#pragma mark global Attribute Scopes globalAttributeScope
/* ObjC start globalAttributeScope */
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>
```

```
/* ObjC end globalAttributeScope */
/* ObjC start actions.(actionScope).synthesize */
<actions.(actionScope).synthesize>
/* ObjC start synthesize() */
<@synthesize()>

+ (void) initialize
{
  #pragma mark Bitsets
  <bitsets:{it | <bitsetInit(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}>
  [BaseRecognizer setTokenNames:[[AMutableArray arrayWithObjects:@"\<invalid>", @"\<EOR>",
@"\<DOWN>", @"\<UP>", <tokenNames:{it | @<it>}; separator=", ", wrap="\n ">, nil] retain]];
  [BaseRecognizer setGrammarFileName:@"<fileName>"];
  <synpreds:{pred | <synpred(pred)>}>
}

+ (<grammar.recognizerName> *)new<grammar.recognizerName>:(<inputStreamType>)aStream
{
<if(PARSER)>
  return [[<grammar.recognizerName> alloc] initWithTokenStream:aStream];
<else><! TREE_PARSER !>
  return [[<grammar.recognizerName> alloc] initWithStream:aStream];
<endif>
}

<if(PARSER)>
- (id) initWithTokenStream:(<inputStreamType>)aStream
{
  self = [super initWithTokenStream:aStream State:[[RecognizerSharedState
newRecognizerSharedStateWithRuleLen:<numRules>+1] retain]];
  if ( self != nil ) {
<else><! TREE_PARSER !>
- (id) initWithStream:(<inputStreamType>)aStream
{
  self = [super initWithStream:aStream State:[[RecognizerSharedState
newRecognizerSharedStateWithRuleLen:<numRules>+1] retain]];
  if ( self != nil ) {
<endif>
    <! <parserCtorBody()> !>
    <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = [DFA<dfa.decisionNumber>
newDFA<dfa.decisionNumber>WithRecognizer:self];}; separator="\n">
    <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeInit(scope=it)><endif>}>
    <rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScopeInit()>}>
    /* start of actions-actionScope-init */
    <actions.(actionScope).init>
    /* start of init */
    <@init()>
  }
  return self;
}

- (void) dealloc
{
  <cyclicDFAs:{dfa | [dfa<dfa.decisionNumber> release];}; separator="\n">
  <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDealloc(scope=it)><endif>}>
  <actions.(actionScope).dealloc>
  <@dealloc()>
  [super dealloc];
}

/* ObjC start actions.(actionScope).methods */
<actions.(actionScope).methods>
/* ObjC end actions.(actionScope).methods */
/* ObjC start methods() */
<@methods()>
/* ObjC end methods() */
/* ObjC start rules */
<rules; separator="\n">
/* ObjC end rules */

@end /* end of <grammar.recognizerName> implementation line 692 */<\n>
>>

parserCtorBody() ::= <<
<if(memoize)> /* parserCtorBody */
<if(grammar.grammarIsRoot)>
state.ruleMemo = [[RuleStack newRuleStack:<numRules>+1] retain];<\n> <! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>_fragment
- (void) <ruleName>_fragment
{
  <ruleLabelDefs()>
  <if(trace)>
     [self traceIn:\@"<ruleName>_fragment" Index:<ruleDescriptor.index>];
  @try {
     <block>
  }
  @finally {
     [self traceOut:\@"<ruleName>_fragment" Index:<ruleDescriptor.index>];
  }
<else>
  <block>
<endif>
} // $ANTLR end <ruleName>_fragment
>>

synpred(name) ::= <<
SEL <name>Selector = @selector(<name>_fragment);
<! // $ANTLR start <name>
- (BOOL) <name>
{
  state.backtracking++;
  <@start()>
  NSInteger start = [input mark];
  @try {
     [self <name>_fragment]; // can never throw exception
  }
  @catch (RecognitionException *re) {
     NSLog(@"impossible: %@\n", re.name);
  }
  BOOL success = (state.failed == NO);
  [input rewind:start];
  <@stop()>
  state.backtracking--;
  state.failed=NO;
  return success;
} // $ANTLR end <name> <\n> !>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( state.backtracking > 0 && [self alreadyParsedRule:input RuleIndex:<ruleDescriptor.index>] ) { return
<ruleReturnValue()>; }
<endif>
>>
```

```
/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if (backtracking)>if ( state.failed ) return <ruleReturnValue()>;<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if ( state.backtracking > 0 ) { state.failed = YES; return <ruleReturnValue()>; }<\n><endif>
>>

/** How to generate code for a rule.
*  The return type aggregates are declared in the header file (headerFile template)
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<

/*
* $ANTLR start <ruleName>
* <fileName>:<description>
*/
- (<returnType()>) <ruleName><ruleDescriptor.parameterScope:parameterScope()>
{
   <if(trace)>[self traceIn:\@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
   <if(trace)>NSLog(@"enter <ruleName> %@ failed=%@ backtracking=%d", [input LT:1],
(state.failed==YES)?@"YES":@"NO", state.backtracking);<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleDescriptor.actions.init>
   <@preamble()>
   @try {
       <ruleMemoization(name=ruleName)>
       <ruleLabelDefs()>
       <block>
       <ruleCleanUp()>
       <(ruleDescriptor.actions.after):execAction()>
   }
<if(exceptions)>
   <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else><if(!emptyRule)><if(actions.(actionScope).rulecatch)>
   <actions.(actionScope).rulecatch>
<else>
   @catch (RecognitionException *re) {
       [self reportError:re];
       [self recover:input Exception:re];
       <@setErrorReturnValue()>
   }<\n>
<endif><endif><endif>
   @finally {
       <if(trace)>[self traceOut:@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
```

```
        <memoize()>
        <ruleScopeCleanUp()>
        <finally>
    }
    <@postamble()>
    return <ruleReturnValue()>;
}
/* $ANTLR end <ruleName> */
>>

finalCode(finalBlock) ::= <<
{
    <finalBlock>
}
>>

catch(decl,action) ::= <<
@catch (<e.decl>) {
    <e.action>
}
>>

ruleDeclarations() ::= <<
/* ruleDeclarations */
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()> retval = [<ruleDescriptor:returnStructName()> new<ruleDescriptor:returnStructName()>];
[retval setStart:[input LT:1]];<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
NSInteger <ruleDescriptor.name>_StartIndex = input.index;
<endif>
>>

ruleScopeSetUp() ::= <<
/* ruleScopeSetUp */
<ruleDescriptor.useScopes:{it | [<it>_stack push:[<it>_Scope new<it>_Scope]];}>
<ruleDescriptor.ruleScope:{it | [<it.name>_stack push:[<it.name>_Scope new<it.name>_Scope]];}>
>>

ruleScopeCleanUp() ::= <<
/* ruleScopeCleanUp */
<ruleDescriptor.useScopes:{it | [<it>_stack pop];}; separator="\n">
<ruleDescriptor.ruleScope:{it | [<it.name>_stack pop];}; separator="\n">
>>
```

```
ruleLabelDefs() ::= <%
/* ruleLabelDefs entry */<"\n">
<[ruleDescriptor.tokenLabels, ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it |<labelType> *<it.label.text> = nil;}; separator="\n"><"\n">
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it | AMutableArray *list_<it.label.text> = nil;}; separator="\n"><"\n">
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n"><"\n">
<ruleDescriptor.ruleListLabels:{ll|ParserRuleReturnScope *<ll.label.text> = nil;}; separator="\n"><"\n">
%>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<labelType> *<it.label.text>=nil;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |NSInteger <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]:{it |AMutableArray *list_<it.label.text>=nil; }; separator="\n">
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
/* token+rule list labels */
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{it |[list_<it.label.text> release];}; separator="\n">
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
[retval setStop:[input LT:-1]];<\n>
<endif><endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) [self memoize:input RuleIndex:<ruleDescriptor.index>
```

```
StartIndex:<ruleDescriptor.name>_StartIndex];
<endif><endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName, nakedBlock, ruleDescriptor, block, memoize) ::= <<
// $ANTLR start "<ruleName>"
- (void)
m<ruleName><if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope:parameterScope(scope=it)><en
dif>
{
  //<if(trace)>[self traceIn:\@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
  <if(trace)>NSLog(@"enter <ruleName> %C line=%d:%d failed=%@ backtracking=%d",
      [input LA:1],
      self.line,
      self.charPositionInLine,
      (state.failed==YES) ? @"YES" : @"NO",
      state.backtracking);
  <endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  @try {
<if(nakedBlock)>
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block><\n>
<else>
      NSInteger _type = <ruleName>;
      NSInteger _channel = TokenChannelDefault;
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block>
      <ruleCleanUp()>
      state.type = _type;
      state.channel = _channel;
      <(ruleDescriptor.actions.after):execAction()>
<endif>
  }
  @finally {
      //<if(trace)>[self traceOut:[NSString stringWithFormat:@"<ruleName> %d\n",
<ruleDescriptor.index>]];<endif>
      <if(trace)>NSLog(@"exit <ruleName> %C line=%d:%d failed=%@ backtracking=%d",
            [input LA:1], self.line, self.charPositionInLine,
            (state.failed==YES) ? @"YES" : @"NO", state.backtracking);<endif>
```

```
        <ruleScopeCleanUp()>
        <memoize()>
    }
    return;
}
/* $ANTLR end "<ruleName>" */
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
- (void) mTokens
{
    <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description> // block
NSInteger alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>) {
    <alts:{a | <altSwitchCase(i, a)>}>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description> //ruleblock
NSInteger alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
    <alts:{a | <altSwitchCase(i, a)>}>
}
>>
```

```
ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description> // ruleBlockSingleAlt
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description> // blockSingleAlt
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description> // positiveClosureBlock
NSInteger cnt<decisionNumber> = 0;
<decls>
<@preloop()>
do {
   NSInteger alt<decisionNumber> = <maxAlt>;
   <@predecision()>
   <decision>
   <@postdecision()>
   switch (alt<decisionNumber>) {
       <alts:{a | <altSwitchCase(i, a)>}>
       default :
           if ( cnt<decisionNumber> >= 1 )
               goto loop<decisionNumber>;
           <ruleBacktrackFailure()>
           EarlyExitException *eee =
               [EarlyExitException newException:input decisionNumber:<decisionNumber>];
           <@earlyExitException()>
           @throw eee;
   }
   cnt<decisionNumber>++;
} while (YES);
loop<decisionNumber>: ;
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock
```

```
/** A (..)* block with 0 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
<decls>
<@preloop()>
do {
   NSInteger alt<decisionNumber>=<maxAlt>;
   <@predecision()>
   <decision>
   <@postdecision()>
   switch (alt<decisionNumber>) {
       <alts:{a | <altSwitchCase(i, a)>}>
       default :
           goto loop<decisionNumber>;
   }
} while (YES);
loop<decisionNumber>: ;
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum, alt) ::= <<
case <altNum> : ;
   <@prealt()>
   <alt>
   break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description> // alt
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= << <@prematch()><\n><e.el><\n> >>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label>=(<labelType> *)<endif>[self match:input TokenType:<token>
Follow:FOLLOW_<token>_in_<ruleName><elementIndex>]; <checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label> == nil) list_<label> = [[AMutableArray arrayWithCapacity:5] retain];
[list_<label> addObject:<elem>];<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>NSInteger <label> = [input LA:1];<\n><endif>
[self matchChar:<char>]; <checkRuleBacktrackFailure()><\n>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)><label> = [input LA:1];<\n><endif>
[self matchRangeFromChar:<a> to:<b>]; <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label> = [input LA:1];<\n>
<else>
```

```
<label> = (<labelType> *)[input LT:1]; /* matchSet */<\n>
<endif><endif>
if (<s>) {
  [input consume];
  <postmatchCode>
<if(!LEXER)>
  [state setIsErrorRecovery:NO];
<endif>
  <if(backtracking)>state.failed = NO;<\n><endif>
} else {
  <ruleBacktrackFailure()>
  MismatchedSetException *mse = [MismatchedSetException newException:nil stream:input];
  <@mismatchedSetException()>
<if(LEXER)>
<if(label)>
  mse.c = <label>;
<endif>
  [self recover:mse];
  @throw mse;
<else>
  @throw mse;
  <! use following code to make it recover inline; remove throw mse;
  [self recoverFromMismatchedSet:input exception:mse follow:FOLLOW_set_in_<ruleName><elementIndex>]; !>
<endif>
}<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
NSInteger <label>Start = input.index;
[self matchString:<string>]; <checkRuleBacktrackFailure()>
NSInteger StartLine<elementIndex> = self.line;
NSInteger <label>StartCharPos<elementIndex> = self.charPositionInLine;
<label> = [[<labelType> newToken:input Type:TokenTypeInvalid Channel:TokenChannelDefault
Start:<label>Start Stop:input.index] retain];
[self setLine:<label>StartLine<elementIndex>];
[self setCharPositionInLine:<label>StartCharPos<elementIndex>];
<else>
[self matchString:<string>]; <checkRuleBacktrackFailure()><\n>
<endif>
```

```
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label> = (<labelType> *)[input LT:1];<\n>
<endif>
[self matchAny:input]; <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
NSInteger <label> = [input LA:1];<\n>
<endif>
[self matchAny]; <checkRuleBacktrackFailure()><\n>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ruleRef */
[self pushFollow:FOLLOW_<rule.name>_in_<ruleName><elementIndex>];
<if(label)><label> = <endif>[self <if(scope)><scope:delegateName()>.<endif><rule.name><if(args)>:<first(args)>
<rest(args):{ a | arg<i>:<rest(args)>}; separator=" "><endif>];<\n>
[self popFollow];
<checkRuleBacktrackFailure()><\n>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>
```

```
/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
NSInteger <label>Start<elementIndex> = input.index;
[self m<rule.name><if(args)>:<args; separator=" :"><endif>]; <checkRuleBacktrackFailure()><\n>
<label> = [[<labelType> newToken:input Type:TokenTypeInvalid Channel:TokenChannelDefault
Start:<label>Start<elementIndex> Stop:input.index-1] retain];
<label>.line = self.line;
<else>
[self <if(scope)><scope:delegateName()>.<endif>m<rule.name><if(args)>:<args; separator=" :"><endif>];
<checkRuleBacktrackFailure()><\n>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
NSInteger <label>Start<elementIndex> = input.index;
[self matchChar:CharStreamEOF]; <checkRuleBacktrackFailure()><\n>
<labelType> <label> = [[<labelType> newToken:input Type:TokenTypeEOF Channel:TokenChannelDefault
Start:<label>Start<elementIndex> Stop:input.index-1] retain];
<label>.line = self.line;
<else>
[self matchChar:CharStreamEOF]; <checkRuleBacktrackFailure()><\n>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                       ::= "int <recRuleArg()>"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
```

```
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( [input LA:1] == DOWN ) {
  [self match:input TokenType:DOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:UP Follow:nil]; <checkRuleBacktrackFailure()>
}
<else>
  [self match:input TokenType:DOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:UP Follow:nil]; <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
  <ruleBacktrackFailure()>
  @throw [FailedPredicateException newException:@"<ruleName>" predicate:@"<description>" stream:input];
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];<\n>
<edges; separator="\nelse ">
else {
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  NoViableAltException *nvae = [NoViableAltException newException:<decisionNumber> state:<stateNumber>
stream:input];
  nvae.c = LA<decisionNumber>_<stateNumber>;
  <@noViableAltException()>
  @throw nvae;<\n>
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
```

```
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];<\n>
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
   alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif><endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
   <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
unichar charLA<decisionNumber> = [input LA:<k>];
switch (charLA<decisionNumber>) {
   <edges; separator="\n"><\n>
default: ;
<if(eotPredictsAlt)>
```

```
  alt<decisionNumber> = <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  NoViableAltException *nvae = [NoViableAltException newException:<decisionNumber> state:<stateNumber>
stream:input];
  nvae.c = charLA<decisionNumber>;
  <@noViableAltException()>
  @throw nvae;<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ([input LA:<k>]) { // dfaOptionalBlockStateSwitch
  <edges; separator="\n"><\n>
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ([input LA:<k>]) { // dfaLoopbackStateSwitch
  <edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
  alt<decisionNumber> = <eotPredictsAlt>;
  break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it | case <it>: ;}; separator="\n">
  {
  <targetState>
  }
  break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = [dfa<decisionNumber> predict:input];
>>

/** Used in headerFile */
```

```
cyclicDFAInterface(dfa) ::= <<
#pragma mark Cyclic DFA interface start DFA<dfa.decisionNumber>
@interface DFA<dfa.decisionNumber> : DFA {
}
+ (DFA<dfa.decisionNumber> *) newDFA<dfa.decisionNumber>WithRecognizer:(BaseRecognizer
*)theRecognizer;
- initWithRecognizer:(BaseRecognizer *)recognizer;
@end /* end of DFA<dfa.decisionNumber> interface  */<\n>
#pragma mark Cyclic DFA interface end DFA<dfa.decisionNumber><\n>
>>

/** Used in lexer/parser implementation files */
/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
#pragma mark Cyclic DFA implementation start DFA<dfa.decisionNumber>

@implementation DFA<dfa.decisionNumber>
const static NSInteger dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
   {<dfa.eot; wrap="\n     ", separator=",", null="-1">};
const static NSInteger dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>] =
   {<dfa.eof; wrap="\n     ", separator=",", null="-1">};
const static unichar dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
   {<dfa.min; wrap="\n     ", separator=",", null="-1">};
const static unichar dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
   {<dfa.max; wrap="\n     ", separator=",", null="-1">};
const static NSInteger dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
   {<dfa.accept; wrap="\n     ", separator=",", null="-1">};
const static NSInteger dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
   {<dfa.special; wrap="\n     ", separator=",", null="-1">};

/** Used when there is no transition table entry for a particular state */
#define dfa<dfa.decisionNumber>_T_empty     nil

<dfa.edgeTransitionClassMap.keys:{ table |
const static NSInteger dfa<dfa.decisionNumber>_T<i0>[] =
{
    <table; separator=", ", wrap="\n ", null="-1">
\};
}; null="">

const static NSInteger *dfa<dfa.decisionNumber>_transition[] =
{
  <dfa.transitionEdgeTables:{whichTable|dfa<dfa.decisionNumber>_T<whichTable>}; separator=", ", wrap="\n",
null="nil">
};

+ (DFA<dfa.decisionNumber> *) newDFA<dfa.decisionNumber>WithRecognizer:(BaseRecognizer *)aRecognizer
{
  return [[[DFA<dfa.decisionNumber> alloc] initWithRecognizer:aRecognizer] retain];
}

- (id) initWithRecognizer:(BaseRecognizer *) theRecognizer
{
  self = [super initWithRecognizer:theRecognizer];
  if ( self != nil ) {
     decisionNumber = <dfa.decisionNumber>;
     eot = dfa<dfa.decisionNumber>_eot;
     eof = dfa<dfa.decisionNumber>_eof;
     min = dfa<dfa.decisionNumber>_min;
     max = dfa<dfa.decisionNumber>_max;
     accept = dfa<dfa.decisionNumber>_accept;
     special = dfa<dfa.decisionNumber>_special;
     transition = dfa<dfa.decisionNumber>_transition;
  }
  return self;
}

<if(dfa.specialStateSTs)>
/* start dfa.specialStateSTs */
- (NSInteger) specialStateTransition:(NSInteger)s Stream:(id\<IntStream\>)anInput
{
<if(LEXER)>
  id\<IntStream\> input = anInput;<\n>
<endif>
<if(PARSER)>
  id\<TokenStream\> input = (id\<TokenStream\>)anInput;<\n>
<endif>
<if(TREE_PARSER)>
  id\<TreeNodeStream\> input = (id\<TreeNodeStream\>)anInput;<\n>
<endif>
  switch (s) {
     <dfa.specialStateSTs:{state |
     case <i0> : ;<! compressed special state numbers 0..n-1 !>
        <state>}; separator="\n">
  }
<if(backtracking)>
  if ( [recognizer getBacktrackingLevel] > 0 ) { [recognizer setFailed:YES]; return -1; }<\n>
<endif>
  NoViableAltException *nvae = [NoViableAltException newException:<dfa.decisionNumber> state:s
stream:recognizer.input];
   // nvae.c = s;
   /* [self error:nvae]; */ <! for debugger - do later !>
   @throw nvae;
}<\n>
/* end dfa.specialStateSTs */
<endif>

- (void) dealloc
{
   //free(transition);
   [super dealloc];
}

- (NSString *) description
{
   return @"<dfa.description>";
}

<@errorMethod()>

@end /* end DFA<dfa.decisionNumber> implementation */<\n>
#pragma mark Cyclic DFA implementation end DFA<dfa.decisionNumber>
<\n>
>>
/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber, stateNumber, edges, needErrorClause, semPredState) ::= <<
/* cyclicDFAState */
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:1];<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
NSInteger index<decisionNumber>_<stateNumber> = input.index;
[input rewind];<\n>
<endif>
s = -1;
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
[input seek:index<decisionNumber>_<stateNumber>];<\n>
<endif>
if ( s >= 0 )
   return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
```

```
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
/* cyclicDFAEdge */
if (<labelExpr><if(predicates)> && (<predicates>)<endif>) { s = <targetStateNumber>;}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n> /* eotDFAEdge */
>>

// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred, {})>)"

evalPredicate(pred,description) ::= "(<pred>)"

/*
* evalSynPredicate(pred,description) ::= "<pred>()"
*
* synpreds are broken in cyclic DFA special states
*  Damn! For now, work around with using the selectors directly, and by providing a trampoline evalSynPred
method in
*  DFA
*/
/* evalSynPredicate(pred,description) ::= "[self evaluateSyntacticPredicate:<pred>Selector stream:input]" */
evalSynPredicate(pred,description) ::= "[self evaluateSyntacticPredicate:@selector(<pred>_fragment)]"
/* evalSynPredicate(pred,description) ::= "[recognizer <pred>]" */

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "[input LA:<k>] == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(([input LA:<k>] >=
<lower>) && ([input LA:<k>] \<= <upper>))"
```

```
setTest(ranges) ::= <%
<ranges; separator="||">
%>

// A T T R I B U T E S

memVars(scope) ::= <% <scope.attributes:{a|<a.type> <a.name>;<\n>}; separator="\n"> %>

properties(scope) ::= <%
<scope.attributes:{a|@property (assign, getter=get<a.name>, setter=set<a.name>:) <a.type> <a.name>;<\n>};
separator="\n">
%>

methodsDecl(scope) ::= <%
<scope.attributes:{a|- (<a.type>)get<a.name>;<\n>- (void)set<a.name>:(<a.type>)aVal;<\n>}; separator="\n">
%>

synthesize(scope) ::= <% <scope.attributes:{a|@synthesize <a.name>;}; separator="\n"> %>

methods(scope) ::= <%
<scope.attributes:{a|
- (<a.type>)get<a.name> { return( <a.name> ); \}<\n>
- (void)set<a.name>:(<a.type>)aVal { <a.name> = aVal; \}<\n>}; separator="\n">
%>

globalAttributeScopeInterface(scope) ::= <%
/* globalAttributeScopeInterface */<\n>
@interface <scope.name>_Scope : SymbolsScope {<\n>
<if(scope.attributes)>
<memVars(scope)>
<endif>
}<\n>
<if(scope.attributes)>
/* start of globalAttributeScopeInterface properties */<\n>
<properties(scope)>
/* end globalAttributeScopeInterface properties */<\n>
<endif>

+ (<scope.name>_Scope *)new<scope.name>_Scope;<\n>
- (id) init;<\n>
<if(scope.attributes)>
/* start of globalAttributeScopeInterface methodsDecl */<\n>
<methodsDecl(scope)>
/* End of globalAttributeScopeInterface methodsDecl */<\n>
<endif>
@end /* end of <scope.name>_Scope interface */<\n>
%>
```

```
globalAttributeScopeMemVar(scope) ::= <%
/* globalAttributeScopeMemVar */<\n>
SymbolStack *<scope.name>_stack;<\n>
<scope.name>_Scope *<scope.name>_scope;<\n>
%>

globalAttributeScopeImplementation(scope) ::= <%
@implementation <scope.name>_Scope  /* globalAttributeScopeImplementation */<\n>
<if(scope.attributes)>
/* start of synthesize -- OBJC-Line 1750 */<\n>
<synthesize(scope)><\n>
<endif>
<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope<\n>
{<\n>
   return [[<scope.name>_Scope alloc] init];<\n>
}<\n>
<\n>
- (id) init<\n>
{<\n>
   self = [super init];<\n>
   return self;<\n>
}<\n>
<\n>
<if(scope.attributes)>
/* start of iterate get and set functions */<\n>
<methods(scope)><\n>
/* End of iterate get and set functions */<\n>
<endif>
@end /* end of <scope.name>_Scope implementation */<\n><\n>
%>

globalAttributeScopeInit(scope) ::= <<
/* globalAttributeScopeInit */<\n>
<scope.name>_scope = [<scope.name>_Scope new<scope.name>_Scope];<\n>
<scope.name>_stack = [SymbolStack newSymbolStackWithLen:30];<\n>
>>

globalAttributeScopeDealloc(scope) ::= <% [<scope.name>_stack release];<\n> %>

globalAttributeScope(scope) ::= <%
<if(scope.name)>
static <scope.name>_stack;<\n>
<endif>
%>

ruleAttributeScopeMemVar(scope) ::= <%
/* ObjC ruleAttributeScopeMemVar */<\n>
```

```
<if(scope.attributes)>
<scope.name>_Scope *<scope.name>_scope; /* ObjC ruleAttributeScopeMemVar */<\n>
<endif>
%>

ruleAttributeScopeInterface(scope) ::= <%
<if(scope.attributes)>
/* start of ruleAttributeScopeInterface */<\n>
@interface <scope.name>_Scope : SymbolsScope {<\n>
   <memVars(scope)><\n>
}<\n>
<\n>
/* start property declarations */<\n>
<properties(scope)><\n>
/* start method declarations */<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope;<\n>
- (id) init;<\n>
<methodsDecl(scope)><\n>
@end /* end of ruleAttributeScopeInterface */<\n><\n>
<endif>
%>

ruleAttributeScopeImplementation(scope) ::= <%
<if(scope.attributes)>
@implementation <scope.name>_Scope  /* start of ruleAttributeScopeImplementation */<\n>
<synthesize(scope)><\n>
<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope<\n>
{<\n>
   return [[<scope.name>_Scope alloc] init];<\n>
}<\n>
<\n>
- (id) init<\n>
{<\n>
   self = [super init];<\n>
   return self;<\n>
}<\n>
<\n>
/* start of <scope.name>_Scope get and set functions */<\n>
<methods(scope)><\n>
/* End of <scope.name>_Scope get and set functions */<\n>
@end /* end of ruleAttributeScopeImplementation */<\n><\n>
<endif>
%>

ruleAttributeScopeInit(scope) ::= <%
/* ruleAttributeScopeInit */<\n>
<scope.name>_scope = [<scope.name>_Scope new<scope.name>_Scope];<\n>
```

```
<scope.name>_stack = [SymbolStack newSymbolStackWithLen:30];<\n>
%>

ruleAttributeScopeDealloc(scope) ::= <% [<scope.name>_Scope release];<\n> %>

ruleAttributeScope(scope) ::= <%
<if(scope.attributes)>
/* ruleAttributeScope */<\n>
static SymbolStack *<scope.name>_stack;<\n>
static <scope.name>_Scope *<scope.name>_scope;
<endif>
%>

ruleAttributeScopeDecl(scope) ::= <%
/* ruleAttributeScopeDecl */<\n>
<if(scope.attributes)>
<scope.name>_Scope *<scope.name>_scope;<\n>
<endif>
%>

returnStructName(r) ::= "<className()>_<r.name>_return"

returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()> *
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
<else>
void
<endif>
%>

/** Generate the Objective-C type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<className()>_<referencedRule.name>_return *<else>
<if(referencedRule.hasSingleReturnValue)><referencedRule.singleValueReturnType><else>
void<endif>
<endif>
%>
```

```
delegateName(d) ::= <% <if(d.label)><d.label><else>g<d.name><endif> %>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <% <objcTypeInitMap.(typeName)> %>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
%>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScopeInterface(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
/* returnScopeInterface <ruleDescriptor:returnStructName()> */
@interface <ruleDescriptor:returnStructName()> :
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope { /* returnScopeInterface line 1838 */
<@memVars()> /* ObjC start of memVars() */<\n>
<if(scope.attributes)>
<memVars(scope)><\n>
<endif>
}
/* start property declarations */
<@properties()><\n>
<if(scope.attributes)>
<properties(scope)><\n>
<endif>
/* start of method declarations */<\n>
+ (<ruleDescriptor:returnStructName()> *)new<ruleDescriptor:returnStructName()>;
/* this is start of set and get methods */
<@methodsDecl()>  /* methodsDecl */<\n>
<if(scope.attributes)>
/* start of iterated get and set functions */<\n>
<methodsDecl(scope)><\n>
<endif>
@end /* end of returnScopeInterface interface */<\n>
<endif>
>>

returnScopeImplementation(scope) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
@implementation <ruleDescriptor:returnStructName()> /* returnScopeImplementation */<\n>
```

```
<@synthesize()> /* start of synthesize -- OBJC-Line 1837 */<\n>
<if(scope.attributes)>
  <synthesize(scope)><\n>
<endif>
+ (<ruleDescriptor:returnStructName()> *)new<ruleDescriptor:returnStructName()><\n>
{<\n>
  return [[[<ruleDescriptor:returnStructName()> alloc] init] retain];<\n>
}<\n>
<\n>
- (id) init<\n>
{<\n>
  self = [super init];<\n>
  return self;<\n>
}<\n>
<\n>
<@methods()><\n>
<if(scope.attributes)>
/* start of iterate get and set functions */<\n>
<methods(scope)><\n>
/* End of iterate get and set functions */<\n>
<endif>
<actions.(actionScope).ruleReturnMethods>
<@ruleReturnMembers()><\n>
@end /* end of returnScope implementation */<\n><\n>
<endif>
%>

parameterScope(scope) ::= <<
<! <scope.attributes:{it | :(<it.type>)<it.name>}; separator=" "> !>
<first(scope.attributes):{ a | :(<a.type>)<a.name>}> <rest(scope.attributes):{ a | arg<i>:(<a.type>)<a.name> };
separator=" ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>;"

/** Note that the scopeAttributeRef does not have access to the
* grammar name directly
*/
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
([((<scope>_Scope *)[<scope>_stack objectAtIndex:[<scope>_stack size]-<negIndex>-1)]).<attr.name>
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name>
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name>
<endif>
```

```
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
/* scopeSetAttributeRef */
<if(negIndex)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:([<scope>_stack size]-<negIndex>-1)]).<attr.name> = <expr>;
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name> = <expr>;
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name> = <expr>;
<endif>
<endif>
%>

scopeAttributeRefStack() ::= <<
/* scopeAttributeRefStack */
<if(negIndex)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:[<scope>_stack count]-<negIndex>-1]).<attr.name> = <expr>;
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name> = <expr>;
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name> = <expr>;
<endif>
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=nil?<scope>.<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>  /* added to returnAttributeRef */<\n>
<else>
```

```
<attr.name><\n>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>; /* added to returnSetAttributeRef */<\n>
<else>
<attr.name> = <expr>;<\n>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"



/* not sure the next are the right approach; and they are evaluated early; */
/* they cannot see TREE_PARSER or PARSER attributes for example. :( */

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=nil?<scope>.text:nil)"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=nil?<scope>.type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=nil?<scope>.line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=nil?<scope>.charPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=nil?<scope>.channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=nil?[<scope> getTokenIndex]:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=nil?[<scope>.text integerValue]:0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=nil?((<labelType> *)<scope>.start):nil)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=nil?((<labelType> *)<scope>.stopToken):nil)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>!=nil?((<ASTLabelType> *)<scope>.tree):nil)"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=nil?[[input getTokenStream] toStringFromStart:[[input getTreeAdaptor] getTokenStartIndex:[<scope>
getStart]]
    ToEnd:[[input getTreeAdaptor] getTokenStopIndex:[<scope> getStart]]]:0)
<else>
(<scope>!=nil?([input toStringFromToken:[<scope> getStart] ToToken:[<scope> getStop]]:0)
<endif>
%>
ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=nil?[<scope> st]:nil)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"
```

```
lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>!=nil?<scope>.type:0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>!=nil?<scope>.line:0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=nil?<scope>.charPositionInLine:-1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=nil?<scope>.channel:0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>!=nil?[<scope> getTokenIndex]:0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>!=nil?<scope>.text:nil)"
lexerRuleLabelPropertyRef_int(scope,attr) ::="(<scope>!=nil?[<scope>.text integerValue]:0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "((<labelType> *)retval.start)"
rulePropertyRef_stop(scope,attr) ::= "((<labelType> *)retval.stopToken)"
rulePropertyRef_tree(scope,attr) ::= "((<ASTLabelType> *)retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
[[input getTokenStream] toStringFromStart:[[input getTreeAdaptor]
getTokenStartIndex:retval.start.token.startIndex]
                    ToEnd:[[input getTreeAdaptor] getTokenStopIndex:retval.start.token.stopIndex]]
<else>
[input toStringFromToken:retval.start ToToken:[input LT:-1]]
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

/* hideous: find a way to cut down on the number of templates to support read/write access */
/* TODO: also, which ones are valid to write to? ask Ter */
lexerRuleSetPropertyRef_text(scope,attr,expr) ::= "state.text = <expr>;"
lexerRuleSetPropertyRef_type(scope,attr,expr) ::= "_type"
lexerRuleSetPropertyRef_line(scope,attr,expr) ::= "state.tokenStartLine"
lexerRuleSetPropertyRef_pos(scope,attr,expr) ::= "state.tokenStartCharPositionInLine"
lexerRuleSetPropertyRef_index(scope,attr,expr) ::= "-1" /* undefined token index in lexer */
lexerRuleSetPropertyRef_channel(scope,attr,expr) ::= "state.channel=<expr>;"
lexerRuleSetPropertyRef_start(scope,attr,expr) ::= "state.tokenStartCharIndex"
lexerRuleSetPropertyRef_stop(scope,attr,expr) ::= "(input.index-1)"


lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "state.type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(input.index-1)"
lexerRulePropertyRef_int(scope,attr) ::= "[<scope>.text integerValue]"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.start =<expr>;"
```

```
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;" /* "<\n>#error StringTemplates are
unsupported<\n>" */


/** How to execute an action */
execAction(action) ::= <<
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
  <action>
}
<else>
<action>
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
static ANTLRBitSet *<name>;
static const unsigned long long <name>_data[] = { <words64:{it | <it>LL};separator=", ">};<\n>
>>

bitsetInit(name, words64) ::= <<
<name> = [[ANTLRBitSet newBitSetWithBits:(const unsigned long long *)<name>_data
Count:(NSUInteger)<length(words64)>] retain];<\n>
>>

codeFileExtension() ::= ".m"

true_value() ::= "YES"
false_value() ::= "NO"
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/ObjC.stg

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*/

```
group Perl5;

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
           docComment, recognizer,
           name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
<if(TREE_PARSER)>
<endif>
<if(backtracking)>
<endif>
<@end>

<docComment>
<recognizer>
>>
```

```
lexer(grammar, name, tokens, scopes, rules, numRules, labelType="Token",
    filterMode, superClass="ANTLR::Runtime::Lexer")  ::= <<
package <name>;

use Carp;
use English qw( -no_match_vars ) ;
use Readonly;
use Switch;

use ANTLR::Runtime::BaseRecognizer;
use ANTLR::Runtime::DFA;
use ANTLR::Runtime::NoViableAltException;

use Moose;

extends 'ANTLR::Runtime::Lexer';

Readonly my $HIDDEN => ANTLR::Runtime::BaseRecognizer->HIDDEN;
sub HIDDEN { $HIDDEN }

use constant {
  <tokens:{ <it.name> => <it.type>, }; separator="\n">
};
<scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
<actions.lexer.members>

sub BUILD {
  my ($self, $arg_ref) = @_;

  $self->init_dfas();
}

sub get_grammar_file_name {
  return "<fileName>";
}

<if(filterMode)>
<filteringNextToken()>
<endif>
<rules; separator="\n\n">

<synpreds:{p | <lexerSynpred(p)>}>

<cyclicDFAs:{dfa | has 'dfa<dfa.decisionNumber>';}; separator="\n">

sub init_dfas {
  my ($self) = @_;
```

```
   <cyclicDFAs:{dfa |
   $self->dfa<dfa.decisionNumber>(<name>::DFA<dfa.decisionNumber>->new({ recognizer => $self }));
   }; separator="\n">

   return;
}

<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

no Moose;
__PACKAGE__->meta->make_immutable();
1;

>>

perlTypeInitMap ::= [
 "$":"undef",
 "@":"()",
 "%":"()",
 default:"undef"
]

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public Token nextToken() {
   while (true) {
       if ( input.LA(1)==CharStream.EOF ) {
           return Token.EOF_TOKEN;
       }
       token = null;
 channel = Token.DEFAULT_CHANNEL;
       tokenStartCharIndex = input.index();
       tokenStartCharPositionInLine = input.getCharPositionInLine();
       tokenStartLine = input.getLine();
 text = null;
       try {
           int m = input.mark();
           backtracking=1; <! means we won't throw slow exception !>
           failed=false;
           mTokens();
           backtracking=0;
           <! mTokens backtracks with synpred at backtracking==2
              and we set the synpredgate to allow actions at level 1. !>
```

```
            if ( failed ) {
                input.rewind(m);
                input.consume(); <! advance one char and try again !>
            }
            else {
                emit();
                return token;
            }
        }
        catch (RecognitionException re) {
            // shouldn't happen in backtracking mode, but...
            reportError(re);
            recover(re);
        }
    }
}

public void memoize(IntStream input,
  int ruleIndex,
  int ruleStartIndex)
{
if ( backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

public boolean alreadyParsedRule(IntStream input, int ruleIndex) {
if ( backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>

actionGate() ::= "$self->state->backtracking==0"

filteringActionGate() ::= "backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass, filterMode,
              ASTLabelType="Object", labelType, members) ::= <<
package <name>;

use English qw( -no_match_vars ) ;
use Readonly;
use Switch;
use Carp;
use ANTLR::Runtime::BitSet;

use Moose;
```

```
extends '<@superClassName><superClass><@end>';

Readonly my $token_names => [
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
];

use constant {
<tokens:{ <it.name> => <it.type>, }; separator="\n">
};

<bitsets:bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
                words64=it.bits)>

<scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
<@members>
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>

sub BUILD {
  my ($self, $arg_ref) = @_;

<if(backtracking)>
  $self->state->rule_memo({});<\n>
<endif>
}
<@end>

sub get_token_names {
  return $token_names;
}

sub get_grammar_file_name {
  return "<fileName>";
}

<members>

<rules; separator="\n\n">

<synpreds:{p | <synpred(p)>}>

<cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = __PACKAGE__::DFA<dfa.decisionNumber>->new($self);};
separator="\n">
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

no Moose;
__PACKAGE__->meta->make_immutable();
1;
__END__
```

```
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType,
superClass="ANTLR::Runtime::Parser", labelType="ANTLR::Runtime::Token",
members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ANTLR::Runtime::TokenStream", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules, numRules, bitsets,
labelType={<ASTLabelType>}, ASTLabelType="Object", superClass="ANTLR::Runtime::TreeParser",
members={<actions.treeparser.members>}, filterMode) ::= <<
<genericParser(inputStreamType="TreeNodeStream", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start <ruleName>
sub <ruleName>_fragment {
# <ruleDescriptor.parameterScope:parameterScope(scope=it)>

<if(trace)>
   $self->traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
   eval {
       <block>
   };
   $self->traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
   if ($EVAL_ERROR) {
       croak $EVAL_ERROR;
   }
<else>
   <block>
<endif>
}
# $ANTLR end <ruleName>
>>

synpred(name) ::= <<
public final boolean <name>() {
   backtracking++;
   <@start()>
   int start = input.mark();
   try {
       <name>_fragment(); // can never throw exception
   } catch (RecognitionException re) {
       System.err.println("impossible: "+re);
   }
   boolean success = !failed;
   input.rewind(start);
   <@stop()>
   backtracking--;
   failed=false;
   return success;
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) { return <ruleReturnValue()>; }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>
if ($self->state->failed) {
   return <ruleReturnValue()>;
}
<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (backtracking>0) {failed=true; return <ruleReturnValue()>;}<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>
```

```
# $ANTLR start <ruleName>
# <fileName>:<description>
sub <ruleName>() {
  my ($self, <ruleDescriptor.parameterScope:parameterScope(scope=it)>) = @_;
  <if(trace)>$self->traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
  <@preamble()>
  eval {
    <ruleMemoization(name=ruleName)>
    <block>
    <ruleCleanUp()>
    <(ruleDescriptor.actions.after):execAction()>
  };
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  my $exception = $EVAL_ERROR;
  if (ref $exception && $exception->isa('ANTLR::Runtime::RecognitionException')) {
    $self->report_error($exception);
    $self->recover($self->input, $exception);
    $exception = undef;
  }<\n>
<endif>
<endif>
<endif>
  <if(trace)>$self->traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
  if ($exception) {
    croak $exception;
    #$exception->rethrow();
  }
  <@postamble()>
  return <ruleReturnValue()>;
}
# $ANTLR end <ruleName>
>>

catch(decl,action) ::= <<
catch (<e.decl>) {
   <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
my $retval = <returnType()>->new();
$retval->set_start($self->input->LT(1));<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
my $<a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
my $<ruleDescriptor.name>_start_index = $self->input->index();
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{<it>_stack.push(new <it>_scope());}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>_stack.push(new <it.name>_scope());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>_stack.pop();}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
   :{my $<it.label.text> = undef;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
   :{List list_<it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|RuleReturnScope <ll.label.text> = null;}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{<labelType> <it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.charLabels:{my $<it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{List list_<it.label.text>=null;}; separator="\n"
>
>>

ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
$<ruleDescriptor.singleValueReturnName>
<else>
$retval
<endif>
<endif>
<endif>
>>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
$retval->set_stop($self->input->LT(-1));<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start <ruleName>
sub m_<ruleName> {
# <ruleDescriptor.parameterScope:parameterScope(scope=it)>
   my ($self) = @_;
   <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
   <ruleDeclarations()>
   eval {
<if(nakedBlock)>
       <ruleMemoization(name=ruleName)>
       <lexerRuleLabelDefs()>
       <ruleDescriptor.actions.init>
```

```
        <block><\n>
<else>
        my $_type = <ruleName>;
        my $_channel = $self->DEFAULT_TOKEN_CHANNEL;
        <ruleMemoization(name=ruleName)>
        <lexerRuleLabelDefs()>
        <ruleDescriptor.actions.init>
        <block>
        <ruleCleanUp()>
        $self->state->type($_type);
        $self->state->channel($_channel);
        <(ruleDescriptor.actions.after):execAction()>
<endif>
    };
    <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
    <memoize()>

    if ($EVAL_ERROR) {
        croak $EVAL_ERROR;
    }
}
# $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
sub m_tokens {
    my ($self) = @_;
    <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
my $alt<decisionNumber> = <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch ($alt<decisionNumber>) {
    <alts:altSwitchCase()>
}
```

```
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
my $alt<decisionNumber> = <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch ($alt<decisionNumber>) {
  <alts:altSwitchCase()>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
# <fileName>:<description>
my $cnt<decisionNumber> = 0;
<decls>
<@preloop()>
LOOP<decisionNumber>:
while (1) {
  my $alt<decisionNumber> = <maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch ($alt<decisionNumber>) {
    <alts:altSwitchCase()>
    else {
        if ( $cnt<decisionNumber> >= 1 ) { last LOOP<decisionNumber> }
        <ruleBacktrackFailure()>
          my $eee =
              ANTLR::Runtime::EarlyExitException->new(<decisionNumber>, $self->input);
          <@earlyExitException()>
          croak $eee;
      }
  }
  ++$cnt<decisionNumber>;
}
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
<@preloop()>
LOOP<decisionNumber>:
while (1) {
  my $alt<decisionNumber> = <maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch ($alt<decisionNumber>) {
    <alts:altSwitchCase()>
    else { last LOOP<decisionNumber> }
  }
}
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
```

```
*/
altSwitchCase() ::= <<
case <i> {
   <@prealt()>
   <it>
}<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
# <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element() ::= <<
<@prematch()>
<it.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>$<label> =<endif>$self->match($self->input, <token>,
$FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new ArrayList();
list_<label>.add(<elem>);<\n>
```

```
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = $self->input->LA(1);<\n>
<endif>
$self->match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = $self->input->LA(1);<\n>
<endif>
$self->match_range(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= $self->input->LA(1);<\n>
<else>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
<endif>
if ( <s> ) {
  $self->input->consume();
  <postmatchCode>
<if(!LEXER)>
  $self->state->error_recovery(0);
<endif>
  <if(backtracking)>failed=false;<endif>
}
else {
  <ruleBacktrackFailure()>
  my $mse =
     ANTLR::Runtime::MismatchedSetException->new(undef, $self->input);
  <@mismatchedSetException()>
<if(LEXER)>
  $self->recover($mse);
  $mse->throw();
<else>
  $mse->throw();
  <! use following code to make it recover inline; remove throw mse;
  $self->recoverFromMismatchedSet($self->input, $mse, $FOLLOW_set_in_<ruleName><elementIndex>);
  !>
<endif>
}<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
int <label>Start = getCharIndex();
$self->match(<string>); <checkRuleBacktrackFailure()>
<labelType> <label> = new CommonToken(input, Token.INVALID_TOKEN_TYPE,
Token.DEFAULT_CHANNEL, <label>Start, getCharIndex()-1);
<else>
$self->match(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(label,elementIndex) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(label,elementIndex) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = $self->input->LA(1);<\n>
<endif>
matchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>
```

```
/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
$self->push_follow($FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)>
$<label> = $self-><rule.name>(<args; separator=", ">);<\n>
<else>
$self-><rule.name>(<args; separator=", ">);<\n>
<endif>
$self->state->_fsp($self->state->_fsp - 1);
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
$self->m_<rule>(<args; separator=", ">); <checkRuleBacktrackFailure()>
<label> = new CommonToken(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
<else>
$self->m_<rule.name>(<args; separator=", ">); <checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
match(EOF); <checkRuleBacktrackFailure()>
```

```
<labelType> <label> = new CommonToken(input, EOF, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
<else>
match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
   match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
   <children:element()>
   match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
   <ruleBacktrackFailure()>
   throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels">
else {
<if(eotPredictsAlt)>
   $alt<decisionNumber> = <eotPredictsAlt>;
<else>
   <ruleBacktrackFailure()>
   my $nvae =
       ANTLR::Runtime::NoViableAltException->new({
           grammar_decision_description => "<description>",
        decision_number => <decisionNumber>,
        state_number => <stateNumber>,
        input => $self->input,
    });<\n>
  <@noViableAltException()>
  croak $nvae;<\n>
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels"><\n>
<if(eotPredictsAlt)>
<if(!edges)>
$alt<decisionNumber> = <eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
  $alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "$alt<decisionNumber> = <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
```

```
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
   <targetState>
}
>>

// Fixed DFA (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
   <edges; separator="\n">
   else {
   <if(eotPredictsAlt)>
       $alt<decisionNumber> = <eotPredictsAlt>;
   <else>
       <ruleBacktrackFailure()>
       my $nvae =
           ANTLR::Runtime::NoViableAltException->new({
               grammar_decision_description => "<description>",
               decision_number => <decisionNumber>,
               state_number => <stateNumber>,
               input => $self->input,
           });<\n>
       <@noViableAltException()>
       croak $nvae;<\n>
   <endif>
   }
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
   <edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
else { $alt<decisionNumber> = <eotPredictsAlt> }<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
```

```
case [<labels:{ <it> }; separator=", ">] { <targetState> }
>>

// Cyclic DFA

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
$alt<decisionNumber> = $self->dfa<decisionNumber>->predict($self->input);
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
Readonly my $DFA<dfa.decisionNumber>_eot => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedEOT; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_eof => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedEOF; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_min => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedMin; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_max => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedMax; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_accept => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedAccept; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_special => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedSpecial; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_transition => [
<dfa.javaCompressedTransition:{s|ANTLR::Runtime::DFA->unpack_rle([ <s; separator=", "> ])}; separator=", "> ];

{
package <name>::DFA<dfa.decisionNumber>;
use ANTLR::Runtime::Class;

use strict;
use warnings;

extends 'ANTLR::Runtime::DFA';

sub BUILD {
  my $self = shift;
  my $param_ref = __PACKAGE__->unpack_params(@_, {
      spec => [
          {
              name => 'recognizer',
              isa  => 'ANTLR::Runtime::BaseRecognizer'
          },
      ]
  });

  $self->recognizer($param_ref->{recognizer});
  $self->decision_number(<dfa.decisionNumber>);
  $self->eot($DFA<dfa.decisionNumber>_eot);
  $self->eof($DFA<dfa.decisionNumber>_eof);
  $self->min($DFA<dfa.decisionNumber>_min);
  $self->max($DFA<dfa.decisionNumber>_max);
  $self->accept($DFA<dfa.decisionNumber>_accept);
  $self->special($DFA<dfa.decisionNumber>_special);
  $self->transition($DFA<dfa.decisionNumber>_transition);
}

sub get_description {
  return "<dfa.description>";
}

<@errorMethod()>

<if(dfa.specialStateSTs)>
sub special_state_transition {
  my ($self, $param_ref) = unpack_params(@_, {
      spec => [
          {
              name => 's',
              type => SCALAR,
          },
          {
              name => 'input',
              isa  => 'ANTLR::Runtime::IntStream',
          }
      ]
  });
  my $s = $param_ref->{s};
  my $input = $param_ref->{input};

  switch ($s) {
      <dfa.specialStateSTs:{state |
      case <i0> \{ <! compressed special state numbers 0..n-1 !>
          <state>}; separator="\n">
      }
  }

<if(backtracking)>
  if ($self->state->backtracking > 0) {
      $self->state->failed = 1;
      return -1;
  }<\n>
<endif>

  my $nvae =
      ANTLR::Runtime::NoViableAltException->new({
          grammar_decision_description => $self->get_description(),
          decision_number => <dfa.decisionNumber>,
          state_number => $s,
          input => $input,
      });<\n>
  $self->error($nvae);
  $nvae->throw();
  }<\n>
<endif>
}<\n>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
my $input = $self->input;
my $LA<decisionNumber>_<stateNumber> = $input->LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
my $index<decisionNumber>_<stateNumber> = $input->index();
$input->rewind();<\n>
<endif>
s = -1;
<edges; separator="\nels">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);<\n>
<endif>
if ( s>=0 ) return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>
```

```
/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left> && <right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "<pred>"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "$LA<decisionNumber>_<stateNumber> eq <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "$self->input->LA(<k>) eq <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
($LA<decisionNumber>_<stateNumber> ge <lower> && $LA<decisionNumber>_<stateNumber> le <upper>)
>>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "($self->input->LA(<k>) ge
<lower> && $self->input->LA(<k>) le <upper>)"

setTest(ranges) ::= "<ranges; separator=\" || \">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
  <scope.attributes:{<it.decl>;}; separator="\n">
}
protected Stack <scope.name>_stack = new Stack();<\n>
<endif>
>>
```

```
ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
   <scope.attributes:{<it.decl>;}; separator="\n">
}
protected Stack <scope.name>_stack = new Stack();<\n>
<endif>
>>

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.name>_return
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "undef".
*/
initValue(typeName) ::= <<
<if(typeName)>
<perlTypeInitMap.(typeName)>
<else>
undef
<endif>
>>

/** Define a rule label including default value */
```

```
ruleLabelDef(label) ::= <<
my $<label.label.text> = <initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
>>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
{
   package <returnType()>;
   use ANTLR::Runtime::Class;

   extends 'ANTLR::Runtime::<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope';

   <scope.attributes:{public <it.decl>;}; separator="\n">
   <@ruleReturnMembers()>
}
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{$<it.name>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "$<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "$<attr.name> =<expr>;"

scopeAttributeRef(scope,attr,index,negIndex) ::= <<
<if(negIndex)>
((<scope>_scope)<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1)).<attr.name>
<else>
<if(index)>
((<scope>_scope)<scope>_stack.elementAt(<index>)).<attr.name>
<else>
((<scope>_scope)<scope>_stack.peek()).<attr.name>
<endif>
<endif>
>>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <<
<if(negIndex)>
((<scope>_scope)<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1)).<attr.name> =<expr>;
<else>
<if(index)>
((<scope>_scope)<scope>_stack.elementAt(<index>)).<attr.name> =<expr>;
<else>
```

```
((<scope>_scope)<scope>_stack.peek()).<attr.name> =<expr>;
<endif>
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
$<scope>.<attr.name>
<else>
$<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
$<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>;
<else>
$<attr.name> =<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "$<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "$<scope>->get_text()"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.getType()"
tokenLabelPropertyRef_line(scope,attr) ::= "<scope>.getLine()"
```

```
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.getCharPositionInLine()"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.getChannel()"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.getTokenIndex()"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "((<labelType>)<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr) ::= "((<labelType>)<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::= "((<ASTLabelType>)<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
 input.getTreeAdaptor().getTokenStopIndex(<scope>.start))
<else>
substr($self->input, $<scope>->start, $<scope>->stop)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "$<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "<scope>.getType()"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "<scope>.getLine()"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "<scope>.getCharPositionInLine()"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "<scope>.getChannel()"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "<scope>.getTokenIndex()"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "<scope>.getText()"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "((<labelType>)retval.start)"
rulePropertyRef_stop(scope,attr) ::= "((<labelType>)retval.stop)"
rulePropertyRef_tree(scope,attr) ::= "((<ASTLabelType>)retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "$_type"
lexerRulePropertyRef_line(scope,attr) ::= "tokenStartLine"
```

```
lexerRulePropertyRef_pos(scope,attr) ::= "tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "$_channel"
lexerRulePropertyRef_start(scope,attr) ::= "tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_self(scope,attr) ::= "$self"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"


/** How to execute an action */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
if ( backtracking==0 ) {
 <action>
}
<endif>
<else>
<action>
<endif>
>>

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
Readonly my $<name> => ANTLR::Runtime::BitSet->new({ words64 => [ <words64:{'<it>'};separator=", "> ]
});<\n>
>>

codeFileExtension() ::= ".pm"

true() ::= "1"
false() ::= "0"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Perl5/Perl5.stg
No license file was found, but licenses were detected in source scan.

/*

```
/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType> _first_0 = null;
<ASTLabelType> _last = null;<\n>
<endif>
>>
```

```
/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = _first_0;
if ( adaptor.getParent(retval.tree)!=null && adaptor.isNil( adaptor.getParent(retval.tree) ) )
 retval.tree = (<ASTLabelType>)adaptor.getParent(retval.tree);
<endif>
<if(backtracking)>}<endif>
<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
  enclosingTreeLevel, treeLevel) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = null;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> =
(<ASTLabelType>)<root.el.label>.getTree();
<elseif(root.el.label)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
 match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
 <children:element()>
 match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
<else>
<super.tree(...)>
<endif>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
<else>
<super.tokenRef(...)>
<endif>
>>
```

```
/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabel(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.dupTree(<label>);
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>

// SET AST

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSet(...)>
<endif>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
```

```
<else>
<super.matchSetBang(...)>
<endif>
>>

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.getTree());
<else> <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = (<ASTLabelType>)<label>.getTree();
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabel(label, {<label>.getTree()})>
```

```
<else>
<super.ruleRefAndListLabel(...)>
<endif>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.becomeRoot(<label>.getTree(), root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.getTree()})>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
<endif>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
```

```
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRootTrack(...)>
<endif>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/ASTTreeParser.stg

No license file was found, but licenses were detected in source scan.

```
asTypeInitMap ::= [
 "int":"0",
 "uint":"0",
 "Number":"0.0",
 "Boolean":"false",
 default:"null" // anything other than an atomic type
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
          docComment, recognizer,
          name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
package<if(actions.(actionScope).package)> <actions.(actionScope).package><endif> {
   <actions.(actionScope).header>
   <@imports>
import org.antlr.runtime.*;
```

```
<if(TREE_PARSER)>
   import org.antlr.runtime.tree.*;
<endif>
   <@end>

   <docComment>
   <recognizer>
}
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="Token",
     superClass="Lexer") ::= <<
public class <grammar.recognizerName> extends
<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else><@superClassName><superClass
><@end><endif> {
   <tokens:{it |public static const <it.name>:int=<it.type>;}; separator="\n">
   <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
   <actions.lexer.members>

   // delegates
   <grammar.delegates:
        {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
   // delegators
   <grammar.delegators:
        {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
   <last(grammar.delegators):{g|public var gParent:<g.recognizerName>;}>

   public function <grammar.recognizerName>(<grammar.delegators:{g|<g:delegateName()>:<g.recognizerName>,
}>input:CharStream = null, state:RecognizerSharedState = null) {
       super(input, state);
       <cyclicDFAs:cyclicDFACtor()>
<if(memoize)>
<if(grammar.grammarIsRoot)>
       this.state.ruleMemo = new Array(<numRules>+1);<\n> <! index from 1..n !>
<endif>
<endif>
       <grammar.directDelegates:
        {g|<g:delegateName()> = new <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>this,
input, this.state);}; separator="\n">
       <grammar.delegators:
        {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
       <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
   }
   public override function get grammarFileName():String { return "<fileName>"; }

<if(filterMode)>
   <filteringNextToken()>
<endif>
```

```
   <rules; separator="\n\n">

   <synpreds:{p | <lexerSynpred(p)>}>

   <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public override function nextToken():Token {
   while (true) {
       if ( input.LA(1)==CharStreamConstants.EOF ) {
           return TokenConstants.EOF_TOKEN;
       }
       this.state.token = null;
     this.state.channel = TokenConstants.DEFAULT_CHANNEL;
       this.state.tokenStartCharIndex = input.index;
       this.state.tokenStartCharPositionInLine = input.charPositionInLine;
       this.state.tokenStartLine = input.line;
     this.state.text = null;
       try {
           var m:int = input.mark();
           this.state.backtracking=1; <! means we won't throw slow exception !>
           this.state.failed=false;
           mTokens();
           this.state.backtracking=0;
           <! mTokens backtracks with synpred at backtracking==2
              and we set the synpredgate to allow actions at level 1. !>
           if ( this.state.failed ) {
               input.rewindTo(m);
               input.consume(); <! advance one char and try again !>
           }
           else {
               emit();
               return this.state.token;
           }
       }
       catch (re:RecognitionException) {
           // shouldn't happen in backtracking mode, but...
           reportError(re);
           recover(re);
```

```
        }
    }
    // Not reached - For ActionScript compiler
    throw new Error();
}

public override function memoize(input:IntStream,
  ruleIndex:int,
  ruleStartIndex:int):void
{
if ( this.state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

public override function alreadyParsedRule(input:IntStream, ruleIndex:int):Boolean {
if ( this.state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>

actionGate() ::= "this.state.backtracking==0"

filteringActionGate() ::= "this.state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
             bitsets, inputStreamType, superClass,
             labelType, members, rewriteElementType,
             filterMode, ASTLabelType="Object") ::= <<
public class <grammar.recognizerName> extends
<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else><@superClassName><superClass
><@end><endif> {
<if(grammar.grammarIsRoot)>
    public static const tokenNames:Array = [
        "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
    ];<\n>
<endif>
    <tokens:{it |public static const <it.name>:int=<it.type>;}; separator="\n">

    // delegates
    <grammar.delegates: {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
    // delegators
    <grammar.delegators:
        {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
    <last(grammar.delegators):{g|public var gParent:<g.recognizerName>;}>

    <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
    <@members>
  <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
    public function <grammar.recognizerName>(<grammar.delegators:{g|<g:delegateName()>:<g.recognizerName>,
}>input:<inputStreamType>, state:RecognizerSharedState = null) {
        super(input, state);
        <cyclicDFAs:cyclicDFACtor()>
        <parserCtorBody()>
        <grammar.directDelegates:
        {g|<g:delegateName()> = new <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>this,
input, this.state);}; separator="\n">
        <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
        <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
    }
    <@end>

    public override function get tokenNames():Array { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; }
    public override function get grammarFileName():String { return "<fileName>"; }

    <members>

    <rules; separator="\n\n">

    <! generate rule/method definitions for imported rules so they
       appear to be defined in this recognizer. !>
       // Delegated rules
    <grammar.delegatedRules:{ruleDescriptor|
        public function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>):<returnType()> {
<if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope.attribut
es:{a|<a.name>}; separator=", ">); \}}; separator="\n">

    <synpreds:{p | <synpred(p)>}>

    <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

    <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
                        words64=it.bits)>}>
}
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new Array(<length(grammar.allImportedRules)>+1);<\n> <! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
```

```
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType="Object",
superClass="Parser", labelType="Token", members={<actions.parser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TokenStream", superClass,
            labelType, members, "Token",
            false, ASTLabelType)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
         numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
         superClass="TreeParser", members={<actions.treeparser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TreeNodeStream", superClass,
            labelType, members, "Node",
            filterMode, ASTLabelType)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
public final function <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>):void {
  <ruleLabelDefs()>
<if(trace)>
  traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
  try {
      <block>
  }
  finally {
      traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  }
<else>
  <block>
<endif>
}
// $ANTLR end <ruleName>
>>
```

```
synpred(name) ::= <<
public final function <name>():Boolean {
  this.state.backtracking++;
  <@start()>
  var start:int = input.mark();
  try {
      <name>_fragment(); // can never throw exception
  } catch (re:RecognitionException) {
      trace("impossible: "+re);
  }
  var success:Boolean = !this.state.failed;
  input.rewindTo(start);
  <@stop()>
  this.state.backtracking--;
  this.state.failed=false;
  return success;
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( this.state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) { return <ruleReturnValue()>;
}
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (this.state.failed) return <ruleReturnValue()>;<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (this.state.backtracking>0) {this.state.failed=true; return <ruleReturnValue()>;}<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
// $ANTLR start <ruleName>
// <fileName>:<description>
```

```
public final function <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>):<returnType()> {
   <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
   <@preamble()>
   try {
       <ruleMemoization(name=ruleName)>
       <block>
       <ruleCleanUp()>
       <(ruleDescriptor.actions.after):execAction()>
   }
<if(exceptions)>
   <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
   <actions.(actionScope).rulecatch>
<else>
   catch (re:RecognitionException) {
       reportError(re);
       recoverStream(input,re);
       <@setErrorReturnValue()>
   }<\n>
<endif>
<endif>
<endif>
   finally {
       <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
       <memoize()>
       <ruleScopeCleanUp()>
       <finally>
   }
   <@postamble()>
   return <ruleReturnValue()>;
}
// $ANTLR end <ruleName>
>>

catch(decl,action) ::= <<
catch (<e.decl>) {
   <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
```

```
var retval:<returnType()> = new <returnType()>();
retval.start = input.LT(1);<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
var <a.name>:<a.type> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
var <ruleDescriptor.name>_StartIndex:int = input.index;
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.push(new Object());}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.push(new Object());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.pop();}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it |var <it.label.text>:<labelType>=null;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it |var list_<it.label.text>:Array=null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|var <ll.label.text>:RuleReturnScope = null;}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |var <it.label.text>:<labelType>=null;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |var <it.label.text>:int;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |var list_<it.label.text>:Array=null;}; separator="\n"
>
>>

ruleReturnValue() ::= <%
```

```
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = input.LT(-1);<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( this.state.backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start <ruleName>
public final function m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>):void {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  try {
<if(nakedBlock)>
    <ruleMemoization(name=ruleName)>
    <lexerRuleLabelDefs()>
    <ruleDescriptor.actions.init>
    <block><\n>
<else>
    var _type:int = <ruleName>;
    var _channel:int = DEFAULT_TOKEN_CHANNEL;
    <ruleMemoization(name=ruleName)>
    <lexerRuleLabelDefs()>
    <ruleDescriptor.actions.init>
```

```
        <block>
        <ruleCleanUp()>
        this.state.type = _type;
        this.state.channel = _channel;
        <(ruleDescriptor.actions.after):execAction()>
<endif>
    }
    finally {
        <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
        <ruleScopeCleanUp()>
        <memoize()>
    }
}
// $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
public override function mTokens():void {
    <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber>:int=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>) {
    <alts:{a | <altSwitchCase(i, a)>}>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber>:int=<maxAlt>;
<decls>
<@predecision()>
```

```
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
   <alts:{a | <altSwitchCase(i, a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var cnt<decisionNumber>:int=0;
<decls>
<@preloop()>
loop<decisionNumber>:
do {
   var alt<decisionNumber>:int=<maxAlt>;
   <@predecision()>
   <decision>
   <@postdecision()>
   switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i, a)>}>
 default :
     if ( cnt<decisionNumber> >= 1 ) break loop<decisionNumber>;
     <ruleBacktrackFailure()>
           throw new EarlyExitException(<decisionNumber>, input);
           <! Need to add support for earlyExitException debug hook !>
   }
   cnt<decisionNumber>++;
} while (true);
<@postloop()>
```

```
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
loop<decisionNumber>:
do {
   var alt<decisionNumber>:int=<maxAlt>;
   <@predecision()>
   <decision>
   <@postdecision()>
   switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i, a)>}>
 default :
     break loop<decisionNumber>;
   }
} while (true);
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum, alt) ::= <<
case <altNum> :
   <@prealt()>
   <alt>
   break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
```

```
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label>=<labelType>(<endif>matchStream(input,<token>,FOLLOW_<token>_in_<ruleName><element
Index>)<if(label)>)<endif>; <checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new Array();
list_<label>.push(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
```

```
<if(label)>
<label> = input.LA(1);<\n>
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1);<\n>
<else>
<label>=<labelType>(input.LT(1));<\n>
<endif>
<endif>
if ( <s> ) {
  input.consume();
  <postmatchCode>
<if(!LEXER)>
  this.state.errorRecovery=false;
<endif>
  <if(backtracking)>this.state.failed=false;<endif>
}
else {
  <ruleBacktrackFailure()>
  <@mismatchedSetException()>
<if(LEXER)>
  throw recover(new MismatchedSetException(null,input));<\n>
<else>
  throw new MismatchedSetException(null,input);
  <! use following code to make it recover inline; remove throw mse;
  recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
  !>
<endif>
}<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
var <label>Start:int = charIndex;
```

```
matchString(<string>); <checkRuleBacktrackFailure()>
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int = charPositionInLine;
<label> = CommonToken.createFromStream(input, TokenConstants.INVALID_TOKEN_TYPE,
TokenConstants.DEFAULT_CHANNEL, <label>Start, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
matchString(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=<labelType>(input.LT(1));<\n>
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(label, label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
matchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*
* GMS: Note:  do not use post-decrement operator!  ASC produces bad code for exceptions in this case.
*      See: https://bugs.adobe.com/jira/browse/ASC-3625
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
```

```
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);<\n>
state._fsp = state._fsp - 1;
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
var <label>Start<elementIndex>:int = charIndex;
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int = charPositionInLine;
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<label> = CommonToken.createFromStream(input, TokenConstants.INVALID_TOKEN_TYPE,
TokenConstants.DEFAULT_CHANNEL, <label>Start<elementIndex>, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
var <label>Start<elementIndex>:int = charIndex;
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int = charPositionInLine;
match(EOF); <checkRuleBacktrackFailure()>
```

```
var <label>:<labelType> = CommonToken.createFromStream(input, EOF,
TokenConstants.DEFAULT_CHANNEL, <label>Start<elementIndex>, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                       ::= "var <recRuleArg()>:int"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==TokenConstants.DOWN ) {
   matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
   <children:element()>
   matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
}
<else>
matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(pred,description)>) ) {
   <ruleBacktrackFailure()>
   throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
```

```
<edges; separator="\nelse ">
else {
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  throw new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);<\n>
  <! Need to add hook for noViableAltException() !>
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
  alt<decisionNumber>=<eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
```

```
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
   <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
   alt<decisionNumber>=<eotPredictsAlt>;
<else>
   <ruleBacktrackFailure()>
   throw new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);<\n>
   <! Need to add hook for noViableAltException !>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
   <edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
   alt<decisionNumber>=<eotPredictsAlt>;
   break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
   {
   <targetState>
   }
```

```
  break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = dfa<decisionNumber>.predict(input);
>>

cyclicDFACtor(dfa) ::= <<

dfa<dfa.decisionNumber> = new DFA(this, <dfa.decisionNumber>,
        "<dfa.description>",
        DFA<dfa.decisionNumber>_eot, DFA<dfa.decisionNumber>_eof, DFA<dfa.decisionNumber>_min,
        DFA<dfa.decisionNumber>_max, DFA<dfa.decisionNumber>_accept, DFA<dfa.decisionNumber>_special,
        DFA<dfa.decisionNumber>_transition<if(dfa.specialStateSTs)>,
DFA<dfa.decisionNumber>_specialStateTransition<endif>);

>>
/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<

private const DFA<dfa.decisionNumber>_eot:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedEOT; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_eof:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedEOF; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_min:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedMin; wrap="\"+\n    \"">", true);
private const DFA<dfa.decisionNumber>_max:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedMax; wrap="\"+\n    \"">", true);
private const DFA<dfa.decisionNumber>_accept:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedAccept; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_special:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedSpecial; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_transition:Array = [
     <dfa.javaCompressedTransition:{s|DFA.unpackEncodedString("<s; wrap="\"+\n\"">")}; separator=",\n">
];
```

```
<if(dfa.specialStateSTs)>
   private function DFA<dfa.decisionNumber>_specialStateTransition(dfa:DFA, s:int, _input:IntStream):int {
       <if(LEXER)>
       var input:IntStream = _input;
       <endif>
       <if(PARSER)>
       var input:TokenStream = TokenStream(_input);
       <endif>
       <if(TREE_PARSER)>
       var input:TreeNodeStream = TreeNodeStream(_input);
       <endif>
    var _s:int = s;
       switch ( s ) {
       <dfa.specialStateSTs:{state |
       case <i0> : <! compressed special state numbers 0..n-1 !>
           <state>}; separator="\n">
       }
<if(backtracking)>
       if (this.state.backtracking>0) {this.state.failed=true; return -1;}<\n>
<endif>
       throw dfa.error(new NoViableAltException(dfa.description, <dfa.decisionNumber>, _s, input));
   }<\n>
<endif>

protected var dfa<dfa.decisionNumber>:DFA;  // initialized in constructor

>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
var index<decisionNumber>_<stateNumber>:int = input.index;
input.rewind();<\n>
<endif>
s = -1;
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);<\n>
<endif>
if ( s>=0 ) return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
```

```
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred,{})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atomAsInt>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atomAsInt>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<stateNumber> >= <lowerAsInt> && LA<decisionNumber>_<stateNumber> \<=
<upperAsInt>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(input.LA(<k>) >=
<lowerAsInt> && input.LA(<k>) \<= <upperAsInt>)"

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
```

```
protected var <scope.name>_stack:Array = new Array();<\n>
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected var <scope.name>_stack:Array = new Array();<\n>
<endif>
>>

returnStructName() ::= "<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope"

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<returnStructName()>
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<asTypeInitMap.(typeName)>
```

```
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
var <label.label.text>:<ruleLabelType(referencedRule=label.referencedRule)> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
>>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public static class <returnType()> extends <if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope {
   <scope.attributes:{it |public <it.decl>;}; separator="\n">
   <@ruleReturnMembers()>
};
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{it |<it.name>:<it.type>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>;"

scopeAttributeRef(scope,attr,index,negIndex) ::= <<
<if(negIndex)>
<scope>_stack[<scope>_stack.length-<negIndex>-1].<attr.name>
<else>
<if(index)>
<scope>_stack[<index>].<attr.name>
<else>
<scope>_stack[<scope>_stack.length-1].<attr.name>
<endif>
<endif>
>>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <<
<if(negIndex)>
<scope>_stack[<scope>_stack.length-<negIndex>-1].<attr.name> =<expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name> =<expr>;
<else>
<scope>_stack[<scope>_stack.length-1].<attr.name> =<expr>;
```

```
<endif>
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?<scope>.values.<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.values.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.values.<attr.name> =<expr>;
<else>
<attr.name> =<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.text:null)"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.charPositionInLine:0)"
```

```
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.tokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int(<scope>.text):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?<labelType>(<scope>.start):null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?<labelType>(<scope>.stop):null)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>!=null?<ASTLabelType>(<scope>.tree):null)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(<scope>!=null?(input.tokenStream.toStringWithRange(
 input.treeAdaptor.getTokenStartIndex(<scope>.start),
 input.treeAdaptor.getTokenStopIndex(<scope>.start))):null)
<else>
(<scope>!=null?input.toStringWithTokenRange(<scope>.start,<scope>.stop):null)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?<scope>.st:null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
   "(<scope>!=null?<scope>.type:0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
   "(<scope>!=null?<scope>.lien:0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
   "(<scope>!=null?<scope>.charPositionInLine:0)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
   "(<scope>!=null?<scope>.channel:0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::=
   "(<scope>!=null?<scope>.tokenIndex:0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::=
   "(<scope>!=null?<scope>.text:null)"
lexerRuleLabelPropertyRef_int(scope,attr) ::=
   "(<scope>!=null?int(<scope>.text):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "<labelType>(retval.start)"
rulePropertyRef_stop(scope,attr) ::= "<labelType>(retval.stop)"
rulePropertyRef_tree(scope,attr) ::= "<ASTLabelType>(retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.tokenStream.toStringWithRange(
 input.treeAdaptor.getTokenStartIndex(retval.start),
 input.treeAdaptor.getTokenStopIndex(retval.start))
<else>
```

```
input.toStringWithTokenRange(retval.start,input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(charIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
<action>
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static const <name>:BitSet = new BitSet([<words64:{it |<it>};separator=", ">]);<\n>
>>

codeFileExtension() ::= ".as"

true_value() ::= "true"
false_value() ::= "false"
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ActionScript/ActionScript.stg

No license file was found, but licenses were detected in source scan.

```
/** The API version of the runtime that recognizers generated by this runtime
*  need.
*/
apiVersion() ::= "1"

// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
        "True":"true",
        "False":"false",
        "true":"true",
        "false":"false",
        default:"false"
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
```

```
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
           docComment, recognizer,
           name, tokens, tokenNames, rules, cyclicDFAs,
           bitsets, buildTemplate, buildAST, rewriteMode, profile,
           backtracking, synpreds, memoize, numRules,
           fileName, ANTLRVersion, generatedTimestamp, trace,
           scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
import sys
from antlr3 import *
<if(TREE_PARSER)>
from antlr3.tree import *<\n>
<endif>
from antlr3.compat import set, frozenset
<@end>

<actions.(actionScope).header>

<! <docComment> !>

# for convenience in actions
HIDDEN = BaseRecognizer.HIDDEN

# token types
<tokens:{it | <it.name>=<it.type>}; separator="\n">

<recognizer>

<if(actions.(actionScope).main)>
<actions.(actionScope).main>
<else>
def main(argv, stdin=sys.stdin, stdout=sys.stdout, stderr=sys.stderr):
<if(LEXER)>
    from antlr3.main import LexerMain
    main = LexerMain(<recognizer.name>)<\n>
<endif>
<if(PARSER)>
    from antlr3.main import ParserMain
    main = ParserMain("<recognizer.grammar.name>Lexer", <recognizer.name>)<\n>
<endif>
<if(TREE_PARSER)>
    from antlr3.main import WalkerMain
    main = WalkerMain(<recognizer.name>)<\n>
<endif>
    main.stdin = stdin
```

```
  main.stdout = stdout
  main.stderr = stderr
  main.execute(argv)<\n>
<endif>

<actions.(actionScope).footer>

if __name__ == '__main__':
  main(sys.argv)

>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode,
    labelType="CommonToken", superClass="Lexer") ::= <<
<grammar.directDelegates:
{g|from <g.recognizerName> import <g.recognizerName>}; separator="\n">

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
  <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>

  grammarFileName = "<fileName>"
  api_version = <apiVersion()>

  def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input=None, state=None):
      if state is None:
          state = RecognizerSharedState()
      super(<grammar.recognizerName>, self).__init__(input, state)

<if(memoize)>
<if(grammar.grammarIsRoot)>
      self._state.ruleMemo = {}
<endif>
<endif>

      <grammar.directDelegates:
       {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
      <grammar.directDelegates:
       {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
      <grammar.delegators:
       {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
      <last(grammar.delegators):
    {g|self.gParent = <g:delegateName()>}; separator="\n">
      self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

      <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">
```

```
        <actions.lexer.init>



    <actions.lexer.members>



<if(filterMode)>
    <filteringNextToken()>
<endif>
    <rules; separator="\n\n">

    <synpreds:{p | <lexerSynpred(p)>}>

    <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>



>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
def nextToken(self):
    while True:
        if self.input.LA(1) == EOF:
            return self.makeEOFToken()

        self._state.token = None
        self._state.channel = DEFAULT_CHANNEL
        self._state.tokenStartCharIndex = self.input.index()
        self._state.tokenStartCharPositionInLine = self.input.charPositionInLine
        self._state.tokenStartLine = self.input.line
        self._state._text = None
        try:
            m = self.input.mark()
            try:
                # means we won't throw slow exception
                self._state.backtracking = 1
                try:
                    self.mTokens()
                finally:
                    self._state.backtracking = 0

            except BacktrackingFailed:
                # mTokens backtracks with synpred at backtracking==2
                # and we set the synpredgate to allow actions at level 1.
                self.input.rewind(m)
                self.input.consume() # advance one char and try again

            else:
                self.emit()
                return self._state.token

        except RecognitionException, re:
            # shouldn't happen in backtracking mode, but...
            self.reportError(re)
            self.recover(re)


def memoize(self, input, ruleIndex, ruleStartIndex, success):
    if self._state.backtracking > 1:
        # is Lexer always superclass?
        super(<grammar.recognizerName>, self).memoize(input, ruleIndex, ruleStartIndex, success)


def alreadyParsedRule(self, input, ruleIndex):
    if self._state.backtracking > 1:
        return super(<grammar.recognizerName>, self).alreadyParsedRule(input, ruleIndex)
    return False


>>

actionGate() ::= "self._state.backtracking == 0"

filteringActionGate() ::= "self._state.backtracking == 1"

/** How to generate a parser */

genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass, labelType, members,
        rewriteElementType, filterMode, init, ASTLabelType="Object") ::= <<
<if(grammar.grammarIsRoot)>
# token names
tokenNames = [
    "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>",
    <tokenNames; wrap, separator=", ">
]<\n>
<else>
from <grammar.composite.rootGrammar.recognizerName> import tokenNames<\n>
<endif>
<scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScopeClass(scope=it)><endif>}>
```

```
<grammar.directDelegates:
{g|from <g.recognizerName> import <g.recognizerName>}; separator="\n">

<rules:{it|<ruleAttributeScopeClass(scope=it.ruleDescriptor.ruleScope)>}>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
   grammarFileName = "<fileName>"
   api_version = <apiVersion()>
   tokenNames = tokenNames

   def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input, state=None, *args, **kwargs):
       if state is None:
           state = RecognizerSharedState()

       <@args()>
       super(<grammar.recognizerName>, self).__init__(input, state, *args, **kwargs)

<if(memoize)>
<if(grammar.grammarIsRoot)>
       self._state.ruleMemo = {}
<endif>
<endif>

       <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">

       <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeStack(scope=it)><endif>}>
 <rules:{it | <ruleAttributeScopeStack(scope=it.ruleDescriptor.ruleScope)>}>

       <init>

       <grammar.delegators:
        {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
       <grammar.directDelegates:
        {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
       <grammar.directDelegates:
        {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
       <last(grammar.delegators):
     {g|self.gParent = self.<g:delegateName()>}; separator="\n">
       self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

 <@init><@end>


   <@members><@end>

   <members>
```

```
    <rules; separator="\n\n">

    <! generate rule/method definitions for imported rules so they
       appear to be defined in this recognizer. !>
    <grammar.delegatedRules:{ruleDescriptor| <delegateRule(ruleDescriptor)> }; separator="\n">

    <synpreds:{p | <synpred(p)>}>

    <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

    <bitsets:{it | FOLLOW_<it.name>_in_<it.inName><it.tokenIndex> = frozenset([<it.tokenTypes:{it |
<it>};separator=", ">])<\n>}>

>>

delegateRule(ruleDescriptor) ::= <<
def <ruleDescriptor.name>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<\ >   <if(ruleDescriptor.hasReturnValue)>return
<endif>self.<ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)
><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>)



>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
       ASTLabelType="Object", superClass="Parser", labelType="Token",
       members={<actions.parser.members>},
       init={<actions.parser.init>}
       ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TokenStream", superClass,
            labelType, members, "Token",
            false, init, ASTLabelType)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
         numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>},
    init={<actions.treeparser.init>}
         ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TreeNodeStream", superClass,
            labelType, members, "Node",
        filterMode, init, ASTLabelType)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start "<ruleName>"
def <ruleName>_fragment(self, <ruleDescriptor.parameterScope:parameterScope()>):
  <ruleLabelDefs()>
<if(trace)>
  self.traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
  try:
      <block>

  finally:
      self.traceOut("<ruleName>_fragment", <ruleDescriptor.index>)

<else>
  <block>
<endif>
# $ANTLR end "<ruleName>"



>>

synpred(name) ::= <<
def <name>(self):
  self._state.backtracking += 1
  <@start()>
  start = self.input.mark()
  try:
      self.<name>_fragment()
  except BacktrackingFailed:
      success = False
  else:
      success = True
  self.input.rewind(start)
  <@stop()>
  self._state.backtracking -= 1
  return success
```

```
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if self._state.backtracking > 0 and self.alreadyParsedRule(self.input, <ruleDescriptor.index>):
   # for cached failed rules, alreadyParsedRule will raise an exception
   success = True
   return <ruleReturnValue()>

<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if self._state.backtracking > 0:
   raise BacktrackingFailed

<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<returnScope(scope=ruleDescriptor.returnScope)>

# $ANTLR start "<ruleName>"
# <fileName>:<description>
<ruleDescriptor.actions.decorate>
def <ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
   self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
   <@preamble()>
   <@body><ruleBody()><@end>
   <@postamble()>
   return <ruleReturnValue()>

# $ANTLR end "<ruleName>"
```

```
>>

ruleBody() ::= <<
<if(memoize)>
<if(backtracking)>
success = False<\n>
<endif>
<endif>
try:
   try:
       <ruleMemoization(name=ruleName)>
       <block>
       <ruleCleanUp()>
       <(ruleDescriptor.actions.after):execAction()>

<if(memoize)>
<if(backtracking)>
       success = True<\n>
<endif>
<endif>
<if(exceptions)>
   <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
   <actions.(actionScope).rulecatch>
<else>
   except RecognitionException, re:
       self.reportError(re)
       self.recover(self.input, re)
       <@setErrorReturnValue()>

<endif>
<else>
   finally:
       pass

<endif>
<endif>
finally:
<if(trace)>
   self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
   <memoize()>
   <ruleScopeCleanUp()>
   <finally>
   pass
>>
```

```
catch(decl,action) ::= <<
except <e.decl>:
   <e.action>

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval = self.<ruleDescriptor.name>_return()
retval.start = self.input.LT(1)<\n>
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> = <if(a.initValue)><a.initValue><else>None<endif>
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = self.input.index()
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.append(<it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.append(<it.name>_scope())}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.pop()}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it | <it.label.text> = None}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,
 ruleDescriptor.wildcardTreeListLabels]
   :{it | list_<it.label.text> = None}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{it | <it.label.text> = None}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
```

```
   :{it | <it.label.text> = None}; separator="\n"
>
<ruleDescriptor.charLabels:{it | <it.label.text> = None}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | list_<it.label.text> = None}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = self.input.LT(-1)<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if self._state.backtracking > 0:
   self.memoize(self.input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex, success)

<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start "<ruleName>"
def m<ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
   self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
```

```
  <ruleScopeSetUp()>
  <ruleDeclarations()>
<if(memoize)>
<if(backtracking)>
  success = False<\n>
<endif>
<endif>
  try:
<if(nakedBlock)>
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block><\n>
<else>
      _type = <ruleName>
      _channel = DEFAULT_CHANNEL

      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block>
      <ruleCleanUp()>
      self._state.type = _type
      self._state.channel = _channel
      <(ruleDescriptor.actions.after):execAction()>
<endif>
<if(memoize)>
<if(backtracking)>
      success = True<\n>
<endif>
<endif>

  finally:
<if(trace)>
      self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
 <ruleScopeCleanUp()>
      <memoize()>
      pass

# $ANTLR end "<ruleName>"


>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
```

```
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
def mTokens(self):
   <block><\n>



>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@body><blockBody()><@end>
>>

blockBody() ::= <<
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<@prebranch()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
```

```
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
# <fileName>:<description>
cnt<decisionNumber> = 0
<decls>
<@preloop()>
<@loopBody>
<positiveClosureBlockLoop()>
<@end>
<@postloop()>
>>

positiveClosureBlockLoop() ::= <<
while True: #loop<decisionNumber>
   alt<decisionNumber> = <maxAlt>
   <@predecision()>
   <@decisionBody><decision><@end>
   <@postdecision()>
   <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
   else:
       if cnt<decisionNumber> >= 1:
           break #loop<decisionNumber>

       <ruleBacktrackFailure()>
       eee = EarlyExitException(<decisionNumber>, self.input)
       <@earlyExitException()>
       raise eee

   cnt<decisionNumber> += 1
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
<@preloop()>
<@loopBody>
<closureBlockLoop()>
```

```
<@end>
<@postloop()>
>>

closureBlockLoop() ::= <<
while True: #loop<decisionNumber>
   alt<decisionNumber> = <maxAlt>
   <@predecision()>
   <@decisionBody><decision><@end>
   <@postdecision()>
   <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
   else:
       break #loop<decisionNumber>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
if alt<decisionNumber> == <altNum>:
   <@prealt()>
   <alt>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt, treeLevel,rew) ::= <<
# <fileName>:<description>
pass <! so empty alternatives are a valid block !>
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""
```

```
// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label> = <endif>self.match(self.input, <token>,
self.FOLLOW_<token>_in_<ruleName><elementIndex>)
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>

listLabel(label, elem) ::= <<
if list_<label> is None:
  list_<label> = []
list_<label>.append(<elem>)<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.match(<char>)
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchRange(<a>, <b>)
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
```

```
if <s>:
   self.input.consume()
   <postmatchCode>
<if(!LEXER)>
   self._state.errorRecovery = False<\n>
<endif>

else:
   <ruleBacktrackFailure()>
   mse = MismatchedSetException(None, self.input)
   <@mismatchedSetException()>
<if(LEXER)>
   self.recover(mse)
   raise mse
<else>
   raise mse
   <! use following code to make it recover inline; remove throw mse;
   self.recoverFromMismatchedSet(
       self.input, mse, self.FOLLOW_set_in_<ruleName><elementIndex>
       )
   !>
<endif>
<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
<label>Start = self.getCharIndex()
self.match(<string>)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(input=self.input, type=INVALID_TOKEN_TYPE, channel=DEFAULT_CHANNEL,
start=<label>Start, stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.match(<string>)
<endif>
>>
```

```
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
self.matchAny(self.input)
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label,label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchAny()
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values. The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
self._state.following.append(self.FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label> = <endif>self.<if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=",
">)<\n>
self._state.following.pop()
>>

/** ids+=rule */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
```

```
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(
  input=self.input,
  type=INVALID_TOKEN_TYPE,
  channel=DEFAULT_CHANNEL,
  start=<label>Start<elementIndex>,
  stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
self.match(EOF)
<label> = <labelType>(input=self.input, type=EOF, channel=DEFAULT_CHANNEL,
start=<label>Start<elementIndex>, stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.match(EOF)
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                       ::= "<recRuleArg()>"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName, opPrec) ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0 = $<ruleName>_primary.tree"
recRuleSetReturnAction(src, name)     ::= "$<name> = $<src>.<name>"
```

```
/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
   self.match(self.input, DOWN, None)
   <children:element()>
   self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if not (<evalPredicate(pred, description)>):
   <ruleBacktrackFailure()>
   raise FailedPredicateException(self.input, "<ruleName>", "<description>")

>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
   alt<decisionNumber> = <eotPredictsAlt>
<else>
   <ruleBacktrackFailure()>
   nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
   <@noViableAltException()>
   raise nvae<\n>
<endif>
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel"><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt> <! if no edges, don't gen ELSE !>
<else>
else:
   alt<decisionNumber> = <eotPredictsAlt>
<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if (<labelExpr>) <if(predicates)>and (<predicates>)<endif>:
   <targetState>
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
<!
 FIXME: this is one of the few occasion, where I miss a switch statement
 in Python. ATM this is implemented as a list of if .. elif ..
 This may be replaced by faster a dictionary lookup, when I find a solution
 for the cases when an edge is not a plain dfaAcceptState.
!>
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
   alt<decisionNumber> = <eotPredictsAlt>
<else>
   <ruleBacktrackFailure()>
   nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
   <@noViableAltException()>
   raise nvae<\n>
<endif>

>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
<if(eotPredictsAlt)>
else:
   alt<decisionNumber> = <eotPredictsAlt>
<endif>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
if <labels:{it | LA<decisionNumber> == <it>}; separator=" or ">:
   <targetState>
>>

// Cyclic DFA

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = self.dfa<decisionNumber>.predict(self.input)
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
# lookup tables for DFA #<dfa.decisionNumber>

DFA<dfa.decisionNumber>_eot = DFA.unpack(
    u"<dfa.javaCompressedEOT; wrap="\"\n    u\"">"
    )

DFA<dfa.decisionNumber>_eof = DFA.unpack(
    u"<dfa.javaCompressedEOF; wrap="\"\n    u\"">"
    )

DFA<dfa.decisionNumber>_min = DFA.unpack(
    u"<dfa.javaCompressedMin; wrap="\"\n    u\"">"
    )

DFA<dfa.decisionNumber>_max = DFA.unpack(
    u"<dfa.javaCompressedMax; wrap="\"\n    u\"">"
    )

DFA<dfa.decisionNumber>_accept = DFA.unpack(
    u"<dfa.javaCompressedAccept; wrap="\"\n    u\"">"
    )

DFA<dfa.decisionNumber>_special = DFA.unpack(
    u"<dfa.javaCompressedSpecial; wrap="\"\n    u\"">"
    )


DFA<dfa.decisionNumber>_transition = [
    <dfa.javaCompressedTransition:{s|DFA.unpack(u"<s; wrap="\"\nu\"">")}; separator=",\n">
]

# class definition for DFA #<dfa.decisionNumber>

class DFA<dfa.decisionNumber>(DFA):
    pass

    <@errorMethod()>

<if(dfa.specialStateSTs)>
    def specialStateTransition(self_, s, input):
        # convince pylint that my self_ magic is ok ;)
        # pylint: disable-msg=E0213

        # pretend we are a member of the recognizer
        # thus semantic predicates can be evaluated
        self = self_.recognizer

        _s = s

        <dfa.specialStateSTs:{state | if s == <i0>: <! compressed special state numbers 0..n-1 !>
    <state>}; separator="\nel">

<if(backtracking)>
        if self._state.backtracking > 0:
            raise BacktrackingFailed

<endif>
        nvae = NoViableAltException(self_.getDescription(), <dfa.decisionNumber>, _s, input)
        self_.error(nvae)
        raise nvae<\n>
<endif>

>>

cyclicDFAInit(dfa) ::= <<
self.dfa<dfa.decisionNumber> = self.DFA<dfa.decisionNumber>(
    self, <dfa.decisionNumber>,
    eot = self.DFA<dfa.decisionNumber>_eot,
    eof = self.DFA<dfa.decisionNumber>_eof,
    min = self.DFA<dfa.decisionNumber>_min,
    max = self.DFA<dfa.decisionNumber>_max,
    accept = self.DFA<dfa.decisionNumber>_accept,
    special = self.DFA<dfa.decisionNumber>_special,
    transition = self.DFA<dfa.decisionNumber>_transition
    )<\n>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = input.LA(1)<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
index<decisionNumber>_<stateNumber> = input.index()
input.rewind()<\n>
<endif>
s = -1
<edges; separator="\nel">
<if(semPredState)> <! return input cursor to state before we rewound !>
```

```
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if s >= 0:
   return s
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if (<labelExpr>)<if(predicates)> and (<predicates>)<endif>:
   s = <targetStateNumber><\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
se:
   s = <targetStateNumber><\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"

orPredicates(operands) ::= "(<operands; separator=\" or \">)"

notPredicate(pred) ::= "not (<evalPredicate(pred, {})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "self.<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "self.input.LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(<lower> \<= LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(<lower> \<=
self.input.LA(<k>) \<= <upper>)"
```

```
setTest(ranges) ::= "<ranges; separator=\" or \">"

// A T T R I B U T E S

globalAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
   def __init__(self):
       <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

globalAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

ruleAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
   def __init__(self):
       <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

ruleAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Define a rule label including default value */
```

```
ruleLabelDef(label) ::= <<
<label.label.text> = None
>>

returnStructName(r) ::= "<r.name>_return"

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
class <ruleDescriptor:returnStructName()>(<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope):
   def __init__(self):
       super(<grammar.recognizerName>.<ruleDescriptor:returnStructName()>, self).__init__()

       <if(scope)><scope.attributes:{it | self.<it.decl> = None}; separator="\n"><endif>
       <@ruleReturnInit()>



   <@ruleReturnMembers()>

<endif>
>>

parameterScope(scope) ::= <<
<if(scope)><scope.attributes:{it | <it.decl>}; separator=", "><endif>
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
self.<scope>_stack[-<negIndex>].<attr.name>
<else>
<if(index)>
self.<scope>_stack[<index>].<attr.name>
<else>
self.<scope>_stack[-1].<attr.name>
<endif>
<endif>
%>

/* not applying patch because of bug in action parser!

<if(negIndex)>
((len(self.<scope>_stack) - <negIndex> - 1) >= 0 and [self.<scope>_stack[-<negIndex>].<attr.name>] or [None])[0]
```

```
<else>
<if(index)>
((<index> \< len(self.<scope>_stack)) and [self.<scope>_stack[<index>].<attr.name>] or [None])[0]
<else>
((len(self.<scope>_stack) > 0) and [self.<scope>_stack[-1].<attr.name>] or [None])[0]
<endif>
<endif>

*/

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[-<negIndex>].<attr.name> = <expr>
<else>
<if(index)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[<index>].<attr.name> = <expr>
<else>
self.<scope>_stack[-1].<attr.name> = <expr>
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "self.<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
((<scope> is not None) and [<scope>.<attr.name>] or [None])[0]
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
```

```
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> = <expr>
<else>
<attr.name> = <expr>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach; and they are evaluated early;
// they cannot see TREE_PARSER or PARSER attributes for example. :(

tokenLabelPropertyRef_text(scope,attr) ::= "<scope>.text"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.type"
tokenLabelPropertyRef_line(scope,attr) ::= "<scope>.line"
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.charPositionInLine"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.channel"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.index"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "<scope>.start"
ruleLabelPropertyRef_stop(scope,attr) ::= "<scope>.stop"
ruleLabelPropertyRef_tree(scope,attr) ::= "<scope>.tree"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
((<scope> is not None) and [self.input.getTokenStream().toString(
   self.input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
   self.input.getTreeAdaptor().getTokenStopIndex(<scope>.start)
   )] or [None])[0]
<else>
((<scope> is not None) and [self.input.toString(<scope>.start,<scope>.stop)] or [None])[0]
<endif>
%>
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> is not None) and [<scope>.st] or [None])[0]"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "((<scope> is not None) and [<scope>.type] or [0])[0]"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "((<scope> is not None) and [<scope>.line] or [0])[0]"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "((<scope> is not None) and [<scope>.charPositionInLine] or
[0])[0]"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "((<scope> is not None) and [<scope>.channel] or [0])[0]"
```

```
lexerRuleLabelPropertyRef_index(scope,attr) ::= "((<scope> is not None) and [<scope>.index] or [0])[0]"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "((<scope> is not None) and [<scope>.text] or [None])[0]"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "((<scope> is not None) and [int(<scope>.text)] or [0])[0]"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop" //mmm... or input.LT(-1)??
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= "self.input.toString(retval.start, self.input.LT(-1))"
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "self._state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "self._state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "self._state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(self.getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"


/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if <actions.(actionScope).synpredgate>:
  pass
  <action>

<else>
if <actions.(actionScope).synpredgate>:
  pass
  <action>

<endif>
<else>
#action start
<action>
#action end
<endif>
>>
```

```
/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"


// M I S C (properties, etc...)

codeFileExtension() ::= ".py"

true_value() ::= "True"
false_value() ::= "False"
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/Python.stg

No license file was found, but licenses were detected in source scan.

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Python by code generator.
*/
group ASTDbg;
```

```
astAccessor() ::= <<
def setTreeAdaptor(self, adaptor):
<if(grammar.grammarIsRoot)>
   self._adaptor = DebugTreeAdaptor(self.dbg, adaptor)
<else>
   self._adaptor = adaptor # delegator sends dbg adaptor
<endif>
   <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(self._adaptor)}>

def getTreeAdaptor(self):
   return self._adaptor

adaptor = property(getTreeAdaptor, setTreeAdaptor)<\n>
>>

createListenerAndHandshake() ::= <<
proxy = DebugEventSocketProxy(self,
adaptor=<if(TREE_PARSER)>self.input.getTreeAdaptor()<else>self._adaptor<endif>,
                            debug=debug_socket, port=port)
self.setDebugListener(proxy)
self.adaptor.setDebugListener(proxy)
self.input.setDebugListener(proxy)
#self.set<inputStreamType>(Debug<inputStreamType>(self.input, proxy))
proxy.handshake()
>>

@rewriteElement.pregen() ::= "self._dbg.location(<e.line>, <e.pos>)"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python3/ASTDbg.stg
No license file was found, but licenses were detected in source scan.

```
*/
group Delphi;

csharpTypeInitMap ::= [
 "int":"0",
 "uint":"0",
 "long":"0",
 "ulong":"0",
 "float":"0.0",
 "double":"0.0",
 "bool":"False",
 "byte":"0",
 "sbyte":"0",
 "short":"0",
 "ushort":"0",
 "char":"#0",
 "string":"''",
 "String":"''",
 default:"nil" // anything other than an atomic type
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*  LEXER (Boolean): should we generate lexer code?
*  PARSER (Boolean): should we generate parser code?
*  TREE_PARSER (Boolean): should we generate tree parser code?
*  actionScope (String): 'lexer', 'parser', 'tree_parser' or custom scope
*  actions (HashMap):
*  docComment (String): document comment
*  recognizer (Object): recognizer class generator
*  name (String): name of grammar
*  tokens (HashMap<name: String, type: Integer>):
*  tokenNames:
*  rules:
```

```
*  cyclicDFAs:
*  bitsets:
*  buildTemplate (Boolean): should we generate a string template?
*  buildAST (Boolean): should we generate an AST?
*  rewriteMode (Boolean): are we rewriteing nodes?
*  profile (Boolean):
*  backtracking (Boolean): backtracking mode?
*  synpreds (): syntactic predicates
*  memoize (Boolean): should we memoize?
*  numRules (Integer): number of rules
*  fileName (String): fully qualified name of original .g file
*  ANTLRVersion (String): ANTLR version in Major.Minor.Build format
*  generatedTimestamp (String): date/time when the file is generated
*  trace (Boolean): should we trace input/output?
*  scopes:
*  superClass (String): name of base class, or empty string
*  literals:
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
        docComment, recognizer,
        name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
unit <name>;

{$HINTS OFF}

// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<actions.(actionScope).header>

interface

<@imports>
uses<\n>
<@end>
 <actions.(actionScope).usesInterface>
<if(TREE_PARSER)>
 Antlr.Runtime.Tree,<\n>
<endif>
 Antlr.Runtime,
 Antlr.Runtime.Collections,
 Antlr.Runtime.Tools;

<docComment>
```

```
<recognizer>
>>

/** Generates source code for the lexer class
* grammar (Grammar object)
*/
lexer(grammar, name, tokens, scopes, rules, numRules, labelType="Token",
    filterMode, superClass="Lexer") ::= <<
type
 I<grammar.recognizerName> = interface(I<@superClassName><superClass><@end>)
 end;

 T<grammar.recognizerName> = class(T<@superClassName><superClass><@end>,
I<grammar.recognizerName>)
 strict private
   FCnt: array [0..<grammar.numberOfDecisions>] of Byte;
   FLA: array [0..<grammar.numberOfDecisions>, 0..255] of Integer;
   FException: ERecognitionException;
   procedure InitializeCyclicDFAs;
 <cyclicDFAs:cyclicDFADeclaration()>
 public
   const
     <tokens:{<it.name> = <it.type>;}; separator="\n">
   <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 strict private
   <actions.(actionScope).memberDeclarations>
 public
   // delegates
   <grammar.delegates: {g|<g:delegateName()>: I<superClass>; {<g.recognizerName>}}; separator="\n">
 public
   // delegators
   <grammar.delegators: {g|<g:delegateName()>: Pointer; {<g.recognizerName>}}; separator="\n">
   <last(grammar.delegators):{g|gParent: Pointer; {<g.recognizerName>}}>
 protected
   { IBaseRecognizer }
   function GetGrammarFileName: String; override;
<if(filterMode)>
   function AlreadyParsedRule(const Input: IIntStream;
     const RuleIndex: Integer): Boolean; override;
   procedure Memoize(const Input: IIntStream; const RuleIndex,
     RuleStartIndex: Integer); override;
 protected
   { ILexer }
   function NextToken: IToken; override;<\n>
<endif>
 protected
   { ILexer }
   procedure DoTokens; override;
 public
   constructor Create; overload;
   constructor Create(const AInput: ICharStream<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>); overload;
   constructor Create(const AInput: ICharStream; const AState: IRecognizerSharedState<grammar.delegators:{g|;
const A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>); overload;

   <rules: {r | <if(!r.ruleDescriptor.isSynPred)><lexerRuleDeclaration(r)><endif>}>
   <synpreds:{p | <lexerSynpredDeclaration(p)>}; separator="\n">
 end;

implementation

uses
 <grammar.delegates: {g|<g.recognizerName>,}; separator="\n">
 <grammar.delegators: {g|<g.recognizerName>,}; separator="\n">
 <actions.(actionScope).usesImplementation>
 SysUtils,
 StrUtils,
 Math;

{ T<grammar.recognizerName> }

constructor T<grammar.recognizerName>.Create;
begin
 InitializeCyclicDFAs;
end;

constructor T<grammar.recognizerName>.Create(const AInput: ICharStream<grammar.delegators:{g|; const
A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>);
begin
 Create(AInput, nil<grammar.delegators:{g|, A<g:delegateName()>}>);
end;

constructor T<grammar.recognizerName>.Create(const AInput: ICharStream; const AState:
IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>);
begin
 inherited Create(AInput, AState);
 InitializeCyclicDFAs; { TODO: Necessary in Delphi??? Not removed yet. }
 <if(memoize)>
 <if(grammar.grammarIsRoot)>
 State.RuleMemoCount := <numRules>+1;<\n> <! index from 1..n !>
 <endif>
 <endif>
 <grammar.directDelegates:
  {g|<g:delegateName()> := T<g.recognizerName>.Create(AInput, State<trunc(g.delegators):{p|,
<p:delegateName()>}>, Self);}; separator="\n">
```

```
 <grammar.delegators:
  {g|<g:delegateName()> := Pointer(A<g:delegateName()>);}; separator="\n">
 <last(grammar.delegators):{g|gParent := Pointer(A<g:delegateName()>);}>
 <actions.(actionScope).memberInitializations>
end;
<actions.(actionScope).memberImplementations>
function T<grammar.recognizerName>.GetGrammarFileName: String;
begin
 Result := '<fileName>';
end;

<if(filterMode)>
<filteringNextToken()>
<endif>

<rules; separator="\n\n">
<synpreds:{p | <lexerSynpred(p)>}>

procedure T<grammar.recognizerName>.InitializeCyclicDFAs;
begin
 <cyclicDFAs:{dfa | FDFA<dfa.decisionNumber> :=
TDFA<dfa.decisionNumber>.Create(Self<@debugAddition()>);}; separator="\n">
 <cyclicDFAs:{dfa | <if(dfa.specialStateSTs)>FDFA<dfa.decisionNumber>.SpecialStateTransitionHandler :=
DFA<dfa.decisionNumber>_SpecialStateTransition;<endif>}; separator="\n">
end;

<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
end.>>

lexerRuleDeclaration(rule) ::= <<
procedure m<rule.ruleName>(<rule.ruleDescriptor.parameterScope:parameterScope(scope=rule)>);<\n>
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
function T<grammar.recognizerName>.NextToken: IToken;
var
 M: Integer;
begin
 while (True) do
 begin
   if (Input.LA(1) = Integer(cscEOF)) then
```

```
      Exit(TToken.EOF_TOKEN);

    State.Token := nil;
    State.Channel := TToken.DEFAULT_CHANNEL;
    State.TokenStartCharIndex := Input.Index;
    State.TokenStartCharPositionInLine := Input.CharPositionInLine;
    State.TokenStartLine := Input.Line;
    State.Text := '';
    try
      M := Input.Mark();
      State.Backtracking := 1; <! means we won't throw slow exception !>
      State.Failed := False;
      mTokens();
      State.Backtracking := 0;
<!
      mTokens backtracks with synpred at backtracking==2
            and we set the synpredgate to allow actions at level 1.
!>
      if (State.Failed) then
      begin
        Input.Rewind(M);
        Input.Consume; <! // advance one char and try again !>
      end
      else
      begin
        Emit;
        Exit(State.Token);
      end;
    except
      on RE: ERecognitionException do
      begin
        // shouldn't happen in backtracking mode, but...
        ReportError(RE);
        Recover(RE);
      end;
    end;
  end;
end;

function T<grammar.recognizerName>.AlreadyParsedRule(const Input: IIntStream;
  const RuleIndex: Integer): Boolean;
begin
  if (State.Backtracking > 1) then
    Result := inherited AlreadyParsedRule(Input, RuleIndex)
  else
    Result := False;
end;
```

```
procedure T<grammar.recognizerName>.Memoize(const Input: IIntStream; const RuleIndex,
 RuleStartIndex: Integer);
begin
 if (State.Backtracking > 1) then
   inherited Memoize(Input, RuleIndex, RuleStartIndex);
end;

>>

filteringActionGate() ::= "(State.Backtracking = 1)"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
             bitsets, inputStreamType, superClass, filterMode,
             ASTLabelType="ANTLRInterface", labelType, members, rewriteElementType) ::= <<
type
 <rules: {r | <genericParserRuleReturnType(rule=r, ruleDescriptor=r.ruleDescriptor)>}>
 I<grammar.recognizerName> = interface(I<@superClassName><superClass><@end>)
   <rules: {r | <genericParserRuleInterface(rule=r, ruleDescriptor=r.ruleDescriptor)>}>
 end;

 T<grammar.recognizerName> = class(T<@superClassName><superClass><@end>,
I<grammar.recognizerName>)
<if(grammar.grammarIsRoot)>
 public
   const
     TOKEN_NAMES: array [0..<length(tokenNames)>+3] of String = (
       '\<invalid>',
       '\<EOR>',
       '\<DOWN>',
       '\<UP>',
       <tokenNames; separator=",\n">);<\n>
<endif>
 public
   const
     <tokens:{<it.name> = <it.type>;}; separator="\n">
 public
   // delegates
   <grammar.delegates: {g|<g:delegateName()>: I<superClass>; {<g.recognizerName>}}; separator="\n">
 public
   // delegators
   <grammar.delegators: {g|<g:delegateName()>: Pointer; {<g.recognizerName>}}; separator="\n">
   <last(grammar.delegators):{g|gParent: Pointer; {<g.recognizerName>}}>

   <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScopeDeclaration(scope=it)><endif>}>
<@members>
   <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
 public
```

```
   constructor Create(const AInput: <inputStreamType><grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>); overload;
   constructor Create(const AInput: <inputStreamType>; const AState:
IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>); overload;
<@end>
 protected
   { IBaseRecognizer }
   function GetTokenNames: TStringArray; override;
   function GetGrammarFileName: String; override;
 strict private
   <actions.(actionScope).memberDeclarations>
 <rules: {r | <genericParserRuleDeclaration(rule=r, ruleDescriptor=r.ruleDescriptor)>}>

<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
   // Delegated rules
   <grammar.delegatedRules:{ruleDescriptor| <delegatedRuleDeclaration(ruleDescriptor)>}>

   <synpreds:{p | <synpredDeclaration(p)>}; separator="\n">
 <cyclicDFAs:cyclicDFADeclaration()>
 strict private
   FException: ERecognitionException;
   FLA: array [0..<grammar.numberOfDecisions>, 0..255] of Integer;
   FCnt: array [0..<grammar.numberOfDecisions>] of Byte;
   procedure InitializeCyclicDFAs;
<if(bitsets)>
 public
   class var
     <bitsets:bitsetDecl(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>})>
 public
   class procedure InitializeBitsets; static;<\n>
<endif>
 end;

implementation

uses
 <grammar.delegates: {g|<g.recognizerName>,}; separator="\n">
 <grammar.delegators: {g|<g.recognizerName>,}; separator="\n">
 <actions.(actionScope).usesImplementation>
 SysUtils,
 StrUtils,
 Math;

{ T<grammar.recognizerName> }

constructor T<grammar.recognizerName>.Create(const AInput: <inputStreamType><grammar.delegators:{g|; const
A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>);
begin
 Create(AInput, TRecognizerSharedState.Create<grammar.delegators:{g|, A<g:delegateName()>}>);
end;

constructor T<grammar.recognizerName>.Create(const AInput: <inputStreamType>;
 const AState: IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>);
begin
 inherited Create(AInput, AState);
 <@membersConstructor>
 <@end>
 <parserCtorBody()>
 <grammar.directDelegates:{g|<g:delegateName()> := T<g.recognizerName>.Create(Input,
State<trunc(g.delegators):{p|, <p:delegateName()>}>, Self);}; separator="\n">
 <grammar.indirectDelegates:{g | <g:delegateName()> := <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
 <last(grammar.delegators):{g|gParent := Pointer(A<g:delegateName()>);}>
 <rules: {r | <ruleAttributeScopeInit(scope=r.ruleDescriptor.ruleScope)>}>
 <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.(actionScope).memberInitializations>
end;
<actions.(actionScope).memberImplementations>

<grammar.delegatedRules:{ruleDescriptor| <delegatedRuleImplementation(ruleDescriptor)>}; separator="\n">
procedure T<grammar.recognizerName>.InitializeCyclicDFAs;
begin
 <cyclicDFAs:{dfa | FDFA<dfa.decisionNumber> := TDFA<dfa.decisionNumber>.Create(Self);}; separator="\n">
 <cyclicDFAs:{dfa | <if(dfa.specialStateSTs)>FDFA<dfa.decisionNumber>.SpecialStateTransitionHandler :=
DFA<dfa.decisionNumber>_SpecialStateTransition;<endif>}; separator="\n">
end;

<if(bitsets)>
class procedure T<grammar.recognizerName>.InitializeBitsets;
begin
 <bitsets:bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>
end;
<endif>

<@membersImplementation>
<@end>

function T<grammar.recognizerName>.GetTokenNames: TStringArray;
var
 I: Integer;
begin
 SetLength(Result,Length(T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES));
 for I := 0 to Length(T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES) - 1 do
```

```
  Result[I] := T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES[I];
end;

function T<grammar.recognizerName>.GetGrammarFileName: String;
begin
 Result := '<fileName>';
end;

<rules; separator="\n\n">
<synpreds:{p | <synpred(p)>}>

<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
<if(bitsets)>
initialization
 T<grammar.recognizerName>.InitializeBitsets;<\n>
<endif>
end.>>

delegatedRuleDeclaration(ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
<returnType()>;<\n>
<else>
procedure <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);<\n>
<endif>
<endif>
>>

delegatedRuleImplementation(ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
function
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
): I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
): <returnType()>;<\n>
<else>
procedure
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
);<\n>
<endif>
<endif>
```

```
begin
 <if(ruleDescriptor.hasReturnValue)>Result :=<endif>
T<ruleDescriptor.grammar.recognizerName>(<ruleDescriptor.grammar:delegateName()>.Implementor).<ruleDescri
ptor.name>(<ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", ">);
end;

>>

parserCtorBody() ::= <<
InitializeCyclicDFAs;
<if(memoize)>
<if(grammar.grammarIsRoot)>
State.RuleMemoCount := <length(grammar.allImportedRules)>+1;<\n> <! index from 1..n !>
<endif>
<endif>
<grammar.delegators: {g|<g:delegateName()> := Pointer(A<g:delegateName()>);}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType, superClass="Parser",
labelType="Token", members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="Token", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules, numRules, bitsets,
labelType={<ASTLabelType>}, ASTLabelType="object", superClass="TreeParser",
members={<actions.treeparser.members>}, filterMode) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start "<ruleName>"
procedure
T<grammar.recognizerName>.<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope(scope=it)>)
;
var
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
 <ruleLabelDefVars()>
```

```
begin
 <ruleLabelDefs()>
<if(trace)>
 TraceIn('<ruleName>_fragment', <ruleDescriptor.index>);
 try
   <block>
 finally
   TraceOut('<ruleName>_fragment', <ruleDescriptor.index>);
 end;
<else>
 <block>
<endif>
end;
// $ANTLR end "<ruleName>"
>>

synpredDecls(name) ::= <<
SynPredPointer <name>;<\n>
>>

synpred(name) ::= <<

function T<grammar.recognizerName>.<name>: Boolean;
var
 Start: Integer;
 Success: Boolean;
begin
 State.Backtracking := State.Backtracking + 1;
 <@start()>
 Start := Input.Mark;
 try
   <name>_fragment(); // can never throw exception
 except
   on RE: ERecognitionException do
     WriteLn('Impossible: ' + RE.ToString);
 end;
 Success := not State.Failed;
 Input.Rewind(Start);
 <@stop()>
 State.Backtracking := State.Backtracking - 1;
 State.Failed := False;
 Result := Success;
end;<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>
```

```
lexerSynpredDeclaration(name) ::= <<
function <name>: Boolean;
procedure <name>_fragment;
>>

synpredDeclaration(name) ::= <<
function <name>: Boolean;
procedure <name>_fragment;
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ((State.Backtracking > 0) and AlreadyParsedRule(Input, <ruleDescriptor.index>)) then
 Exit(<ruleReturnValue()>);
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)><\n>if (State.Failed) then Exit(<ruleReturnValue()>);<\n><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (State.Backtracking > 0) then
begin
 State.Failed := True;
 Exit(<ruleReturnValue()>);
end;<endif>
>>

genericParserRuleDeclaration(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.isSynPred)>
<else>
<ruleAttributeScopeDeclaration(scope=ruleDescriptor.ruleScope)>
<returnScopeDeclaration(scope=ruleDescriptor.returnScope)>
public
<if(ruleDescriptor.hasMultipleReturnValues)>
 function <rule.ruleName>: I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
 function <rule.ruleName>: <returnType()>;<\n>
<else>
 procedure <rule.ruleName>;<\n>
<endif>
<endif>
<endif>
```

```
>>

genericParserRuleInterface(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.isSynPred)>
<else>
<if(ruleDescriptor.hasMultipleReturnValues)>
function <rule.ruleName>: I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function <rule.ruleName>: <returnType()>;<\n>
<else>
procedure <rule.ruleName>;<\n>
<endif>
<endif>
<endif>
>>

genericParserRuleReturnType(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(ruleDescriptor.isSynPred)>
<else>
I<returnType()> = interface(I<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope)
end;<\n>
<endif>
<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
(* <fileName>:<description> *)
<if(ruleDescriptor.hasMultipleReturnValues)>
function T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
I<returnType()>;
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
<returnType()>;
<else>
procedure
T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);
<endif>
<endif>
```

```
var
<ruleDescriptor.actions.vars>
 Locals: TLocalStorage;
<if(ruleDescriptor.hasMultipleReturnValues)>
 RetVal: I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
 RetVal: <returnType()>;<\n>
<else>
<endif>
<endif>
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
 <ruleDeclarationVars()>
 <ruleLabelDefVars()>
begin
 Locals.Initialize;
 try
   <if(trace)>TraceIn('<ruleName>', <ruleDescriptor.index>);<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
   <@preamble()>
   try
     try
       <ruleMemoization(name=ruleName)>
       <block>
       <ruleCleanUp()>
       <(ruleDescriptor.actions.after):execAction()>
<if(exceptions)>
       <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
       <actions.(actionScope).rulecatch>
<else>
     except
       on RE: ERecognitionException do
       begin
         ReportError(RE);
         Recover(Input,RE);
         <@setErrorReturnValue()>
       end;<\n>
<endif>
<endif>
<endif>
     end;
   finally
     <if(trace)>TraceOut("<ruleName>", <ruleDescriptor.index>);<endif>
     <memoize()>
     <ruleScopeCleanUp()>
     <finally>
   end;
   <@postamble()>
 finally
   Locals.Finalize;
 end;
 Exit(<ruleReturnValue()>);
end;
// $ANTLR end "<ruleName>"
>>

catch(decl,action) ::= <<
catch (<e.decl>)
{
   <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal := T<returnType()>.Create;
RetVal.Start := Input.LT(1);<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> := <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex := Input.Index();
<endif>
>>

ruleDeclarationVars() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name>: <a.type>;
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex: Integer;
<endif>
>>
```

```
ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{<it>Stack.Push(T<it>Scope.Create);}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>Stack.Push(T<it.name>Scope.Create);}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{<it>Stack.Pop();}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>Stack.Pop;}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]:{<it.label.text> := nil;}; separator="\n">
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{list_<it.label.text> := nil;}; separator="\n">
<ruleDescriptor.ruleLabels:ruleLabelDef(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|<ll.label.text> := nil;}; separator="\n">
>>

ruleLabelDefVars() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]:{<it.label.text>: I<labelType>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{list_<it.label.text>: IList\<IANTLRInterface\>;};
separator="\n">
<ruleDescriptor.ruleLabels:ruleLabelDefVar(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|<ll.label.text>: <ruleLabelType(referencedRule=ll.referencedRule)>;};
separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{<it.label.text> := nil;}; separator="\n"
>
<ruleDescriptor.charLabels:{int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{List_<it.label.text> := nil;}; separator="\n"
>
>>

lexerRuleLabelDefDeclarations() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{<it.label.text>: I<labelType>;}; separator="\n"
>
<ruleDescriptor.charLabels:{int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{List_<it.label.text>: IList;}; separator="\n"
>
>>

ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
RetVal
<endif>
<else>
<! nil !>
<endif>
<endif>
>>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
RetVal.Stop := Input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (State.Backtracking > 0) then
 Memoize(Input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex);
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
<ruleDescriptor.parameterScope>
procedure
T<grammar.recognizerName>.m<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);
var
 <ruleDescriptor.actions.vars>
 Locals: TLocalStorage;
 TokenType, Channel: Integer;
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
 <lexerRuleLabelDefDeclarations()>
begin
 Locals.Initialize;
 try
   <ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
   <if(trace)>TraceIn("<ruleName>", <ruleDescriptor.index>);<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   try
<if(nakedBlock)>
     <ruleMemoization(name=ruleName)>
     <lexerRuleLabelDefs()>
     <ruleDescriptor.actions.init>
     <block><\n>
<else>
     TokenType := <ruleName>;
     Channel := DEFAULT_TOKEN_CHANNEL;
     <ruleMemoization(name=ruleName)>
     <lexerRuleLabelDefs()>
     <ruleDescriptor.actions.init>
     <block>
     <ruleCleanUp()>
     State.TokenType := TokenType;
     State.Channel := Channel;
     <(ruleDescriptor.actions.after):execAction()>
<endif>
   finally
     <if(trace)>TraceOut("<ruleName>", <ruleDescriptor.index>);<endif>
     <ruleScopeCleanUp()>
     <memoize()>
   end;
 finally
   Locals.Finalize;
 end;
end;
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
procedure T<grammar.recognizerName>.mTokens;
var
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
begin
```

```
 <block>
end;

procedure T<grammar.recognizerName>.DoTokens;
begin
 mTokens;
end;
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
(* <fileName>:<description> *)
Alt[<decisionNumber>] := <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
case Alt[<decisionNumber>] of
 <alts:altSwitchCase()>
end;
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
(* <fileName>:<description> *)
Alt[<decisionNumber>] := <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
case Alt[<decisionNumber>] of
 <alts:altSwitchCase()>
end;
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
(* <fileName>:<description> *)
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
```

```
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
(* <fileName>:<description> *)
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
(* <fileName>:<description> *)
FCnt[<decisionNumber>] := 0;
<decls>
<@preloop()>
while (True) do
begin
 Alt[<decisionNumber>] := <maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 case Alt[<decisionNumber>] of
   <alts:altSwitchCase()>
 else
   begin
     if (FCnt[<decisionNumber>] >= 1) then
       Break;
     <ruleBacktrackFailure()>
     raise EEarlyExitException.Create(<decisionNumber>, Input);
     <@earlyExitException()>
   end;
 end;
 Inc(FCnt[<decisionNumber>]);
end;
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
(* <fileName>:<description> *)
<decls>
<@preloop()>
while (True) do
begin
 Alt[<decisionNumber>] := <maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 case Alt[<decisionNumber>] of
   <alts:altSwitchCase()>
 else
   Break;
 end;
end;
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase() ::= <<
<i>:
 <@prealt()>
 <it><\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
(* <fileName>:<description> *)
begin
 <@declarations()>
 <elements:element()>
 <rew>
 <@cleanup()>
end;
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S
```

```
/** Dump the elements one per line */
element() ::= <<
<@prematch()>
<it.el>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> := <endif>Match(Input, <token>,
FOLLOW_<token>_in_<ruleName><elementIndex>)<if(label)> as
I<labelType><endif>;<\n><checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label> = nil) then list_<label> := TList\<IANTLRInterface\>.Create;
list_<label>.Add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
Match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
MatchRange(<a>, <b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label> := Input.LA(1);<\n>
<else>
<label> := Input.LT(1) as I<labelType>;<\n>
```

```
<endif>
<endif>
if (<s>) then
begin
 Input.Consume;
 <postmatchCode>
 <if(!LEXER)>
 State.ErrorRecovery := False;<endif>
 <if(backtracking)>State.Failed := False;<endif>
end
else
begin
 <ruleBacktrackFailure()>
 FException := EMismatchedSetException.Create(nil, Input);
 <@mismatchedSetException()>
<if(LEXER)>
 Recover(FException);
 raise FException;<\n>
<else>
 raise FException;
 <! use following code to make it recover inline; remove throw mse;
 RecoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
 !>
<endif>
end;<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
Locals.AsInteger['<label>Start'] := CharIndex;
Match(<string>); <checkRuleBacktrackFailure()>
<label> := TCommonToken.Create(Input, TToken.INVALID_TOKEN_TYPE, TToken.DEFAULT_CHANNEL,
Locals.AsInteger['<label>Start'], CharIndex-1);
<else>
Match(<string>); <checkRuleBacktrackFailure()>
<endif>
>>

wildcard(label,elementIndex) ::= <<
<if(label)>
```

```
<label> := Input.LT(1) as I<labelType>;<\n>
<endif>
MatchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(label,elementIndex) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
PushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)>
<label> := <if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);<\n>
<else>
<if(scope)>T<scope.recognizerName>(IANTLRObject(<scope:delegateName()>).Implementor).<endif><rule.name
>(<args; separator=", ">);<\n>
<endif>
State.FollowingStackPointer := State.FollowingStackPointer - 1;
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference.
```

```
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
Locals.AsInteger['<label>Start<elementIndex>'] := CharIndex;
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<label> := TCommonToken.Create(Input, TToken.INVALID_TOKEN_TYPE, TToken.DEFAULT_CHANNEL,
 Locals.AsInteger['<label>Start<elementIndex>'], CharIndex - 1);
<else>
<if(scope)>(<scope:delegateName()>.Implementor as T<scope.recognizerName>).<endif>m<rule.name>(<args;
separator=", ">); <checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
Locals.AsInteger['<label>Start<elementIndex>'] := CharIndex;
Match(EOF); <checkRuleBacktrackFailure()>
Locals['<label>'] := TCommonToken.Create(Input, EOF, TToken.DEFAULT_CHANNEL,
Locals.AsInteger['<label>Start<elementIndex>'], CharIndex-1);
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (Input.LA(1) = TToken.DOWN) then
begin
 Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
end;
```

```
<else>
Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
<children:element()>
Match(Input, TToken.UP, nil);<\n><checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if (not (<evalPredicate(...)>)) then
begin
 <ruleBacktrackFailure()>
 raise EFailedPredicateException.Create(Input, '<ruleName>', '<description>');
end;<\n>
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);<\n>
<edges; separator="\nelse ">
else
begin
<if(eotPredictsAlt)>
 Alt[<decisionNumber>] := <eotPredictsAlt>;<\n>
<else>
 <ruleBacktrackFailure()>
 raise ENoViableAltException.Create('<description>', <decisionNumber>, <stateNumber>, Input);<\n>
<endif>
end;
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);<\n>
<edges; separator="\nelse ">;
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);
<edges; separator="\nelse ">;<\n>
<if(eotPredictsAlt)>
<if(!edges)>
Alt[<decisionNumber>] := <eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else
begin
 Alt[<decisionNumber>] := <eotPredictsAlt>;
end;<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "Alt[<decisionNumber>] := <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> and (<predicates>)<endif>) then
begin
 <targetState>
end <! no ; here !>
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
case Input.LA(<k>) of
 <edges; separator="\n">
else
 begin
<if(eotPredictsAlt)>
   Alt[<decisionNumber>] := <eotPredictsAlt>;
<else>
   <ruleBacktrackFailure()>
   <@noViableAltException()>
   raise ENoViableAltException.Create('<description>', <decisionNumber>, <stateNumber>, Input);<\n>
<endif>
```

```
 end;
end;<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
case Input.LA(<k>) of
 <edges; separator="\n">
end;<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
case Input.LA(<k>) of
 <edges; separator="\n"><\n>
<if(eotPredictsAlt)>
else
 Alt[<decisionNumber>] := <eotPredictsAlt>;<\n>
<endif>
end;<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{<it>}; separator=",\n">:
 begin
   <targetState>
 end;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
Alt[<decisionNumber>] := FDFA<decisionNumber>.Predict(Input);
>>

/* Dump DFA tables.
*/
cyclicDFADeclaration(dfa) ::= <<
strict protected
 type
   TDFA<dfa.decisionNumber> = class(TDFA)
   protected
     { IDFA }
     function Description: String; override;
   public
     constructor Create(const ARecognizer: IBaseRecognizer);
```

```
  end;
 var
  FDFA<dfa.decisionNumber>: IDFA;
<if(dfa.specialStateSTs)>
strict protected
 function DFA<dfa.decisionNumber>_SpecialStateTransition(const DFA: IDFA; S: Integer;
  const AInput: IIntStream): Integer;<endif>
>>

cyclicDFA(dfa) ::= <<
{ T<grammar.recognizerName>.TDFA<dfa.decisionNumber> }

constructor T<grammar.recognizerName>.TDFA<dfa.decisionNumber>.Create(const ARecognizer:
IBaseRecognizer);
const
 DFA<dfa.decisionNumber>_EOT = '<dfa.javaCompressedEOT; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_EOF = '<dfa.javaCompressedEOF; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_MIN = '<dfa.javaCompressedMin; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_MAX = '<dfa.javaCompressedMax; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_ACCEPT = '<dfa.javaCompressedAccept; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_SPECIAL = '<dfa.javaCompressedSpecial; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_TRANSITION: array [0..<length(dfa.javaCompressedTransition)>-1] of String = (
  <dfa.javaCompressedTransition:{s|'<s; wrap="'+\n'">'}; separator=",\n">);
begin
 inherited Create;
 Recognizer := ARecognizer;
 DecisionNumber := <dfa.decisionNumber>;
 EOT := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_EOT);
 EOF := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_EOF);
 Min := TDFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_MIN);
 Max := TDFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_MAX);
 Accept := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_ACCEPT);
 Special := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_SPECIAL);
 Transition := TDFA.UnpackEncodedStringArray(DFA<dfa.decisionNumber>_TRANSITION);
end;

function T<grammar.recognizerName>.TDFA<dfa.decisionNumber>.Description: String;
begin
 Result := '<dfa.description>';
end;<\n>
<if(dfa.specialStateSTs)>
function T<grammar.recognizerName>.DFA<dfa.decisionNumber>_SpecialStateTransition(const DFA: IDFA; S:
Integer;
 const AInput: IIntStream): Integer;
var
 Locals: TLocalStorage;
 <if(LEXER)>
 Input: IIntStream;
 <endif>
 <if(PARSER)>
 Input: ITokenStream;
 <endif>
 <if(TREE_PARSER)>
 Input: ITreeNodeStream;
 <endif>
 _S: Integer;
 NVAE: ENoViableAltException;
begin
 Result := -1;
 Locals.Initialize;
 try
   <if(LEXER)>
   Input := AInput;
   <endif>
   <if(PARSER)>
   Input := AInput as ITokenStream;
   <endif>
   <if(TREE_PARSER)>
   Input := AInput as ITreeNodeStream;
   <endif>
   _S := S;
   case S of
     <dfa.specialStateSTs:{state | <i0>: begin<! compressed special state numbers 0..n-1 !>
    <state> <\n>   end;}; separator="\n">
   end;
<if(backtracking)>
   if (State.Backtracking > 0) then
   begin
     State.Failed := True;
     Exit(-1);
   end;<\n>
<endif>
   NVAE := ENoViableAltException.Create(DFA.Description, <dfa.decisionNumber>, _S, Input);
   DFA.Error(NVAE);
   raise NVAE;
 finally
   Locals.Finalize;
 end;
end;<\n>
<endif>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
```

```
FLA[<decisionNumber>,<stateNumber>] := Input.LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
Locals.AsInteger['index<decisionNumber>_<stateNumber>'] := Input.Index;
Input.Rewind;<\n>
<endif>
S := -1;
<edges; separator="\nelse ">;
<if(semPredState)> <! return input cursor to state before we rewound !>
Input.Seek(Locals.AsInteger['index<decisionNumber>_<stateNumber>']);<\n>
<endif>
if (S >= 0) then
 Exit(S);
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> and (<predicates>)<endif>) then
 S := <targetStateNumber>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
S := <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"

orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\" or \">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "FLA[<decisionNumber>,<stateNumber>] = <atomAsInt>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "Input.LA(<k>) = <atomAsInt>"
```

```
lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
((FLA[<decisionNumber>,<stateNumber>] \>= <lowerAsInt>) and (FLA[<decisionNumber>,<stateNumber>] \<=
<upperAsInt>))
>>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(Input.LA(<k>) \>=
<lowerAsInt>) and (Input.LA(<k>) \<= <upperAsInt>)"

setTest(ranges) ::= "<ranges; separator=\") or (\">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<scope.name>Stack := TStackList\<I<scope.name>Scope\>.Create;<\n>
<endif>
>>

globalAttributeScopeDeclaration(scope) ::= <<
<if(scope.attributes)>
strict protected
 type
   I<scope.name>Scope = interface(IANTLRObject)
   end;
   T<scope.name>Scope = class(TANTLRObject, I<scope.name>Scope)
   protected
     <scope.attributes:{<it.name>: <it.type>;}; separator="\n">
   end;
strict protected
 <scope.name>Stack: IStackList\<I<scope.name>Scope\>;
<endif>
>>

ruleAttributeScopeDeclaration(scope) ::= <<
<if(scope.attributes)>
strict protected
 type
   I<scope.name>Scope = interface(IANTLRObject)
   end;
   T<scope.name>Scope = class(TANTLRObject, I<scope.name>Scope)
   protected
     <scope.attributes:{<it.name>: <it.type>;}; separator="\n">
   end;
strict protected
 <scope.name>Stack: IStackList\<I<scope.name>Scope\>;
<endif>
>>
```

```
ruleAttributeScope(scope) ::= <<
<! protected Stack <scope.name>Stack = new Stack();<\n> !>
>>

ruleAttributeScopeInit(scope) ::= <<
<if(scope)>
<scope.name>Stack := TStackList\<I<scope.name>Scope\>.Create;<\n>
<endif>
>>

returnStructName() ::= "<it.name>_return"

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()>
<! I<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope !>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
<! Pointer/void !>
<endif>
<endif>
>>

/** Generate the C# type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
I<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

delegateName() ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
```

```
<csharpTypeInitMap.(typeName)>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
<label.label.text> := <initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
>>

ruleLabelDefVar(label) ::= <<
<label.label.text>: <ruleLabelType(referencedRule=label.referencedRule)>;
>>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
{ T<ruleDescriptor:returnStructName()> }

<scope.attributes:{public <it.decl>;}; separator="\n">
<@ruleReturnMembers()>
<endif>
>>

returnScopeDeclaration(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public
 type
   T<ruleDescriptor:returnStructName()> =
class(T<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope, I<ruleDescriptor:returnStructName()>)
   <scope.attributes:{public <it.decl>;}; separator="\n">
   <@ruleReturnMembers()>
   end;
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> := <expr>;"

scopeAttributeRef(scope,attr,index,negIndex) ::= <<
<if(negIndex)>
(<scope>Stack[<scope>Stack.Count-<negIndex>-1] as T<scope>Scope).<attr.name>
<else>
```

```
<if(index)>
(<scope>Stack[<index>] as T<scope>Scope).<attr.name>
((<scope>_scope)<scope>_stack[<index>]).<attr.name>
<else>
(<scope>Stack.Peek.Implementor as T<scope>Scope).<attr.name>
<endif>
<endif>
>>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <<
<if(negIndex)>
(<scope>Stack[<scope>Stack.Count-<negIndex>-1] as T<scope>Scope).<attr.name> := <expr>;<\n>
<else>
<if(index)>
(<scope>Stack[<index>] as T<scope>Scope).<attr.name> := <expr>;<\n>
<else>
(<scope>Stack.Peek.Implementor as T<scope>Scope).<attr.name> := <expr>;<\n>
<endif>
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>Stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
(IfThen(Assigned(<scope>),Def(<scope>).<attr.name>,<initValue(attr.type)>))
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal.<attr.name> := <expr>;
<else>
```

```
<attr.name> := <expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(Def(<scope>).Text)"
tokenLabelPropertyRef_type(scope,attr) ::= "(Def(<scope>).TokenType)"
tokenLabelPropertyRef_line(scope,attr) ::= "(Def(<scope>).Line)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(Def(<scope>).CharPositionInLine)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(Def(<scope>).Channel)"
tokenLabelPropertyRef_index(scope,attr) ::= "(Def(<scope>).TokenIndex)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(StrToIntDef(Def(<scope>).Text,0))"

ruleLabelPropertyRef_start(scope,attr) ::= "(IfThen(Assigned(<scope>), Def(<scope>).Start, nil) as I<labelType>)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(Def(<scope>).Stop as I<labelType>)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(Def(Def(<scope>).Tree as I<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
IfThen(Assigned(<scope>), Input.TokenStream.ToString(
 Input.TreeAdaptor.GetTokenStartIndex(Def(<scope>).Start),
 Input.TreeAdaptor.GetTokenStopIndex(Def(<scope>).Start)), '')
<else>
IfThen(Assigned(<scope>), Input.ToString(
 (Def(<scope>).Start) as IToken,(Def(<scope>).Stop) as IToken), '')
<endif>
>>
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> != null) ? <scope>.ST : null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(Def(<scope>).TokenType)"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(Def(<scope>).Line)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(IfThen(Assigned(<scope>),Def(<scope>).CharPositionInLine,-1))"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(Def(<scope>).Channel)"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(Def(<scope>).TokenIndex)"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(Def(<scope>).Text)"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "(StrToIntDef(Def(<scope>).Text,0))"
```

```
// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(RetVal.Start as I<labelType>)"
rulePropertyRef_stop(scope,attr) ::= "(RetVal.Stop as I<labelType>)"
rulePropertyRef_tree(scope,attr) ::= "(RetVal.Tree as I<ASTLabelType>)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
Input.TokenStream.ToString(
 Input.TreeAdaptor.GetTokenStartIndex(RetVal.Start),
 Input.TreeAdaptor.GetTokenStopIndex(RetVal.Start))
<else>
Input.ToString(RetVal.Start as IToken,Input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "RetVal.ST"

lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "TokenType"
lexerRulePropertyRef_line(scope,attr) ::= "State.TokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "State.TokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "Channel"
lexerRulePropertyRef_start(scope,attr) ::= "State.TokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "StrToInt(<scope>.Text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "RetVal.Tree := <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "RetVal.ST := <expr>;"


/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if (<actions.(actionScope).synpredgate>) then
begin
 <action>
end;
<else>
if (State.Backtracking = 0) then
begin
 <action>
end;<\n>
<endif>
<else>
<action>
<endif>
```

```
>>


/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
<name> := TBitSet.Create([<words64:{<it>};separator=",">]);<\n>
>>

bitsetDecl(name) ::= <<
<name>: IBitSet;<\n>
>>

codeFileExtension() ::= ".pas"

true() ::= "True"
false() ::= "False"
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Delphi/Delphi.stg

No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
* Copyright (c) 2005-2008 Terence Parr
* All rights reserved.
*
* Conversion to C#:
* Copyright (c) 2008-2009 Sam Harwell, Pixel Mine, Inc.
* All rights reserved.
*
* Redistribution and use in source and binary forms, with or without
* modification, are permitted provided that the following conditions
* are met:
* 1. Redistributions of source code must retain the above copyright
*    notice, this list of conditions and the following disclaimer.
* 2. Redistributions in binary form must reproduce the above copyright
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*    derived from this software without specific prior written permission.
*
* THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
* IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
```

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/

parserMembers() ::= <<
 // Implement this function in your helper file to use a custom tree adaptor
 partial void InitializeTreeAdaptor();
 protected DebugTreeAdaptor adaptor;

 public ITreeAdaptor TreeAdaptor
 {
  get
  {
   return adaptor;
  }
  set
  {
<if(grammar.grammarIsRoot)>
   this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
   this.adaptor = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif><\n>
   <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
  }
 }<\n>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port,
<if(TREE_PARSER)>input.TreeAdaptor<else>adaptor<endif> );
DebugListener = proxy;
<inputStreamType> = new Debug<inputStreamType>( input, proxy );
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>

@ctorForRootGrammar.finally() ::= <<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
proxy.TreeAdaptor = adap;
>>

@ctorForProfilingRootGrammar.finally() ::=<<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
>>

@ctorForPredefinedListener.superClassRef() ::= ": base( input, dbg )"

@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)><! don't create new adaptor for delegates !>
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;<\n>
<endif>
>>

//@rewriteElement.pregen() ::= "dbg.Location( <e.line>, <e.pos> );"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp3/ASTDbg.stg
No license file was found, but licenses were detected in source scan.

```
/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/

@rule.setErrorReturnValue() ::= <<
retval.Tree = (<ASTLabelType>)adaptor.ErrorNode(input, retval.Start, input.LT(-1), re);
<! System.out.WriteLine("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if (state.backtracking == 0) {<endif>
<label>_tree = <createNodeFromToken(...)>;
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex) ::= "<super.tokenRef(...)>"
```

```
/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={<if(backtracking)>if (<actions.(actionScope).synpredgate>)
<endif>adaptor.AddChild(root_0, <createNodeFromToken(...)>);}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
```

```
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<createNodeFromToken(...)>, root_0);}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <label>.Tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_0);
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
```

```
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(token=[],...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.text)>,<terminalOptions.text; format="string"><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.text)>,<terminalOptions.text; format="string"><endif>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
adaptor.SetTokenBoundaries(retval.Tree, retval.Start, retval.Stop);
<if(backtracking)>}<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp2/ASTParser.stg
No license file was found, but licenses were detected in source scan.

/*

```
*/

/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/

finishedBacktracking(block) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
   <block>
<else>
<block>
<endif>
<endif>
```

```
>>

@ruleBody.setErrorReturnValue() ::= <<
retval.tree = self._adaptor.errorNode(self.input, retval.start, self.input.LT(-1), re)
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
self._adaptor.addChild(root_0, <label>_tree)
})>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST
// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <%
<super.matchSet(postmatchCode={<finishedBacktracking({self._adaptor.addChild(root_0,
<createNodeFromToken(...)>)})>}, ...)>
%>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
<super.matchSet(postmatchCode={<finishedBacktracking({root_0 =
self._adaptor.becomeRoot(<createNodeFromToken(...)>, root_0)})>}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({self._adaptor.addChild(root_0, <label>.tree)})>
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
```

```
<finishedBacktracking({root_0 = self._adaptor.becomeRoot(<label>.tree, root_0)})>
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(label, {<label>.tree})>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
self._adaptor.addChild(root_0, <label>_tree)
})>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<terminalOptions.node>(<label>) <! new MethodNode(IDLabel) !>
<else>
self._adaptor.createWithPayload(<label>)
<endif>
%>
```

```
ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
self._adaptor.setTokenBoundaries(retval.tree, retval.start, retval.stop)
})>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/ASTParser.stg
No license file was found, but licenses were detected in source scan.

```
group AST;

@outputFile.imports() ::= <<
<@super.imports()><if(!TREE_PARSER)><! tree parser would already have imported !>
```

```
Antlr.Runtime.Tree,<\n><endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

@genericParser.membersConstructor() ::= <<
<@super.membersConstructor()>
<parserMembersConstructor()>
>>

@genericParser.membersImplementation() ::= <<
<@super.membersImplementation()>
<parserMembersImplementation()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
 strict protected
   FAdaptor: ITreeAdaptor;
   procedure SetAdaptor(const Value: ITreeAdaptor);
   property Adaptor: ITreeAdaptor read FAdaptor;
 public
   property TreeAdaptor: ITreeAdaptor read FAdaptor write SetAdaptor;

>>

parserMembersConstructor() ::= <<
FAdaptor := TCommonTreeAdaptor.Create;
>>

parserMembersImplementation() ::= <<
procedure T<grammar.recognizerName>.SetAdaptor(const Value: ITreeAdaptor);
begin
 FAdaptor := Value;
 <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor := FAdaptor;}>
end;
>>

@returnScope.ruleReturnMembers() ::= <<
function T<grammar.recognizerName>.T<ruleDescriptor:returnStructName()>.GetTree: IANTLRInterface;
begin
 Result := FTree;
end;

procedure T<grammar.recognizerName>.T<ruleDescriptor:returnStructName()>.SetTree(const Value:
```

```
IANTLRInterface);
begin
 FTree := Value as I<ASTLabelType>;
end;
>>

@returnScopeDeclaration.ruleReturnMembers() ::= <<
strict private
 FTree: I<ASTLabelType>;
protected
 { IRuleReturnScope }
 function GetTree: IANTLRInterface; override;
 procedure SetTree(const Value: IANTLRInterface); override;
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
Root[0] := nil;<\n>
>>

ruleDeclarationVars() ::= <<
<super.ruleDeclarationVars()>
Root: array [0..63] of I<ASTLabelType>;
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{<it.label.text>_tree := nil;}; separator="\n">
<ruleDescriptor.tokenListLabels:{<it.label.text>_tree := nil;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites:{Locals['Stream_<it>'] :=
TRewriteRule<rewriteElementType>Stream.Create(Adaptor,'token <it>');}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites:{Locals['Stream_<it>'] :=
TRewriteRuleSubtreeStream.Create(Adaptor,'rule <it>');}; separator="\n">
>>

ruleLabelDefVars() ::= <<
<super.ruleLabelDefVars()>
<ruleDescriptor.tokenLabels:{<it.label.text>_tree: I<ASTLabelType>;}; separator="\n">
<ruleDescriptor.tokenListLabels:{<it.label.text>_tree: I<ASTLabelType>;}; separator="\n">
>>
/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
```

```
<if(outerAlt)>
<if(!rewriteMode)>
Root[0] := Adaptor.GetNilNode as I<ASTLabelType>;
<endif>
<endif>
<endif>
>>

// Tracking Rule Elements

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<token>'] as
IRewriteRuleElementStream).Add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<token>'] as
IRewriteRuleElementStream).Add(<label>);<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<rule.name>'] as
IRewriteRuleElementStream).Add(<label>.Tree);<\n>
>>
```

```
/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<rule>'] as
IRewriteRuleElementStream).Add(<label>.Tree);
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem=label+".Tree",...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
   referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements:          <referencedElementsDeep; separator=", ">
// token labels:      <referencedTokenLabels; separator=", ">
// rule labels:       <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels:  <referencedRuleListLabels; separator=", ">
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
<prevRuleRootRef()>.Tree := Root[0];
<rewriteCodeLabels()>
Root[0] := Adaptor.GetNilNode as I<ASTLabelType>;
<alts:rewriteAlt(); separator="else ">
```

```
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.rulePostProcessing(root[0]);
input.ReplaceChildren(adaptor.GetParent(retval.Start),
                  adaptor.GetChildIndex(retval.Start),
                  adaptor.GetChildIndex(_last),
                  retval.Tree);
<endif>
<endif>
<! if parser or rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.Tree := Root[0];<\n>
<endif>
<if(!rewriteMode)>
<prevRuleRootRef()>.Tree := Root[0];<\n>
<endif>
<if(backtracking)>
end;
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
   :{Locals['Stream_<it>'] := TRewriteRule<rewriteElementType>Stream.Create(Adaptor, 'token <it>', <it>);};
   separator="\n"
>
<referencedTokenListLabels
   :{Locals['Stream_<it>'] := TRewriteRule<rewriteElementType>Stream.Create(Adaptor,'token <it>', list_<it>);};
   separator="\n"
>
<referencedRuleLabels:{
if Assigned(<it>) then
 Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', <it>.Tree)
else
 Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', nil);}; separator="\n">
<referencedRuleListLabels
   :{Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', list_<it>);};
   separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,     // elements in immediately block; no nested blocks
 description) ::=
<<
(* <fileName>:<description> *)
if (<referencedElementsDeep:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator="
or ">) then
begin
 <alt>
end;
<referencedElementsDeep:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset;<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,     // elements in immediately block; no nested blocks
 description) ::=
<<
(* <fileName>:<description> *)
while (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">) do
begin
 <alt>
end;
<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,     // elements in immediately block; no nested blocks
 description) ::=
<<
if (not (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">)) then
 raise ERewriteEarlyExitException.Create('');

while (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">) do
begin
 <alt>
end;
<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset();<\n>}>
>>

rewriteAlt(a) ::= <<
(* <a.description> *)
<if(a.pred)>
```

```
if (<a.pred>) then
begin
 <a.alt>
end<\n>
<else>
begin
 <a.alt>
end;<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "Root[0] = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
(* <fileName>:<description> *)
begin
 Root[<treeLevel>] := Adaptor.GetNilNode as I<ASTLabelType>;
 <root:rewriteElement()>
 <children:rewriteElement()>
 Adaptor.AddChild(Root[<enclosingTreeLevel>], Root[<treeLevel>]);
end;<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as
IRewriteRuleElementStream).NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode);<\n>
>>

/** Gen ^($label ...) */
```

```
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as
IRewriteRuleElementStream).NextNode(), Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>, Root[<treeLevel>]) as
I<ASTLabelType>;<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>, Root[<treeLevel>]) as
I<ASTLabelType>;<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
Root[0] = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of Root[0] right
*  before I set it during rewrites.  The assign will be to retval.Tree.
*/
prevRuleRootRef() ::= "RetVal"

rewriteRuleRef(rule) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<rule>'] as IRewriteRuleElementStream).NextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<rule>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

rewriteNodeAction(action) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <action>);<\n>
>>
```

```
rewriteNodeActionRoot(action) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot(<action>, Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
T<terminalOptions.node>.Create(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
Adaptor.CreateNode(<tokenType>, <args; separator=", "><if(!args)>'<tokenType>'<endif>) as I<ASTLabelType>
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create((Locals['Stream_<token>'] as IRewriteRuleElementStream).NextToken<if(args)>,
<args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
Adaptor.Create(<token>, <args; separator=", ">)
<else>
(Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Delphi/AST.stg
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*/

```
/** Template overrides to add debugging to normal Java output;
*  If ASTs are built, then you'll also get ASTDbg.stg loaded.
*/
@outputFile.imports() ::= <<
<@super.imports()>
import org.antlr.runtime.debug.*;
import java.io.IOException;
>>

@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
 public static final String[] ruleNames = new String[] {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n\t\t", separator=", ">
 };<\n>
<endif>
 public static final boolean[] decisionCanBacktrack = new boolean[] {
  false, // invalid decision
  <grammar.decisions:{d | <d.dfa.hasSynPred; null="false">}; wrap="\n    ", separator=", ">
 };<\n>
<if(grammar.grammarIsRoot)> <! grammar imports other grammar(s) !>
 public int ruleLevel = 0;
 public int getRuleLevel() { return ruleLevel; }
 public void incRuleLevel() { ruleLevel++; }
 public void decRuleLevel() { ruleLevel--; }
<if(profile)>
 <ctorForProfilingRootGrammar()>
<else>
 <ctorForRootGrammar()>
<endif>
 <ctorForPredefinedListener()>
<else><! imported grammar !>
 public int getRuleLevel() { return <grammar.delegators:{g| <g:delegateName()>}>.getRuleLevel(); }
 public void incRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.incRuleLevel(); }
 public void decRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.decRuleLevel(); }
 <ctorForDelegateGrammar()>
<endif>
<if(profile)>
 public boolean alreadyParsedRule(IntStream input, int ruleIndex) {
  int stopIndex = getRuleMemoization(ruleIndex, input.index());
  ((Profiler)dbg).examineRuleMemoization(input, ruleIndex, stopIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
  return super.alreadyParsedRule(input, ruleIndex);
 }

 @Override
 public void memoize(IntStream input,
      int ruleIndex,
      int ruleStartIndex)
 {
  ((Profiler)dbg).memoize(input, ruleIndex, ruleStartIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
  super.memoize(input, ruleIndex, ruleStartIndex);
 }<\n>
<endif>
 protected boolean evalPredicate(boolean result, String predicate) {
  dbg.semanticPredicate(result, predicate);
  return result;
 }<\n>
>>

ctorForRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<! Same except we add port number and profile stuff if root grammar !>
public <name>(<inputStreamType> input) {
 this(input, DebugEventSocketProxy.DEFAULT_DEBUGGER_PORT, new RecognizerSharedState());
}
public <name>(<inputStreamType> input, int port, RecognizerSharedState state) {
 super(input, state);
 <parserCtorBody()>
 <createListenerAndHandshake()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <@finally()>
}<\n>
>>

ctorForProfilingRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
public <name>(<inputStreamType> input) {
 this(input, new Profiler(null), new RecognizerSharedState());
}
public <name>(<inputStreamType> input, DebugEventListener dbg, RecognizerSharedState state) {
 super(input, dbg, state);
 Profiler p = (Profiler)dbg;
 p.setParser(this);
 <parserCtorBody()>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state, this<grammar.delegators:{g|,
<g:delegateName()>}>);}; separator="\n">
 <@finally()>
}
<\n>
>>

/** Basically we don't want to set any dbg listeners are root will have it. */
ctorForDelegateGrammar() ::= <<
public <name>(<inputStreamType> input, DebugEventListener dbg, RecognizerSharedState
state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
 super(input, dbg, state);
 <parserCtorBody()>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, this, this.state<grammar.delegators:{g|,
<g:delegateName()>}>);}; separator="\n">
}<\n>
>>

ctorForPredefinedListener() ::= <<
public <name>(<inputStreamType> input, DebugEventListener dbg) {
 <@superClassRef>super(input, dbg, new RecognizerSharedState());<@end>
<if(profile)>
 Profiler p = (Profiler)dbg;
 p.setParser(this);
```

```
<endif>
 <parserCtorBody()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <@finally()>
}<\n>
>>

createListenerAndHandshake() ::= <<
<if(TREE_PARSER)>
DebugEventSocketProxy proxy =
 new DebugEventSocketProxy(this, port, input.getTreeAdaptor());<\n>
<else>
DebugEventSocketProxy proxy =
 new DebugEventSocketProxy(this, port, null);<\n>
<endif>
setDebugListener(proxy);
try {
 proxy.handshake();
}
catch (IOException ioe) {
 reportError(ioe);
}
>>

@genericParser.superClassName() ::= "Debug<@super.superClassName()>"

@rule.preamble() ::= <<
try { dbg.enterRule(getGrammarFileName(), "<ruleName>");
if ( getRuleLevel()==0 ) {dbg.commence();}
incRuleLevel();
dbg.location(<ruleDescriptor.tree.line>, <ruleDescriptor.tree.charPositionInLine>);<\n>
>>

@rule.postamble() ::= <<
dbg.location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);<\n>
}
finally {
 dbg.exitRule(getGrammarFileName(), "<ruleName>");
 decRuleLevel();
 if ( getRuleLevel()==0 ) {dbg.terminate();}
}<\n>
>>

@synpred.start() ::= "dbg.beginBacktrack(state.backtracking);"

@synpred.stop() ::= "dbg.endBacktrack(state.backtracking, success);"
```

```
// Common debug event triggers used by region overrides below

enterSubRule() ::=
 "try { dbg.enterSubRule(<decisionNumber>);<\n>"

exitSubRule() ::=
 "} finally {dbg.exitSubRule(<decisionNumber>);}<\n>"

enterDecision() ::=
 "try { dbg.enterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);<\n>"

exitDecision() ::=
 "} finally {dbg.exitDecision(<decisionNumber>);}<\n>"

enterAlt(n) ::= "dbg.enterAlt(<n>);<\n>"

// Region overrides that tell various constructs to add debugging triggers

@block.predecision() ::= "<enterSubRule()><enterDecision()>"

@block.postdecision() ::= "<exitDecision()>"

@block.postbranch() ::= "<exitSubRule()>"

@ruleBlock.predecision() ::= "<enterDecision()>"

@ruleBlock.postdecision() ::= "<exitDecision()>"

@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

@positiveClosureBlock.predecision() ::= "<enterDecision()>"

@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

@positiveClosureBlock.earlyExitException() ::=
 "dbg.recognitionException(eee);<\n>"

@closureBlock.preloop() ::= "<enterSubRule()>"

@closureBlock.postloop() ::= "<exitSubRule()>"

@closureBlock.predecision() ::= "<enterDecision()>"
```

```
@closureBlock.postdecision() ::= "<exitDecision()>"

@altSwitchCase.prealt() ::= "<enterAlt(altNum)>" // altNum is arg of altSwitchCase

@element.prematch() ::=
 "dbg.location(<e.line>,<e.pos>);" // e is arg of element

@matchSet.mismatchedSetException() ::=
 "dbg.recognitionException(mse);"

@dfaState.noViableAltException() ::= "dbg.recognitionException(nvae);"

@dfaStateSwitch.noViableAltException() ::= "dbg.recognitionException(nvae);"

dfaDecision(decisionNumber,description) ::= <<
try {
 isCyclicDecision = true;
 <super.dfaDecision(...)>
}
catch (NoViableAltException nvae) {
 dbg.recognitionException(nvae);
 throw nvae;
}
>>

@cyclicDFA.errorMethod() ::= <<
public void error(NoViableAltException nvae) {
 dbg.recognitionException(nvae);
}
>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
evalPredicate(<pred>,"<description>")
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/Dbg.stg
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```
/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/
group ASTParser;

@rule.setErrorReturnValue() ::= <<
RetVal.Tree := Adaptor.ErrorNode(Input, RetVal.Start as IToken,
 Input.LT(-1), RE) as I<ASTLabelType>;
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>
```

```
if (State.Backtracking = 0) then
begin<\n>
<endif>
<label>_tree := <createNodeFromToken(...)>;
Adaptor.AddChild(Root[0], <label>_tree);
<if(backtracking)>
end;
<endif>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
<label>_tree := <createNodeFromToken(...)>;
Root[0] := Adaptor.BecomeRoot(<label>_tree, Root[0]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<super.matchSet(..., postmatchCode={<if(backtracking)>if (State.Backtracking = 0) then
<endif>Adaptor.AddChild(Root[0], <createNodeFromToken(...)>);})>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(label)>
<label> := Input.LT(1) as I<labelType>;<\n>
<endif>
<super.matchSet(..., postmatchCode={<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[0] :=
Adaptor.BecomeRoot(<createNodeFromToken(...)>, Root[0]) as I<ASTLabelType>;})>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Adaptor.AddChild(Root[0], <label>.Tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[0] := Adaptor.BecomeRoot(<label>.Tree, Root[0])
as I<ASTLabelType>;
```

```
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(elem=label+".Tree",...)>
>>

// WILDCARD AST

wildcard(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
 <label>_tree := Adaptor.CreateNode(<label>) as I<ASTLabelType>;
 Adaptor.AddChild(Root[0], <label>_tree);
<if(backtracking)>
end;
<endif>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"

wildcardRuleRoot(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
 <label>_tree := Adaptor.CreateNode(<label>) as I<ASTLabelType>;
 Root[0] := Adaptor.BecomeRoot(<label>_tree, Root[0]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
```

```
>>

createNodeFromToken(label,terminalOptions) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create(<label>) <! new MethodNode(IDLabel) !>
<else>
Adaptor.CreateNode(<label>) as I<ASTLabelType>
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
RetVal.Tree := Adaptor.RulePostProcessing(Root[0]) as I<ASTLabelType>;
<if(!TREE_PARSER)>
Adaptor.SetTokenBoundaries(RetVal.Tree, RetVal.Start as IToken, RetVal.Stop as IToken);
<endif>
<if(backtracking)>
<\n>end;
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Delphi/ASTParser.stg

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```
*/
/** Template overrides to add debugging to normal C output;
*  If ASTs are built, then you'll also get ASTDbg.stg loaded.
*/
@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
const char *
ruleNames[] =
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n  ", separator=", ">
 };<\n>
<endif>
<if(grammar.grammarIsRoot)> <! grammar imports other grammar(s) !>
static ANTLR3_UINT32 ruleLevel = 0;
static ANTLR3_UINT32 getRuleLevel()
{
 return ruleLevel;
}
static void incRuleLevel()
{
 ruleLevel++;
}
static void decRuleLevel()
{
 ruleLevel--;
}
<else> <! imported grammar !>
static ANTLR3_UINT32
getRuleLevel()
{
 return <grammar.delegators:{g| <g:delegateName()>}>->getRuleLevel();
}
static void incRuleLevel()
{
 <grammar.delegators:{g| <g:delegateName()>}>->incRuleLevel();
}
static void
```

```
decRuleLevel()
{
 <grammar.delegators:{g| <g:delegateName()>}>.decRuleLevel();
}
<endif>
<if(profile)>
// Profiling not yet implemented for C target
//
<endif>
<if(grammar.grammarIsRoot)>
<ctorForPredefinedListener()>
<else>
<ctorForDelegateGrammar()>
<endif>

static ANTLR3_BOOLEAN
evalPredicate(p<name> ctx, ANTLR3_BOOLEAN result, const char * predicate)
{
   DBG->semanticPredicate(DBG, result, predicate);
   return result;
}<\n>
>>

@genericParser.debugStuff() ::= <<
<if(grammar.grammarIsRoot)>
<createListenerAndHandshake()>
<endif>
>>

ctorForProfilingRootGrammar() ::= <<
>>

/** Basically we don't want to set any dbg listeners as root will have it. */
ctorForDelegateGrammar() ::= <<

>>

ctorForPredefinedListener() ::= <<

>>

createListenerAndHandshake() ::= <<
{
 // DEBUG MODE code
 //
 pANTLR3_DEBUG_EVENT_LISTENER  proxy;
 proxy = antlr3DebugListenerNew();
 proxy->grammarFileName = INPUT->tokenSource->strFactory->newStr8(INPUT->tokenSource->strFactory,
(pANTLR3_UINT8)ctx->getGrammarFileName());

<if(TREE_PARSER)>
 proxy->adaptor = ADAPTOR;
<endif>
 PARSER->setDebugListener(PARSER, proxy);

 // Try to connect to the debugger (waits forever for a connection)
 //
 proxy->handshake(proxy);

 // End DEBUG MODE code
 //
}
>>



@rule.preamble() ::= <<
if ( getRuleLevel()==0 )
{
 DBG->commence(DBG);
}
DBG->enterRule(DBG, getGrammarFileName(), (const char *)"<ruleName>");
incRuleLevel();
DBG->location(DBG, <ruleDescriptor.tree.line>, <ruleDescriptor.tree.column>);<\n>
>>

@rule.postamble() ::= <<
DBG->location(DBG, <ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.column>);<\n>
DBG->exitRule(DBG, getGrammarFileName(), (const char *)"<ruleName>");
decRuleLevel();
if ( getRuleLevel()==0 )
{
 DBG->terminate(DBG);
}
<\n>
>>

@checkRuleBacktrackFailure.debugClean() ::= <<
DBG->exitRule(DBG, getGrammarFileName(), (const char *)"<ruleName>");
decRuleLevel();
>>

@synpred.start() ::= "DBG->beginBacktrack(DBG, BACKTRACKING);"

@synpred.stop() ::= "DBG->endBacktrack(DBG, BACKTRACKING, success);"

// Common debug event triggers used by region overrides below
```

```
enterSubRule() ::=
   "DBG->enterSubRule(DBG, <decisionNumber>);<\n>"

exitSubRule() ::=
   "DBG->exitSubRule(DBG, <decisionNumber>);<\n>"

enterDecision() ::=
   "DBG->enterDecision(DBG, <decisionNumber>);<\n>"

exitDecision() ::=
   "DBG->exitDecision(DBG, <decisionNumber>);<\n>"

enterAlt(n) ::= "DBG->enterAlt(DBG, <n>);<\n>"

// Region overrides that tell various constructs to add debugging triggers

@block.predecision() ::= "<enterSubRule()><enterDecision()>"

@block.postdecision() ::= "<exitDecision()>"

@block.postbranch() ::= "<exitSubRule()>"

@ruleBlock.predecision() ::= "<enterDecision()>"

@ruleBlock.postdecision() ::= "<exitDecision()>"

@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

@positiveClosureBlock.predecision() ::= "<enterDecision()>"

@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

@positiveClosureBlock.earlyExitException() ::=
   "DBG->recognitionException(DBG, EXCEPTION);<\n>"

@closureBlock.preloop() ::= "<enterSubRule()>"

@closureBlock.postloop() ::= "<exitSubRule()>"

@closureBlock.predecision() ::= "<enterDecision()>"
```

```
@closureBlock.postdecision() ::= "<exitDecision()>"

@altSwitchCase.prealt() ::= "<enterAlt(altNum)>"

@element.prematch() ::=
  "DBG->location(DBG, <e.line>, <e.pos>);" // e is arg of element

@matchSet.mismatchedSetException() ::=
  "DBG->recognitionException(DBG, EXCEPTION);"

@newNVException.noViableAltException() ::= "DBG->recognitionException(DBG, EXCEPTION);"

dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = cdfa<decisionNumber>.predict(ctx, RECOGNIZER, ISTREAM,
&cdfa<decisionNumber>);
if  (HASEXCEPTION())
{
 DBG->recognitionException(DBG, EXCEPTION);
  goto rule<ruleDescriptor.name>Ex;
}
<checkRuleBacktrackFailure()>
>>

@cyclicDFA.errorMethod() ::= <<
//static void
//dfaError(p<name> ctx)
//{
//    DBG->recognitionException(DBG, EXCEPTION);
//}
>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
evalPredicate(ctx, <pred>, (const char *)"<description>")
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/Dbg.stg
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```
/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

/* addition memVars for returnscopes */
@returnScopeInterface.memVars() ::= <<
/* ASTTreeParser returnScopeInterface.memVars */
<recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** the interface of returnScope methodsDecl */
@returnScopeInterface.methodsDecl() ::= <<
/* ASTTreeParser returnScopeInterface.methodsDecl */
- (<recognizer.ASTLabelType; null="CommonTree"> *)getTree;
- (void) setTree:(<recognizer.ASTLabelType; null="CommonTree"> *)aTree;<\n>
>>

/** the implementation of returnScope methods */
@returnScope.methods() ::= <<
/* ASTTreeParser returnScope.methods */
```

```
- (<ASTLabelType> *)getTree
{
   return tree;
}

- (void) setTree:(<ASTLabelType> *)aTree
{
   if (tree != aTree) {
       if (tree != nil) [tree release];
       if (aTree != nil) [aTree retain];
       tree = aTree;
   }
}

- (void) dealloc
{
   [self setTree:nil];
   [super dealloc];
}

@synthesize tree;
>>

@returnScopeProperties() ::= <<
@property (retain) <recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
/* ASTTreeParser ruleDeclarations */
<super.ruleDeclarations()>
<ASTLabelType> *_first_0 = nil;
<ASTLabelType> *_last = nil;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
/* ASTTreeParser noRewrite */
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = (<ASTLabelType> *)_first_0;
if ( [treeAdaptor getParent:retval.tree] != nil && [treeAdaptor isNil:[treeAdaptor getParent:retval.tree]] ) )
   retval.tree = (<ASTLabelType> *)[treeAdaptor getParent:retval.tree];
<endif>
<if(backtracking)>}<endif>
>>
```

```
/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
/* ASTTreeParser tree */
_last = (<ASTLabelType> *)[input LT:1];
{
<ASTLabelType> *_save_last_<treeLevel> = _last;
<ASTLabelType> *_first_<treeLevel> = nil;
<if(!rewriteMode)>
<ASTLabelType> *root_<treeLevel> = [[[treeAdaptor class] newEmptyTree] retain];
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==nil ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==nil ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( [input LA:1] == TokenTypeDOWN ) {
  [self match:input TokenType:TokenTypeDOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:TokenTypeUP Follow:nil]; <checkRuleBacktrackFailure()>
}
<else>
[self match:input TokenType:TokenTypeDOWN Follow:nil]; <checkRuleBacktrackFailure()>
<children:element()>
[self match:input TokenType:TokenTypeUP Follow:nil]; <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
[treeAdaptor addChild:root_<treeLevel> toTree:root_<enclosingTreeLevel>];
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
```

```
/* ASTTreeParser tokenRefBang */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRef */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
   <label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
   <label>_tree = (<ASTLabelType> *)[treeAdaptor dupNode:<label>];
<endif><\n>
   [treeAdaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==nil ) _first_<treeLevel> = <label>;
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRefAndListLabel */
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex) ::= <<
/* ASTTreeParser tokenRefRuleRoot */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[treeAdaptor dupNode:<label>];
<endif><\n>
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_<treeLevel>];
<if(backtracking)>}<endif>
<endif>
>>
```

```
/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRefRuleRootAndListLabel */
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser wildcard */
_last = (<ASTLabelType> *)[input LT:1];
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType> *)[adaptor dupTree:<label>];
[adaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel> == nil ) _first_<treeLevel> = <label>;
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
/* ASTTreeParser matchSet */
_last = (<ASTLabelType> *)[input LT:1];
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[adaptor dupNode:<label>];
<endif><\n>
[adaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
/* ASTTreeParser matchRuleBlockSet */
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
```

```
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
/* ASTTreeParser matchSetBang */
_last = (<ASTLabelType> *)[input LT:1];
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
/* ASTTreeParser matchSetRuleRoot */
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[adaptor dupNode:<label>];
<endif><\n>
root_<treeLevel> = (<ASTLabelType> *)[adaptor becomeRoot:<label>_tree old:root_<treeLevel>];
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRef */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
  [treeAdaptor addChild:<label>.tree toTree:root_<treeLevel>];
<else> <! rewrite mode !>
if ( _first_<treeLevel> == nil ) _first_<treeLevel> = <label>.tree;
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefAndListLabel */
<ruleRef(...)>
<! <listLabel(elem = "["+label+" getTree]",...)> !>
<listLabel(elem = {[<label> getTree]},...)>
>>
```

```
/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRoot */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking == 0 ) <endif>
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>.tree old:root_<treeLevel>];
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRootAndListLabel */
<ruleRefRuleRoot(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefTrack */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefTrackAndListLabel */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRootTrack */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRootTrackAndListLabel */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
```

```
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
/* ASTTreeParser createRewriteNodeFromElement */
<if(terminalOptions.node)>
<! new <terminalOptions.node>(stream_<token>.nextNode()) !>
[[[<terminalOptions.node>(stream_<token> alloc] init] nextNode];
<else>
<! stream_<token>.nextNode() !>
[stream_<token> nextNode]
<endif>
>>

ruleCleanUp() ::= <<
/* ASTTreeParser ruleCleanUp */
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = (<ASTLabelType> *)[treeAdaptor rulePostProcessing:root_0];
<if(backtracking)>}<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/

parserMembers() ::= <<
 protected DebugTreeAdaptor adaptor;

 public ITreeAdaptor TreeAdaptor
 {
  get
  {
   return adaptor;
  }
  set
  {
<if(grammar.grammarIsRoot)>
   this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
   this.adaptor = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif><\n>
   <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
  }
 }<\n>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port,
<if(TREE_PARSER)>input.TreeAdaptor<else>adaptor<endif> );
DebugListener = proxy;
<inputStreamType> = new Debug<inputStreamType>( input, proxy );
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
```

```
{
 ReportError( ioe );
}
>>

@ctorForRootGrammar.finally() ::= <<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
proxy.TreeAdaptor = adap;
>>

@ctorForProfilingRootGrammar.finally() ::=<<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
>>

@ctorForPredefinedListener.superClassRef() ::= ": base( input, dbg )"

@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)><! don't create new adaptor for delegates !>
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;<\n>
<endif>
>>

//@rewriteElement.pregen() ::= "dbg.Location( <e.line>, <e.pos> );"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp2/ASTDbg.stg
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*/
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CSharp3Target.java
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```
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
```

```
/*
* This code generating template and the associated Cpp runtime was produced by:
* Gokulakannan Somasundaram ( heavy lifting from C Run-time by Jim Idle )
*/
cTypeInitMap ::= [
 "int"      : "0",              // Integers     start out being 0
 "long"      : "0",              // Longs        start out being 0
 "float"      : "0.0",           // Floats       start out being 0
 "double"     : "0.0",           // Doubles      start out being 0
 "bool"         : "false",   // Booleans     start out being Antlr C for false
 "byte"      : "0",              // Bytes        start out being 0
 "short"      : "0",              // Shorts       start out being 0
 "char"      : "0"              // Chars        start out being 0
]

leadIn(type) ::=
<<
/** \file
*  This <type> file was generated by $ANTLR version <ANTLRVersion>
*
*     -  From the grammar source file : <fileName>
*     -                            On : <generatedTimestamp>
<if(LEXER)>
*     -                 for the lexer : <name>Lexer
<endif>
<if(PARSER)>
*     -                for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
*     -           for the tree parser : <name>TreeParser
<endif>
*
* Editing it, at least manually, is not wise.
*
* C++ language generator and runtime by Gokulakannan Somasundaram ( heavy lifting from C Run-time by Jim Idle )
*
*
>>

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,
          PARSER,
          TREE_PARSER,
          actionScope,
          actions,
          docComment,
          recognizer,
          name,
          tokens,
          tokenNames,
          rules,
          cyclicDFAs,
          bitsets,
          buildTemplate,
          buildAST,
          rewriteMode,
          profile,
          backtracking,
          synpreds,
          memoize,
          numRules,
          fileName,
          ANTLRVersion,
          generatedTimestamp,
          trace,
          scopes,
          superClass,
          literals
          ) ::=
<<
<leadIn("C++ source")>
*/
```

```
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// THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
// (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
// THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

<if(actions.(actionScope).header)>

/* =============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* =============================================================================
*/
<endif>

/* -----------------------------------------
* Include the ANTLR3 generated header file.
*/
#include    "<name>.hpp"
<if(trace)>
#include \<iostream>
<endif>
<if(recognizer.grammar.delegators)>
// Include delegator definition header files
//
<recognizer.grammar.delegators: {g|#include "<g.recognizerName>.hpp" }; separator="\n">
<endif>

<actions.(actionScope).postinclude>
/* ----------------------------------------- */

<docComment>

<if(literals)>

<beginNamespace(actions)>

/** String literals used by <name> that we must do things like MATCHS() with.
*  C will normally just lay down 8 bit characters, and you can use L"xxx" to
*  get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
*  we perform this little trick of defining the literals as arrays of UINT32
*  and passing in the address of these.
*/
<literals:{it | static ANTLR_UCHAR lit_<i>[]  = <it>;}; separator="\n">
```

```
<endNamespace(actions)>

<endif>

/* ============================================================================= */

/* =============================================================================
* Start of recognizer
*/

<recognizer>

/* End of code
* =============================================================================
*/

>>
headerFileExtension() ::= ".hpp"

beginNamespace(actions) ::= <%
 <if(actions.(actionScope).namespace)>
 namespace <actions.(actionScope).namespace> {
 <endif>
%>

endNamespace(actions) ::= <%
 <if(actions.(actionScope).namespace)>
 }
 <endif>
%>


headerFile( LEXER,
          PARSER,
          TREE_PARSER,
          actionScope,
          actions,
          docComment,
          recognizer,
          name,
          tokens,
          tokenNames,
          rules,
          cyclicDFAs,
          bitsets,
          buildTemplate,
          buildAST,
          rewriteMode,
          profile,
          backtracking,
          synpreds,
          memoize,
          numRules,
          fileName,
          ANTLRVersion,
          generatedTimestamp,
          trace,
          scopes,
          superClass,
          literals
      ) ::=
<<
<leadIn("C++ header")>
<if(PARSER)>
* The parser <mainName()> has the callable functions (rules) shown below,
<endif>
<if(LEXER)>
* The lexer <mainName()> has the callable functions (rules) shown below,
<endif>
<if(TREE_PARSER)>
* The tree parser <mainName()> has the callable functions (rules) shown below,
<endif>
* which will invoke the code for the associated rule in the source grammar
* assuming that the input stream is pointing to a token/text stream that could begin
* this rule.
*
* For instance if you call the first (topmost) rule in a parser grammar, you will
* get the results of a full parse, but calling a rule half way through the grammar will
* allow you to pass part of a full token stream to the parser, such as for syntax checking
* in editors and so on.
*
*/
// [The "BSD license"]
// Copyright (c) 2005-2009 Gokulakannan Somasundaram.
//
// All rights reserved.
//
// Redistribution and use in source and binary forms, with or without
// modification, are permitted provided that the following conditions
// are met:
// 1. Redistributions of source code must retain the above copyright
//    notice, this list of conditions and the following disclaimer.
// 2. Redistributions in binary form must reproduce the above copyright
//    notice, this list of conditions and the following disclaimer in the
//    documentation and/or other materials provided with the distribution.
// 3. The name of the author may not be used to endorse or promote products
```

```
#ifndef _<name>_H
#define _<name>_H
<actions.(actionScope).preincludes>
/* =============================================================================
* Standard antlr3 C++ runtime definitions
*/
#include \<antlr3.hpp>

/* End of standard antlr 3 runtime definitions
* =============================================================================
*/

<actions.(actionScope).includes>

<if(recognizer.grammar.delegates)>
// Include delegate definition header files
//
<recognizer.grammar.delegates: {g|#include "<g.recognizerName>.hpp"}; separator="\n">

<endif>



<actions.(actionScope).header>

#ifdef WIN32
// Disable: Unreferenced parameter,       - Rules with parameters that are not used
//          constant conditional,       - ANTLR realizes that a prediction is always true (synpred usually)
//          initialized but unused variable     - tree rewrite variables declared but not needed
//          Unreferenced local variable      - lexer rule declares but does not always use _type
//          potentially unitialized variable used   - retval always returned from a rule
//   unreferenced local function has been removed - susually getTokenNames or freeScope, they can go without
warnigns
//
// These are only really displayed at warning level /W4 but that is the code ideal I am aiming at
// and the codegen must generate some of these warnings by necessity, apart from 4100, which is
// usually generated when a parser rule is given a parameter that it does not use. Mostly though
// this is a matter of orthogonality hence I disable that one.
//
#pragma warning( disable : 4100 )
#pragma warning( disable : 4101 )
#pragma warning( disable : 4127 )
#pragma warning( disable : 4189 )
#pragma warning( disable : 4505 )
#pragma warning( disable : 4701 )
#endif
<if(backtracking)>

/* ========================
* BACKTRACKING IS ENABLED
* ========================
*/
<endif>

<beginNamespace(actions)>

<if(recognizer.grammar.delegators)>
// Include delegator definition classes
//
<recognizer.grammar.delegators: {g|class <g.recognizerName>; }; separator="\n">
<endif>

<actions.(actionScope).traits>
typedef <name>Traits <name>ImplTraits;

<rules:{r | <if(r.ruleDescriptor.isSynPred)> struct <r.ruleDescriptor.name> {\}; <endif>}; separator="\n">

class <name>Tokens
{
public:
 /** Symbolic definitions of all the tokens that the <grammarType()> will work with.
  *
  * Antlr will define EOF, but we can't use that as it it is too common in
  * in C header files and that would be confusing. There is no way to filter this out at the moment
  * so we just undef it here for now. That isn't the value we get back from C recognizers
  * anyway. We are looking for ANTLR_TOKEN_EOF.
  */
 enum Tokens
 {
  EOF_TOKEN = <name>ImplTraits::CommonTokenType::TOKEN_EOF
  <tokens:{it | , <it.name> = <it.type> }; separator="\n">
 };

};
```

```
/** Context tracking structure for <mainName()>
*/
class <name> : public <componentBaseType()>, public <name>Tokens
{
public:
 typedef <name>ImplTraits ImplTraits;
 typedef <name> ComponentType;
 typedef ComponentType::StreamType StreamType;
 typedef <componentBaseType()> BaseType;
 typedef ImplTraits::RecognizerSharedStateType\<StreamType> RecognizerSharedStateType;
 typedef StreamType InputType;
<if(recognizer.filterMode)>
 static const bool IsFiltered = true;
<else>
 static const bool IsFiltered = false;
<endif>

 <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDecl(it)><endif>}>
 <rules:{r | <if(r.ruleDescriptor.ruleScope)><ruleAttributeScopeDecl(scope=r.ruleDescriptor.ruleScope)><endif>}>

private:
<if(recognizer.grammar.delegates)>
 <recognizer.grammar.delegates:
       {g|<g.recognizerName>*  m_<g:delegateName()>;}; separator="\n">
<endif>
<if(recognizer.grammar.delegators)>
 <recognizer.grammar.delegators:
       {g|<g.recognizerName>*  m_<g:delegateName()>;}; separator="\n">
<endif>
<scopes:{it | <if(it.isDynamicGlobalScope)>
   <globalAttributeScopeDef(it)>
<endif>}; separator="\n\n">
<rules: {r |<if(r.ruleDescriptor.ruleScope)>
   <ruleAttributeScopeDef(scope=r.ruleDescriptor.ruleScope)>
<endif>}>
   <@members>
   <@end>

public:
   <name>(InputType* instream<recognizer.grammar.delegators:{g|, <g.recognizerName>*
<g:delegateName()>}>);
   <name>(InputType* instream, RecognizerSharedStateType* state<recognizer.grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>);

   void init(InputType* instream <recognizer.grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>
);
```

```
   <actions.(actionScope).context>

<if(LEXER)>
<if(recognizer.filterMode)>
   void  memoize(ANTLR_MARKER  ruleIndex, ANTLR_MARKER  ruleParseStart);
   bool  alreadyParsedRule(ANTLR_MARKER ruleIndex);
   <filteringNextToken()>
<endif>
   <rules:{r | <if(!r.ruleDescriptor.isSynPred)><headerReturnType(ruleDescriptor=r.ruleDescriptor)>
m<r.ruleDescriptor.name>( <r.ruleDescriptor.parameterScope:parameterScope()>);<endif>}; separator="\n">
   <rules:{r | <if(r.ruleDescriptor.isSynPred)>  <headerReturnType(ruleDescriptor=r.ruleDescriptor)> msynpred(
antlr3::ClassForwarder\< <r.ruleDescriptor.name> > <r.ruleDescriptor.parameterScope:parameterScope()>);
   void m<r.ruleDescriptor.name>_fragment (<r.ruleDescriptor.parameterScope:parameterScope()>);<endif>};
separator="\n">
<endif>
<if(!LEXER)>
   <rules:{r | <headerReturnScope(ruleDescriptor=r.ruleDescriptor)>}>
   <rules:{r | <if(!r.ruleDescriptor.isSynPred)> <headerReturnType(ruleDescriptor=r.ruleDescriptor)>
<r.ruleDescriptor.name> (<r.ruleDescriptor.parameterScope:parameterScope()>); <endif>}; separator="\n">
   <rules:{r | <if(r.ruleDescriptor.isSynPred)>  <headerReturnType(ruleDescriptor=r.ruleDescriptor)> msynpred(
antlr3::ClassForwarder\< <r.ruleDescriptor.name> > <r.ruleDescriptor.parameterScope:parameterScope()>);
   void m<r.ruleDescriptor.name>_fragment (<r.ruleDescriptor.parameterScope:parameterScope()>);<endif>};
separator="\n">
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
   // Delegated rules
<recognizer.grammar.delegatedRules:{ruleDescriptor|
   <headerReturnType(ruleDescriptor)>
<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">
<endif>

   const char *    getGrammarFileName();
   void            reset();
   ~<name>();

};

// Function protoypes for the constructor functions that external translation units
// such as delegators and delegates may wish to call.
//
<if(!recognizer.grammar.grammarIsRoot)>
extern ANTLR_UINT8*   <recognizer.grammar.composite.rootGrammar.recognizerName>TokenNames[];
<endif>


/* End of token definitions for <name>
* ============================================================================
*/
```

```
<endNamespace(actions)>

#endif

/* END - Note:Keep extra line feed to satisfy UNIX systems */

>>

grammarType() ::= <%
<if(PARSER)>
parser
<endif>
<if(LEXER)>
lexer
<endif>
<if(TREE_PARSER)>
tree parser
<endif>
%>

componentType() ::= <<
<if(PARSER)>
<name>ImplTraits::ParserType
<endif>
<if(LEXER)>
<name>ImplTraits::LexerType
<endif>
<if(TREE_PARSER)>
<name>ImplTraits::TreeParserType
<endif>
>>

componentBaseType() ::= <%
<if(PARSER)>
<name>ImplTraits::BaseParserType
<endif>
<if(LEXER)>
<name>ImplTraits::BaseLexerType
<endif>
<if(TREE_PARSER)>
<name>ImplTraits::BaseTreeParserType
<endif>
%>

streamType() ::= <<
<if(PARSER)>
<name>ImplTraits::ParserType::StreamType
```

```
<endif>
<if(LEXER)>
<name>ImplTraits::LexerType::StreamType
<endif>
<if(TREE_PARSER)>
<name>ImplTraits::TreeParserType::StreamType
<endif>
>>


mainName() ::= <%
<if(PARSER)>
<name>
<endif>
<if(LEXER)>
<name>
<endif>
<if(TREE_PARSER)>
<name>
<endif>
%>

headerReturnScope(ruleDescriptor) ::= "<returnScope(scope=ruleDescriptor.returnScope)>"

headerReturnType(ruleDescriptor) ::= <%
<if(LEXER)>
<if(!ruleDescriptor.isSynPred)>
void
<else>
<returnType()>
<endif>
<else>
<returnType()>
<endif>
%>

// Produce the lexer output
//
lexer(  grammar,
 name,
      tokens,
      scopes,
      rules,
      numRules,
      filterMode,
      superClass,
      labelType="ImplTraits::CommonTokenType*") ::= <<
```

```
using namespace antlr3;

<beginNamespace(actions)>

<if(filterMode)>

/* Override the normal MEMOIZE and HAVEALREADYPARSED macros as this is a filtering
* lexer. In filter mode, the memoizing and backtracking are gated at BACKTRACKING > 1 rather
* than just BACKTRACKING. In some cases this might generate code akin to:
*   if (BACKTRACKING) if (BACKTRACKING > 1) memoize.
*/
void <name>::memoize(ANTLR_MARKER  ruleIndex, ANTLR_MARKER  ruleParseStart)
{
 BaseType* base = this;
 if ( this->get_backtracking()>1 )
  base->memoize( ruleIndex, ruleParseStart );

}

bool <name>::alreadyParsedRule(ANTLR_MARKER ruleIndex)
{
 BaseType* base = this;
 if ( this->get_backtracking() > 1 )
  return base->haveParsedRule(ruleIndex);
 return false;
}

<endif>

/* =============================================================================
* Lexer matching rules end.
* =============================================================================
*/

<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<actions.lexer.members>

<name>::~<name>()
{
<if(memoize)>
 RuleMemoType* rulememo = this->getRuleMemo();
 if(rulememo != NULL)
 {
  delete rulememo;
  this->setRuleMemo(NULL);
 }
<endif>
<if(grammar.directDelegates)>
 // Free the lexers that we delegated to
 // functions to. NULL the state so we only free it once.
 //
 <grammar.directDelegates:
        {g| m_<g:delegateName()>->set_lexstate(NULL);
        delete m_<g:delegateName()>; }; separator="\n">
<endif>
}

void
<name>::reset()
{
   this->get_rec()->reset();
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
const char* <name>::getGrammarFileName()
{
 return fileName;
}

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
<name>::<name>(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
:<name>ImplTraits::BaseLexerType(ANTLR_SIZE_HINT, instream, NULL)
{
 // See if we can create a new lexer with the standard constructor
 //
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \param[state] state Previously created shared recognizer stat
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
<name>::<name>(StreamType* instream, RecognizerSharedStateType* state<grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>)
:<name>ImplTraits::BaseLexerType(ANTLR_SIZE_HINT, instream, state)
{
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>} >);
}

void <name>::init(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>} >)
{
   /* -------------------------------------------------------------------
    * Memory for basic structure is allocated, now to fill in
    * in base ANTLR3 structures. We initialize the function pointers
    * for the standard ANTLR3 lexer function set, but upon return
    * from here, the programmer may set the pointers to provide custom
    * implementations of each function.
    *
    * We don't use the macros defined in <name>.h here so you can get a sense
    * of what goes where.
    */

<if(memoize)>
<if(grammar.grammarIsRoot)>
   // Create a LIST for recording rule memos.
   //
   this->setRuleMemo( new IntTrie(15) ); /* 16 bit depth is enough for 32768 rules! */
<endif>
<endif>

<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
        {g|m_<g:delegateName()> = new <g.recognizerName>(instream, this->get_lexstate(),
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
<endif>
<if(grammar.delegators)>
 // Install the pointers back to lexers that will delegate us to perform certain functions
 // for them.
 //
 <grammar.delegators:
        {g| m_<g:delegateName()> = <g:delegateName()>;}; separator="\n">
<endif>
}

<if(cyclicDFAs)>
```

```
/* =============================================================================
* DFA tables for the lexer
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* =============================================================================
* End of DFA tables for the lexer
*/
<endif>

/* =============================================================================
* Functions to match the lexer grammar defined tokens from the input stream
*/

<rules; separator="\n\n">

/* =============================================================================
* Lexer matching rules end.
* =============================================================================
*/
<if(synpreds)>

/* =============================================================================
* Lexer syntactic predicates
*/
<synpreds:{p | <lexerSynpred(predname=p)>}>
/* =============================================================================
* Lexer syntactic predicates end.
* =============================================================================
*/
<endif>

/* End of Lexer code
* ================================================
* ================================================
*/

<endNamespace(actions)>

>>



filteringNextToken() ::= <<
<name>ImplTraits::CommonTokenType*
<name>ImplTraits::TokenSourceType::nextToken()
{
   LexerType*   lexer;
   typename LexerType::RecognizerSharedStateType* state;
```

```
 lexer   = this->get_super();
 state = lexer->get_lexstate();

 /* Get rid of any previous token (token factory takes care of
  * any deallocation when this token is finally used up.
  */
 state->set_token_present( false );
 state->set_error( false );     /* Start out without an exception */
 state->set_failedflag(false);

 /* Record the start of the token in our input stream.
  */
 state->set_tokenStartCharIndex( lexer->index();
 state->set_tokenStartCharPositionInLine( lexer->getCharPositionInLine() );
 state->set_tokenStartLine( lexer->getLine() );
 state->set_text("");

 /* Now call the matching rules and see if we can generate a new token
  */
 for (;;)
 {
if (lexer->LA(1) == ANTLR_CHARSTREAM_EOF)
{
 /* Reached the end of the stream, nothing more to do.
  */
 CommonTokenType&    teof = m_eofToken;

 teof.set_startIndex(lexer->getCharIndex());
 teof.set_stopIndex(lexer->getCharIndex());
 teof.setLine(lexer->getLine());
 return  &teof;
}

state->set_token_present(false);
state->set_error(false);     /* Start out without an exception */

{
 ANTLR_MARKER   m;

 m = this->get_istream()->mark();
 state->set_backtracking(1);    /* No exceptions */
 state->set_failedflag(false);

 /* Call the generated lexer, see if it can get a new token together.
  */
 lexer->mTokens();
    state->set_backtracking(0);
```

```
     <! mTokens backtracks with synpred at BACKTRACKING==2
    and we set the synpredgate to allow actions at level 1. !>

   if(state->get_failed())
   {
    lexer->rewind(m);
    lexer->consume(); <! advance one char and try again !>
   }
   else
   {
    lexer->emit();     /* Assemble the token and emit it to the stream */
    TokenType& tok = state->get_token();
    return &tok;
   }
  }
   }
}
>>

actionGate() ::= "this->get_backtracking()==0"

filteringActionGate() ::= "this->get_backtracking()==1"

/** How to generate a parser */
genericParser(  grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass,
              labelType, members, rewriteElementType,
              filterMode, ASTLabelType="ImplTraits::TreeType*") ::= <<

using namespace antlr3;
<if(grammar.grammarIsRoot)>
/** \brief Table of all token names in symbolic order, mainly used for
*         error reporting.
*/
ANTLR_UINT8* <name>TokenNames[<length(tokenNames)>+4]
    = {
       (ANTLR_UINT8*) "\<invalid>",       /* String to print to indicate an invalid token */
       (ANTLR_UINT8*) "\<EOR>",
       (ANTLR_UINT8*) "\<DOWN>",
       (ANTLR_UINT8*) "\<UP>",
       <tokenNames:{it |(ANTLR_UINT8*) <it>}; separator=",\n">
      };
<endif>

   <@members>

   <@end>
```

```
/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
const char* <name>::getGrammarFileName()
{
 return fileName;
}
/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
<name>::<name>( StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
<constructorInitializerType("NULL")>
{
 // See if we can create a new parser with the standard constructor
 //
 this->init(instream<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
<name>::<name>( StreamType* instream, RecognizerSharedStateType* state<grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>)
<constructorInitializerType("state")>
{
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>}>);
}

void <name>::init(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
{
   <actions.parser.apifuncs>
<if(memoize)>
<if(grammar.grammarIsRoot)>
   /* Create a LIST for recording rule memos.
    */
    typedef RecognizerSharedStateType::RuleMemoType RuleMemoType;
    this->setRuleMemo( new RuleMemoType(15) ); /* 16 bit depth is enough for 32768 rules! */<\n>
<endif>
```

```
<endif>
<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
        {g|m_<g:delegateName()> = new <g.recognizerName>(instream, this->get_psrstate(),
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <endif>
       <if(grammar.delegators)>
     // Install the pointers back to lexers that will delegate us to perform certain functions
     // for them.
     //
      <grammar.delegators: {g| m_<g:delegateName()> = <g:delegateName()>;}; separator="\n">
 <endif>
 /* Install the token table
 */
 this->get_psrstate()->set_tokenNames( <grammar.composite.rootGrammar.recognizerName>TokenNames );

 <@debugStuff()>

}

void
<name>::reset()
{
   this->get_rec()->reset();
}

/** Free the parser resources
*/
<name>::~<name>()
{
   <@cleanup>
   <@end>
<if(grammar.directDelegates)>
 // Free the parsers that we delegated to
 // functions to.NULL the state so we only free it once.
 //
 <grammar.directDelegates:
        {g| m_<g:delegateName()>->set_psrstate( NULL );
        delete m_<g:delegateName()>;}; separator="\n">
<endif>
<if(memoize)>
<if(grammar.grammarIsRoot)>
 if(this->getRuleMemo() != NULL)
 {
  delete this->getRuleMemo();
  this->setRuleMemo(NULL);
 }
<endif>
<endif>
}

/** Return token names used by this <grammarType()>
*
* The returned pointer is used as an index into the token names table (using the token
* number as the index).
*
* \return Pointer to first char * in the table.
*/
static ANTLR_UINT8** getTokenNames()
{
       return <grammar.composite.rootGrammar.recognizerName>TokenNames;
}

   <members>

/* Declare the bitsets
*/
<bitsets:{it | <bitsetDeclare(bitsetname={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
                  words64=it.bits, traits={<name>ImplTraits} )>}>


<if(cyclicDFAs)>

/* =========================================================================
* DFA tables for the parser
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* =========================================================================
* End of DFA tables for the parser
*/
<endif>

/* ==============================================
* Parsing rules
*/
<rules; separator="\n\n">
<if(grammar.delegatedRules)>
 // Delegated methods that appear to be a part of this
 // parser
 //
<grammar.delegatedRules:{ruleDescriptor|
   <returnType()> <name>::<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>)
   {
    <if(ruleDescriptor.hasReturnValue)>return <endif>m_<ruleDescriptor.grammar:delegateName()>-
><ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.nam
e>}; separator=", "><endif>);
   \}}; separator="\n">

<endif>
/* End of parsing rules
* ==============================================
*/

/* ==============================================
* Syntactic predicates
*/
<synpreds:{p | <synpred(predname=p)>}>
/* End of syntactic predicates
* ==============================================
*/

>>

constructorInitializerType(rec_state) ::=<<
<if(PARSER)>
   :ImplTraits::BaseParserType(ANTLR_SIZE_HINT, instream, <rec_state>)
<endif>
<if(TREE_PARSER)>
   :ImplTraits::BaseTreeParserType(ANTLR_SIZE_HINT, instream, <rec_state>)
<endif>
>>

parser( grammar,
  name,
  scopes,
  tokens,
  tokenNames,
  rules,
  numRules,
  bitsets,
  ASTLabelType,
  superClass="Parser",
  labelType="ImplTraits::CommonTokenType*",
  members={<actions.parser.members>}
  ) ::= <<
<beginNamespace(actions)>
<genericParser(inputStreamType="CommonTokenStreamType*", rewriteElementType="Token", filterMode=false,
...)>
<endNamespace(actions)>
>>
```

```
/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser( grammar,
   name,
   scopes,
   tokens,
   tokenNames,
   globalAction,
   rules,
   numRules,
   bitsets,
   filterMode,
   labelType={<ASTLabelType>},
   ASTLabelType="ImplTraits::TreeType*",
   superClass="TreeParser",
   members={<actions.treeparser.members>}
   ) ::= <<
<beginNamespace(actions)>
<genericParser(inputStreamType="CommonTreeNodeStream*", rewriteElementType="Node", ...)>
<endNamespace(actions)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
void <name>::m<ruleName>_fragment( <ruleDescriptor.parameterScope:parameterScope()> )
{
 <ruleLabelDefs()>
 <ruleLabelInitializations()>
<if(trace)>
   ANTLR_PRINTF("enter <ruleName> %d failed = %d, backtracking = %d\\n", this->LT(1),failed,this-
>get_backtracking() );
   <block>
   ANTLR_PRINTF("exit <ruleName> %d, failed = %d, backtracking = %d\\n", this->LT(1),failed,this-
>get_backtracking());

<else>
   <block>
<endif>
goto rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
}
// $ANTLR end <ruleName>
>>

synpred(predname) ::= <<

bool <name>::msynpred( antlr3::ClassForwarder\< <predname> >  )
{
   ANTLR_MARKER   start;
   bool  success;

   this->inc_backtracking();
   <@start()>
   start = this->mark();
   this->m<predname>_fragment();     // can never throw exception
   success = !( this->get_failedflag() );
   this->rewind(start);
   <@stop()>
   this->dec_backtracking();
   this->set_failedflag(false);
   return success;
}<\n>
>>

lexerSynpred(predname) ::= <<
<synpred(predname)>
>>

ruleMemoization(rname) ::= <<
<if(memoize)>
if ( (this->get_backtracking()>0) && (this->haveParsedRule(<ruleDescriptor.index>)) )
{
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
 retval.start = 0;<\n>
<endif>
<endif>
   <(ruleDescriptor.actions.after):execAfter()>
   <finalCode(finalBlock=finally)>
<if(!ruleDescriptor.isSynPred)>
   <scopeClean()><\n>
<endif>
   return <ruleReturnValue()>;
}
<endif>
>>
```

```
/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
if  (this->hasException())
{
   goto rule<ruleDescriptor.name>Ex;
}
<if(backtracking)>
if (this->hasFailed())
{
   <scopeClean()>
   <@debugClean()>
   return <ruleReturnValue()>;
}
<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if (this->get_backtracking()>0)
{
   this->set_failedflag( true );
   <scopeClean()>
   return <ruleReturnValue()>;
}
<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
/**
* $ANTLR start <ruleName>
* <fileName>:<description>
*/
<returnType()>
<name>::<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
   <if(trace)>ANTLR_PRINTF("enter <ruleName> %s failed=%d, backtracking=%d\n", this->LT(1), this-
>get_backtracking() );<endif>
   <ruleDeclarations()>
   <ruleDescriptor.actions.declarations>
   <ruleLabelDefs()>
   <ruleInitializations()>
   <ruleDescriptor.actions.init>
   <ruleMemoization(rname=ruleName)>
   <ruleLabelInitializations()>

   <if(actions.(actionScope).rulecatch)>
    try {
   <else>
   <if(exceptions)>
       try {
   <endif>
   <endif>
   <@preamble()>
   {
       <block>
   }
   <ruleCleanUp()>

<if(exceptions)>
   <(ruleDescriptor.actions.after):execAfter()>
   <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
   <if(!emptyRule)>
    if (this->hasException())
       {
           this->preporterror();
           this->precover();
           <@setErrorReturnValue()>
       }
       <if(ruleDescriptor.actions.after)>
       else
       {
           <(ruleDescriptor.actions.after):execAfter()>
       }<\n>
       <endif>
 <if(actions.(actionScope).rulecatch)>
     } <actions.(actionScope).rulecatch>
       <endif>
   <endif>
<endif>

   <if(trace)>ANTLR_PRINTF("exit <ruleName> %d failed=%s backtracking=%s\n", this->LT(1), failed, this->get_backtracking() );<endif>
   <memoize()>
<if(finally)>
   <finalCode(finalBlock=finally)>
<endif>
   <scopeClean()>
   <@postamble()>
   return <ruleReturnValue()>;
}
```

```
/* $ANTLR end <ruleName> */
>>

finalCode(finalBlock) ::= <<
{
   <finalBlock>
}

>>

catch(decl,action) ::= <<
/* catch(decl,action)
*/
}catch (<e.decl>) {
  <e.action>
}
>>

ruleDeclarations() ::= <<

<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()> retval(this);<\n>
<else>
<if(PARSER)>
   <name>ImplTraits::RuleReturnValueType _antlr_rule_exit(this);
<endif>
<if(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name>;
}>
<endif>
<endif>
<if(memoize)>
ANTLR_MARKER <ruleDescriptor.name>_StartIndex;
<endif>
>>

ruleInitializations() ::= <<
/* Initialize rule variables
*/
<if(ruleDescriptor.returnScope)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.returnScope.attributes:{ a | <if(a.initValue)>retval.<a.name> = <a.initValue>;<endif> }>
<else>
<ruleDescriptor.returnScope.attributes:{ a | <if(a.initValue)><a.name> = <a.initValue>;<endif> }>
<endif>
<endif>
<if(memoize)>
```

```
<ruleDescriptor.name>_StartIndex = this->index();<\n>
<endif>
<ruleDescriptor.useScopes:{it | m_<it>_stack.push(<it>Scope()); }; separator="\n">
<ruleDescriptor.ruleScope:{it | m_<it.name>_stack.push(<it.name>Scope()); }; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it |<labelType> <it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it |ImplTraits::TokenPtrsListType list_<it.label.text>;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
>>

ruleLabelInitializations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
retval.call_start_placeholder();
<endif>
<endif>
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<labelType> <it.label.text> = NULL;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |ANTLR_UINT32 <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | ImplTraits::IntTrieType<CommonTokenType>* list_<it.label.text>;}; separator="\n"
>
>>

lexerRuleLabelInit() ::= <<
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |list_<it.label.text> = new ImplTraits::IntTrieType<CommonTokenType>(31);}; separator="\n"
>
>>

lexerRuleLabelFree() ::= <<
```

```
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | delete list_<it.label.text>;}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( this->get_backtracking() > 0 ) { this->memoize(<ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

ruleCleanUp() ::= <<

// This is where rules clean up and exit
//
goto rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
<if(!ruleDescriptor.isSynPred)>
retval.call_stop_placeholder();<\n>
<endif>
<endif>
<endif>
>>

scopeClean() ::= <<
```

```
<ruleDescriptor.useScopes:{it | m_<it>_stack.pop(); }; separator="\n">
<ruleDescriptor.ruleScope:{it | m_<it.name>_stack.pop(); }; separator="\n">

>>
/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules, which do not produce tokens.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
//   Comes from: <block.description>
/** \brief Lexer rule generated by ANTLR3
*
* $ANTLR start <ruleName>
*
* Looks to match the characters the constitute the token <ruleName>
* from the attached input stream.
*
*
* \remark
*  - lexer->error == true if an exception was thrown.
*/
void <name>::m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
   ANTLR_UINT32 _type;
   <ruleDeclarations()>
   <ruleDescriptor.actions.declarations>
   <lexerRuleLabelDefs()>
   <if(trace)>
   std::cout \<\< "enter <ruleName> '" \<\< (char)this->LA(1)
            \<\< "' line=" \<\< this->getLine() \<\< ":" \<\< this->getCharPositionInLine()
            \<\< " failed=" \<\< this->get_failedflag() \<\< " backtracking=" \<\< this->get_backtracking() \<\<
std::endl;
   <endif>

<if(nakedBlock)>
   <ruleMemoization(rname=ruleName)>
   <lexerRuleLabelInit()>
   <ruleDescriptor.actions.init>

   <block><\n>
<else>
   <ruleMemoization(rname=ruleName)>
   <lexerRuleLabelInit()>
   _type     = <ruleName>;

   <ruleDescriptor.actions.init>

   <block>
 this->get_lexstate()->set_type(_type);
```

```
<endif>
   <if(trace)>
   std::cout \<\< "exit <ruleName> '" \<\< (char)this->LA(1)
            \<\< "' line=" \<\< this->getLine() \<\< ":" \<\< this->getCharPositionInLine()
            \<\< " failed=" \<\< this->get_failedflag() \<\< " backtracking=" \<\< this->get_backtracking() \<\<
std::endl;
   <endif>
   <ruleCleanUp()>
   <lexerRuleLabelFree()>
   <(ruleDescriptor.actions.after):execAfter()>
   <memoize>
}
// $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
/** This is the entry point in to the lexer from an object that
*  wants to generate the next token, such as a pCOMMON_TOKEN_STREAM
*/
void
<name>::mTokens()
{
   <block><\n>

   goto ruleTokensEx; /* Prevent compiler warnings */
ruleTokensEx: ;
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<

// <fileName>:<description>
{
   int alt<decisionNumber>=<maxAlt>;
   <decls>
   <@predecision()>
   <decision>
   <@postdecision()>
   <@prebranch()>
   switch (alt<decisionNumber>)
   {
 <alts:{a | <altSwitchCase(i,a)>}>
```

```
  }
  <@postbranch()>
}
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
{
  //  <fileName>:<description>

  ANTLR_UINT32 alt<decisionNumber>;

  alt<decisionNumber>=<maxAlt>;

  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
 <alts:{a | <altSwitchCase(i,a)>}>
  }
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
{
  int cnt<decisionNumber>=0;
```

```
   <decls>
   <@preloop()>

   for (;;)
   {
       int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
     <alts:{a | <altSwitchCase(i,a)>}>
     default:

  if ( cnt<decisionNumber> >= 1 )
  {
      goto loop<decisionNumber>;
  }
  <ruleBacktrackFailure()>
  <earlyExitEx()>
  <@earlyExitException()>
  goto rule<ruleDescriptor.name>Ex;
 }
 cnt<decisionNumber>++;
   }
   loop<decisionNumber>: ; /* Jump to here if this rule does not match */
   <@postloop()>
}
>>

earlyExitEx() ::= <<
/* mismatchedSetEx()
*/
new ANTLR_Exception\< <name>ImplTraits, EARLY_EXIT_EXCEPTION, StreamType>( this->get_rec(), "" );
<\n>
>>
positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<

// <fileName>:<description>
<decls>

<@preloop()>
for (;;)
{
   int alt<decisionNumber>=<maxAlt>;
   <@predecision()>
   <decision>
   <@postdecision()>
   switch (alt<decisionNumber>)
   {
 <alts:{a | <altSwitchCase(i,a)>}>
 default:
     goto loop<decisionNumber>; /* break out of the loop */
     break;
   }
}
loop<decisionNumber>: ; /* Jump out to here if this rule does not match */
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by antlr before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
   <@prealt()>
   <alt>
   break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
   <@declarations()>
   <@initializations()>
   <elements:element()>
   <rew>
   <@cleanup()>
}
>>
```

```
// E L E M E N T S
/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> = <endif> this->matchToken(<token>, &FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
list_<label>.push_back(<elem>);
>>



/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchc(<char>);
<checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchRange(<a>, <b>);
<checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
```

```
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= this->LA(1);<\n>
<else>
<label>=(<labelType>) this->LT(1);<\n>
<endif>
<endif>
if ( <s> )
{
  this->consume();
  <postmatchCode>
<if(!LEXER)>
  this->set_perror_recovery(false);
<endif>
  <if(backtracking)> this->set_failedflag(false); <\n><endif>
}
else
{
  <ruleBacktrackFailure()>
  <mismatchedSetEx()>
  <@mismatchedSetException()>
<if(LEXER)>
  this->recover();
<else>
<! use following code to make it recover inline;
  this->recoverFromMismatchedSet(&FOLLOW_set_in_<ruleName><elementIndex>);
!>
<endif>
  goto rule<ruleDescriptor.name>Ex;
}<\n>
>>

mismatchedSetEx() ::= <<
new ANTLR_Exception\< <name>ImplTraits, MISMATCHED_SET_EXCEPTION, StreamType>( this->get_rec(),
"" );
<if(PARSER)>
this->get_exception()->set_expectingSet(NULL);
<! use following code to make it recover inline;
this->get_exception()->set_expectingSet( &FOLLOW_set_in_<ruleName><elementIndex> );
!>
<endif>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
```

```
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
ANTLR_MARKER <label>Start = this->getCharIndex();
ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
ANTLR_UINT32 <label>StartCharPos<elementIndex> = this->getCharPositionInLine();
this->matchs(<string>);
<checkRuleBacktrackFailure()>
<label> = new CommonTokenType;
<label>->set_type( CommonTokenType::TOKEN_INVALID );
<label>->set_startIndex( <label>Start);
<label>->set_stopIndex( this->getCharIndex()-1);
<label>->set_input( this->get_input() );
<label>->set_line( <label>StartLine<elementIndex> );
<label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
<else>
this->matchs(<string>);
<checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=(<labelType>)this->LT(1);<\n>
<endif>
this->matchAnyToken();
<checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchAny();
<checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
```

```
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values. The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
this->followPush(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)>m_<scope:delegateName()>-><endif><rule.name>(<if(args)><args;
separator=", "><endif>);<\n>
this->followPop();
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
/* <description> */
<if(label)>
{
   ANTLR_MARKER <label>Start<elementIndex> = this->getCharIndex();
   ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
   ANTLR_UINT32 <label>StartCharPos<elementIndex> = this->getCharPositionInLine();
   <if(scope)>m_<scope:delegateName()>-><endif>m<rule.name>(<if(scope)>m_<scope:delegateName()><endif>
<if(args)>, <endif><args; separator=", ">);
   <checkRuleBacktrackFailure()>
   <label> = new CommonTokenType();
   <label>->set_type( CommonTokenType::TOKEN_INVALID);
   <label>->set_startIndex( <label>Start<elementIndex> );
   <label>->set_stopIndex( this->getCharIndex()-1 );
   <label>->set_input( this->get_input() );
   <label>->set_line( <label>StartLine<elementIndex> );
   <label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
}
<else>
<if(scope)>m_<scope:delegateName()>-><endif>m<rule.name>(<args; separator=", ">);
```

```
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
{
  ANTLR_UINT32 <label>Start<elementIndex>;
  ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
  ANTLR_UINT32 <label>StartCharPos<elementIndex> = this->getCharPositionInLine();
  <labelType> <label>;
  <label>Start<elementIndex> = this->getCharIndex();
  this->matchc(ANTLR_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <label> = new CommonTokenType();
  <label>->set_type( CommonTokenType::TOKEN_EOF );
  <label>->set_startIndex(<label>Start<elementIndex>);
  <label>->set_stopIndex(this->getCharIndex()-1);
  <label>->set_input( this->get_input() );
  <label>->set_line( <label>StartLine<elementIndex> );
  <label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
}
<else>
  this->matchc(ANTLR_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <endif>
>>

// used for left-recursive rules
recRuleDefArg()                       ::= "int <recRuleArg()>"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( this->LA(1)== CommonTokenType::TOKEN_DOWN ) {
   this->matchToken(CommonTokenType::TOKEN_DOWN, NULL);
   <checkRuleBacktrackFailure()>
   <children:element()>
   this->matchToken(CommonTokenType::TOKEN_UP, NULL);
   <checkRuleBacktrackFailure()>
}
<else>
this->matchToken(CommonTokenType::TOKEN_DOWN, NULL);
<checkRuleBacktrackFailure()>
<children:element()>
this->matchToken(CommonTokenType::TOKEN_UP, NULL);
<checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) )
{
   <ruleBacktrackFailure()>
   <newFPE(...)>
}
>>

newFPE() ::= <<
 ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, FAILED_PREDICATE_EXCEPTION,
StreamType>( this->get_rec(), "<description>" );
   ex->set_ruleName( "<ruleName>" );
   <\n>
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<

{
   int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
   <edges; separator="\nelse ">
   else
   {
<if(eotPredictsAlt)>
       alt<decisionNumber>=<eotPredictsAlt>;
<else>
       <ruleBacktrackFailure()>

       <newNVException()>
```

```
      goto rule<ruleDescriptor.name>Ex;

<endif>
   }
}
>>

newNVException() ::= <<
ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, NO_VIABLE_ALT_EXCEPTION,
StreamType>( this->get_rec(), "<description>" );
ex->set_decisionNum( <decisionNumber> );
ex->set_state( <stateNumber> );
<@noViableAltException()>
<\n>
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
   int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
   <edges; separator="\nelse ">
}
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/

dfaLoopbackStateDecls()::= <<
ANTLR_UINT32   LA<decisionNumber>_<stateNumber>;
>>
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
  /* dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
   */
   int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
   <edges; separator="\nelse "><\n>
   <if(eotPredictsAlt)>
   <if(!edges)>
 alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
 <else>
```

```
   else
   {
 alt<decisionNumber>=<eotPredictsAlt>;
   }<\n>
   <endif>
   <endif>
}
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
   <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( this->LA(<k>) )
{
<edges; separator="\n">

default:
<if(eotPredictsAlt)>
   alt<decisionNumber>=<eotPredictsAlt>;
<else>
   <ruleBacktrackFailure()>
   <newNVException()>
   goto rule<ruleDescriptor.name>Ex;<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( this->LA(<k>) )
{
   <edges; separator="\n">
```

```
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( this->LA(<k>) )
{
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
   alt<decisionNumber>=<eotPredictsAlt>;
   break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
 {
  <targetState>
 }
   break;
>>

// Cyclic DFA

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = cdfa<decisionNumber>.predict(this, this->get_rec(), this->get_istream(),
cdfa<decisionNumber> );
<checkRuleBacktrackFailure()>
>>

/* Dump DFA tables as static initialized arrays of shorts(16 bits)/characters(8 bits)
* which are then used to statically initialize the dfa structure, which means that there
* is no runtime initialization whatsoever, other than anything the C compiler might
* need to generate. In general the C compiler will lay out memory such that there is no
* runtime code required.
*/
cyclicDFA(dfa) ::= <<
/** Static dfa state tables for Cyclic dfa:
*    <dfa.description>
*/
static const ANTLR_INT32 dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
   {
 <dfa.eot; wrap="\n", separator=", ", null="-1">
```

```
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>] =
   {
 <dfa.eof; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
   {
 <dfa.min; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
   {
 <dfa.max; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
   {
 <dfa.accept; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
   {
 <dfa.special; wrap="\n", separator=", ", null="-1">
   };

/** Used when there is no transition table entry for a particular state */
static const ANTLR_INT32* dfa<dfa.decisionNumber>_T_empty  =   NULL;

<dfa.edgeTransitionClassMap.keys:{ table |
static const ANTLR_INT32 dfa<dfa.decisionNumber>_T<i0>[] =
   {
 <table; separator=", ", wrap="\n", null="-1">
   \};<\n>}; null = "">

/* Transition tables are a table of sub tables, with some tables
* reused for efficiency.
*/
static const ANTLR_INT32 * const dfa<dfa.decisionNumber>_transitions[] =
{
   <dfa.transitionEdgeTables:{xref|dfa<dfa.decisionNumber>_T<xref>}; separator=", ", wrap="\n", null="NULL">
};

<@errorMethod()>

/* Declare tracking structure for Cyclic DFA <dfa.decisionNumber>
*/
class <name>CyclicDFA<dfa.decisionNumber> : public CyclicDFA\< <name>ImplTraits, <name> >, public
<name>Tokens
{
public:
 typedef CyclicDFA\< <name>ImplTraits, <name> >  BaseType;
 typedef BaseType::ContextType CtxType;

private:
<if(dfa.specialStateSTs)>
 //to maintain C-Target compatibility, we need to make some of ctx functions look like member funcs
 CtxType* m_ctx;
<endif>

public:
 <name>CyclicDFA<dfa.decisionNumber>( ANTLR_INT32 decisionNumber
     , const ANTLR_UCHAR* description
     , const ANTLR_INT32* const eot
     , const ANTLR_INT32* const eof
     , const ANTLR_INT32* const min
     , const ANTLR_INT32* const max
     , const ANTLR_INT32* const accept
     , const ANTLR_INT32* const special
     , const ANTLR_INT32* const *const transition)
     :BaseType( decisionNumber, description, eot, eof, min, max, accept,
        special, transition )
 {
 <if(dfa.specialStateSTs)>
  m_ctx = NULL;
 <endif>
 }

   <if(dfa.specialStateSTs)>
   ANTLR_UINT32 LA(ANTLR_INT32 i)
   {
      return m_ctx->LA(i);
   }

   <if(PARSER)>
   const CtxType::CommonTokenType*  LT(ANTLR_INT32 k)
   {
      return m_ctx->LT(k);
   }
   <endif>
   <if(synpreds)>
   template\<typename PredType>
   bool msynpred( PredType pred )
   {
      return m_ctx->msynpred(pred);
   }
   <endif>

 ANTLR_INT32  specialStateTransition(CtxType * ctx, RecognizerType* recognizer, IntStreamType* is,
ANTLR_INT32 s)
```

```
 {
    ANTLR_INT32    _s;

    m_ctx = ctx;
    _s     = s;
    switch  (s)
    {
    <dfa.specialStateSTs:{state |
    case <i0>:

  <state>}; separator="\n">
    }
 <if(backtracking)>
    if ( ctx->get_backtracking() > 0)
    {
   ctx->set_failedflag( true );
  return -1;
    }
 <endif>
    ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, NO_VIABLE_ALT_EXCEPTION,
StreamType>( recognizer, "<dfa.description>" );
    ex->set_decisionNum( <dfa.decisionNumber> );
    ex->set_state(_s);
    <@noViableAltException()>
    return -1;
 }
 <endif>
};

static <name>CyclicDFA<dfa.decisionNumber>  cdfa<dfa.decisionNumber>(
    <dfa.decisionNumber>,      /* Decision number of this dfa     */
    /* Which decision this represents:   */
    (const ANTLR_UCHAR*)"<dfa.description>",
    dfa<dfa.decisionNumber>_eot,     /* EOT table       */
    dfa<dfa.decisionNumber>_eof,     /* EOF table       */
    dfa<dfa.decisionNumber>_min,     /* Minimum tokens for each state    */
    dfa<dfa.decisionNumber>_max,     /* Maximum tokens for each state    */
    dfa<dfa.decisionNumber>_accept, /* Accept table       */
    dfa<dfa.decisionNumber>_special, /* Special transition states     */
    dfa<dfa.decisionNumber>_transitions /* Table of transition tables     */

 );



/* End of Cyclic DFA <dfa.decisionNumber>
* ---------------------
*/
>>
```

```
/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
   ANTLR_UINT32 LA<decisionNumber>_<stateNumber>;<\n>
   ANTLR_MARKER index<decisionNumber>_<stateNumber>;<\n>

   LA<decisionNumber>_<stateNumber> = ctx->LA(1);<\n>
   <if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
   index<decisionNumber>_<stateNumber> = ctx->index();<\n>
   ctx->rewindLast();<\n>
   <endif>
   s = -1;
   <edges; separator="\nelse ">
 <if(semPredState)> <! return input cursor to state before we rewound !>
 ctx->seek(index<decisionNumber>_<stateNumber>);<\n>
 <endif>
   if ( s>=0 )
   {
 return s;
   }
}
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif> )
{
   s = <targetStateNumber>;
}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "( (<left>) && (<right>) )"
```

```
orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\"||\">)"

notPredicate(pred) ::= "!( <evalPredicate(pred,{})> )"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "this->msynpred( antlr3::ClassForwarder\<<pred>>() )"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "this->LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
((LA<decisionNumber>_<stateNumber> >= <lower>) && (LA<decisionNumber>_<stateNumber> \<= <upper>))
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "((this->LA(<k>) >=
<lower>) && (this->LA(<k>) \<= <upper>))"

setTest(ranges) ::= "<ranges; separator=\" || \">"

// A T T R I B U T E S

makeScopeSet() ::= <<
/* makeScopeSet()
*/
/** Definition of the <scope.name> scope variable tracking
*  structure. An instance of this structure is created by calling
*  <name>_<scope.name>Push().
*/
struct  <scopeStruct(sname=scope.name,...)>
{
   /* =============================================================================
    * Programmer defined variables...
    */
   <scope.attributes:{it |<it.decl>;}; separator="\n">

   /* End of programmer defined variables
    * =============================================================================
    */
};

>>
```

```
globalAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

ruleAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

globalAttributeScopeDef(scope) ::=
<<
/* globalAttributeScopeDef(scope)
*/
<if(scope.attributes)>

StackType\< <scopeStruct(sname=scope.name)> > <scopeStack(sname=scope.name)>;

<endif>
>>

ruleAttributeScopeDef(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDef(scope)
*/
StackType\< <scopeStruct(sname=scope.name)> >  <scopeStack(sname=scope.name,...)>;

<endif>
>>

scopeStruct(sname) ::= <<
<sname>Scope
>>

scopeStack(sname) ::= <<
m_<sname>_stack
>>

returnStructName(r) ::= "<r.name>_return"

returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
```

```
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>::<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
<else>
bool
<endif>
%>

/** Generate the C type associated with a single or multiple return
*  value(s).
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
%>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "0".
*/
initValue(typeName) ::= <<
= <cTypeInitMap.(typeName)>
>>

/** Define a rule label  */
ruleLabelDef(label) ::= <<
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text>;
>>
/**  Rule label default value */
ruleLabelInitVal(label) ::= <<
>>
```

```
ASTLabelType() ::=
"<if(recognizer.ASTLabelType)><recognizer.ASTLabelType><else>ImplTraits::TreeType*<endif>"

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
struct <ruleDescriptor:returnStructName()> : public <name>ImplTraits::RuleReturnValueType
{
public:
  typedef <name>ImplTraits::RuleReturnValueType BaseType;
  <ruleDescriptor:returnStructName()>()
     : BaseType()
     <if(scope)>, <scope.attributes:{it | <it.name>() }; separator=","><endif>
     { init(); }
  <ruleDescriptor:returnStructName()>( BaseParserType* parser )
     : BaseType(parser)
     <if(scope)>, <scope.attributes:{it | <it.name>() }; separator=","><endif>
     { init(); }
  <ruleDescriptor:returnStructName()>( const <ruleDescriptor:returnStructName()>& other )
     : BaseType(other)
  <if(scope)>, <scope.attributes:{it | <it.name>(other.<it.name>) }; separator=", "><endif>
  { copy(other); }
  ~<ruleDescriptor:returnStructName()>()
  {
     <@ruleReturnMembersDelete()>
  }

  <ruleDescriptor:returnStructName()>&
  operator=( const <ruleDescriptor:returnStructName()>& other )
  {
     BaseType::operator=( other );
     <if(scope)><scope.attributes:{it | <it.name> = other.<it.name>; }; separator="\n"><endif>
     copy(other);
   return *this;
  }
  <@ruleReturnMembers()>
  void init() { <@ruleReturnMembersInit()> }
  void copy( const <ruleDescriptor:returnStructName()>& other) { <@ruleReturnMembersCopy()> }
<else>
struct <ruleDescriptor:returnStructName()>
{
public:
  <name>ImplTraits::<recognizer.ASTLabelType>       start;
```

```
   <name>ImplTraits::<recognizer.ASTLabelType>       stop;
   <ruleDescriptor:returnStructName()>( const <ruleDescriptor:returnStructName()>& other )
   <if(scope.attributes)>
   <scope.attributes:{it | <it.name>(other.<it.name>) }; separator=",">
   <endif>
   {
     start = other.start;
     stop  = other.stop;
   }

   <ruleDescriptor:returnStructName()>&
   operator=( const <ruleDescriptor:returnStructName()>& other )
   {
     start = other.start;
     stop  = other.stop;

    <scope.attributes:{it | <it.name> = other.<it.name>; }; separator="\n">
    return *this;
   }
<endif>
   <if(scope)><scope.attributes:{it |<it.type> <it.name>;}; separator="\n"><endif>
};

<endif>
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name>=<expr>;"

/** Note that the scopeAttributeRef does not have access to the
* grammar name directly
*/
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
 m_<scope>_stack.at( m_<scope>_stack.size()-<negIndex>-1).<attr.name>
<else>
<if(index)>
 m_<scope>_stack.at(<index>).<attr.name>
<else>
 m_<scope>_stack.peek().<attr.name>
<endif>
<endif>
%>
```

```
scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
 m_<scope>_stack.at( m_<scope>_stack.size()-<negIndex>-1).<attr.name> = <expr>;
<else>
<if(index)>
 m_<scope>_stack.at(<index>).<attr.name> = <expr>;
<else>
 m_<scope>_stack.peek().<attr.name> =<expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<scope>.<attr.name>
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>=<expr>;
<else>
<attr.name>=<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
```

```
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach
//
tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText())"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>->get_type())"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>->get_line())"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>->get_charPositionInLine())"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>->get_channel())"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>->get_tokenIndex())"
tokenLabelPropertyRef_tree(scope,attr) ::= "(<scope>->get_tree())"
tokenLabelPropertyRef_int(scope,attr) ::= "(<name>ImplTraits::ConvertToInt32(<scope>->getText()))"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(this->get_strstream()->toStringSS(<scope>.start, <scope>.start))
<else>
(this->get_strstream()->toStringTT(<scope>.start, <scope>.stop))
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>->get_type())"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>->get_line())"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>->get_charPositionInLine())"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>->get_channel())"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>->get_tokenIndex())"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText())"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop"
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
this->get_input()->toStringSS( this->get_adaptor()->getTokenStartIndex(retval.start), this->get_adaptor()->getTokenStopIndex(retval.start))
<else>
this->get_strstream()->toStringTT(retval.start, this->LT(-1))
<endif>
```

```
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "this->getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "this->get_state()->get_tokenStartLine()"
lexerRulePropertyRef_pos(scope,attr) ::= "this->get_state()->get_tokenStartCharPositionInLine()"
lexerRulePropertyRef_channel(scope,attr) ::= "this->get_state()->get_channel()"
lexerRulePropertyRef_start(scope,attr) ::= "this->get_state()->get_tokenStartCharIndex()"
lexerRulePropertyRef_stop(scope,attr) ::= "(this->getCharIndex()-1)"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_int(scope,attr) ::= "(<name>ImplTraits::ConvertToInt32(<scope>->getText()))"


// setting $st and $tree is allowed in local rule. everything else is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree=<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st=<expr>;"


/** How to deal with an @after for C targets. Because we cannot rely on
*  any garbage collection, after code is executed even in backtracking
*  mode. Must be documented clearly.
*/
execAfter(action) ::= <<
{
  <action>
}
>>

/** How to execute an action (when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if ( <actions.(actionScope).synpredgate> )
{
  <action>
}
<else>
if ( BACKTRACKING == 0 )
{
  <action>
}
<endif>
<else>
{
  <action>
}
<endif>
```

```
>>

// M I S C (properties, etc...)

bitsetDeclare(bitsetname, words64, traits) ::= <<

/** Bitset defining follow set for error recovery in rule state: <name>  */
static ANTLR_BITWORD <bitsetname>_bits[] = { <words64:{it |ANTLR_UINT64_LIT(<it>)}; separator=", "> };
static  <traits>::BitsetListType <bitsetname>( <bitsetname>_bits, <length(words64)> );
>>

codeFileExtension() ::= ".cpp"

true_value() ::= "true"
false_value() ::= "false"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Cpp/Cpp.stg
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```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/

parserMembers() ::= <<
 protected DebugTreeAdaptor adaptor;
 public void setTreeAdaptor(TreeAdaptor adaptor) {
<if(grammar.grammarIsRoot)>
  this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
  this.adaptor = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif>
  <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
 }
 public TreeAdaptor getTreeAdaptor() {
  return adaptor;
 }
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy =
 new DebugEventSocketProxy(this,port,<if(TREE_PARSER)>input.getTreeAdaptor()<else>adaptor<endif>);
setDebugListener(proxy);
set<inputStreamType>(new Debug<inputStreamType>(input,proxy));
try {
 proxy.handshake();
}
catch (IOException ioe) {
 reportError(ioe);
}
>>

@ctorForRootGrammar.finally() ::= <<
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
proxy.setTreeAdaptor(adap);
>>

@ctorForProfilingRootGrammar.finally() ::=<<
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
>>

@ctorForPredefinedListener.superClassRef() ::= "super(input, dbg);"
```

```
@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)> <! don't create new adaptor for delegates !>
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
<endif>
>>

@rewriteElement.pregen() ::= "dbg.location(<e.line>,<e.pos>);"
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/ASTDbg.stg

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```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Python by code generator.
*/
group ASTDbg;
```

```
astAccessor() ::= <<
def setTreeAdaptor(self, adaptor):
<if(grammar.grammarIsRoot)>
  self._adaptor = DebugTreeAdaptor(self.dbg, adaptor)
<else>
  self._adaptor = adaptor # delegator sends dbg adaptor
<endif>
  <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(self._adaptor)}>

def getTreeAdaptor(self):
  return self._adaptor

adaptor = property(getTreeAdaptor, setTreeAdaptor)<\n>
>>

createListenerAndHandshake() ::= <<
proxy = DebugEventSocketProxy(self,
adaptor=<if(TREE_PARSER)>self.input.getTreeAdaptor()<else>self._adaptor<endif>,
                          debug=debug_socket, port=port)
self.setDebugListener(proxy)
self.adaptor.setDebugListener(proxy)
self.input.setDebugListener(proxy)
#self.set<inputStreamType>(Debug<inputStreamType>(self.input, proxy))
proxy.handshake()
>>

@rewriteElement.pregen() ::= "self._dbg.location(<e.line>, <e.pos>)"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/ASTDbg.stg
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

@outputFile.imports() ::= <<
<@super.imports()>
<if(!TREE_PARSER)><! tree parser would already have imported !>
import org.antlr.runtime.tree.*;<\n>
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
 <parserMembers()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
protected TreeAdaptor adaptor = new CommonTreeAdaptor();

public void setTreeAdaptor(TreeAdaptor adaptor) {
 this.adaptor = adaptor;
 <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
}
public TreeAdaptor getTreeAdaptor() {
 return adaptor;
}
>>

@returnScope.ruleReturnMembers() ::= <<
<ASTLabelType> tree;
@Override
public <ASTLabelType> getTree() { return tree; }
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0 = null;<\n>
```

```
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<if(!ruleDescriptor.isSynPred)>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it | <ASTLabelType> <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> <it.label.text>_tree=null;}; separator="\n">
<if(ruleDescriptor.supportsLabelOptimization)>
<ruleDescriptor.allTokenRefsInRewrites
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInRewrites
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
<else>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
<endif>
<endif>
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode && !ruleDescriptor.isSynPred)>
root_0 = (<ASTLabelType>)adaptor.nil();<\n>
<endif>
<endif>
<endif>
>>

// Tracking Rule Elements

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>
```

```
/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label, ...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label, ...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.getTree());
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(label, {<label>.getTree()})>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.getTree());
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(label, {<label>.getTree()})>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = (<ASTLabelType>)adaptor.nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
input.replaceChildren(adaptor.getParent(retval.start),
      adaptor.getChildIndex(retval.start),
      adaptor.getChildIndex(_last),
      retval.tree);
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>
```

```
rewriteCodeLabels() ::= <<
<referencedTokenLabels
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
 separator="\n"
>
<referencedTokenListLabels
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
 separator="\n"
>
<referencedWildcardLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
 separator="\n"
>
<referencedWildcardListLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
 separator="\n"
>
<referencedRuleLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.getTree():null);};
 separator="\n"
>
<referencedRuleListLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
 separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElementsDeep:{el | stream_<el>.reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if ( !(<referencedElements:{el | stream_<el>.hasNext()}; separator="||">) ) {
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
 <a.alt>
}<\n>
<else>
{
 <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.nil();
<root:rewriteElement()>
<children:rewriteElement()>
```

```
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);
>>

rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.addChild(root_<treeLevel>, <createImaginaryNode(token,args,terminalOptions)>);
>>

rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<createImaginaryNode(token,args,terminalOptions)>,
root_<treeLevel>);
>>
```

```
/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>);
>>

rewriteNodeAction(action) ::= <<
adaptor.addChild(root_<treeLevel>, <action>);
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<action>, root_<treeLevel>);
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>
```

```
rewriteWildcardLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>



createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
%>

createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
%>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/AST.stg

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(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
import stringtemplate3
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnInit() ::= <<
self.st = None
>>

@returnScope.ruleReturnMembers() ::= <<
def getTemplate(self):
   return self.st

def toString(self):
   if self.st is not None:
       return self.st.toString()
   return None
__str__ = toString

>>

@genericParser.init() ::= <<
<@super.init()>
self.templateLib = stringtemplate3.StringTemplateGroup(
   '<name>Templates', lexer='angle-bracket'
   )

>>

@genericParser.members() ::= <<
<@super.members()>
def setTemplateLib(self, templateLib):
   self.templateLib = templateLib
```

```
def getTemplateLib(self):
  return self.templateLib

>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.st})>
>>

rewriteTemplate(alts) ::= <<
# TEMPLATE REWRITE
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
  <first(alts):rewriteTemplateAltFirst()>
  <rest(alts):{it | el<rewriteTemplateAlt(it)>}>
  <if(rewriteMode)><replaceTextInLine()><endif>

<else>
<first(alts):rewriteTemplateAltFirst()>
<rest(alts):{it | el<rewriteTemplateAlt(it)>}>
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>

replaceTextInLine() ::= <<
<if(TREE_PARSER)>
self.input.getTokenStream().replace(
  self.input.getTreeAdaptor().getTokenStartIndex(retval.start),
  self.input.getTreeAdaptor().getTokenStopIndex(retval.start),
  retval.st
  )
<else>
self.input.replace(
  retval.start.getTokenIndex(),
  self.input.LT(-1).getTokenIndex(),
  retval.st
  )
<endif>
>>

rewriteTemplateAltFirst(alt) ::= <<
<if(alt.pred)>
if <alt.pred>:
  # <alt.description>
  retval.st = <alt.alt>
```

```
<\n>
<else>
# <alt.description>
retval.st = <alt.alt>
<\n>
<endif>
>>

rewriteTemplateAlt(alt) ::= <<
<if(alt.pred)>if <alt.pred>:
   # <alt.description>
   retval.st = <alt.alt>
<\n>
<else>se:
   # <alt.description>
   retval.st = <alt.alt>
<\n>
<endif>
>>

rewriteEmptyTemplate(alts) ::= <<
None
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <%
self.templateLib.getInstanceOf("<name>"<if(args)>, attributes={<args:{a | "<a.name>": <a.value>}; separator=",
">}<endif>)
%>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
self.templateLib.getInstanceOf(<expr><if(args)>, attributes={<args:{a | "<a.name>": <a.value>}; separator=",
">}<endif>)
%>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
stringtemplate3.StringTemplate("<template>", group=self.templateLib<if(args)>, attributes={<args:{a |
"<a.name>": <a.value>}; separator=", ">}<endif>)
%>

/** plain -> {foo} action */
```

```
rewriteAction(action) ::= <<
<action>
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>)["<attrName>"] = <expr>
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
stringtemplate3.StringTemplate(<stringExpr>, group=self.templateLib)
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python3/ST.stg
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```
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
```

```
*/

@outputFile.imports() ::= <<
<@super.imports()>
import org.antlr.stringtemplate.*;
import org.antlr.stringtemplate.language.*;
import java.util.HashMap;
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
public StringTemplate st;
public Object getTemplate() { return st; }
public String toString() { return st==null?null:st.toString(); }
>>

@genericParser.members() ::= <<
<@super.members()>
 protected StringTemplateGroup templateLib =
   new StringTemplateGroup("<name>Templates", AngleBracketTemplateLexer.class);

 public void setTemplateLib(StringTemplateGroup templateLib) {
   this.templateLib = templateLib;
 }
 public StringTemplateGroup getTemplateLib() {
   return templateLib;
 }
 /** allows convenient multi-value initialization:
  *  "new STAttrMap().put(...).put(...)"
  */
 @SuppressWarnings("serial")
 public static class STAttrMap extends HashMap\<String, Object> {
  public STAttrMap put(String attrName, Object value) {
   super.put(attrName, value);
   return this;
  }
 }
>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, {<label>.getTemplate()})>
>>

rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
```

```
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>

replaceTextInLine() ::= <<
<if(TREE_PARSER)>
((TokenRewriteStream)input.getTokenStream()).replace(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start),
 retval.st);
<else>
((TokenRewriteStream)input).replace(
 ((Token)retval.start).getTokenIndex(),
 input.LT(-1).getTokenIndex(),
 retval.st);
<endif>
>>

rewriteTemplateAlt(alt) ::= <<
// <alt.description>
<if(alt.pred)>
if (<alt.pred>) {
 retval.st = <alt.alt>;
}<\n>
<else>
{
 retval.st = <alt.alt>;
}<\n>
<endif>
>>

rewriteEmptyTemplate(alts) ::= <<
null;
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
```

```
rewriteExternalTemplate(name,args) ::= <%
templateLib.getInstanceOf("<name>"<if(args)>,
 new STAttrMap()<args:{a | .put("<a.name>", <a.value>)}>
 <endif>)
%>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
templateLib.getInstanceOf(<expr><if(args)>,
 new STAttrMap()<args:{a | .put("<a.name>", <a.value>)}>
 <endif>)
%>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
new StringTemplate(templateLib, "<template>"<if(args)>,
 new STAttrMap()<args:{a | .put("<a.name>", <a.value>)}>
 <endif>)
%>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>).setAttribute("<attrName>",<expr>);
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
new StringTemplate(templateLib,<stringExpr>)
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/ST.stg
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```
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*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var _first_0:<ASTLabelType> = null;
var _last:<ASTLabelType> = null;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = <ASTLabelType>(_first_0);
if ( adaptor.getParent(retval.tree)!=null && adaptor.isNil( adaptor.getParent(retval.tree) ) )
   retval.tree = <ASTLabelType>(adaptor.getParent(retval.tree));
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_last = <ASTLabelType>(input.LT(1));
{
var _save_last_<treeLevel>:<ASTLabelType> = _last;
var _first_<treeLevel>:<ASTLabelType> = null;
<if(!rewriteMode)>
var root_<treeLevel>:<ASTLabelType> = <ASTLabelType>(adaptor.nil());
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==TokenConstants.DOWN ) {
   matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
   <children:element()>
   matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
}
<else>
matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
```

```
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<label>_tree, root_<treeLevel>));
<if(backtracking)>}<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
```

```
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.dupTree(<label>);
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.matchSet(...)>
>>
```

```
matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<label>_tree, root_<treeLevel>));
<if(backtracking)>}<endif>
<endif>
}, ...
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.tree);
<else> <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>.tree;
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_<treeLevel> =
<ASTLabelType>(adaptor.becomeRoot(<label>.tree, root_<treeLevel>));
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = <ASTLabelType>(adaptor.rulePostProcessing(root_0));
<if(backtracking)>}<endif>
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ActionScript/ASTTreeParser.stg

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```
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*/

/** Templates for building ASTs during tree parsing.
 *
 *  Deal with many combinations.  Dimensions are:
 *  Auto build or rewrite
 *    no label, label, list label  (label/no-label handled together)
 *    child, root
 *    token, set, rule, wildcard
 *
 *  Each combination has its own template except that label/no label
 *  is combined into tokenRef, ruleRef, ...
 */
group ASTTreeParser;
```

```
/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_First[0] := nil;
_Last := nil;<\n>
>>

ruleDeclarationVars() ::= <<
<super.ruleDeclarationVars()>
_First, _Save_Last: array [0..63] of I<ASTLabelType>;
_Last: I<ASTLabelType>;
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if (State.Backtracking = 0) then
begin<endif>
<if(rewriteMode)>
RetVal.Tree := _First[0] as I<ASTLabelType>;
if (Adaptor.GetParent(RetVal.Tree) \<\> nil) and (Adaptor.IsNil(Adaptor.GetParent(RetVal.Tree))) then
 RetVal.Tree := Adaptor.GetParent(RetVal.Tree) as I<ASTLabelType>;
<endif>
<if(backtracking)>end;<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
begin
 _Save_Last[<treeLevel>] := _Last;
 _First[<treeLevel>] := nil;
<if(!rewriteMode)>
 Root[<treeLevel>] := Adaptor.GetNilNode as I<ASTLabelType>;<\n>
<endif>
 <root:element()>
<if(rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
<if(root.el.rule)>
 if (_First[<enclosingTreeLevel>] = nil) then _First[<enclosingTreeLevel>] := <root.el.label>.Tree;
<else>
 if (_First[<enclosingTreeLevel>] = nil) then _First[<enclosingTreeLevel>] := <root.el.label>;
<endif>
```

```
<endif>
 <actionsAfterRoot:element()>
<if(nullableChildList)>
 if (Input.LA(1) = TToken.DOWN) then
 begin
   Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
   <children:element()>
   Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
 end;
<else>
 Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
 Adaptor.AddChild(Root[<enclosingTreeLevel>], Root[<treeLevel>]);
<endif>
 _Last := _Save_Last[<treeLevel>];
end;<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
 <label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
 Adaptor.AddChild(Root[<treeLevel>], <label>_tree);
<if(backtracking)>
end;
```

```
<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
if (_First[<treeLevel>] = nil) then _First[<treeLevel>] := <label>;
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
 <label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
 Root[<treeLevel>] := Adaptor.BecomeRoot(<label>_tree, Root[<treeLevel>]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_Llast := Input.LT(1) as I<ASTLabelType>;
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then begin <endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
<label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
Adaptor.AddChild(Root[<treeLevel>], <label>_tree);
<if(backtracking)>end;<endif>
<endif>
}
)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then begin <endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
<label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
Root[<treeLevel>] := Adaptor.BecomeRoot(<label>_tree, Root[<treeLevel>]) as I<ASTLabelType>;
<if(backtracking)>end;<endif>
<endif>
}
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
<if(!rewriteMode)>
Adaptor.AddChild(Root[<treeLevel>], <label>.Tree);
<else> <! rewrite mode !>
if (_First[<treeLevel>] = nil) then _First[<treeLevel>] := <label>.Tree;
```

```
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[<treeLevel>] :=
Adaptor.BecomeRoot(<label>.Tree, Root[<treeLevel>]) as I<ASTLabelType>;
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>
```

```
/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create((Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode)
<else>
(Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
RetVal.Tree := Adaptor.RulePostProcessing(Root[0]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Delphi/ASTTreeParser.stg

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```
/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType> _first_0 = default(<ASTLabelType>);
<ASTLabelType> _last = default(<ASTLabelType>);
<endif>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(rewriteMode)>
retval.Tree = (<ASTLabelType>)_first_0;
if (adaptor.GetParent(retval.Tree)!=null && adaptor.IsNil(adaptor.GetParent(retval.Tree)))
 retval.Tree = (<ASTLabelType>)adaptor.GetParent(retval.Tree);
<endif>
<if(backtracking)>}<endif>
```

```
<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = default(<ASTLabelType>);
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(root.el.rule)>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>.Tree;
<else>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down) {
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}
<else>
<super.tree(...)>
<endif>
>>

// TOKEN AST STUFF
```

```
/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.tokenRef(...)>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
```

```
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.DupTree(<label>);
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
```

```
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSet(...)>
<endif>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
<else>
```

```
<super.matchSetBang(...)>
<endif>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(!ruleDescriptor.isSynPred)>
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<treeLevel>, <label>.Tree);
<else> <! rewrite mode !>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>.Tree;
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefAndListLabel(...)>
<endif>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
<endif>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>
```

```
/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRuleRootTrack(...)>
<endif>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>

/** Streams for token refs are tree nodes now; override to
*  change NextToken to NextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,args) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif>stream_<token>.NextNode())
<else>
stream_<token>.NextNode()
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp3/ASTTreeParser.stg

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```
/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

finishedBacktracking(block) ::= <<
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
   <block>
<else>
<block>
<endif>
>>
```

```
/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_first_0 = None
_last = None<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<finishedBacktracking({
<if(rewriteMode)>
retval.tree = _first_0
if self._adaptor.getParent(retval.tree) is not None and self._adaptor.isNil(self._adaptor.getParent(retval.tree)):
   retval.tree = self._adaptor.getParent(retval.tree)
<endif>
})>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_last = self.input.LT(1)
_save_last_<treeLevel> = _last
_first_<treeLevel> = None
<if(!rewriteMode)>
root_<treeLevel> = self._adaptor.nil()<\n>
<endif>
<root:element()>
<if(rewriteMode)>
<finishedBacktracking({
<if(root.el.rule)>
if _first_<enclosingTreeLevel> is None:
   _first_<enclosingTreeLevel> = <root.el.label>.tree<\n>
<else>
if _first_<enclosingTreeLevel> is None:
   _first_<enclosingTreeLevel> = <root.el.label><\n>
<endif>
})>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
   self.match(self.input, DOWN, None)
```

```
  <children:element()>
  self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)<\n>
<endif>
<if(!rewriteMode)>
self._adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>)<\n>
<endif>
_last = _save_last_<treeLevel>

>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
  _first_<treeLevel> = <label><\n>
})>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
```

```
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.wildcard(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<label>_tree = self._adaptor.dupTree(<label>)
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label>
})>
<endif>
>>

// SET AST
matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
```

```
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<endif>
}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
}, ...)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<finishedBacktracking({
<if(!rewriteMode)>
self._adaptor.addChild(root_<treeLevel>, <label>.tree)
<else> <! rewrite mode !>
if _first_<treeLevel> is None:
  _first_<treeLevel> = <label>.tree<\n>
<endif>
})>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
root_<treeLevel> = self._adaptor.becomeRoot(<label>.tree, root_<treeLevel>)
})>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
_last = self.input.LT(1)
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,scope,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
})>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/MultiMap.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/Utils.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/RuleLabelScope.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/Python3Target.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/StateCluster.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/IntervalSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarSerializerFoo.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/DFAOptimizer.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarSyntaxMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/NFAFactory.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Message.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFAState.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarUnreachableAltsMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/Tool.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFAContext.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Grammar.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFAToDFAConverter.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/NameSpaceChecker.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarReport2.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/IntArrayList.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/DelphiTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/AnalysisTimeoutException.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/Perl5Target.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/LookaheadSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/BitSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/LL1Analyzer.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFA.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/MutableInteger.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarSpelunker.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/ActionScriptTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarDanglingStateMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-

jar/org/antlr/tool/BuildDependencyGenerator.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/CompositeGrammar.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/DecisionProbe.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CSharp2Target.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/CompositeGrammarTree.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFAConfiguration.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Interpreter.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/SemanticContext.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/JavaScriptTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/GrammarSemanticsMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/GrammarInsufficientPredicatesMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/analysis/NFAConversionThread.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/analysis/RuleClosureTransition.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Rule.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Attribute.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/Barrier.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/PythonTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/DOTGenerator.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/ToolMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/RandomPhrase.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Strip.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/State.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/analysis/AnalysisRecursionOverflowException.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/Label.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/LeftRecursionCyclesMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CppTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/AssignTokenTypesBehavior.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/AttributeScope.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/Interval.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/GrammarNonDeterminismMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/DFAState.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/IntSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/Transition.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/Target.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Interp.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/LL1DFA.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/RecursionOverflowMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-

jar/org/antlr/tool/GrammarAnalysisAbortedMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/ANTLRErrorListener.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/NonRegularDecisionMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarSanity.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/PredicateLabel.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NonLLStarDecisionException.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/ACyclicDFACodeGenerator.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/JavaTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarAST.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarReport.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/ActionLabel.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/Graph.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/ErrorManager.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/DFA.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/FASerializer.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/OrderedHashSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/MachineProbe.java
No license file was found, but licenses were detected in source scan.

```
*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

finishedBacktracking(block) ::= <<
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
   <block>
<else>
<block>
<endif>
>>

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_first_0 = None
_last = None<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<finishedBacktracking({
<if(rewriteMode)>
retval.tree = _first_0
if self._adaptor.getParent(retval.tree) is not None and self._adaptor.isNil(self._adaptor.getParent(retval.tree)):
   retval.tree = self._adaptor.getParent(retval.tree)
<endif>
})>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
```

```
_last = self.input.LT(1)
_save_last_<treeLevel> = _last
_first_<treeLevel> = None
<if(!rewriteMode)>
root_<treeLevel> = self._adaptor.nil()<\n>
<endif>
<root:element()>
<if(rewriteMode)>
<finishedBacktracking({
<if(root.el.rule)>
if _first_<enclosingTreeLevel> is None:
   _first_<enclosingTreeLevel> = <root.el.label>.tree<\n>
<else>
if _first_<enclosingTreeLevel> is None:
   _first_<enclosingTreeLevel> = <root.el.label><\n>
<endif>
})>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
   self.match(self.input, DOWN, None)
   <children:element()>
   self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)<\n>
<endif>
<if(!rewriteMode)>
self._adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>)<\n>
<endif>
_last = _save_last_<treeLevel>

>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
>>

/** ID auto construct */
```

```
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label><\n>
})>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>
```

```
/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.wildcard(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<label>_tree = self._adaptor.dupTree(<label>)
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label>
})>
<endif>
>>

// SET AST
matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<endif>
}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
```

```
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
}, ...)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<finishedBacktracking({
<if(!rewriteMode)>
self._adaptor.addChild(root_<treeLevel>, <label>.tree)
<else> <! rewrite mode !>
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label>.tree<\n>
<endif>
})>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
root_<treeLevel> = self._adaptor.becomeRoot(<label>.tree, root_<treeLevel>)
})>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
```

```
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,scope,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
})>
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-

jar/org/antlr/codegen/templates/Python3/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

```
/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/
group ASTTreeParser;

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
```

```
<ASTLabelType> _first_0 = null;
<ASTLabelType> _last = null;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(rewriteMode)>
retval.tree = (<ASTLabelType>)_first_0;
if ( adaptor.getParent(retval.tree)!=null && adaptor.isNil( adaptor.getParent(retval.tree) ) )
   retval.tree = (<ASTLabelType>)adaptor.getParent(retval.tree);
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = null;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
   match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
   <children:element()>
   match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( state.backtracking==0 )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
```

```
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<endif>
}
)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
```

```
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
}
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if ( state.backtracking==0 ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.getTree());
<else> <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>.tree;
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".getTree()",...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.becomeRoot(<label>.getTree(), root_<treeLevel>);
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
```

```
<listLabel(elem=label+".getTree()",...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<\n><endif>
retval.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Perl5/ASTTreeParser.stg

No license file was found, but licenses were detected in source scan.

```
/*
New style messages. This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the format that mimicks GCC output.
*/

group gnu;

location(file, line, column) ::= "<file>:<line>:"

message(id, text) ::= "<text> (<id>)"

report(location, message, type) ::= "<location> <type>: <message>"

wantsSingleLineMessage() ::= "true"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/templates/messages/formats/gnu.stg
No license file was found, but licenses were detected in source scan.

```
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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/*
New style messages. This file only contains the messages in English, but no
information about which file, line, or column it occurred in.
The location and message ids are taken out of the formats directory.
		Kay Roepke
*/
group en_US;

// TOOL ERRORS
// file errors
CANNOT_WRITE_FILE(arg,exception,stackTrace) ::= <<
cannot write file <arg>: <exception>
<stackTrace; separator="\n">
>>
CANNOT_CLOSE_FILE(arg,exception,stackTrace) ::= "cannot close file <arg>: <exception>"
CANNOT_FIND_TOKENS_FILE(arg) ::= "cannot find tokens file <arg>"
ERROR_READING_TOKENS_FILE(arg,exception,stackTrace) ::= <<
problem reading token vocabulary file <arg>: <exception>
<stackTrace; separator="\n">
>>
DIR_NOT_FOUND(arg,exception,stackTrace) ::= "directory not found: <arg>"
OUTPUT_DIR_IS_FILE(arg,exception,stackTrace) ::= "output directory is a file: <arg>"
CANNOT_OPEN_FILE(arg,exception,stackTrace) ::= "cannot find or open file: <arg><if(exception)>; reason:
<exception><endif>"
CIRCULAR_DEPENDENCY() ::= "your grammars contain a circular dependency and cannot be sorted into a valid
build order."

INTERNAL_ERROR(arg,arg2,exception,stackTrace) ::= <<
internal error: <arg> <arg2><if(exception)>: <exception><endif>
<stackTrace; separator="\n">
>>
INTERNAL_WARNING(arg) ::= "internal warning: <arg>"
ERROR_CREATING_ARTIFICIAL_RULE(arg,exception,stackTrace) ::= <<
problems creating lexer rule listing all tokens: <exception>
<stackTrace; separator="\n">
>>
TOKENS_FILE_SYNTAX_ERROR(arg,arg2) ::=
 "problems parsing token vocabulary file <arg> on line <arg2>"
CANNOT_GEN_DOT_FILE(arg,exception,stackTrace) ::=
 "cannot write DFA DOT file <arg>: <exception>"
BAD_ACTION_AST_STRUCTURE(exception,stackTrace) ::=
 "bad internal tree structure for action '<arg>': <exception>"
BAD_AST_STRUCTURE(arg,exception,stackTrace) ::= <<
bad internal tree structure '<arg>': <exception>
<stackTrace; separator="\n">
>>
FILE_AND_GRAMMAR_NAME_DIFFER(arg,arg2) ::=
 "file <arg2> contains grammar <arg>; names must be identical"
FILENAME_EXTENSION_ERROR(arg) ::=
 "file <arg> must end in a file extension, normally .g"

// code gen errors
MISSING_CODE_GEN_TEMPLATES(arg) ::=
 "cannot find code generation templates <arg>.stg"
MISSING_CYCLIC_DFA_CODE_GEN_TEMPLATES() ::=
 "cannot find code generation cyclic DFA templates for language <arg>"
CODE_GEN_TEMPLATES_INCOMPLETE(arg) ::=
 "at least one code generation template missing for language <arg>"
CANNOT_CREATE_TARGET_GENERATOR(arg,exception,stackTrace) ::=
 "cannot create target <arg> code generator: <exception>"
STRING_TEMPLATE_ERROR(arg,exception,stackTrace) ::=
 "template error: <arg>"
CANNOT_COMPUTE_SAMPLE_INPUT_SEQ() ::=
 "cannot generate a sample input sequence from lookahead DFA"

// grammar interpretation errors
/*
NO_VIABLE_DFA_ALT(arg,arg2) ::=
 "no viable transition from state <arg> on <arg2> while interpreting DFA"
*/

// GRAMMAR ERRORS
SYNTAX_ERROR(arg) ::= "syntax error: <arg>"
RULE_REDEFINITION(arg) ::=
 "rule <arg> redefinition"
LEXER_RULES_NOT_ALLOWED(arg) ::=
 "lexer rule <arg> not allowed in parser"
PARSER_RULES_NOT_ALLOWED(arg) ::=
 "parser rule <arg> not allowed in lexer"
CANNOT_FIND_ATTRIBUTE_NAME_IN_DECL(arg) ::=
 "cannot find an attribute name in attribute declaration"
NO_TOKEN_DEFINITION(arg) ::=
 "no lexer rule corresponding to token: <arg>"
UNDEFINED_RULE_REF(arg) ::=
 "reference to undefined rule: <arg>"
LITERAL_NOT_ASSOCIATED_WITH_LEXER_RULE(arg) ::=
 "literal has no associated lexer rule: <arg>"
CANNOT_ALIAS_TOKENS_IN_LEXER(arg) ::=
 "literals are illegal in lexer tokens{} section: <arg>"
```

```
ATTRIBUTE_REF_NOT_IN_RULE(arg,arg2) ::=
 "reference to attribute outside of a rule: <arg><if(arg2)>.<arg2><endif>"
UNKNOWN_ATTRIBUTE_IN_SCOPE(arg,arg2) ::=
 "unknown attribute for <arg>: <arg2>"
UNKNOWN_RULE_ATTRIBUTE(arg,arg2) ::=
 "unknown attribute for rule <arg>: <arg2>"
UNKNOWN_SIMPLE_ATTRIBUTE(arg,args2) ::=
 "attribute is not a token, parameter, or return value: <arg>"
ISOLATED_RULE_SCOPE(arg) ::=
 "missing attribute access on rule scope: <arg>"
INVALID_RULE_PARAMETER_REF(arg,arg2) ::=
 "cannot access rule <arg>'s parameter: <arg2>"
INVALID_RULE_SCOPE_ATTRIBUTE_REF(arg,arg2) ::=
 "cannot access rule <arg>'s dynamically-scoped attribute: <arg2>"
SYMBOL_CONFLICTS_WITH_GLOBAL_SCOPE(arg) ::=
 "symbol <arg> conflicts with global dynamic scope with same name"
WRITE_TO_READONLY_ATTR(arg,arg2,arg3) ::=
 "cannot write to read only attribute: $<arg><if(arg2)>.<arg2><endif>"
LABEL_CONFLICTS_WITH_RULE(arg) ::=
 "label <arg> conflicts with rule with same name"
LABEL_CONFLICTS_WITH_TOKEN(arg) ::=
 "label <arg> conflicts with token with same name"
LABEL_CONFLICTS_WITH_RULE_SCOPE_ATTRIBUTE(arg,arg2) ::=
 "label <arg> conflicts with rule <arg2>'s dynamically-scoped attribute with same name"
LABEL_CONFLICTS_WITH_RULE_ARG_RETVAL(arg,arg2) ::=
 "label <arg> conflicts with rule <arg2>'s return value or parameter with same name"
ATTRIBUTE_CONFLICTS_WITH_RULE(arg,arg2) ::=
 "rule <arg2>'s dynamically-scoped attribute <arg> conflicts with the rule name"
ATTRIBUTE_CONFLICTS_WITH_RULE_ARG_RETVAL(arg,arg2) ::=
 "rule <arg2>'s dynamically-scoped attribute <arg> conflicts with<arg2>'s return value or parameter with same name"
LABEL_TYPE_CONFLICT(arg,arg2) ::=
 "label <arg> type mismatch with previous definition: <arg2>"
ARG_RETVAL_CONFLICT(arg,arg2) ::=
 "rule <arg2>'s argument <arg> conflicts a return value with same name"
NONUNIQUE_REF(arg) ::=
 "<arg> is a non-unique reference"
FORWARD_ELEMENT_REF(arg) ::=
 "illegal forward reference: <arg>"
MISSING_RULE_ARGS(arg) ::=
 "missing parameter(s) on rule reference: <arg>"
RULE_HAS_NO_ARGS(arg) ::=
 "rule <arg> has no defined parameters"
ARGS_ON_TOKEN_REF(arg) ::=
 "token reference <arg> may not have parameters"
ILLEGAL_OPTION(arg) ::=
 "illegal option <arg>"
LIST_LABEL_INVALID_UNLESS_RETVAL_STRUCT(arg) ::=
 "rule '+=' list labels are not allowed w/o output option: <arg>"
UNDEFINED_TOKEN_REF_IN_REWRITE(arg) ::=
 "reference to undefined token in rewrite rule: <arg>"
REWRITE_ELEMENT_NOT_PRESENT_ON_LHS(arg) ::=
 "reference to rewrite element <arg> without reference on left of ->"
UNDEFINED_LABEL_REF_IN_REWRITE(arg) ::=
 "reference to undefined label in rewrite rule: $<arg>"
NO_GRAMMAR_START_RULE (arg) ::=
 "grammar <arg>: no start rule (no rule can obviously be followed by EOF)"
EMPTY_COMPLEMENT(arg) ::= <<
<if(arg)>
set complement ~<arg> is empty
<else>
set complement is empty
<endif>
>>
UNKNOWN_DYNAMIC_SCOPE(arg) ::=
 "unknown dynamic scope: <arg>"
UNKNOWN_DYNAMIC_SCOPE_ATTRIBUTE(arg,arg2) ::=
 "unknown dynamically-scoped attribute for scope <arg>: <arg2>"
RULE_REF_AMBIG_WITH_RULE_IN_ALT(arg) ::=
 "reference $<arg> is ambiguous; rule <arg> is enclosing rule and referenced in the production (assuming enclosing rule)"
ISOLATED_RULE_ATTRIBUTE(arg) ::=
 "reference to locally-defined rule scope attribute without rule name: <arg>"
INVALID_ACTION_SCOPE(arg,arg2) ::=
 "unknown or invalid action scope for <arg2> grammar: <arg>"
ACTION_REDEFINITION(arg) ::=
 "redefinition of <arg> action"
DOUBLE_QUOTES_ILLEGAL(arg) ::=
 "string literals must use single quotes (such as \'begin\'): <arg>"
INVALID_TEMPLATE_ACTION(arg) ::=
 "invalid StringTemplate % shorthand syntax: '<arg>'"
MISSING_ATTRIBUTE_NAME() ::=
 "missing attribute name on $ reference"
ARG_INIT_VALUES_ILLEGAL(arg) ::=
 "rule parameters may not have init values: <arg>"
REWRITE_OR_OP_WITH_NO_OUTPUT_OPTION(arg) ::=
 "<if(arg)>rule <arg> uses <endif>rewrite syntax or operator with no output option; setting output=AST"
AST_OP_WITH_NON_AST_OUTPUT_OPTION(arg) ::=
 "AST operator with non-AST output option: <arg>"
NO_RULES(arg) ::= "grammar file <arg> has no rules"
MISSING_AST_TYPE_IN_TREE_GRAMMAR(arg) ::=
 "tree grammar <arg> has no ASTLabelType option"
REWRITE_FOR_MULTI_ELEMENT_ALT(arg) ::=
 "with rewrite=true, alt <arg> not simple node or obvious tree element; text attribute for rule not guaranteed to be correct"
RULE_INVALID_SET(arg) ::=
 "Cannot complement rule <arg>; not a simple set or element"
HETERO_ILLEGAL_IN_REWRITE_ALT(arg) ::=
 "alts with rewrites can't use heterogeneous types left of ->"
NO_SUCH_GRAMMAR_SCOPE(arg,arg2) ::=
 "reference to undefined grammar in rule reference: <arg>.<arg2>"
NO_SUCH_RULE_IN_SCOPE(arg,arg2) ::=
 "rule <arg2> is not defined in grammar <arg>"
TOKEN_ALIAS_CONFLICT(arg,arg2) ::=
 "cannot alias <arg>; string already assigned to <arg2>"
TOKEN_ALIAS_REASSIGNMENT(arg,arg2) ::=
 "cannot alias <arg>; token name already assigned to <arg2>"
TOKEN_VOCAB_IN_DELEGATE(arg,arg2) ::=
 "tokenVocab option ignored in imported grammar <arg>"
INVALID_IMPORT(arg,arg2) ::=
 "<arg.grammarTypeString> grammar <arg.name> cannot import <arg2.grammarTypeString> grammar
<arg2.name>"
IMPORTED_TOKENS_RULE_EMPTY(arg,arg2) ::=
 "no lexer rules contributed to <arg> from imported grammar <arg2>"
IMPORT_NAME_CLASH(arg,arg2) ::=
 "combined grammar <arg.name> and imported <arg2.grammarTypeString> grammar <arg2.name> both generate
<arg2.recognizerName>; import ignored"
AST_OP_IN_ALT_WITH_REWRITE(arg,arg2) ::=
 "rule <arg> alt <arg2> uses rewrite syntax and also an AST operator"
WILDCARD_AS_ROOT(arg) ::= "Wildcard invalid as root; wildcard can itself be a tree"
CONFLICTING_OPTION_IN_TREE_FILTER(arg,arg2) ::= "option <arg>=<arg2> conflicts with tree grammar
filter mode"
ILLEGAL_OPTION_VALUE(arg, arg2) ::= "value '<arg2>' invalid for option <arg>"
ALL_OPS_NEED_SAME_ASSOC(arg) ::= "all operators of alt <alt> of left-recursive rule must have same
associativity"
RANGE_OP_ILLEGAL(arg) ::= "the .. range operator isn't allowed in parser rules"

// GRAMMAR WARNINGS

GRAMMAR_NONDETERMINISM(input,conflictingAlts,paths,disabled,hasPredicateBlockedByAction) ::=
<<
<if(paths)>
Decision can match input such as "<input>" using multiple alternatives:
<paths:{ it |  alt <it.alt> via NFA path <it.states; separator=","><\n>}>
<else>
Decision can match input such as "<input>" using multiple alternatives: <conflictingAlts; separator=", ">
<endif>
<if(disabled)><\n>As a result, alternative(s) <disabled; separator=","> were disabled for that
input<endif><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by
actions.<endif>
>>

DANGLING_STATE(danglingAlts,input) ::= <<
the decision cannot distinguish between alternative(s) <danglingAlts; separator=","> for input such as "<input>"
```

>>

UNREACHABLE_ALTS(alts) ::= <<
The following alternatives can never be matched: <alts; separator=","><\n>
>>

INSUFFICIENT_PREDICATES(upon,altToLocations,hasPredicateBlockedByAction) ::= <<
Input such as "<upon>" is insufficiently covered with predicates at locations: <altToLocations.keys:{alt|alt <alt>: <altToLocations.(alt):{loc| line <loc.line>:<loc.column> at <loc.text>}; separator=", ">}; separator=", "><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by actions.<endif>
>>

DUPLICATE_SET_ENTRY(arg) ::=
 "duplicate token type <arg> when collapsing subrule into set"

ANALYSIS_ABORTED(enclosingRule) ::= <<
ANTLR could not analyze this decision in rule <enclosingRule>; often this is because of recursive rule references visible from the left edge of alternatives.  ANTLR will re-analyze the decision with a fixed lookahead of k=1.
Consider using "options {k=1;}" for that decision and possibly adding a syntactic predicate.
>>

RECURSION_OVERLOW(alt,input,targetRules,callSiteStates) ::= <<
Alternative <alt>: after matching input such as <input> decision cannot predict what comes next due to recursion overflow <targetRules,callSiteStates:{t,c|to <t> from <c:{s|<s.enclosingRule.name>};separator=", ">}; separator=" and ">
>>

LEFT_RECURSION(targetRules,alt,callSiteStates) ::= <<
Alternative <alt> discovers infinite left-recursion <targetRules,callSiteStates:{t,c|to <t> from <c:{s|<s.enclosingRule>};separator=", ">}; separator=" and ">
>>

UNREACHABLE_TOKENS(tokens) ::= <<
The following token definitions can never be matched because prior tokens match the same input: <tokens; separator=",">
>>

TOKEN_NONDETERMINISM(input,conflictingTokens,paths,disabled,hasPredicateBlockedByAction) ::=
<<
<if(paths)>
Decision can match input such as "<input>" using multiple alternatives:
<paths:{ it | alt <it.alt> via NFA path <it.states; separator=","><\n>}>
<else>
Multiple token rules can match input such as "<input>": <conflictingTokens; separator=", "><\n>
<endif>
<if(disabled)><\n>As a result, token(s) <disabled; separator=","> were disabled for that input<endif><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by actions.<endif>

```
>>

LEFT_RECURSION_CYCLES(listOfCycles) ::= <<
The following sets of rules are mutually left-recursive <listOfCycles:{c| [<c:{r|<r.name>}; separator=", ">]}; separator=" and ">
>>

NONREGULAR_DECISION(ruleName,alts) ::= <<
[fatal] rule <ruleName> has non-LL(*) decision due to recursive rule invocations reachable from alts <alts; separator=",">.  Resolve by left-factoring or using syntactic predicates or using backtrack=true option.
>>

/* l10n for message levels */
warning() ::= "warning"
error() ::= "error"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/templates/messages/languages/en.stg
No license file was found, but licenses were detected in source scan.

```
/** ANTLR's code generator.
*
*  Generate recognizers derived from grammars.  Language independence
*  achieved through the use of STGroup objects.  All output
*  strings are completely encapsulated in the group files such as Java.stg.
*  Some computations are done that are unused by a particular language.
*  This generator just computes and sets the values into the templates;
*  the templates are free to use or not use the information.
*
*  To make a new code generation target, define X.stg for language X
*  by copying from existing Y.stg most closely releated to your language;
*  e.g., to do CSharp.stg copy Java.stg.  The template group file has a
*  bunch of templates that are needed by the code generator.  You can add
*  a new target w/o even recompiling ANTLR itself.  The language=X option
*  in a grammar file dictates which templates get loaded/used.
*
*  Some language like C need both parser files and header files.  Java needs
*  to have a separate file for the cyclic DFA as ANTLR generates bytecodes
*  directly (which cannot be in the generated parser Java file).  To facilitate
*  this,
*
* cyclic can be in same file, but header, output must be searpate.  recognizer
*  is in outptufile.
*/
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CodeGenerator.java
No license file was found, but licenses were detected in source scan.

/*
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```
/*
New style messages. This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

group antlr;

location(file, line, column) ::= "<file>(<line>,<column>)"

message(id, text) ::= "error <id> : <text>"

report(location, message, type) ::= "<location> : <type> <message.id> : <message.text>"

wantsSingleLineMessage() ::= "true"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/templates/messages/formats/vs2005.stg
No license file was found, but licenses were detected in source scan.

group Dbg;

```
@parserBody.mixins() ::= <<
include ANTLR3::<if(profile)>Profile<else>Debug<endif>::ParserEvents
>>



@parserBody.additionalMembers() ::= <<
<if(grammar.grammarIsRoot)>
RULE_NAMES = [
 :invalid_rule, <grammar.allImportedRules:{rST|:<rST.name>}; wrap="\n  ", separator=", ">
].freeze
<endif>
>>



@rule.body() ::= <<
in_rule(grammar_file_name, "<ruleName>") do
 @debug_listener.location(<ruleDescriptor.tree.line>, <ruleDescriptor.tree.column>)

 <@super.body()>

 @debug_listener.location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.column>)
end
>>



// Common debug event triggers used by region overrides below
enterSubRule() ::= <<
in_subrule(<decisionNumber>) do<\n>
>>



exitSubRule() ::= <<
end<\n>
>>



enterDecision() ::= <<
```

```
in_decision(<decisionNumber>) do<\n>
>>


exitDecision() ::= <<
end<\n>
>>


enterAlt(n) ::= <<
in_alternative(<n>)<\n>
>>


// Region overrides that tell various constructs to add debugging triggers
@block.body() ::= <<
in_subrule(<decisionNumber>) do
 <@super.body()>
end
>>


// @blockBody.predecision() ::= "<enterSubRule()>"
// @blockBody.postdecision() ::= "<exitDecision()>"
// @blockBody.postbranch() ::= "<exitSubRule()>"
@blockBody.decision() ::= <<
in_decision(<decisionNumber>) do
 <@super.decision()>
end
>>


@ruleBlock.decision() ::= <<
in_decision(<decisionNumber>) do
 <@super.decision()>
end<\n>
>>


@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n={1})>"


@blockSingleAlt.prealt() ::= "<enterAlt(n={1})>"


@positiveClosureBlock.loopBody() ::= <<
in_subrule(<decisionNumber>) do
 <@super.loopBody()>
```

```
end
>>


@positiveClosureBlockLoop.decisionBody() ::= <<
in_decision(<decisionNumber>) do
 <@super.decisionBody()>
end
>>


@positiveClosureBlockLoop.earlyExitException() ::= <<
@debug_listener.recognition_exception(eee)
>>


@closureBlock.loopBody() ::= <<
in_subrule(<decisionNumber>) do
 <@super.loopBody()>
end
>>


@closureBlockLoop.decisionBody() ::= <<
in_decision(<decisionNumber>) do
 <@super.decisionBody()>
end
>>


@altSwitchCase.prealt() ::= "<enterAlt(altNum)>"  // altNum is arg of altSwitchCase


element(e) ::= <<
@debug_listener.location(<e.line>, <e.pos>) // e is arg of element
<super.element(e)>
>>


@matchSet.mismatchedSetException() ::= "@debug_listener.recognition_exception(mse)"


@dfaState.noViableAltException() ::= <<
nvae = NoViableAlternative( "<description>", <decisionNumber>, <stateNumber> )
@debug_listener.recognition_exception( nvae )
raise( nvae )<\n>
>>
```

```
@dfaStateSwitch.noViableAltException() ::= <<
nvae = NoViableAlternative( "<description>", <decisionNumber>, <stateNumber> )
@debug_listener.recognition_exception( nvae )
raise( nvae )<\n>
>>

dfaDecision(decisionNumber,description) ::= <<
begin
 @state.cyclic_decision = true
 <super.dfaDecision(...)>
rescue ANTLR3::Error::NoViableAlternative => nvae
 @debug_listener.recognition_exception(nvae)
 raise
end
>>



@cyclicDFA.errorMethod() ::= <<
def error(nvae)
 @recognizer.debug_listener.recognition_exception(nvae)
 super
end
>>
/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
predicate?("<description>") { <pred> }
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Ruby/Dbg.stg

No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/RubyTarget.java
No license file was found, but licenses were detected in source scan.

```
/** Add an adaptor property that knows how to build trees */
@headerFile.members() ::= <<
```

```
/* @headerFile.members() */
pANTLR3_BASE_TREE_ADAPTOR adaptor;
pANTLR3_VECTOR_FACTORY  vectors;
/* End @headerFile.members() */
>>

/** Install the tree adaptor interface pointer and anything else that
*  tree parsers and producers require.
*/
@genericParser.apifuncs() ::= <<
<if(PARSER)>
ADAPTOR = ANTLR3_TREE_ADAPTORNew(instream->tstream->tokenSource->strFactory);<\n>
<endif>
ctx->vectors = antlr3VectorFactoryNew(0);
>>

@genericParser.cleanup() ::= <<
ctx->vectors->close(ctx->vectors);
<if(PARSER)>
/* We created the adaptor so we must free it
*/
ADAPTOR->free(ADAPTOR);
<endif>
>>

@returnScope.ruleReturnMembers() ::= <<

<super.ASTLabelType()> tree;

>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0;<\n>
>>

ruleInitializations() ::= <<
<super.ruleInitializations()>
root_0 = NULL;<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{it | <ASTLabelType> <it.label.text>_tree;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> <it.label.text>_tree;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
   :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;}; separator="\n">
```

```
<ruleDescriptor.allRuleRefsInAltsWithRewrites
   :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM stream_<it>;}; separator="\n">
>>

/* Note that we defer the actual creation of any rewrite streams we need here and just initialize
* them to NULL. This saves creating huge numbers of rewrite streams that cannot be used as only
* one alt will be taken in a rule, but we are declaring all the streams here. So we define
* a macro that conatins the create code, then use this macro later to check if the stream
* has been created yet. Checking for NULL is almost free in C.
*/
ruleLabelInitializations() ::= <<
<super.ruleLabelInitializations()>
<ruleDescriptor.tokenLabels:{it | <it.label.text>_tree   = NULL;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <it.label.text>_tree   = NULL;}; separator="\n">

<ruleDescriptor.allTokenRefsInAltsWithRewrites
:{it | stream_<it>   = NULL;
#define CREATE_stream_<it>  if (stream_<it> == NULL) {stream_<it> =
antlr3RewriteRule<rewriteElementType>StreamNewAE(ADAPTOR, RECOGNIZER, (pANTLR3_UINT8)"token
<it>"); \} }; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
:{it | stream_<it>   = NULL;
#define CREATE_stream_<it>  if (stream_<it> == NULL) {stream_<it> =
antlr3RewriteRuleSubtreeStreamNewAE(ADAPTOR, RECOGNIZER, (pANTLR3_UINT8)"rule <it>"); \}};
separator="\n">

<if(ruleDescriptor.hasMultipleReturnValues)>
retval.tree  = NULL;
<endif>
>>



/**  a rule label including default value */
ruleLabelInitVal(label) ::= <<
<super.ruleLabelInitVal(...)>
<label.label.text>.tree = NULL;
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<endif>
<endif>
```

```
>>

@alt.initializations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));<\n>
<endif>
<endif>
<endif>
>>


// Tracking Rule Elements
//
/** ID but track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<token>;
stream_<token>->add(stream_<token>, <label>, NULL);<if(backtracking)> }<endif><\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>CREATE_stream_<token>; stream_<token>-
>add(stream_<token>, <label>, NULL);<if(backtracking)> }<endif><\n>
>>

wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<rule.name>;
stream_<rule.name>->add(stream_<rule.name>, <label>.tree, NULL);<if(backtracking)> }<endif>
>>
```

```
/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelTrack(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<rule.name>;
stream_<rule.name>->add(stream_<rule.name>, <label>.tree, NULL);<if(backtracking)> }<endif>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelAST(...)>
>>


// RULE REF AST



/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>


/* How to accumulate lists when we are doing rewrite tracking...
*/
listLabelTrack(label) ::= <<
/* listLabelTrack(label)
*/
if (list_<label> == NULL)
{
  list_<label>=ctx->vectors->newVector(ctx->vectors);
}
list_<label>->add(list_<label>, <label>.tree, NULL);
>>

/* How to accumulate lists of rule outputs (only allowed with AST
* option but if the user is going to walk the tree, they will want
* all their custom elements from rule returns.
*
* Normally, we use inline structures (which the compiler lays down
* code to copy from heap allocations. However, here we want to accumulate copies
* of the returned structures because we are adding them to a list. This only makes sense if the
* grammar is not rewriting the tree as a tree rewrite only preserves the tree, not the object/structure
* returned from the rule. The rewrite will extract the tree pointer. However, if we are not going to
* do a tree re-write, then the user may wish to iterate the structures returned by the rule in
* action code and will expect the user defined returns[] elements to be available when they do this.
* Hence we cannot just preserve the tree that was returned. So, we must copy the local structure and provide
* a function that can free the allocated space. We cannot know how to free user allocated elements and
* presume that the user will know to do this using their own factories for the structures they allocate.
*/
listLabelAST(label) ::= <<
if (list_<label> == NULL)
{
   list_<label>=ctx->vectors->newVector(ctx->vectors);
}
{
   RETURN_TYPE_<label> * tcopy;

   tcopy = (RETURN_TYPE_<label> *)ANTLR3_MALLOC(sizeof(RETURN_TYPE_<label>)); /* Note no
memory allocation checks! */
   ANTLR3_MEMCPY((void *)(tcopy), (const void *)&<label>, sizeof(RETURN_TYPE_<label>));
   list_<label>->add(list_<label>, (void *)tcopy, freeScope);  /* Add whatever the return type is */<\n>
}
>>

// Rewrite

rewriteCode(
 alts,
 description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
   referencedWildcardListLabels,
 rewriteBlockLevel,
 enclosingTreeLevel,
 treeLevel) ::=
<<

/* AST REWRITE
* elements          : <referencedElementsDeep; separator=", ">
* token labels      : <referencedTokenLabels; separator=", ">
* rule labels       : <referencedRuleLabels; separator=", ">
* token list labels : <referencedTokenListLabels; separator=", ">
* rule list labels  : <referencedRuleListLabels; separator=", ">
```

```
*/
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) <\n>
<endif>
{
 <rewriteCodeLabelsDecl()>
 <rewriteCodeLabelsInit()>
 root_0       = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
 <prevRuleRootRef()>.tree    = root_0;
 <alts:rewriteAlt(); separator="else ">
 <if(TREE_PARSER)>
 <if(rewriteMode)>
 <prevRuleRootRef()>.tree = (<ASTLabelType>)(ADAPTOR->rulePostProcessing(ADAPTOR, root_0));
 INPUT->replaceChildren(INPUT, ADAPTOR->getParent(ADAPTOR, retval.start),
                    ADAPTOR->getChildIndex(ADAPTOR, retval.start),
                    ADAPTOR->getChildIndex(ADAPTOR, _last),
                    retval.tree);
 <endif>
 <endif>
 <prevRuleRootRef()>.tree = root_0; // set result root
 <rewriteCodeLabelsFree()>

}
>>

rewriteCodeLabelsDecl() ::= <<
<referencedTokenLabels
   :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;};
   separator="\n"
>
<referencedTokenListLabels
   :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;};
   separator="\n"
>
<referencedRuleLabels
   :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM stream_<it>;};
   separator="\n"
>
<referencedRuleListLabels
   :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM stream_<it>;};
   separator="\n"
>
>>

rewriteCodeLabelsInit() ::= <<
<referencedTokenLabels
:{it | stream_<it>=antlr3RewriteRule<rewriteElementType>StreamNewAEE(ADAPTOR,  RECOGNIZER,
(pANTLR3_UINT8)"token <it>", <it>);};
```

```
separator="\n"
>
<referencedTokenListLabels
:{it | stream_<it>=antlr3RewriteRule<rewriteElementType>StreamNewAEV(ADAPTOR,  RECOGNIZER,
(pANTLR3_UINT8)"token <it>", list_<it>); };
separator="\n"
>
<referencedRuleLabels
:{it | stream_<it>=antlr3RewriteRuleSubtreeStreamNewAEE(ADAPTOR,  RECOGNIZER,
(pANTLR3_UINT8)"token <it>", <it>.tree != NULL ? <it>.tree : NULL);};
separator="\n"
>
<referencedRuleListLabels
:{it | stream_<it>=antlr3RewriteRuleSubtreeStreamNewAEV(ADAPTOR,  RECOGNIZER,
(pANTLR3_UINT8)"token <it>", list_<it>);};
separator="\n"
>
>>
rewriteCodeLabelsFree() ::= <<
<referencedTokenLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>); };
separator="\n"
>
<referencedTokenListLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
separator="\n"
>
<referencedRuleLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
separator="\n"
>
<referencedRuleListLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
```

```
{
 if ( <referencedElementsDeep:{el | (stream_<el> != NULL && stream_<el>->hasNext(stream_<el>)) };
separator="|| "> )
 {
  <alt>
 }
 <referencedElementsDeep:{el | if ( stream_<el> != NULL) stream_<el>->reset(stream_<el>);<\n>}>
}<\n>
>>

rewriteClosureBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
{
 while ( <referencedElements:{el | (stream_<el> != NULL && stream_<el>->hasNext(stream_<el>)) }; separator="||
"> )
 {
  <alt>
 }
 <referencedElements:{el | if (stream_<el> != NULL) stream_<el>->reset(stream_<el>);<\n>}>
}<\n>
>>
RewriteEarlyExitException() ::=
<<
CONSTRUCTEX();
EXCEPTION->type         = ANTLR3_REWRITE_EARLY_EXCEPTION;
EXCEPTION->name         = (void *)ANTLR3_REWRITE_EARLY_EXCEPTION_NAME;
>>
rewritePositiveClosureBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
if (<referencedElements:{el | (stream_<el> == NULL || !stream_<el>->hasNext(stream_<el>)) }; separator="|| "> )
{
   <RewriteEarlyExitException()>
}
else
{
 while ( <referencedElements:{el | (stream_<el>->hasNext(stream_<el>)) }; separator="|| "> ) {
  <alt>
 }
 <referencedElements:{el | stream_<el>->reset(stream_<el>);<\n>}>
}
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
   <a.alt>
}<\n>
<else>
{
   <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = NULL; /* \<-- rewriteEmptyAlt()) */"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
   <ASTLabelType> root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
   <root:rewriteElement()>
   <children:rewriteElement()>
   ADAPTOR->addChild(ADAPTOR, root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextNode(stream_<label>));<\n>
```

```
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>->nextNode(stream_<label>));<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRootToken(ADAPTOR, stream_<label> == NULL ? NULL : stream_<label>->nextToken(stream_<label>), root_<treeLevel>));<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <createRewriteNodeFromElement(...)>, root_<treeLevel>));<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <createImaginaryNode(tokenType=token, ...)>, root_<treeLevel>));<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule,dup) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<rule> == NULL ? NULL : stream_<rule>->nextTree(stream_<rule>));<\n>
>>
```

```
rewriteRuleRefRoot(rule,dup) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, stream_<rule> == NULL ? NULL
: stream_<rule>->nextNode(stream_<rule>), root_<treeLevel>));<\n>
>>

rewriteNodeAction(action) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <action>, root_<treeLevel>));<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, stream_<label> == NULL ? NULL
: stream_<label>->nextNode(stream_<label>), root_<treeLevel>));<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot((<ASTLabelType>)(stream_<label> == NULL
? NULL : stream_<label>->nextNode(stream_<label>), root_<treeLevel>));<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
<terminalOptions.node>New(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
```

```
<if(args)>

#if <length(args)> == 2
 (<ASTLabelType>)ADAPTOR->createTypeTokenText(ADAPTOR, <tokenType>, TOKTEXT(<args; separator=",
">))
#else
 (<ASTLabelType>)ADAPTOR->createTypeText(ADAPTOR, <tokenType>, (pANTLR3_UINT8)<args;
separator=", ">)
#endif

<else>
(<ASTLabelType>)ADAPTOR->createTypeText(ADAPTOR, <tokenType>, (pANTLR3_UINT8)"<tokenType>")
<endif>
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(stream_<token>->nextToken(stream_<token>)<if(args)>, <args; separator=",
"><endif>)
<else>
<if(args)> <! must create new node from old !>

#if <length(args)> == 2
ADAPTOR->createTypeTokenText(ADAPTOR, <token>->getType(<token>, TOKTEXT(<token>, <args;
separator=", ">)) /* JIMI */
#else
ADAPTOR->createTypeToken(ADAPTOR, <token>->getType(<token>, <token>, <args; separator=", ">)
#endif

<else>
stream_<token> == NULL ? NULL : stream_<token>->nextNode(stream_<token>)
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/AST.stg
No license file was found, but licenses were detected in source scan.

/*
* [The "BSD license"]
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*

```
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr.StringTemplate;
using Antlr.StringTemplate.Language;
<if(!backtracking)>
using Hashtable = System.Collections.Hashtable;
<endif>

>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
private StringTemplate _st;
public StringTemplate Template { get { return _st; } set { _st = value; } }
public override string ToString() { return (Template==null) ? string.Empty : Template.ToString(); }
>>

@genericParser.members() ::= <<
<@super.members()>
protected StringTemplateGroup templateLib = new StringTemplateGroup("<name>Templates",
typeof(AngleBracketTemplateLexer) );
```

```
public StringTemplateGroup TemplateLib
{
 get { return this.templateLib; }
 set { this.templateLib = value; }
}

/// \<summary> Allows convenient multi-value initialization:
///  "new STAttrMap().Add(...).Add(...)"
/// \</summary>
protected class STAttrMap : Hashtable
{
 public STAttrMap Add(string attrName, object value)
 {
   base.Add(attrName, value);
   return this;
 }
 public STAttrMap Add(string attrName, int value)
 {
   base.Add(attrName, value);
   return this;
 }
}
>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Template",...)>
>>

rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> )
{
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>

replaceTextInLine() ::= <<
<if(TREE_PARSER)>
((TokenRewriteStream)input.TokenStream).Replace(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start),
 retval.Template);
<else>
((TokenRewriteStream)input).Replace(
 ((IToken)retval.Start).TokenIndex,
 input.LT(-1).TokenIndex,
 retval.Template);
<endif>
>>

rewriteTemplateAlt() ::= <<
// <it.description>
<if(it.pred)>
if (<it.pred>) {
   retval.Template = <it.alt>;
}<\n>
<else>
{
   retval.Template = <it.alt>;
}<\n>
<endif>
>>

rewriteEmptyTemplate(alts) ::= <<
null;
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <<
templateLib.GetInstanceOf("<name>"<if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <<
templateLib.GetInstanceOf(<expr><if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>

/** Invoke an inline template with a set of attribute name/value pairs */
```

```
rewriteInlineTemplate(args, template) ::= <<
new StringTemplate(templateLib, "<template>"<if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>).SetAttribute("<attrName>",<expr>);
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
new StringTemplate(templateLib,<stringExpr>)
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp2/ST.stg
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```
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* THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
* (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType> _first_0 = default(<ASTLabelType>);
<ASTLabelType> _last = default(<ASTLabelType>);
<endif>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(rewriteMode)>
retval.Tree = (<ASTLabelType>)_first_0;
if (adaptor.GetParent(retval.Tree)!=null && adaptor.IsNil(adaptor.GetParent(retval.Tree)))
   retval.Tree = (<ASTLabelType>)adaptor.GetParent(retval.Tree);
<endif>
<if(backtracking)>}<endif>
<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
```

```
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = default(<ASTLabelType>);
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(root.el.rule)>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>.Tree;
<else>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down) {
   Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
   <children:element()>
   Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}
<else>
<super.tree(...)>
<endif>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
```

```
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.tokenRef(...)>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
```

```
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.text)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.DupTree(<label>);
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>
```

```
// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSet(...)>
<endif>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
<else>
<super.matchSetBang(...)>
<endif>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(!ruleDescriptor.isSynPred)>
```

```
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<treeLevel>, <label>.Tree);
<else> <! rewrite mode !>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>.Tree;
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefAndListLabel(...)>
<endif>
```

```
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
<endif>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
<else>
<super.ruleRefTrack(...)>
<endif>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
```

```
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRuleRootTrack(...)>
<endif>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>

/** Streams for token refs are tree nodes now; override to
*  change NextToken to NextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,args) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif>stream_<token>.NextNode())
<else>
stream_<token>.NextNode()
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp2/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

```
*/

/** The API version of the runtime that recognizers generated by this runtime
*  need.
*/
apiVersion() ::= "1"

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
           docComment, recognizer,
           name, tokens, tokenNames, rules, cyclicDFAs,
           bitsets, buildTemplate, buildAST, rewriteMode, profile,
           backtracking, synpreds, memoize, numRules,
           fileName, ANTLRVersion, generatedTimestamp, trace,
           scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
import sys
from antlr3 import *
<if(TREE_PARSER)>
```

```
from antlr3.tree import *<\n>
<endif>
<@end>

<actions.(actionScope).header>

<! <docComment> !>

# for convenience in actions
HIDDEN = BaseRecognizer.HIDDEN

# token types
<tokens:{it | <it.name>=<it.type>}; separator="\n">

# token names
tokenNamesMap = {
  0: "\<invalid>", 1: "\<EOR>", 2: "\<DOWN>", 3: "\<UP>",
  <tokens:{it | <it.type>: "<it.name>"}; wrap, separator=", ">
}
Token.registerTokenNamesMap(tokenNamesMap)

<recognizer>

<if(actions.(actionScope).main)>
<actions.(actionScope).main>
<else>
def main(argv, stdin=sys.stdin, stdout=sys.stdout, stderr=sys.stderr):
<if(LEXER)>
  from antlr3.main import LexerMain
  main = LexerMain(<recognizer.name>)<\n>
<endif>
<if(PARSER)>
  from antlr3.main import ParserMain
  main = ParserMain("<recognizer.grammar.name>Lexer", <recognizer.name>)<\n>
<endif>
<if(TREE_PARSER)>
  from antlr3.main import WalkerMain
  main = WalkerMain(<recognizer.name>)<\n>
<endif>
  main.stdin = stdin
  main.stdout = stdout
  main.stderr = stderr
  main.execute(argv)<\n>
<endif>

<actions.(actionScope).footer>

if __name__ == '__main__':
    main(sys.argv)

>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode,
      labelType="CommonToken", superClass="Lexer") ::= <<
<if(grammar.directDelegates)>
# path hack to allow absolute import of related grammars.
from os.path import dirname
__path__ = [dirname(__file__)]
del dirname

<grammar.directDelegates:
{g|from .<g.recognizerName> import <g.recognizerName>}; separator="\n">
<endif>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
    <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>

    grammarFileName = "<fileName>"
    api_version = <apiVersion()>

    def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input=None, state=None):
        if state is None:
            state = RecognizerSharedState()
        super().__init__(input, state)

<if(memoize)>
<if(grammar.grammarIsRoot)>
        self._state.ruleMemo = {}
<endif>
<endif>

        <grammar.directDelegates:
         {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input, state)}; separator="\n">
        <grammar.directDelegates:
         {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>}; separator="\n">}; separator="\n">
        <grammar.delegators:
         {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
        <last(grammar.delegators):
         {g|self.gParent = <g:delegateName()>}; separator="\n">
        self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

        <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">

        <actions.lexer.init>
```

```
   <actions.lexer.members>



<if(filterMode)>
   <filteringNextToken()>
<endif>
   <rules; separator="\n\n">

   <synpreds:{p | <lexerSynpred(p)>}>

   <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>



>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
def nextToken(self):
   while True:
       if self.input.LA(1) == EOF:
           return self.makeEOFToken()

       self._state.token = None
       self._state.channel = DEFAULT_CHANNEL
       self._state.tokenStartCharIndex = self.input.index()
       self._state.tokenStartCharPositionInLine = self.input.charPositionInLine
       self._state.tokenStartLine = self.input.line
       self._state._text = None
       try:
           m = self.input.mark()
           try:
               # means we won't throw slow exception
               self._state.backtracking = 1
               try:
                   self.mTokens()
               finally:
                   self._state.backtracking = 0

           except BacktrackingFailed:
               # mTokens backtracks with synpred at backtracking==2
               # and we set the synpredgate to allow actions at level 1.
```

```
                self.input.rewind(m)
                self.input.consume() # advance one char and try again

            else:
                self.emit()
                return self._state.token

        except RecognitionException as re:
            # shouldn't happen in backtracking mode, but...
            self.reportError(re)
            self.recover(re)



def memoize(self, input, ruleIndex, ruleStartIndex, success):
    if self._state.backtracking > 1:
        # is Lexer always superclass?
        super().memoize(input, ruleIndex, ruleStartIndex, success)



def alreadyParsedRule(self, input, ruleIndex):
    if self._state.backtracking > 1:
        return super().alreadyParsedRule(input, ruleIndex)
    return False



>>

actionGate() ::= "self._state.backtracking == 0"

filteringActionGate() ::= "self._state.backtracking == 1"

/** How to generate a parser */

genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass, labelType, members,
              rewriteElementType, filterMode, init, ASTLabelType="Object") ::= <<
# token names
tokenNames = [
    "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>",
    <tokenNames; wrap, separator=", ">
]

<scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScopeClass(scope=it)><endif>}>

<if(grammar.directDelegates)>
# path hack to allow absolute import of related grammars.
from os.path import dirname
__path__ = [dirname(__file__)]
```

```
del dirname

<grammar.directDelegates:
{g|from .<g.recognizerName> import <g.recognizerName>}; separator="\n">
<endif>

<rules:{it|<ruleAttributeScopeClass(scope=it.ruleDescriptor.ruleScope)>}>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
  grammarFileName = "<fileName>"
  api_version = <apiVersion()>
  tokenNames = tokenNames

  def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input, state=None, *args, **kwargs):
      if state is None:
          state = RecognizerSharedState()

      <@args()>
      super().__init__(input, state, *args, **kwargs)

<if(memoize)>
<if(grammar.grammarIsRoot)>
      self._state.ruleMemo = {}
<endif>
<endif>

      <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">

      <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeStack(scope=it)><endif>}>
      <rules:{it | <ruleAttributeScopeStack(scope=it.ruleDescriptor.ruleScope)>}>

      <init>

      <grammar.delegators:
       {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
      <grammar.directDelegates:
       {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
      <grammar.directDelegates:
       {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
      <last(grammar.delegators):
       {g|self.gParent = self.<g:delegateName()>}; separator="\n">
      self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

      <@init><@end>
  <@members><@end>

  <members>

  <rules; separator="\n\n">

  <! generate rule/method definitions for imported rules so they
     appear to be defined in this recognizer. !>
  <grammar.delegatedRules:{ruleDescriptor| <delegateRule(ruleDescriptor)> }; separator="\n">

  <synpreds:{p | <synpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

  <bitsets:{it | FOLLOW_<it.name>_in_<it.inName><it.tokenIndex> = frozenset([<it.tokenTypes:{it |
<it>};separator=", ">])<\n>}>

>>

delegateRule(ruleDescriptor) ::= <<
def <ruleDescriptor.name>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<\ >   <if(ruleDescriptor.hasReturnValue)>return
<endif>self.<ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)
><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>)



>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
     ASTLabelType="Object", superClass="Parser", labelType="Token",
     members={<actions.parser.members>},
     init={<actions.parser.init>}
     ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
           bitsets, "TokenStream", superClass,
           labelType, members, "Token",
           false, init, ASTLabelType)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
         numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>},
         init={<actions.treeparser.init>}
         ) ::= <<
```

```
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TreeNodeStream", superClass,
            labelType, members, "Node",
            filterMode, init, ASTLabelType)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start "<ruleName>"
def <ruleName>_fragment(self, <ruleDescriptor.parameterScope:parameterScope()>):
   <ruleLabelDefs()>
<if(trace)>
   self.traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
   try:
       <block>

   finally:
       self.traceOut("<ruleName>_fragment", <ruleDescriptor.index>)

<else>
   <block>
<endif>
# $ANTLR end "<ruleName>"


>>

synpred(name) ::= <<
def <name>(self):
   self._state.backtracking += 1
   <@start()>
   start = self.input.mark()
   try:
       self.<name>_fragment()
   except BacktrackingFailed:
       success = False
   else:
       success = True
   self.input.rewind(start)
   <@stop()>
   self._state.backtracking -= 1
   return success



>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if self._state.backtracking > 0 and self.alreadyParsedRule(self.input, <ruleDescriptor.index>):
   # for cached failed rules, alreadyParsedRule will raise an exception
   success = True
   return <ruleReturnValue()>

<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if self._state.backtracking > 0:
   raise BacktrackingFailed

<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<returnScope(scope=ruleDescriptor.returnScope)>

# $ANTLR start "<ruleName>"
# <fileName>:<description>
<ruleDescriptor.actions.decorate>
def <ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
   self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
   <@preamble()>
   <@body><ruleBody()><@end>
   <@postamble()>
```

```
  return <ruleReturnValue()>

# $ANTLR end "<ruleName>"
>>

ruleBody() ::= <<
<if(memoize)>
<if(backtracking)>
success = False<\n>
<endif>
<endif>
try:
  try:
      <ruleMemoization(name=ruleName)>
      <block>
      <ruleCleanUp()>
      <(ruleDescriptor.actions.after):execAction()>

<if(memoize)>
<if(backtracking)>
      success = True<\n>
<endif>
<endif>
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  except RecognitionException as re:
      self.reportError(re)
      self.recover(self.input, re)
      <@setErrorReturnValue()>

<endif>
<else>
  finally:
      pass

<endif>
<endif>
finally:
<if(trace)>
  self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
  pass
>>

catch(decl,action) ::= <<
except <e.decl>:
  <e.action>

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval = self.<ruleDescriptor.name>_return()
retval.start = self.input.LT(1)<\n>
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> = <if(a.initValue)><a.initValue><else>None<endif>
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = self.input.index()
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.append(<it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.append(<it.name>_scope())}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.pop()}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it | <it.label.text> = None}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,
 ruleDescriptor.wildcardTreeListLabels]
  :{it | list_<it.label.text> = None}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{it | <it.label.text> = None}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
```

```
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it | <it.label.text> = None}; separator="\n"
>
<ruleDescriptor.charLabels:{it | <it.label.text> = None}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | list_<it.label.text> = None}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = self.input.LT(-1)<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if self._state.backtracking > 0:
   self.memoize(self.input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex, success)

<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start "<ruleName>"
def m<ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
```

```
<if(trace)>
  self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
<if(memoize)>
<if(backtracking)>
  success = False<\n>
<endif>
<endif>
  try:
<if(nakedBlock)>
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block><\n>
<else>
      _type = <ruleName>
      _channel = DEFAULT_CHANNEL

      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block>
      <ruleCleanUp()>
      self._state.type = _type
      self._state.channel = _channel
      <(ruleDescriptor.actions.after):execAction()>
<endif>
<if(memoize)>
<if(backtracking)>
      success = True<\n>
<endif>
<endif>

  finally:
<if(trace)>
      self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
      <ruleScopeCleanUp()>
      <memoize()>
      pass

# $ANTLR end "<ruleName>"



>>
```

```
/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
def mTokens(self):
   <block><\n>



>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@body><blockBody()><@end>
>>

blockBody() ::= <<
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<@prebranch()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>
```

```
/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
# <fileName>:<description>
cnt<decisionNumber> = 0
<decls>
<@preloop()>
<@loopBody>
<positiveClosureBlockLoop()>
<@end>
<@postloop()>
>>

positiveClosureBlockLoop() ::= <<
while True: #loop<decisionNumber>
  alt<decisionNumber> = <maxAlt>
  <@predecision()>
  <@decisionBody><decision><@end>
  <@postdecision()>
  <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
  else:
    if cnt<decisionNumber> >= 1:
      break #loop<decisionNumber>

    <ruleBacktrackFailure()>
    eee = EarlyExitException(<decisionNumber>, self.input)
    <@earlyExitException()>
    raise eee

  cnt<decisionNumber> += 1
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
```

```
<@preloop()>
<@loopBody>
<closureBlockLoop()>
<@end>
<@postloop()>
>>

closureBlockLoop() ::= <<
while True: #loop<decisionNumber>
   alt<decisionNumber> = <maxAlt>
   <@predecision()>
   <@decisionBody><decision><@end>
   <@postdecision()>
   <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
   else:
       break #loop<decisionNumber>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
if alt<decisionNumber> == <altNum>:
   <@prealt()>
   <alt>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt, treeLevel,rew) ::= <<
# <fileName>:<description>
pass <! so empty alternatives are a valid block !>
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
>>

/** What to emit when there is no rewrite.  For auto build
```

```
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label> = <endif>self.match(self.input, <token>,
self.FOLLOW_<token>_in_<ruleName><elementIndex>)
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>

listLabel(label, elem) ::= <<
if list_<label> is None:
   list_<label> = []
list_<label>.append(<elem>)<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.match(<char>)
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchRange(<a>, <b>)
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
```

```
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
if <s>:
  self.input.consume()
  <postmatchCode>
<if(!LEXER)>
  self._state.errorRecovery = False<\n>
<endif>

else:
  <ruleBacktrackFailure()>
  mse = MismatchedSetException(None, self.input)
  <@mismatchedSetException()>
<if(LEXER)>
  self.recover(mse)
  raise mse
<else>
  raise mse
  <! use following code to make it recover inline; remove throw mse;
  self.recoverFromMismatchedSet(
      self.input, mse, self.FOLLOW_set_in_<ruleName><elementIndex>
      )
  !>
<endif>
<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
<label>Start = self.getCharIndex()
self.match(<string>)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(input=self.input, type=INVALID_TOKEN_TYPE, channel=DEFAULT_CHANNEL,
start=<label>Start, stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
<else>
self.match(<string>)
```

```
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
self.matchAny()
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label,label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchAny()
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values. The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
self._state.following.append(self.FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label> = <endif>self.<if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=",
">)<\n>
self._state.following.pop()
>>

/** ids+=rule */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference
```

```
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(
   input=self.input,
   type=INVALID_TOKEN_TYPE,
   channel=DEFAULT_CHANNEL,
   start=<label>Start<elementIndex>,
   stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
<else>
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
self.match(EOF)
<label> = <labelType>(input=self.input, type=EOF, channel=DEFAULT_CHANNEL,
start=<label>Start<elementIndex>, stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
<else>
self.match(EOF)
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                       ::= "<recRuleArg()>"
recRuleArg()                          ::= "_p"
```

```
recRuleAltPredicate(ruleName, opPrec) ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0 = $<ruleName>_primary.tree"
recRuleSetReturnAction(src, name)     ::= "$<name> = $<src>.<name>"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
   self.match(self.input, DOWN, None)
   <children:element()>
   self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if not (<evalPredicate(pred, description)>):
   <ruleBacktrackFailure()>
   raise FailedPredicateException(self.input, "<ruleName>", "<description>")

>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
   alt<decisionNumber> = <eotPredictsAlt>
<else>
   <ruleBacktrackFailure()>
   nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
   <@noViableAltException()>
   raise nvae<\n>
<endif>
>>
```

```
/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel"><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt> <! if no edges, don't gen ELSE !>
<else>
else:
   alt<decisionNumber> = <eotPredictsAlt>
<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if (<labelExpr>) <if(predicates)>and (<predicates>)<endif>:
   <targetState>
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
```

```
<!
 FIXME: this is one of the few occasion, where I miss a switch statement
 in Python. ATM this is implemented as a list of if .. elif ..
 This may be replaced by faster a dictionary lookup, when I find a solution
 for the cases when an edge is not a plain dfaAcceptState.
!>
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
   alt<decisionNumber> = <eotPredictsAlt>
<else>
   <ruleBacktrackFailure()>
   nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
   <@noViableAltException()>
   raise nvae<\n>
<endif>

>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
<if(eotPredictsAlt)>
else:
   alt<decisionNumber> = <eotPredictsAlt>
<endif>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
if LA<decisionNumber> in {<labels; separator=", ">}:
   <targetState>
>>

// Cyclic DFA

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = self.dfa<decisionNumber>.predict(self.input)
>>
```

```
/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
# lookup tables for DFA #<dfa.decisionNumber>

DFA<dfa.decisionNumber>_eot = DFA.unpack(
    "<dfa.javaCompressedEOT; wrap="\"\n    \"">"
    )

DFA<dfa.decisionNumber>_eof = DFA.unpack(
    "<dfa.javaCompressedEOF; wrap="\"\n    \"">"
    )

DFA<dfa.decisionNumber>_min = DFA.unpack(
    "<dfa.javaCompressedMin; wrap="\"\n    \"">"
    )

DFA<dfa.decisionNumber>_max = DFA.unpack(
    "<dfa.javaCompressedMax; wrap="\"\n    \"">"
    )

DFA<dfa.decisionNumber>_accept = DFA.unpack(
    "<dfa.javaCompressedAccept; wrap="\"\n    \"">"
    )

DFA<dfa.decisionNumber>_special = DFA.unpack(
    "<dfa.javaCompressedSpecial; wrap="\"\n    \"">"
    )


DFA<dfa.decisionNumber>_transition = [
    <dfa.javaCompressedTransition:{s|DFA.unpack("<s; wrap="\"\n\"">")}; separator=",\n">
]

# class definition for DFA #<dfa.decisionNumber>

class DFA<dfa.decisionNumber>(DFA):
    pass

    <@errorMethod()>
```

```
<if(dfa.specialStateSTs)>
   def specialStateTransition(self_, s, input):
       # convince pylint that my self_ magic is ok ;)
       # pylint: disable-msg=E0213

       # pretend we are a member of the recognizer
       # thus semantic predicates can be evaluated
       self = self_.recognizer

       _s = s

       <dfa.specialStateSTs:{state | if s == <i0>: <! compressed special state numbers 0..n-1 !>
   <state>}; separator="\nel">

<if(backtracking)>
       if self._state.backtracking > 0:
           raise BacktrackingFailed

<endif>
       nvae = NoViableAltException(self_.getDescription(), <dfa.decisionNumber>, _s, input)
       self_.error(nvae)
       raise nvae<\n>
<endif>

>>

cyclicDFAInit(dfa) ::= <<
self.dfa<dfa.decisionNumber> = self.DFA<dfa.decisionNumber>(
   self, <dfa.decisionNumber>,
   eot = self.DFA<dfa.decisionNumber>_eot,
   eof = self.DFA<dfa.decisionNumber>_eof,
   min = self.DFA<dfa.decisionNumber>_min,
   max = self.DFA<dfa.decisionNumber>_max,
   accept = self.DFA<dfa.decisionNumber>_accept,
   special = self.DFA<dfa.decisionNumber>_special,
   transition = self.DFA<dfa.decisionNumber>_transition
   )<\n>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = input.LA(1)<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
index<decisionNumber>_<stateNumber> = input.index()
input.rewind()<\n>
<endif>
```

```
s = -1
<edges; separator="\nel">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if s >= 0:
   return s
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if (<labelExpr>)<if(predicates)> and (<predicates>)<endif>:
   s = <targetStateNumber><\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
se:
   s = <targetStateNumber><\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"

orPredicates(operands) ::= "(<operands; separator=\" or \">)"

notPredicate(pred) ::= "not (<evalPredicate(pred, {})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "self.<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "self.input.LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(<lower> \<= LA<decisionNumber>_<stateNumber> \<= <upper>)
%>
```

```
isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(<lower> \<=
self.input.LA(<k>) \<= <upper>)"

lookaheadSetTest(values,k,valuesAsInt) ::= <%
LA<decisionNumber>_<stateNumber> in {<values; separator=", ">}
%>

isolatedLookaheadSetTest(values,k,valuesAsInt) ::= <%
self.input.LA(<k>) in {<values; separator=", ">}
%>

lookaheadVarName(k) ::= "LA<decisionNumber>_<stateNumber>"
isolatedLookaheadVarName(k) ::= "self.input.LA(<k>)"

setTest(ranges) ::= "<ranges; separator=\" or \">"

// A T T R I B U T E S

globalAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
   def __init__(self):
       <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

globalAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

ruleAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
   def __init__(self):
       <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>
```

```
ruleAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
<label.label.text> = None
>>

returnStructName(r) ::= "<r.name>_return"

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
class <ruleDescriptor:returnStructName()>(<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope):
   def __init__(self):
       super().__init__()

       <if(scope)><scope.attributes:{it | self.<it.decl> = None}; separator="\n"><endif>
       <@ruleReturnInit()>



   <@ruleReturnMembers()>

<endif>
>>

parameterScope(scope) ::= <<
<if(scope)><scope.attributes:{it | <it.decl>}; separator=", "><endif>
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
```

```
self.<scope>_stack[-<negIndex>].<attr.name>
<else>
<if(index)>
self.<scope>_stack[<index>].<attr.name>
<else>
self.<scope>_stack[-1].<attr.name>
<endif>
<endif>
%>

/* not applying patch because of bug in action parser!

<if(negIndex)>
((len(self.<scope>_stack) - <negIndex> - 1) >= 0 and [self.<scope>_stack[-<negIndex>].<attr.name>] or [None])[0]
<else>
<if(index)>
((<index> \< len(self.<scope>_stack)) and [self.<scope>_stack[<index>].<attr.name>] or [None])[0]
<else>
((len(self.<scope>_stack) > 0) and [self.<scope>_stack[-1].<attr.name>] or [None])[0]
<endif>
<endif>

*/

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[-<negIndex>].<attr.name> = <expr>
<else>
<if(index)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[<index>].<attr.name> = <expr>
<else>
self.<scope>_stack[-1].<attr.name> = <expr>
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "self.<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
((<scope> is not None) and [<scope>.<attr.name>] or [None])[0]
```

```
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> = <expr>
<else>
<attr.name> = <expr>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach; and they are evaluated early;
// they cannot see TREE_PARSER or PARSER attributes for example. :(

tokenLabelPropertyRef_text(scope,attr) ::= "<scope>.text"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.type"
tokenLabelPropertyRef_line(scope,attr) ::= "<scope>.line"
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.charPositionInLine"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.channel"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.index"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "<scope>.start"
ruleLabelPropertyRef_stop(scope,attr) ::= "<scope>.stop"
ruleLabelPropertyRef_tree(scope,attr) ::= "<scope>.tree"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
((<scope> is not None) and [self.input.getTokenStream().toString(
   self.input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
   self.input.getTreeAdaptor().getTokenStopIndex(<scope>.start)
   )] or [None])[0]
```

```
<else>
((<scope> is not None) and [self.input.toString(<scope>.start,<scope>.stop)] or [None])[0]
<endif>
%>
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> is not None) and [<scope>.st] or [None])[0]"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "((<scope> is not None) and [<scope>.type] or [0])[0]"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "((<scope> is not None) and [<scope>.line] or [0])[0]"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "((<scope> is not None) and [<scope>.charPositionInLine] or
[0])[0]"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "((<scope> is not None) and [<scope>.channel] or [0])[0]"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "((<scope> is not None) and [<scope>.index] or [0])[0]"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "((<scope> is not None) and [<scope>.text] or [None])[0]"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "((<scope> is not None) and [int(<scope>.text)] or [0])[0]"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop" //mmm... or input.LT(-1)??
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= "self.input.toString(retval.start, self.input.LT(-1))"
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "self._state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "self._state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "self._state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(self.getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"


/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if <actions.(actionScope).synpredgate>:
  pass
  <action>
```

```
<else>
if <actions.(actionScope).synpredgate>:
   pass
   <action>

<endif>
<else>
#action start
<action>
#action end
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"



// M I S C (properties, etc...)

codeFileExtension() ::= ".py"

true_value() ::= "True"
false_value() ::= "False"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python3/Python3.stg
No license file was found, but licenses were detected in source scan.

```
/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/

@rule.setErrorReturnValue() ::= <<
retval.Tree = (<ASTLabelType>)adaptor.ErrorNode(input, retval.Start, input.LT(-1), re);
<! System.out.WriteLine("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <%
<super.tokenRef(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)><\n>if (state.backtracking == 0) {<endif>
<\n><label>_tree = <createNodeFromToken(...)>;
<\n>adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)><\n>}<endif>
<endif>
%>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
```

```
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <%
<super.tokenRef(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)><\n>if (<actions.(actionScope).synpredgate>) {<endif>
<\n><label>_tree = <createNodeFromToken(...)>;
<\n>root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)><\n>}<endif>
<endif>
%>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={<if(!ruleDescriptor.isSynPred)><if(backtracking)>if
(<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <createNodeFromToken(...)>);<endif>},
...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
```

```
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);
<endif>
<super.matchSet(postmatchCode={<if(!ruleDescriptor.isSynPred)><if(backtracking)>if
(<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<createNodeFromToken(...)>, root_0);<endif>}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <%
<super.ruleRef(...)>
<if(!ruleDescriptor.isSynPred)>
<\n><if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <label>.Tree);
<endif>
%>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_0);
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>
```

```
/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
<endif>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(token=[],...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
<endif>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalO
ptions.text)>,<terminalOptions.text; format="string"><endif>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
adaptor.SetTokenBoundaries(retval.Tree, retval.Start, retval.Stop);
<if(backtracking)>}<endif>
```

>>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp3/ASTParser.stg
No license file was found, but licenses were detected in source scan.

```
/*
* This code generating template and the associated C runtime was produced by:
* Jim Idle jimi|hereisanat|idle|dotgoeshere|ws.
* If it causes the destruction of the Universe, it will be pretty cool so long as
* I am in a different one at the time.
*/
cTypeInitMap ::= [
 "int"      : "0",              // Integers     start out being 0
 "long"      : "0",              // Longs        start out being 0
 "float"      : "0.0",           // Floats       start out being 0
 "double"     : "0.0",           // Doubles      start out being 0
 "ANTLR3_BOOLEAN"    : "ANTLR3_FALSE",   // Booleans     start out being Antlr C for false
 "byte"      : "0",              // Bytes        start out being 0
 "short"      : "0",             // Shorts       start out being 0
 "char"      : "0"              // Chars        start out being 0
]

leadIn(type) ::=
<<
/** \file
*  This <type> file was generated by $ANTLR version <ANTLRVersion>
*
*     -  From the grammar source file : <fileName>
*     -                            On : <generatedTimestamp>
<if(LEXER)>
*     -                 for the lexer : <name>Lexer
<endif>
<if(PARSER)>
*     -                for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
*     -           for the tree parser : <name>TreeParser
<endif>
*
* Editing it, at least manually, is not wise.
*
* C language generator and runtime by Jim Idle, jimi|hereisanat|idle|dotgoeshere|ws.
*
*
>>

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,
            PARSER,
            TREE_PARSER,
            actionScope,
            actions,
            docComment,
            recognizer,
            name,
            tokens,
            tokenNames,
            rules,
            cyclicDFAs,
            bitsets,
            buildTemplate,
            buildAST,
            rewriteMode,
            profile,
            backtracking,
            synpreds,
            memoize,
            numRules,
            fileName,
            ANTLRVersion,
            generatedTimestamp,
            trace,
            scopes,
            superClass,
            literals
            ) ::=
<<
<leadIn("C source")>
*/
// [The "BSD license"]
// Copyright (c) 2005-2009 Jim Idle, Temporal Wave LLC
// http://www.temporal-wave.com
// http://www.linkedin.com/in/jimidle
//
// All rights reserved.
//
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// DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
// THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
// (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
// THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

<if(actions.(actionScope).header)>
```

```
/* =============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* =============================================================================
*/
<endif>

/* -----------------------------------------
* Include the ANTLR3 generated header file.
*/
#include    "<name>.h"
<actions.(actionScope).postinclude>
/* ----------------------------------------- */

<docComment>

<if(literals)>
/** String literals used by <name> that we must do things like MATCHS() with.
*  C will normally just lay down 8 bit characters, and you can use L"xxx" to
*  get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
*  we perform this little trick of defining the literals as arrays of UINT32
*  and passing in the address of these.
*/
<literals:{it | static ANTLR3_UCHAR lit_<i>[]  = <it>;}; separator="\n">

<endif>




/* MACROS that hide the C interface implementations from the
* generated code, which makes it a little more understandable to the human eye.
* I am very much against using C pre-processor macros for function calls and bits
* of code as you cannot see what is happening when single stepping in debuggers
* and so on. The exception (in my book at least) is for generated code, where you are
* not maintaining it, but may wish to read and understand it. If you single step it, you know that input()
* hides some indirect calls, but is always referring to the input stream. This is
* probably more readable than ctx->input->istream->input(snarfle0->blarg) and allows me to rejig
* the runtime interfaces without changing the generated code too often, without
* confusing the reader of the generated output, who may not wish to know the gory
* details of the interface inheritance.
*/

#define  CTX ctx
```

```
/* Aids in accessing scopes for grammar programmers
*/
#undef SCOPE_TYPE
#undef SCOPE_STACK
#undef SCOPE_TOP
#define SCOPE_TYPE(scope)   p<name>_##scope##_SCOPE
#define SCOPE_STACK(scope)  p<name>_##scope##Stack
#define SCOPE_TOP(scope)    ctx->p<name>_##scope##Top
#define SCOPE_SIZE(scope)  ctx->p<name>_##scope##Stack_limit
#define SCOPE_INSTANCE(scope, i) (ctx->SCOPE_STACK(scope)->get(ctx->SCOPE_STACK(scope),i))

<if(LEXER)>

/* Macros for accessing things in a lexer
*/
#undef    LEXER
#undef    RECOGNIZER
#undef    RULEMEMO
#undef    GETCHARINDEX
#undef    GETLINE
#undef    GETCHARPOSITIONINLINE
#undef    EMIT
#undef    EMITNEW
#undef    MATCHC
#undef    MATCHS
#undef    MATCHRANGE
#undef    LTOKEN
#undef    HASFAILED
#undef    FAILEDFLAG
#undef    INPUT
#undef    STRSTREAM
#undef    LA
#undef    HASEXCEPTION
#undef    EXCEPTION
#undef    CONSTRUCTEX
#undef    CONSUME
#undef    LRECOVER
#undef    MARK
#undef    REWIND
#undef    REWINDLAST
#undef    BACKTRACKING
#undef  MATCHANY
#undef  MEMOIZE
#undef  HAVEPARSEDRULE
#undef  GETTEXT
#undef  INDEX
#undef  SEEK
#undef  PUSHSTREAM
```

```
#undef  POPSTREAM
#undef  SETTEXT
#undef  SETTEXT8

#define     LEXER     ctx->pLexer
#define     RECOGNIZER      LEXER->rec
#define  LEXSTATE    RECOGNIZER->state
#define  TOKSOURCE    LEXSTATE->tokSource
#define     GETCHARINDEX()   LEXER->getCharIndex(LEXER)
#define     GETLINE()    LEXER->getLine(LEXER)
#define     GETTEXT()    LEXER->getText(LEXER)
#define     GETCHARPOSITIONINLINE() LEXER->getCharPositionInLine(LEXER)
#define     EMIT()     LEXSTATE->type = _type; LEXER->emit(LEXER)
#define     EMITNEW(t)    LEXER->emitNew(LEXER, t)
#define     MATCHC(c)    LEXER->matchc(LEXER, c)
#define     MATCHS(s)    LEXER->matchs(LEXER, s)
#define     MATCHRANGE(c1,c2)     LEXER->matchRange(LEXER, c1, c2)
#define     MATCHANY()    LEXER->matchAny(LEXER)
#define     LTOKEN      LEXSTATE->token
#define     HASFAILED()    (LEXSTATE->failed == ANTLR3_TRUE)
#define     BACKTRACKING   LEXSTATE->backtracking
#define     FAILEDFLAG    LEXSTATE->failed
#define     INPUT     LEXER->input
#define     STRSTREAM    INPUT
#define  ISTREAM     INPUT->istream
#define  INDEX()     ISTREAM->index(ISTREAM)
#define  SEEK(n)     ISTREAM->seek(ISTREAM, n)
#define     EOF_TOKEN    &(LEXSTATE->tokSource->eofToken)
#define     HASEXCEPTION()   (LEXSTATE->error == ANTLR3_TRUE)
#define     EXCEPTION    LEXSTATE->exception
#define     CONSTRUCTEX()   RECOGNIZER->exConstruct(RECOGNIZER)
#define     LRECOVER()    LEXER->recover(LEXER)
#define     MARK()     ISTREAM->mark(ISTREAM)
#define     REWIND(m)    ISTREAM->rewind(ISTREAM, m)
#define     REWINDLAST()   ISTREAM->rewindLast(ISTREAM)
#define  MEMOIZE(ri,si)   RECOGNIZER->memoize(RECOGNIZER, ri, si)
#define  HAVEPARSEDRULE(r)  RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define  PUSHSTREAM(str)   LEXER->pushCharStream(LEXER, str)
#define  POPSTREAM()    LEXER->popCharStream(LEXER)
#define  SETTEXT(str)   LEXSTATE->text = str
#define  SKIP()     LEXSTATE->token = &(TOKSOURCE->skipToken)
#define  USER1     LEXSTATE->user1
#define  USER2     LEXSTATE->user2
#define  USER3     LEXSTATE->user3
#define  CUSTOM     LEXSTATE->custom
#define  RULEMEMO    LEXSTATE->ruleMemo
#define  DBG     RECOGNIZER->debugger
```

```
/* If we have been told we can rely on the standard 8 bit or UTF16 input
* stream, then we can define our macros to use the direct pointers
* in the input object, which is much faster than indirect calls. This
* is really only significant to lexers with a lot of fragment rules (which
* do not place LA(1) in a temporary at the moment) and even then
* only if there is a lot of input (order of say 1M or so).
*/
#if defined(ANTLR3_INLINE_INPUT_8BIT) || defined(ANTLR3_INLINE_INPUT_UTF16)

# ifdef ANTLR3_INLINE_INPUT_8BIT

/* 8 bit character set */

#  define     NEXTCHAR ((pANTLR3_UINT8)(INPUT->nextChar))
#  define     DATAP ((pANTLR3_UINT8)(INPUT->data))

# else

#  define     NEXTCHAR ((pANTLR3_UINT16)(INPUT->nextChar))
#  define     DATAP ((pANTLR3_UINT16)(INPUT->data))

# endif

# define     LA(n) ((NEXTCHAR + n) > (DATAP + INPUT->sizeBuf) ? ANTLR3_CHARSTREAM_EOF :
(ANTLR3_UCHAR)(*(NEXTCHAR + n - 1)))
# define            CONSUME()                                   \\
{                                                          \\
   if        (NEXTCHAR \< (DATAP + INPUT->sizeBuf))                    \\
   {                                                      \\
       INPUT->charPositionInLine++;                               \\
       if  ((ANTLR3_UCHAR)(*NEXTCHAR) == INPUT->newlineChar)            \\
       {                                                  \\
          INPUT->line++;                                  \\
          INPUT->charPositionInLine        = 0;                       \\
          INPUT->currentLine               = (void *)(NEXTCHAR + 1); \\
       }                                                  \\
       INPUT->nextChar = (void *)(NEXTCHAR + 1);                      \\
   }                                                      \\
}

#else

// Pick up the input character by calling the input stream implementation.
//
#define     CONSUME()   INPUT->istream->consume(INPUT->istream)
#define     LA(n)       INPUT->istream->_LA(INPUT->istream, n)

#endif
```

```
<endif>

<if(PARSER)>
/* Macros for accessing things in the parser
*/

#undef	    PARSER
#undef	    RECOGNIZER
#undef	    HAVEPARSEDRULE
#undef  MEMOIZE
#undef	    INPUT
#undef	    STRSTREAM
#undef	    HASEXCEPTION
#undef	    EXCEPTION
#undef	    MATCHT
#undef	    MATCHANYT
#undef	    FOLLOWSTACK
#undef	    FOLLOWPUSH
#undef	    FOLLOWPOP
#undef	    PRECOVER
#undef	    PREPORTERROR
#undef	    LA
#undef	    LT
#undef	    CONSTRUCTEX
#undef	    CONSUME
#undef	    MARK
#undef	    REWIND
#undef	    REWINDLAST
#undef	    PERRORRECOVERY
#undef	    HASFAILED
#undef	    FAILEDFLAG
#undef	    RECOVERFROMMISMATCHEDSET
#undef	    RECOVERFROMMISMATCHEDELEMENT
#undef  INDEX
#undef      ADAPTOR
#undef  SEEK
#undef	    RULEMEMO
#undef  DBG

#define	    PARSER	ctx->pParser
#define	    RECOGNIZER	PARSER->rec
#define	    PSRSTATE	RECOGNIZER->state
#define	    HAVEPARSEDRULE(r)	RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define	    MEMOIZE(ri,si)	RECOGNIZER->memoize(RECOGNIZER, ri, si)
#define	    INPUT	PARSER->tstream
#define	    STRSTREAM	INPUT
#define	    ISTREAM	INPUT->istream
#define	    INDEX()	ISTREAM->index(INPUT->istream)
```

```
#define     HASEXCEPTION()   (PSRSTATE->error == ANTLR3_TRUE)
#define     EXCEPTION    PSRSTATE->exception
#define     MATCHT(t, fs)   RECOGNIZER->match(RECOGNIZER, t, fs)
#define     MATCHANYT()    RECOGNIZER->matchAny(RECOGNIZER)
#define     FOLLOWSTACK    PSRSTATE->following
#ifdef  SKIP_FOLLOW_SETS
#define     FOLLOWPUSH(x)
#define     FOLLOWPOP()
#else
#define     FOLLOWPUSH(x)   FOLLOWSTACK->push(FOLLOWSTACK, ((void *)(&(x))), NULL)
#define     FOLLOWPOP()    FOLLOWSTACK->pop(FOLLOWSTACK)
#endif
#define     PRECOVER()    RECOGNIZER->recover(RECOGNIZER)
#define     PREPORTERROR()   RECOGNIZER->reportError(RECOGNIZER)
#define     LA(n)    INPUT->istream->_LA(ISTREAM, n)
#define     LT(n)    INPUT->_LT(INPUT, n)
#define     CONSTRUCTEX()   RECOGNIZER->exConstruct(RECOGNIZER)
#define     CONSUME()    ISTREAM->consume(ISTREAM)
#define     MARK()    ISTREAM->mark(ISTREAM)
#define     REWIND(m)    ISTREAM->rewind(ISTREAM, m)
#define     REWINDLAST()   ISTREAM->rewindLast(ISTREAM)
#define     SEEK(n)    ISTREAM->seek(ISTREAM, n)
#define     PERRORRECOVERY   PSRSTATE->errorRecovery
#define     FAILEDFLAG    PSRSTATE->failed
#define     HASFAILED()    (FAILEDFLAG == ANTLR3_TRUE)
#define     BACKTRACKING   PSRSTATE->backtracking
#define     RECOVERFROMMISMATCHEDSET(s)  RECOGNIZER->recoverFromMismatchedSet(RECOGNIZER,
s)
#define     RECOVERFROMMISMATCHEDELEMENT(e) RECOGNIZER-
>recoverFromMismatchedElement(RECOGNIZER, s)
#define     ADAPTOR                        ctx->adaptor
#define  RULEMEMO      PSRSTATE->ruleMemo
#define  DBG       RECOGNIZER->debugger

<endif>

<if(TREE_PARSER)>
/* Macros for accessing things in the parser
*/

#undef     PARSER
#undef     RECOGNIZER
#undef     HAVEPARSEDRULE
#undef     INPUT
#undef     STRSTREAM
#undef     HASEXCEPTION
#undef     EXCEPTION
#undef     MATCHT
```

```
#undef    MATCHANYT
#undef    FOLLOWSTACK
#undef    FOLLOWPUSH
#undef    FOLLOWPOP
#undef    PRECOVER
#undef    PREPORTERROR
#undef    LA
#undef    LT
#undef    CONSTRUCTEX
#undef    CONSUME
#undef    MARK
#undef    REWIND
#undef    REWINDLAST
#undef    PERRORRECOVERY
#undef    HASFAILED
#undef    FAILEDFLAG
#undef    RECOVERFROMMISMATCHEDSET
#undef    RECOVERFROMMISMATCHEDELEMENT
#undef    BACKTRACKING
#undef     ADAPTOR
#undef    RULEMEMO
#undef  SEEK
#undef  INDEX
#undef  DBG

#define    PARSER       ctx->pTreeParser
#define    RECOGNIZER      PARSER->rec
#define  PSRSTATE      RECOGNIZER->state
#define    HAVEPARSEDRULE(r)    RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define    INPUT       PARSER->ctnstream
#define  ISTREAM       INPUT->tnstream->istream
#define    STRSTREAM      INPUT->tnstream
#define    HASEXCEPTION()     (PSRSTATE->error == ANTLR3_TRUE)
#define    EXCEPTION      PSRSTATE->exception
#define    MATCHT(t, fs)     RECOGNIZER->match(RECOGNIZER, t, fs)
#define    MATCHANYT()      RECOGNIZER->matchAny(RECOGNIZER)
#define    FOLLOWSTACK         PSRSTATE->following
#define    FOLLOWPUSH(x)     FOLLOWSTACK->push(FOLLOWSTACK, ((void *)(&(x))), NULL)
#define    FOLLOWPOP()      FOLLOWSTACK->pop(FOLLOWSTACK)
#define    PRECOVER()      RECOGNIZER->recover(RECOGNIZER)
#define    PREPORTERROR()     RECOGNIZER->reportError(RECOGNIZER)
#define    LA(n)       ISTREAM->_LA(ISTREAM, n)
#define    LT(n)       INPUT->tnstream->_LT(INPUT->tnstream, n)
#define    CONSTRUCTEX()     RECOGNIZER->exConstruct(RECOGNIZER)
#define    CONSUME()      ISTREAM->consume(ISTREAM)
#define    MARK()       ISTREAM->mark(ISTREAM)
#define    REWIND(m)      ISTREAM->rewind(ISTREAM, m)
#define    REWINDLAST()     ISTREAM->rewindLast(ISTREAM)
```

```
#define     PERRORRECOVERY     PSRSTATE->errorRecovery
#define     FAILEDFLAG      PSRSTATE->failed
#define     HASFAILED()      (FAILEDFLAG == ANTLR3_TRUE)
#define     BACKTRACKING     PSRSTATE->backtracking
#define     RECOVERFROMMISMATCHEDSET(s)  RECOGNIZER->recoverFromMismatchedSet(RECOGNIZER,
s)
#define     RECOVERFROMMISMATCHEDELEMENT(e) RECOGNIZER-
>recoverFromMismatchedElement(RECOGNIZER, s)
#define     ADAPTOR                          INPUT->adaptor
#define  RULEMEMO      PSRSTATE->ruleMemo
#define  SEEK(n)       ISTREAM->seek(ISTREAM, n)
#define  INDEX()       ISTREAM->index(ISTREAM)
#define  DBG        RECOGNIZER->debugger


<endif>

#define  TOKTEXT(tok, txt)    tok, (pANTLR3_UINT8)txt

/* The 4 tokens defined below may well clash with your own #defines or token types. If so
* then for the present you must use different names for your defines as these are hard coded
* in the code generator. It would be better not to use such names internally, and maybe
* we can change this in a forthcoming release. I deliberately do not #undef these
* here as this will at least give you a redefined error somewhere if they clash.
*/
#define     UP     ANTLR3_TOKEN_UP
#define     DOWN    ANTLR3_TOKEN_DOWN
#define     EOR     ANTLR3_TOKEN_EOR
#define     INVALID ANTLR3_TOKEN_INVALID


/* =============================================================================
* Functions to create and destroy scopes. First come the rule scopes, followed
* by the global declared scopes.
*/

<rules: {r |<if(r.ruleDescriptor.ruleScope)>
<ruleAttributeScopeFuncDecl(scope=r.ruleDescriptor.ruleScope)>
<ruleAttributeScopeFuncs(scope=r.ruleDescriptor.ruleScope)>
<endif>}>

<recognizer.scopes:{it | <if(it.isDynamicGlobalScope)>
<globalAttributeScopeFuncDecl(it)>
<globalAttributeScopeFuncs(it)>
<endif>}>

/* ============================================================================= */
/* =============================================================================
* Start of recognizer
*/

<recognizer>

/* End of code
* =============================================================================
*/

>>
headerFileExtension() ::= ".h"

headerFile( LEXER,
          PARSER,
          TREE_PARSER,
          actionScope,
          actions,
          docComment,
          recognizer,
          name,
          tokens,
          tokenNames,
          rules,
          cyclicDFAs,
          bitsets,
          buildTemplate,
          buildAST,
          rewriteMode,
          profile,
          backtracking,
          synpreds,
          memoize,
          numRules,
          fileName,
          ANTLRVersion,
          generatedTimestamp,
          trace,
          scopes,
   superClass,
          literals
       ) ::=
<<
<leadIn("C header")>
<if(PARSER)>
* The parser <mainName()>
<endif>
<if(LEXER)>
```

```
* The lexer <mainName()>
<endif>
<if(TREE_PARSER)>
* The tree parser <mainName()>
<endif>
has the callable functions (rules) shown below,
* which will invoke the code for the associated rule in the source grammar
* assuming that the input stream is pointing to a token/text stream that could begin
* this rule.
*
* For instance if you call the first (topmost) rule in a parser grammar, you will
* get the results of a full parse, but calling a rule half way through the grammar will
* allow you to pass part of a full token stream to the parser, such as for syntax checking
* in editors and so on.
*
* The parser entry points are called indirectly (by function pointer to function) via
* a parser context typedef p<name>, which is returned from a call to <name>New().
*
<if(LEXER)>
* As this is a generated lexer, it is unlikely you will call it 'manually'. However
* the methods are provided anyway.
*
<endif>
* The methods in p<name> are  as follows:
*
* <rules:{r | <if(!r.ruleDescriptor.isSynPred)> - <headerReturnType(ruleDescriptor=r.ruleDescriptor,...)>
p<name>-><r.ruleDescriptor.name>(p<name>)<endif>}; separator="\n * ">
*
* The return type for any particular rule is of course determined by the source
* grammar file.
*/
// [The "BSD license"]
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// http://www.temporal-wave.com
// http://www.linkedin.com/in/jimidle
//
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```

```
//
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// THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
// (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
// THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#ifndef _<name>_H
#define _<name>_H
<actions.(actionScope).preincludes>
/* =============================================================================
* Standard antlr3 C runtime definitions
*/
#include    \<antlr3.h>

/* End of standard antlr 3 runtime definitions
* =============================================================================
*/
<actions.(actionScope).includes>

#ifdef __cplusplus
extern "C" {
#endif

// Forward declare the context typedef so that we can use it before it is
// properly defined. Delegators and delegates (from import statements) are
// interdependent and their context structures contain pointers to each other
// C only allows such things to be declared if you pre-declare the typedef.
//
typedef struct <name>_Ctx_struct <name>, * p<name>;

<if(recognizer.grammar.delegates)>
// Include delegate definition header files
//
<recognizer.grammar.delegates: {g|#include \<<g.recognizerName>.h>}; separator="\n">

<endif>



<actions.(actionScope).header>

#ifdef ANTLR3_WINDOWS
// Disable: Unreferenced parameter,       - Rules with parameters that are not used
//          constant conditional,       - ANTLR realizes that a prediction is always true (synpred usually)
//          initialized but unused variable     - tree rewrite variables declared but not needed
//          Unreferenced local variable      - lexer rule declares but does not always use _type
//          potentially unitialized variable used   - retval always returned from a rule
//   unreferenced local function has been removed - susually getTokenNames or freeScope, they can go without
warnigns
//
// These are only really displayed at warning level /W4 but that is the code ideal I am aiming at
// and the codegen must generate some of these warnings by necessity, apart from 4100, which is
// usually generated when a parser rule is given a parameter that it does not use. Mostly though
// this is a matter of orthogonality hence I disable that one.
//
#pragma warning( disable : 4100 )
#pragma warning( disable : 4101 )
#pragma warning( disable : 4127 )
#pragma warning( disable : 4189 )
#pragma warning( disable : 4505 )
#pragma warning( disable : 4701 )
#endif
<if(backtracking)>

/* ========================
* BACKTRACKING IS ENABLED
* ========================
*/
<endif>

<rules:{r |<headerReturnScope(ruleDescriptor=r.ruleDescriptor,...)>}>

<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDecl(it)><endif>}>
<rules:{r |<ruleAttributeScopeDecl(scope=r.ruleDescriptor.ruleScope)>}>
<if(recognizer.grammar.delegators)>
// Include delegator definition header files
//
<recognizer.grammar.delegators: {g|#include \<<g.recognizerName>.h>}; separator="\n">

<endif>

/** Context tracking structure for <mainName()>
*/
struct <name>_Ctx_struct
{
   /** Built in ANTLR3 context tracker contains all the generic elements
    *  required for context tracking.
    */
<if(PARSER)>
   pANTLR3_PARSER   pParser;
<endif>
<if(LEXER)>
   pANTLR3_LEXER    pLexer;
<endif>
<if(TREE_PARSER)>
   pANTLR3_TREE_PARSER     pTreeParser;
<endif>

<if(recognizer.grammar.delegates)>
 <recognizer.grammar.delegates:
        {g|p<g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<if(recognizer.grammar.delegators)>
 <recognizer.grammar.delegators:
        {g|p<g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<scopes:{it | <if(it.isDynamicGlobalScope)>
   <globalAttributeScopeDef(it)>
<endif>}; separator="\n\n">
<rules: {r |<if(r.ruleDescriptor.ruleScope)>
   <ruleAttributeScopeDef(scope=r.ruleDescriptor.ruleScope)>
<endif>}>

<if(LEXER)>
   <rules:{r | <if(!r.ruleDescriptor.isSynPred)><headerReturnType(ruleDescriptor=r.ruleDescriptor)>
(*m<r.ruleDescriptor.name>) (struct <name>_Ctx_struct * ctx<if(r.ruleDescriptor.parameterScope)>,
<endif><r.ruleDescriptor.parameterScope:parameterScope()>);<endif>}; separator="\n">
<endif>
<if(!LEXER)>
   <rules:{r | <headerReturnType(ruleDescriptor=r.ruleDescriptor)> (*<r.ruleDescriptor.name>) (struct
<name>_Ctx_struct * ctx<if(r.ruleDescriptor.parameterScope)>,
<endif><r.ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
   // Delegated rules
<recognizer.grammar.delegatedRules:{ruleDescriptor|
   <headerReturnType(ruleDescriptor)> (*<ruleDescriptor.name>)(struct <name>_Ctx_struct *
ctx<if(ruleDescriptor.parameterScope)>, <endif><ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
<endif>

   const char * (*getGrammarFileName)();
   void            (*reset)  (struct <name>_Ctx_struct * ctx);
   void     (*free)   (struct <name>_Ctx_struct * ctx);
   <@members>
   <@end>
   <actions.(actionScope).context>
};
```

```
// Function protoypes for the constructor functions that external translation units
// such as delegators and delegates may wish to call.
//
ANTLR3_API p<name> <name>New         (<inputType()> instream<recognizer.grammar.delegators:{g|,
p<g.recognizerName> <g:delegateName()>}>);
ANTLR3_API p<name> <name>NewSSD      (<inputType()> instream,
pANTLR3_RECOGNIZER_SHARED_STATE state<recognizer.grammar.delegators:{g|, p<g.recognizerName>
<g:delegateName()>}>);
<if(!recognizer.grammar.grammarIsRoot)>
extern pANTLR3_UINT8   <recognizer.grammar.composite.rootGrammar.recognizerName>TokenNames[];
<endif>


/** Symbolic definitions of all the tokens that the <grammarType()> will work with.
* \{
*
* Antlr will define EOF, but we can't use that as it it is too common in
* in C header files and that would be confusing. There is no way to filter this out at the moment
* so we just undef it here for now. That isn't the value we get back from C recognizers
* anyway. We are looking for ANTLR3_TOKEN_EOF.
*/
#ifdef EOF
#undef EOF
#endif
#ifdef Tokens
#undef Tokens
#endif
<tokens:{it | #define <it.name>      <it.type>}; separator="\n">
#ifdef EOF
#undef EOF
#define EOF ANTLR3_TOKEN_EOF
#endif

#ifndef TOKENSOURCE
#define TOKENSOURCE(lxr) lxr->pLexer->rec->state->tokSource
#endif

/* End of token definitions for <name>
* =============================================================================
*/
/** \} */

#ifdef __cplusplus
}
#endif

#endif
```

```
/* END - Note:Keep extra line feed to satisfy UNIX systems */

>>

inputType() ::=<<
<if(LEXER)>
pANTLR3_INPUT_STREAM
<endif>
<if(PARSER)>
pANTLR3_COMMON_TOKEN_STREAM
<endif>
<if(TREE_PARSER)>
pANTLR3_COMMON_TREE_NODE_STREAM
<endif>
>>

grammarType() ::= <<
<if(PARSER)>
parser
<endif>
<if(LEXER)>
lexer
<endif>
<if(TREE_PARSER)>
tree parser
<endif>
>>

mainName() ::= <<
<if(PARSER)>
<name>
<endif>
<if(LEXER)>
<name>
<endif>
<if(TREE_PARSER)>
<name>
<endif>
>>

headerReturnScope(ruleDescriptor) ::= "<returnScope(...)>"

headerReturnType(ruleDescriptor) ::= <<
<if(LEXER)>
<if(!ruleDescriptor.isSynPred)>
void
<else>
<returnType()>
```

```
<endif>
<else>
<returnType()>
<endif>
>>

// Produce the lexer output
//
lexer(  grammar,
  name,
       tokens,
       scopes,
       rules,
       numRules,
       filterMode,
       superClass,
       labelType="pANTLR3_COMMON_TOKEN") ::= <<

<if(filterMode)>
/* Forward declare implementation function for ANTLR3_TOKEN_SOURCE interface when
* this is a filter mode lexer.
*/
static pANTLR3_COMMON_TOKEN <name>NextToken   (pANTLR3_TOKEN_SOURCE toksource);

/* Override the normal MEMOIZE and HAVEALREADYPARSED macros as this is a filtering
* lexer. In filter mode, the memoizing and backtracking are gated at BACKTRACKING > 1 rather
* than just BACKTRACKING. In some cases this might generate code akin to:
*   if (BACKTRACKING) if (BACKTRACKING > 1) memoize.
* However, I assume that the C compilers/optimizers are smart enough to work this one out
* these days - Jim
*/
#undef  MEMOIZE
#define  MEMOIZE(ri,si)   if (BACKTRACKING>1) { RECOGNIZER->memoize(RECOGNIZER, ri, si) }
#undef  HAVEPARSEDRULE
#define  HAVEPARSEDRULE(r)  if (BACKTRACKING>1) { RECOGNIZER->alreadyParsedRule(RECOGNIZER,
r) }
<endif>

/* Forward declare the locally static matching functions we have generated and any predicate functions.
*/
<rules:{r | static ANTLR3_INLINE <headerReturnType(ruleDescriptor=r.ruleDescriptor)>
<if(!r.ruleDescriptor.isSynPred)>m<endif><r.ruleDescriptor.name>    (p<name>
ctx<if(r.ruleDescriptor.parameterScope)>, <endif><r.ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
static void <name>Free(p<name> ctx);

/* =========================================================================
* Lexer matching rules end.
* ==============================================================================
*/

<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<actions.lexer.members>

static void
<name>Free  (p<name> ctx)
{
<if(memoize)>
 if (RULEMEMO != NULL)
 {
  RULEMEMO->free(RULEMEMO);
  RULEMEMO = NULL;
 }
<endif>
<if(grammar.directDelegates)>
 // Free the lexers that we delegated to
 // functions to. NULL the state so we only free it once.
 //
 <grammar.directDelegates:
        {g|ctx-><g:delegateName()>->pLexer->rec->state = NULL;
        ctx-><g:delegateName()>->free(ctx-><g:delegateName()>);}; separator="\n">
<endif>
   LEXER->free(LEXER);

   ANTLR3_FREE(ctx);
}

static void
<name>Reset (p<name> ctx)
{
   RECOGNIZER->reset(RECOGNIZER);
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
static const char * getGrammarFileName()
{
 return fileName;
}

<if(filterMode)>
```

```
   <filteringNextToken()>
<endif>

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
ANTLR3_API p<name> <name>New
(<inputType()> instream<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
 // See if we can create a new lexer with the standard constructor
 //
 return <name>NewSSD(instream, NULL<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \param[state] state Previously created shared recognizer stat
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
ANTLR3_API p<name> <name>NewSSD
(pANTLR3_INPUT_STREAM instream, pANTLR3_RECOGNIZER_SHARED_STATE
state<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
   p<name> ctx; // Context structure we will build and return

   ctx = (p<name>) ANTLR3_CALLOC(1, sizeof(<name>));

   if  (ctx == NULL)
   {
       // Failed to allocate memory for lexer context
       return  NULL;
   }

   /* -------------------------------------------------------------------
    * Memory for basic structure is allocated, now to fill in
    * in base ANTLR3 structures. We initialize the function pointers
    * for the standard ANTLR3 lexer function set, but upon return
    * from here, the programmer may set the pointers to provide custom
    * implementations of each function.
    *
    * We don't use the macros defined in <name>.h here so you can get a sense
```

```
     * of what goes where.
     */

    /* Create a base lexer, using the supplied input stream
     */
    ctx->pLexer = antlr3LexerNewStream(ANTLR3_SIZE_HINT, instream, state);

    /* Check that we allocated the memory correctly
     */
    if (ctx->pLexer == NULL)
    {
   ANTLR3_FREE(ctx);
   return  NULL;
    }
<if(memoize)>
<if(grammar.grammarIsRoot)>
    // Create a LIST for recording rule memos.
    //
    ctx->pLexer->rec->ruleMemo    = antlr3IntTrieNew(15); /* 16 bit depth is enough for 32768 rules! */
<endif>
<endif>

    /* Install the implementation of our <name> interface
     */
    <rules:{r | <if(!r.ruleDescriptor.isSynPred)>ctx->m<r.ruleDescriptor.name> =
m<r.ruleDescriptor.name>;<endif>}; separator="\n">

    /** When the nextToken() call is made to this lexer's pANTLR3_TOKEN_SOURCE
     *  it will call mTokens() in this generated code, and will pass it the ctx
     * pointer of this lexer, not the context of the base lexer, so store that now.
     */
    ctx->pLexer->ctx     = ctx;

    /**Install the token matching function
     */
    ctx->pLexer->mTokens = (void (*) (void *))(mTokens);

    ctx->getGrammarFileName = getGrammarFileName;
    ctx->free  = <name>Free;
    ctx->reset          = <name>Reset;

<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
       {g|ctx-><g:delegateName()> = <g.recognizerName>NewSSD(instream, ctx->pLexer->rec->state,
ctx<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
```

```
<endif>
<if(grammar.delegators)>
 // Install the pointers back to lexers that will delegate us to perform certain functions
 // for them.
 //
 <grammar.delegators:
       {g|ctx-><g:delegateName()>   = <g:delegateName()>;}; separator="\n">
<endif>
<if(filterMode)>
   /* We have filter mode turned on, so install the filtering nextToken function
    */
   ctx->pLexer->rec->state->tokSource->nextToken = <name>NextToken;
<endif>
  <actions.lexer.apifuncs>

   /* Return the newly built lexer to the caller
    */
   return  ctx;
}
<if(cyclicDFAs)>

/* =========================================================================
* DFA tables for the lexer
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* =========================================================================
* End of DFA tables for the lexer
*/
<endif>

/* =========================================================================
* Functions to match the lexer grammar defined tokens from the input stream
*/

<rules; separator="\n\n">

/* =========================================================================
* Lexer matching rules end.
* =========================================================================
*/
<if(synpreds)>

/* =========================================================================
* Lexer syntactic predicates
*/
<synpreds:{p | <lexerSynpred(predname=p)>}>
/* =========================================================================
* Lexer syntactic predicates end.
* ==============================================================================
*/
<endif>

/* End of Lexer code
* ================================================
* ================================================
*/

>>


filteringNextToken() ::= <<
/** An override of the lexer's nextToken() method that backtracks over mTokens() looking
*  for matches in lexer filterMode.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  BACKTRACKING needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at BACKTRACKING==1.
*/
static pANTLR3_COMMON_TOKEN
<name>NextToken(pANTLR3_TOKEN_SOURCE toksource)
{
   pANTLR3_LEXER   lexer;
 pANTLR3_RECOGNIZER_SHARED_STATE state;

   lexer   = (pANTLR3_LEXER)(toksource->super);
   state = lexer->rec->state;

   /* Get rid of any previous token (token factory takes care of
    * any deallocation when this token is finally used up.
    */
   state  ->token     = NULL;
   state  ->error     = ANTLR3_FALSE;     /* Start out without an exception */
   state  ->failed    = ANTLR3_FALSE;

   /* Record the start of the token in our input stream.
    */
   state->tokenStartCharIndex   = lexer->input->istream->index(lexer->input->istream);
   state->tokenStartCharPositionInLine = lexer->input->getCharPositionInLine(lexer->input);
   state->tokenStartLine    = lexer->input->getLine(lexer->input);
   state->text       = NULL;

   /* Now call the matching rules and see if we can generate a new token
    */
   for (;;)
   {
  if  (lexer->input->istream->_LA(lexer->input->istream, 1) == ANTLR3_CHARSTREAM_EOF)
  {
   /* Reached the end of the stream, nothing more to do.
    */
   pANTLR3_COMMON_TOKEN    teof = &(toksource->eofToken);

   teof->setStartIndex (teof, lexer->getCharIndex(lexer));
   teof->setStopIndex  (teof, lexer->getCharIndex(lexer));
   teof->setLine  (teof, lexer->getLine(lexer));
   return  teof;
  }

  state->token  = NULL;
  state->error  = ANTLR3_FALSE;     /* Start out without an exception */

  {
   ANTLR3_MARKER   m;

   m      = lexer->input->istream->mark(lexer->input->istream);
   state->backtracking  = 1;    /* No exceptions */
   state->failed   = ANTLR3_FALSE;

   /* Call the generated lexer, see if it can get a new token together.
    */
   lexer->mTokens(lexer->ctx);
     state->backtracking = 0;

     <! mTokens backtracks with synpred at BACKTRACKING==2
    and we set the synpredgate to allow actions at level 1. !>

   if (state->failed == ANTLR3_TRUE)
   {
    lexer->input->istream->rewind(lexer->input->istream, m);
    lexer->input->istream->consume(lexer->input->istream); <! advance one char and try again !>
   }
   else
   {
    lexer->emit(lexer);     /* Assemble the token and emit it to the stream */
    return state->token;
   }
  }
   }
}
>>

actionGate() ::= "BACKTRACKING==0"

filteringActionGate() ::= "BACKTRACKING==1"

/** How to generate a parser */
```

```
genericParser(  grammar,
    name,
               scopes,
               tokens,
               tokenNames,
               rules,
               numRules,
               bitsets,
               inputStreamType,
               superClass,
               labelType,
    members,
    rewriteElementType, filterMode,
               ASTLabelType="pANTLR3_BASE_TREE"
             ) ::= <<


<if(grammar.grammarIsRoot)>
/** \brief Table of all token names in symbolic order, mainly used for
*         error reporting.
*/
pANTLR3_UINT8   <name>TokenNames[<length(tokenNames)>+4]
    = {
       (pANTLR3_UINT8) "\<invalid>",       /* String to print to indicate an invalid token */
       (pANTLR3_UINT8) "\<EOR>",
       (pANTLR3_UINT8) "\<DOWN>",
       (pANTLR3_UINT8) "\<UP>",
       <tokenNames:{it |(pANTLR3_UINT8) <it>}; separator=",\n">
      };
<endif>

   <@members>

   <@end>
<rules:{r |<ruleAttributeScopeFuncMacro(scope=r.ruleDescriptor.ruleScope)>}>
<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScopeFuncMacro(it)><endif>}>

// Forward declare the locally static matching functions we have generated.
//
<rules:{r | static <headerReturnType(ruleDescriptor=r.ruleDescriptor)> <r.ruleDescriptor.name>    (p<name>
ctx<if(r.ruleDescriptor.parameterScope)>, <endif><r.ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
static void <name>Free(p<name> ctx);
static void     <name>Reset (p<name> ctx);

<if(!LEXER)>
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
```

```
<if(recognizer.grammar.delegatedRules)>
// Delegated rules
//
<recognizer.grammar.delegatedRules:{ruleDescriptor|static <headerReturnType(ruleDescriptor)>
<ruleDescriptor.name>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">

<endif>
<endif>

/* For use in tree output where we are accumulating rule labels via label += ruleRef
* we need a function that knows how to free a return scope when the list is destroyed.
* We cannot just use ANTLR3_FREE because in debug tracking mode, this is a macro.
*/
static void ANTLR3_CDECL freeScope(void * scope)
{
   ANTLR3_FREE(scope);
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
static const char * getGrammarFileName()
{
 return fileName;
}
/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
ANTLR3_API p<name>
<name>New   (<inputStreamType> instream<grammar.delegators:{g|, p<g.recognizerName>
<g:delegateName()>}>)
{
 // See if we can create a new parser with the standard constructor
 //
 return <name>NewSSD(instream, NULL<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
```

```
* \return Pointer to new parser context upon success.
*/
ANTLR3_API p<name>
<name>NewSSD   (<inputStreamType> instream, pANTLR3_RECOGNIZER_SHARED_STATE
state<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
   p<name> ctx;     /* Context structure we will build and return   */

   ctx = (p<name>) ANTLR3_CALLOC(1, sizeof(<name>));

   if (ctx == NULL)
   {
  // Failed to allocate memory for parser context
  //
       return  NULL;
   }

   /* -------------------------------------------------------------------
    * Memory for basic structure is allocated, now to fill in
    * the base ANTLR3 structures. We initialize the function pointers
    * for the standard ANTLR3 parser function set, but upon return
    * from here, the programmer may set the pointers to provide custom
    * implementations of each function.
    *
    * We don't use the macros defined in <name>.h here, in order that you can get a sense
    * of what goes where.
    */

<if(PARSER)>
   /* Create a base parser/recognizer, using the supplied token stream
    */
   ctx->pParser     = antlr3ParserNewStream(ANTLR3_SIZE_HINT, instream->tstream, state);
<endif>
<if(TREE_PARSER)>
   /* Create a base Tree parser/recognizer, using the supplied tree node stream
    */
   ctx->pTreeParser  = antlr3TreeParserNewStream(ANTLR3_SIZE_HINT, instream, state);
<endif>

   /* Install the implementation of our <name> interface
    */
   <rules:{r | ctx-><r.ruleDescriptor.name> = <r.ruleDescriptor.name>;}; separator="\n">
<if(grammar.delegatedRules)>
 // Install the delegated methods so that they appear to be a part of this
 // parser
 //
   <grammar.delegatedRules:{ruleDescriptor | ctx-><ruleDescriptor.name> = <ruleDescriptor.name>;};
separator="\n">
```

```
<endif>

   ctx->free   = <name>Free;
   ctx->reset   = <name>Reset;
   ctx->getGrammarFileName = getGrammarFileName;

   /* Install the scope pushing methods.
    */
   <rules: {r |<if(r.ruleDescriptor.ruleScope)>
<ruleAttributeScope(scope=r.ruleDescriptor.ruleScope)><\n>
<endif>}>
   <recognizer.scopes:{it |<if(it.isDynamicGlobalScope)>
<globalAttributeScope(it)><\n>
<endif>}>
   <@apifuncs>

   <@end>
<if(grammar.directDelegates)>
 // Initialize the parsers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
        {g|ctx-><g:delegateName()> = <g.recognizerName>NewSSD(instream, PSRSTATE,
ctx<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
<endif>
<if(grammar.delegators)>
 // Install the pointers back to parsers that will delegate us to perform certain functions
 // for them.
 //
 <grammar.delegators:
        {g|ctx-><g:delegateName()>   = <g:delegateName()>;}; separator="\n">
<endif>
   <actions.parser.apifuncs>
   <actions.treeparser.apifuncs>
<if(memoize)>
<if(grammar.grammarIsRoot)>
   /* Create a LIST for recording rule memos.
    */
    RULEMEMO    = antlr3IntTrieNew(15); /* 16 bit depth is enough for 32768 rules! */<\n>
<endif>
<endif>
   /* Install the token table
    */
   PSRSTATE->tokenNames   = <grammar.composite.rootGrammar.recognizerName>TokenNames;

   <@debugStuff()>

   /* Return the newly built parser to the caller
```

```
    */
   return  ctx;
}

static void
<name>Reset (p<name> ctx)
{
   RECOGNIZER->reset(RECOGNIZER);
}

/** Free the parser resources
*/
static void
<name>Free(p<name> ctx)
{
   /* Free any scope memory
    */
   <rules: {r
|<if(r.ruleDescriptor.ruleScope)><ruleAttributeScopeFree(scope=r.ruleDescriptor.ruleScope)><\n><endif>}>
   <recognizer.scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScopeFree(it)><\n><endif>}>

   <@cleanup>
   <@end>
<if(grammar.directDelegates)>
 // Free the parsers that we delegated to
 // functions to.NULL the state so we only free it once.
 //
 <grammar.directDelegates:
        {g| ctx-><g:delegateName()>-><if(TREE_PARSER)>pTreeParser<else>pParser<endif>->rec->state = NULL;
        ctx-><g:delegateName()>->free(ctx-><g:delegateName()>);}; separator="\n">
<endif>
<if(memoize)>
<if(grammar.grammarIsRoot)>
 if (RULEMEMO != NULL)
 {
  RULEMEMO->free(RULEMEMO);
  RULEMEMO = NULL;
 }
<endif>
<endif>
 // Free this parser
 //
<if(TREE_PARSER)>
   ctx->pTreeParser->free(ctx->pTreeParser);<\n>
<else>
   ctx->pParser->free(ctx->pParser);<\n>
<endif>
```

```
   ANTLR3_FREE(ctx);

   /* Everything is released, so we can return
    */
   return;
}

/** Return token names used by this <grammarType()>
*
* The returned pointer is used as an index into the token names table (using the token
* number as the index).
*
* \return Pointer to first char * in the table.
*/
static pANTLR3_UINT8    *getTokenNames()
{
       return <grammar.composite.rootGrammar.recognizerName>TokenNames;
}

   <members>

/* Declare the bitsets
*/
<bitsets:{it | <bitsetDeclare(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
                  words64=it.bits)>}>


<if(cyclicDFAs)>

/* =========================================================================
* DFA tables for the parser
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* =========================================================================
* End of DFA tables for the parser
*/
<endif>

/* ==============================================
* Parsing rules
*/
<rules; separator="\n\n">
<if(grammar.delegatedRules)>
 // Delegated methods that appear to be a part of this
 // parser
 //
<grammar.delegatedRules:{ruleDescriptor|
   <returnType()> <ruleDescriptor.name>(p<name> ctx<if(ruleDescriptor.parameterScope.attributes)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
  \{
      <if(ruleDescriptor.hasReturnValue)>return <endif>ctx-><ruleDescriptor.grammar:delegateName()>-
><ruleDescriptor.name>(ctx-
><ruleDescriptor.grammar:delegateName()><if(ruleDescriptor.parameterScope.attributes)>,
<endif><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", ">);
 \}}; separator="\n">

<endif>
/* End of parsing rules
* ==============================================
*/

/* ==============================================
* Syntactic predicates
*/
<synpreds:{p | <synpred(predname=p)>}>
/* End of syntactic predicates
* ==============================================
*/





>>

parser( grammar,
  name,
  scopes,
  tokens,
  tokenNames,
  rules,
  numRules,
  bitsets,
  ASTLabelType,
  superClass="Parser",
  labelType="pANTLR3_COMMON_TOKEN",
  members={<actions.parser.members>}
  ) ::= <<
<genericParser(inputStreamType="pANTLR3_COMMON_TOKEN_STREAM", rewriteElementType="TOKEN",
...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser( grammar,
  name,
  scopes,
  tokens,
  tokenNames,
  globalAction,
  rules,
  numRules,
  bitsets,
  filterMode,
  labelType={<ASTLabelType>},
  ASTLabelType="pANTLR3_BASE_TREE",
  superClass="TreeParser",
  members={<actions.treeparser.members>}
  ) ::= <<
<genericParser(inputStreamType="pANTLR3_COMMON_TREE_NODE_STREAM",
rewriteElementType="NODE", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
static void <ruleName>_fragment(p<name> ctx <ruleDescriptor.parameterScope:parameterScope()>)
{
 <ruleLabelDefs()>
 <ruleLabelInitializations()>
<if(trace)>
  ANTLR3_PRINTF("enter <ruleName> %d failed = %d, backtracking = %d\\n",LT(1),failed,BACKTRACKING);
  <block>
  ANTLR3_PRINTF("exit <ruleName> %d, failed = %d, backtracking = %d\\n",LT(1),failed,BACKTRACKING);

<else>
  <block>
<endif>
<ruleCleanUp()>
}
// $ANTLR end <ruleName>
>>

synpred(predname) ::= <<
static ANTLR3_BOOLEAN <predname>(p<name> ctx)
{
  ANTLR3_MARKER   start;
  ANTLR3_BOOLEAN  success;

  BACKTRACKING++;
  <@start()>
  start = MARK();
  <predname>_fragment(ctx);     // can never throw exception
  success = !(FAILEDFLAG);
  REWIND(start);
  <@stop()>
  BACKTRACKING--;
  FAILEDFLAG = ANTLR3_FALSE;
  return success;
}<\n>
>>

lexerSynpred(predname) ::= <<
<synpred(predname)>
>>

ruleMemoization(rname) ::= <<
<if(memoize)>
if ( (BACKTRACKING>0) && (HAVEPARSEDRULE(<ruleDescriptor.index>)) )
{
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
 retval.start = 0;<\n>
<endif>
<endif>
  <(ruleDescriptor.actions.after):execAfter()>
  <finalCode(finalBlock=finally)>
<if(!ruleDescriptor.isSynPred)>
  <scopeClean()><\n>
<endif>
  return <ruleReturnValue()>;
}
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
if  (HASEXCEPTION())
{
  goto rule<ruleDescriptor.name>Ex;
}
<if(backtracking)>
if (HASFAILED())
{
   <scopeClean()>
   <@debugClean()>
   return <ruleReturnValue()>;
}
<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if (BACKTRACKING>0)
{
   FAILEDFLAG = <true_value()>;
   <scopeClean()>
   return <ruleReturnValue()>;
}
<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
/**
* $ANTLR start <ruleName>
* <fileName>:<description>
*/
static <returnType()>
<ruleName>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
{
   <if(trace)>ANTLR3_PRINTF("enter <ruleName> %s failed=%d, backtracking=%d\n", LT(1),
BACKTRACKING);<endif>
   <ruleDeclarations()>
   <ruleDescriptor.actions.declarations>
   <ruleLabelDefs()>
   <ruleInitializations()>
   <ruleDescriptor.actions.init>
   <ruleMemoization(rname=ruleName)>
   <ruleLabelInitializations()>
   <@preamble()>
   {
       <block>
   }

   <ruleCleanUp()>
<if(exceptions)>
   if (HASEXCEPTION())
   {
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
   }
   else
   {
 <(ruleDescriptor.actions.after):execAfter()>
   }
<else>
   <if(!emptyRule)>
       <if(actions.(actionScope).rulecatch)>
           <actions.(actionScope).rulecatch>
       <else>
           if (HASEXCEPTION())
           {
               PREPORTERROR();
               PRECOVER();
               <@setErrorReturnValue()>
           }
           <if(ruleDescriptor.actions.after)>
           else
           {
               <(ruleDescriptor.actions.after):execAfter()>
           }<\n>
           <endif>
       <endif>
   <endif>
<endif>

   <if(trace)>ANTLR3_PRINTF("exit <ruleName> %d failed=%s backtracking=%s\n", LT(1), failed,
BACKTRACKING);<endif>
   <memoize()>
<if(finally)>
   <finalCode(finalBlock=finally)>
<endif>
   <scopeClean()>
   <@postamble()>
   return <ruleReturnValue()>;
}
/* $ANTLR end <ruleName> */
>>

finalCode(finalBlock) ::= <<
{
   <finalBlock>
}

>>
```

```
catch(decl,action) ::= <<
/* catch(decl,action)
*/
{
  <e.action>
}

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()> retval;<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name>;
}>
<endif>
<if(memoize)>
ANTLR3_MARKER <ruleDescriptor.name>_StartIndex;
<endif>
>>

ruleInitializations() ::= <<
/* Initialize rule variables
*/
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.returnScope.attributes:{ a |
<if(a.initValue)>retval.<a.name> = <a.initValue>;<endif>
}>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<if(a.initValue)><a.name> = <a.initValue>;<endif>
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = INDEX();<\n>
<endif>
<ruleDescriptor.useScopes:{it |<scopeTop(it)> = <scopePush(it)>;}; separator="\n">
<ruleDescriptor.ruleScope:{it |<scopeTop(it.name)> = <scopePush(it.name)>;}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
  :{it |<labelType>    <it.label.text>;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
  :{it |pANTLR3_VECTOR    list_<it.label.text>;}; separator="\n"
>
```

```
<[ruleDescriptor.ruleLabels,ruleDescriptor.ruleListLabels]
   :ruleLabelDef(); separator="\n"
>
>>

ruleLabelInitializations() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
   :{it |<it.label.text>       = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
   :{it |list_<it.label.text>     = NULL;}; separator="\n"
>
<[ruleDescriptor.ruleLabels,ruleDescriptor.ruleListLabels]
   :ruleLabelInitVal(); separator="\n"
>
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
retval.start = LT(1); retval.stop = retval.start;<\n>
<endif>
<endif>
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<labelType> <it.label.text>;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |ANTLR3_UINT32 <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |pANTLR3_INT_TRIE list_<it.label.text>;}; separator="\n"
>
>>

lexerRuleLabelInit() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |list_<it.label.text> = antlr3IntTrieNew(31);}; separator="\n"
>
>>
```

```
lexerRuleLabelFree() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |list_<it.label.text>->free(list_<it.label.text>);}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( BACKTRACKING>0 ) { MEMOIZE(<ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

ruleCleanUp() ::= <<

// This is where rules clean up and exit
//
goto rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
<if(!ruleDescriptor.isSynPred)>
retval.stop = LT(-1);<\n>
<endif>
<endif>
<endif>
>>
```

```
scopeClean() ::= <<
<ruleDescriptor.useScopes:{it |<scopePop(it)>}; separator="\n">
<ruleDescriptor.ruleScope:{it |<scopePop(it.name)>}; separator="\n">

>>
/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules, which do not produce tokens.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
//   Comes from: <block.description>
/** \brief Lexer rule generated by ANTLR3
*
* $ANTLR start <ruleName>
*
* Looks to match the characters the constitute the token <ruleName>
* from the attached input stream.
*
*
* \remark
*  - lexer->error == ANTLR3_TRUE if an exception was thrown.
*/
static ANTLR3_INLINE
void m<ruleName>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
{
 ANTLR3_UINT32 _type;
   <ruleDeclarations()>
   <ruleDescriptor.actions.declarations>
   <lexerRuleLabelDefs()>
   <if(trace)>System.out.println("enter <ruleName> '"+(char)LA(1)+"'
line="+GETLINE()+":"+GETCHARPOSITIONINLINE()+" failed="+failed+"
backtracking="+BACKTRACKING);<endif>

<if(nakedBlock)>
   <ruleMemoization(rname=ruleName)>
   <lexerRuleLabelInit()>
   <ruleDescriptor.actions.init>

   <block><\n>
<else>
   <ruleMemoization(rname=ruleName)>
   <lexerRuleLabelInit()>
   _type     = <ruleName>;

   <ruleDescriptor.actions.init>

   <block>
 LEXSTATE->type = _type;
<endif>
   <if(trace)> ANTLR3_FPRINTF(stderr, "exit <ruleName> '%c' line=%d:%d failed = %d, backtracking
=%d\n",LA(1),GETLINE(),GETCHARPOSITIONINLINE(),failed,BACKTRACKING);<endif>
   <ruleCleanUp()>
   <lexerRuleLabelFree()>
   <(ruleDescriptor.actions.after):execAfter()>
   <memoize>
}
// $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
/** This is the entry point in to the lexer from an object that
*  wants to generate the next token, such as a pCOMMON_TOKEN_STREAM
*/
static void
mTokens(p<name> ctx)
{
   <block><\n>

   goto ruleTokensEx; /* Prevent compiler warnings */
ruleTokensEx: ;
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<

// <fileName>:<description>
{
   int alt<decisionNumber>=<maxAlt>;
   <decls>
   <@predecision()>
   <decision>
   <@postdecision()>
   <@prebranch()>
   switch (alt<decisionNumber>)
   {
 <alts:{a | <altSwitchCase(i,a)>}>
   }
   <@postbranch()>
}
```

```
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
{
   //  <fileName>:<description>

   ANTLR3_UINT32 alt<decisionNumber>;

   alt<decisionNumber>=<maxAlt>;

   <decls>
   <@predecision()>
   <decision>
   <@postdecision()>
   switch (alt<decisionNumber>)
   {
 <alts:{a | <altSwitchCase(i,a)>}>
   }
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
{
   int cnt<decisionNumber>=0;
   <decls>
   <@preloop()>
   for (;;)
   {
       int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
     <alts:{a | <altSwitchCase(i,a)>}>
     default:

  if ( cnt<decisionNumber> >= 1 )
  {
      goto loop<decisionNumber>;
  }
  <ruleBacktrackFailure()>
  <earlyExitEx()>
  <@earlyExitException()>
  goto rule<ruleDescriptor.name>Ex;
 }
 cnt<decisionNumber>++;
   }
   loop<decisionNumber>: ; /* Jump to here if this rule does not match */
   <@postloop()>
}
>>

earlyExitEx() ::= <<
/* mismatchedSetEx()
*/
CONSTRUCTEX();
EXCEPTION->type = ANTLR3_EARLY_EXIT_EXCEPTION;
EXCEPTION->name = (void *)ANTLR3_EARLY_EXIT_NAME;
<\n>
>>
positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<

// <fileName>:<description>
<decls>

<@preloop()>
for (;;)
{
   int alt<decisionNumber>=<maxAlt>;
   <@predecision()>
   <decision>
   <@postdecision()>
   switch (alt<decisionNumber>)
   {
 <alts:{a | <altSwitchCase(i,a)>}>
 default:
     goto loop<decisionNumber>; /* break out of the loop */
     break;
   }
}
loop<decisionNumber>: ; /* Jump out to here if this rule does not match */
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by antlr before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
   <@prealt()>
   <alt>
   break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
   <@declarations()>
   <@initializations()>
   <elements:element()>
   <rew>
   <@cleanup()>
}
>>

// E L E M E N T S
```

```
/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> = (<labelType>)<endif> MATCHT(<token>,
&FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label> == NULL)
{
   list_<label>=ctx->vectors->newVector(ctx->vectors);
}
list_<label>->add(list_<label>, <elem>, NULL);
>>


/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHC(<char>);
<checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHRANGE(<a>, <b>);
```

```
<checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= LA(1);<\n>
<else>
<label>=(<labelType>)LT(1);<\n>
<endif>
<endif>
if ( <s> )
{
  CONSUME();
  <postmatchCode>
<if(!LEXER)>
  PERRORRECOVERY=ANTLR3_FALSE;
<endif>
  <if(backtracking)>FAILEDFLAG=ANTLR3_FALSE;<\n><endif>
}
else
{
  <ruleBacktrackFailure()>
  <mismatchedSetEx()>
  <@mismatchedSetException()>
<if(LEXER)>
  LRECOVER();
<else>
  RECOVERFROMMISMATCHEDSET(&FOLLOW_set_in_<ruleName><elementIndex>);
<endif>
  goto rule<ruleDescriptor.name>Ex;
}<\n>
>>

mismatchedSetEx() ::= <<
CONSTRUCTEX();
EXCEPTION->type         = ANTLR3_MISMATCHED_SET_EXCEPTION;
EXCEPTION->name         = (void *)ANTLR3_MISMATCHED_SET_NAME;
<if(PARSER)>
EXCEPTION->expectingSet = &FOLLOW_set_in_<ruleName><elementIndex>;
<endif>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
```

```
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
<label>Start = GETCHARINDEX();
MATCHS(<string>);
<checkRuleBacktrackFailure()>
<label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
<label>->setType(<label>, ANTLR3_TOKEN_INVALID);
<label>->setStartIndex(<label>, <label>Start);
<label>->setStopIndex(<label>, GETCHARINDEX()-1);
<label>->input = INPUT->tnstream->istream;
<else>
MATCHS(<string>);
<checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=(<labelType>)LT(1);<\n>
<endif>
MATCHANYT();
<checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHANY();
<checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
```

```
*  and a return value or values. The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
FOLLOWPUSH(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)>ctx-><scope:delegateName()>-><endif><rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif><if(args)>, <args; separator=", "><endif>);<\n>
FOLLOWPOP();
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
/* <description> */
<if(label)>
{
   ANTLR3_MARKER <label>Start<elementIndex> = GETCHARINDEX();
   <if(scope)>ctx-><scope:delegateName()>-><endif>m<rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif> <if(args)>, <endif><args; separator=", ">);
   <checkRuleBacktrackFailure()>
   <label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
   <label>->setType(<label>, ANTLR3_TOKEN_INVALID);
   <label>->setStartIndex(<label>, <label>Start<elementIndex>);
   <label>->setStopIndex(<label>, GETCHARINDEX()-1);
   <label>->input = INPUT;
}
<else>
<if(scope)>ctx-><scope:delegateName()>-><endif>m<rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif> <if(args)>, <endif><args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
```

```
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
{
  ANTLR3_UINT32 <label>Start<elementIndex>;
  <labelType> <label>;
  <label>Start<elementIndex> = GETCHARINDEX();
  MATCHC(ANTLR3_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
  <label>->setType(<label>, ANTLR3_TOKEN_EOF);
  <label>->setStartIndex(<label>, <label>Start<elementIndex>);
  <label>->setStopIndex(<label>, GETCHARINDEX()-1);
  <label>->input = INPUT->tnstream->istream;
}
<else>
  MATCHC(ANTLR3_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <endif>
>>

// used for left-recursive rules
recRuleDefArg()                       ::= "int <recRuleArg()>"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( LA(1)==ANTLR3_TOKEN_DOWN ) {
  MATCHT(ANTLR3_TOKEN_DOWN, NULL);
  <checkRuleBacktrackFailure()>
  <children:element()>
  MATCHT(ANTLR3_TOKEN_UP, NULL);
  <checkRuleBacktrackFailure()>
}
<else>
MATCHT(ANTLR3_TOKEN_DOWN, NULL);
<checkRuleBacktrackFailure()>
<children:element()>
MATCHT(ANTLR3_TOKEN_UP, NULL);
```

```
<checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) )
{
   <ruleBacktrackFailure()>
   <newFPE(...)>
}
>>

newFPE() ::= <<
   CONSTRUCTEX();
   EXCEPTION->type         = ANTLR3_FAILED_PREDICATE_EXCEPTION;
   EXCEPTION->message      = (void *)"<description>";
   EXCEPTION->ruleName  = (void *)"<ruleName>";
   <\n>
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<

{
   int LA<decisionNumber>_<stateNumber> = LA(<k>);
   <edges; separator="\nelse ">
   else
   {
<if(eotPredictsAlt)>
       alt<decisionNumber>=<eotPredictsAlt>;
<else>
       <ruleBacktrackFailure()>

       <newNVException()>
       goto rule<ruleDescriptor.name>Ex;

<endif>
   }
}
>>

newNVException() ::= <<
CONSTRUCTEX();
EXCEPTION->type         = ANTLR3_NO_VIABLE_ALT_EXCEPTION;
```

```
EXCEPTION->message      = (void *)"<description>";
EXCEPTION->decisionNum  = <decisionNumber>;
EXCEPTION->state        = <stateNumber>;
<@noViableAltException()>
<\n>
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
   int LA<decisionNumber>_<stateNumber> = LA(<k>);
   <edges; separator="\nelse ">
}
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/

dfaLoopbackStateDecls()::= <<
ANTLR3_UINT32   LA<decisionNumber>_<stateNumber>;
>>
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
  /* dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
   */
   int LA<decisionNumber>_<stateNumber> = LA(<k>);
   <edges; separator="\nelse "><\n>
   <if(eotPredictsAlt)>
   <if(!edges)>
 alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
 <else>
   else
   {
 alt<decisionNumber>=<eotPredictsAlt>;
   }<\n>
   <endif>
   <endif>
}
>>
```

```
/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( <if(predicates)>(<predicates>) && <endif>(<labelExpr>))
{
   <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
{
<edges; separator="\n">

default:
<if(eotPredictsAlt)>
   alt<decisionNumber>=<eotPredictsAlt>;
<else>
   <ruleBacktrackFailure()>
   <newNVException()>
   goto rule<ruleDescriptor.name>Ex;<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
{
   <edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
{
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
   alt<decisionNumber>=<eotPredictsAlt>;
   break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
 {
  <targetState>
 }
   break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = cdfa<decisionNumber>.predict(ctx, RECOGNIZER, ISTREAM,
&cdfa<decisionNumber>);
<checkRuleBacktrackFailure()>
>>

/* Dump DFA tables as static initialized arrays of shorts(16 bits)/characters(8 bits)
* which are then used to statically initialize the dfa structure, which means that there
* is no runtime initialization whatsoever, other than anything the C compiler might
* need to generate. In general the C compiler will lay out memory such that there is no
* runtime code required.
*/
cyclicDFA(dfa) ::= <<
/** Static dfa state tables for Cyclic dfa:
*    <dfa.description>
*/
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
   {
 <dfa.eot; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>] =
   {
 <dfa.eof; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
   {
 <dfa.min; wrap="\n", separator=", ", null="-1">
   };
```

```
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
   {
 <dfa.max; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
   {
 <dfa.accept; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
   {
 <dfa.special; wrap="\n", separator=", ", null="-1">
   };

/** Used when there is no transition table entry for a particular state */
#define dfa<dfa.decisionNumber>_T_empty     NULL

<dfa.edgeTransitionClassMap.keys:{ table |
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_T<i0>[] =
   {
 <table; separator=", ", wrap="\n", null="-1">
   \};}; null = "">

/* Transition tables are a table of sub tables, with some tables
* reused for efficiency.
*/
static const ANTLR3_INT32 * const dfa<dfa.decisionNumber>_transitions[] =
{
   <dfa.transitionEdgeTables:{xref|dfa<dfa.decisionNumber>_T<xref>}; separator=", ", wrap="\n", null="_empty">
};

<if(dfa.specialStateSTs)>
static ANTLR3_INT32 dfa<dfa.decisionNumber>_sst(p<name> ctx, pANTLR3_BASE_RECOGNIZER recognizer,
pANTLR3_INT_STREAM is, pANTLR3_CYCLIC_DFA dfa, ANTLR3_INT32 s)
{
   ANTLR3_INT32    _s;

   _s     = s;
   switch  (s)
   {
   <dfa.specialStateSTs:{state |
   case <i0>:

 <state>}; separator="\n">
   }
<if(backtracking)>
   if (BACKTRACKING > 0)
   {
 FAILEDFLAG = ANTLR3_TRUE;
 return -1;
  }
<endif>

  CONSTRUCTEX();
  EXCEPTION->type         = ANTLR3_NO_VIABLE_ALT_EXCEPTION;
  EXCEPTION->message      = (void *)"<dfa.description>";
  EXCEPTION->decisionNum  = <dfa.decisionNumber>;
  EXCEPTION->state        = _s;
  <@noViableAltException()>
  return -1;
}
<endif>

<@errorMethod()>

/* Declare tracking structure for Cyclic DFA <dfa.decisionNumber>
*/
static
ANTLR3_CYCLIC_DFA cdfa<dfa.decisionNumber>
  = {
    <dfa.decisionNumber>,      /* Decision number of this dfa     */
    /* Which decision this represents:   */
    (const pANTLR3_UCHAR)"<dfa.description>",
<if(dfa.specialStateSTs)>
    (CDFA_SPECIAL_FUNC) dfa<dfa.decisionNumber>_sst,
<else>
    (CDFA_SPECIAL_FUNC) antlr3dfaspecialStateTransition, /* Default special state transition function */
<endif>

    antlr3dfaspecialTransition,  /* DFA specialTransition is currently just a default function in the runtime */
    antlr3dfapredict,   /* DFA simulator function is in the runtime */
    dfa<dfa.decisionNumber>_eot,     /* EOT table       */
    dfa<dfa.decisionNumber>_eof,     /* EOF table       */
    dfa<dfa.decisionNumber>_min,     /* Minimum tokens for each state    */
    dfa<dfa.decisionNumber>_max,     /* Maximum tokens for each state    */
    dfa<dfa.decisionNumber>_accept, /* Accept table       */
    dfa<dfa.decisionNumber>_special, /* Special transition states     */
    dfa<dfa.decisionNumber>_transitions /* Table of transition tables     */

 };
/* End of Cyclic DFA <dfa.decisionNumber>
* ---------------------
*/
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
```

```
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
   ANTLR3_UINT32 LA<decisionNumber>_<stateNumber>;<\n>
   ANTLR3_MARKER index<decisionNumber>_<stateNumber>;<\n>

 LA<decisionNumber>_<stateNumber> = LA(1);<\n>
   <if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
   index<decisionNumber>_<stateNumber> = INDEX();<\n>
   REWINDLAST();<\n>
   <endif>
   s = -1;
   <edges; separator="\nelse ">
 <if(semPredState)> <! return input cursor to state before we rewound !>
 SEEK(index<decisionNumber>_<stateNumber>);<\n>
 <endif>
   if ( s>=0 )
   {
 return s;
   }
}
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( <if(predicates)>(<predicates>) && <endif>(<labelExpr>) )
{
   s = <targetStateNumber>;
}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "( (<left>) && (<right>) )"

orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\"||\">)"
```

```
notPredicate(pred) ::= "!( <evalPredicate(pred,{})> )"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>(ctx)"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
((LA<decisionNumber>_<stateNumber> >= <lower>) && (LA<decisionNumber>_<stateNumber> \<= <upper>))
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "((LA(<k>) >= <lower>) &&
(LA(<k>) \<= <upper>))"

setTest(ranges) ::= "<ranges; separator=\" || \">"

// A T T R I B U T E S

makeScopeSet() ::= <<
/* makeScopeSet()
*/
/** Definition of the <scope.name> scope variable tracking
*  structure. An instance of this structure is created by calling
*  <name>_<scope.name>Push().
*/
typedef struct  <scopeStruct(sname=scope.name,...)>_struct
{
   /** Function that the user may provide to be called when the
    *  scope is destroyed (so you can free pANTLR3_HASH_TABLES and so on)
    *
    * \param POinter to an instance of this typedef/struct
    */
   void    (ANTLR3_CDECL *free) (struct <scopeStruct(sname=scope.name,...)>_struct * frame);

   /* =============================================================================
    * Programmer defined variables...
    */
   <scope.attributes:{it |<it.decl>;}; separator="\n">

   /* End of programmer defined variables
    * =============================================================================
    */
```

```
}
   <scopeStruct(sname=scope.name,...)>, * <scopeType(sname=scope.name,...)>;

>>

globalAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

ruleAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

globalAttributeScopeFuncDecl(scope) ::=
<<
/* globalAttributeScopeFuncDecl(scope)
*/
<if(scope.attributes)>
/* -----------------------------------------------------------------------------
* Function declaration for creating a <name>_<scope.name> scope set
*/
static <scopeType(sname=scope.name,...)>   <scopePushName(sname=scope.name,...)>(p<name> ctx);
static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope);
/* ----------------------------------------------------------------------------- */

<endif>
>>

globalAttributeScopeFuncMacro(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeFuncMacro(scope)
*/
/** Function  for popping the top value from a <scopeStack(sname=scope.name)>
*/
void
<scopePopName(sname=scope.name,...)>(p<name> ctx)
{
   // First see if the user defined a function they want to be called when a
   // scope is popped/freed.
   //
```

```
 // If the user supplied the scope entries with a free function,then call it first
 //
   if (SCOPE_TOP(<scope.name>)->free != NULL)
 {
       SCOPE_TOP(<scope.name>)->free(SCOPE_TOP(<scope.name>));
 }

   // Now we decrement the scope's upper limit bound. We do not actually pop the scope as
   // we want to reuse scope entries if we do continuous push and pops. Most scopes don't
   // next too far so we don't want to keep freeing and allocating them
   //
   ctx-><scopeStack(sname=scope.name,...)>_limit--;
   SCOPE_TOP(<scope.name>) = (<scopeType(sname=scope.name)>)(ctx-><scopeStack(sname=scope.name,...)>-
>get(ctx-><scopeStack(sname=scope.name,...)>, ctx-><scopeStack(sname=scope.name,...)>_limit - 1));
}
<endif>
>>

ruleAttributeScopeFuncDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncDecl(scope)
*/
/* -----------------------------------------------------------------------------
* Function declarations for creating a <name>_<scope.name> scope set
*/
static <scopeType(sname=scope.name,...)>   <scopePushName(sname=scope.name,...)>(p<name> ctx);
static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope);
/* ----------------------------------------------------------------------------- */

<endif>
>>

ruleAttributeScopeFuncMacro(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncMacro(scope)
*/
/** Function for popping the top value from a <scopeStack(sname=scope.name,...)>
*/
void
<scopePopName(sname=scope.name,...)>(p<name> ctx)
{
   // First see if the user defined a function they want to be called when a
   // scope is popped/freed.
   //
 // If the user supplied the scope entries with a free function,then call it first
 //
   if (SCOPE_TOP(<scope.name>)->free != NULL)
 {
      SCOPE_TOP(<scope.name>)->free(SCOPE_TOP(<scope.name>));
 }

   // Now we decrement the scope's upper limit bound. We do not actually pop the scope as
   // we want to reuse scope entries if we do continuous push and pops. Most scopes don't
   // next too far so we don't want to keep freeing and allocating them
   //
   ctx-><scopeStack(sname=scope.name,...)>_limit--;
   SCOPE_TOP(<scope.name>) = (<scopeType(sname=scope.name)>)(ctx-><scopeStack(sname=scope.name,...)>->get(ctx-><scopeStack(sname=scope.name,...)>, ctx-><scopeStack(sname=scope.name,...)>_limit - 1));
}

<endif>
>>

globalAttributeScopeDef(scope) ::=
<<
/* globalAttributeScopeDef(scope)
*/
<if(scope.attributes)>
/** Pointer to the  <scope.name> stack for use by <scopePushName(sname=scope.name)>()
*  and <scopePopName(sname=scope.name,...)>()
*/
pANTLR3_STACK <scopeStack(sname=scope.name)>;
ANTLR3_UINT32 <scopeStack(sname=scope.name)>_limit;
/** Pointer to the top of the stack for the global scope <scopeStack(sname=scope.name)>
*/
<scopeType(sname=scope.name,...)>    (*<scopePushName(sname=scope.name,...)>)(struct <name>_Ctx_struct * ctx);
<scopeType(sname=scope.name,...)>    <scopeTopDecl(sname=scope.name,...)>;

<endif>
>>

ruleAttributeScopeDef(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDef(scope)
*/
/** Pointer to the  <scope.name> stack for use by <scopePushName(sname=scope.name)>()
*  and <scopePopName(sname=scope.name,...)>()
*/
pANTLR3_STACK <scopeStack(sname=scope.name,...)>;
ANTLR3_UINT32 <scopeStack(sname=scope.name,...)>_limit;
<scopeType(sname=scope.name,...)>   (*<scopePushName(sname=scope.name,...)>)(struct <name>_Ctx_struct * ctx);
<scopeType(sname=scope.name,...)>   <scopeTopDecl(sname=scope.name,...)>;

<endif>
```

```
>>

globalAttributeScopeFuncs(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeFuncs(scope)
*/
<attributeFuncs(scope)>
<endif>
>>

ruleAttributeScopeFuncs(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncs(scope)
*/
<attributeFuncs(scope)>
<endif>
>>

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScope(scope)
*/
ctx-><scopePushName(sname=scope.name,...)>     = <scopePushName(sname=scope.name,...)>;
ctx-><scopeStack(sname=scope.name,...)>    = antlr3StackNew(0);
ctx-><scopeStack(sname=scope.name,...)>_limit    = 0;
<scopeTop(sname=scope.name,...)>      = NULL;
<endif>
>>

ruleAttributeScope(scope) ::=
<<
<if(scope.attributes)>
/* ruleAttributeScope(scope)
*/
ctx-><scopePushName(sname=scope.name,...)>     = <scopePushName(sname=scope.name,...)>;
ctx-><scopeStack(sname=scope.name,...)>    = antlr3StackNew(0);
ctx-><scopeStack(sname=scope.name,...)>_limit    = 0;
<scopeTop(sname=scope.name,...)>      = NULL;
<endif>
>>
globalAttributeScopeFree(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScope(scope)
*/
ctx-><scopeStack(sname=scope.name,...)>->free(ctx-><scopeStack(sname=scope.name,...)>);
<endif>
>>
```

```
ruleAttributeScopeFree(scope) ::=
<<
<if(scope.attributes)>
/* ruleAttributeScope(scope)
*/
ctx-><scopeStack(sname=scope.name,...)>->free(ctx-><scopeStack(sname=scope.name,...)>);
<endif>
>>

scopeTopDecl(sname) ::= <<
p<name>_<sname>Top
>>

scopeTop(sname) ::= <<
ctx-><scopeTopDecl(sname=sname,...)>
>>

scopePop(sname) ::= <<
<scopePopName(sname=sname,...)>(ctx);
>>

scopePush(sname) ::= <<
p<name>_<sname>Push(ctx)
>>

scopePopName(sname) ::= <<
p<name>_<sname>Pop
>>

scopePushName(sname) ::= <<
p<name>_<sname>Push
>>

scopeType(sname) ::= <<
p<name>_<sname>_SCOPE
>>

scopeStruct(sname) ::= <<
<name>_<sname>_SCOPE
>>

scopeStack(sname) ::= <<
p<name>_<sname>Stack
>>

attributeFuncs(scope) ::= <<
<if(scope.attributes)>
/* attributeFuncs(scope)
```

```
*/

static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope)
{
   ANTLR3_FREE(scope);
}

/** \brief Allocate initial memory for a <name> <scope.name> scope variable stack entry and
 *         add it to the top of the stack.
 *
 * \remark
 * By default the structure is freed with ANTLR_FREE(), but you can use the
 * the \@init action to install a pointer to a custom free() routine by
 * adding the code:
 * \code
 *   <scopeTop(sname=scope.name)>->free = myroutine;
 * \endcode
 *
 * With lots of comments of course! The routine should be declared in
 * \@members { } as:
 * \code
 *   void ANTLR3_CDECL myfunc( <scopeType(sname=scope.name)> ptr).
 * \endcode
 *
 * It should perform any custom freeing stuff that you need (call ANTLR_FREE3, not free()
 * NB: It should not free the pointer it is given, which is the scope stack entry itself
 * and will be freed by the function that calls your custom free routine.
 *
 */
static <scopeType(sname=scope.name)>
<scopePushName(sname=scope.name)>(p<name> ctx)
{
   /* Pointer used to create a new set of attributes
    */
   <scopeType(sname=scope.name)>      newAttributes;

   /* Allocate the memory for a new structure if we need one.
    */
   if (ctx-><scopeStack(sname=scope.name)>->size(ctx-><scopeStack(sname=scope.name)>) > ctx-><scopeStack(sname=scope.name)>_limit)
   {
       // The current limit value was less than the number of scopes available on the stack so
       // we can just reuse one. Our limit tracks the stack count, so the index of the entry we want
       // is one less than that, or conveniently, the current value of limit.
       //
       newAttributes = (<scopeType(sname=scope.name)>)ctx-><scopeStack(sname=scope.name)>->get(ctx-><scopeStack(sname=scope.name)>, ctx-><scopeStack(sname=scope.name)>_limit);
   }
   else
   {
       // Need a new allocation
       //
       newAttributes = (<scopeType(sname=scope.name)>)
ANTLR3_MALLOC(sizeof(<scopeStruct(sname=scope.name)>));
       if  (newAttributes != NULL)
       {
           /* Standard ANTLR3 library implementation
            */
           ctx-><scopeStack(sname=scope.name)>->push(ctx-><scopeStack(sname=scope.name)>, newAttributes,
(void (*)(void *))<scope.name>Free);
       }
   }

   // Blank out any previous free pointer, the user might or might install a new one.
   //
   newAttributes->free = NULL;

   // Indicate the position in the available stack that the current level is at
   //
   ctx-><scopeStack(sname=scope.name)>_limit++;

 /* Return value is the pointer to the new entry, which may be used locally
  * without de-referencing via the context.
    */
   return  newAttributes;
}<\n>

<endif>
>>
returnStructName(r) ::= "<r.name>_return"

returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
<else>
ANTLR3_BOOLEAN
<endif>
%>
```

```
/** Generate the C type associated with a single or multiple return
*  value(s).
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.grammar.recognizerName>_<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
%>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<it.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "0".
*/
initValue(typeName) ::= <<
= <cTypeInitMap.(typeName)>
>>

/** Define a rule label  */
ruleLabelDef(label) ::= <<
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text>;
#undef RETURN_TYPE_<label.label.text>
#define RETURN_TYPE_<label.label.text> <ruleLabelType(referencedRule=label.referencedRule)><\n>
>>
/**  Rule label default value */
ruleLabelInitVal(label) ::= <<
>>

ASTLabelType() ::=
"<if(recognizer.ASTLabelType)><recognizer.ASTLabelType><else>pANTLR3_BASE_TREE<endif>"

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
typedef struct <ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>_struct
```

```
{
<if(!TREE_PARSER)>
   /** Generic return elements for ANTLR3 rules that are not in tree parsers or returning trees
    */
   pANTLR3_COMMON_TOKEN    start;
   pANTLR3_COMMON_TOKEN    stop;
<else>
   <recognizer.ASTLabelType>       start;
   <recognizer.ASTLabelType>       stop;
<endif>
   <@ruleReturnMembers()>
   <ruleDescriptor.returnScope.attributes:{it |<it.type> <it.name>;}; separator="\n">
}
   <ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>;<\n><\n>
<endif>
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name>=<expr>;"

/** Note that the scopeAttributeRef does not have access to the
* grammar name directly
*/
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get( ctx->SCOPE_STACK(<scope>), ctx-
>SCOPE_STACK(<scope>)->size(ctx->SCOPE_STACK(<scope>)) - <negIndex> - 1) ))-><attr.name>
<else>
<if(index)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get(ctx->SCOPE_STACK(<scope>),
(ANTLR3_UINT32)<index> ) ))-><attr.name>
<else>
 (SCOPE_TOP(<scope>))-><attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get( ctx->SCOPE_STACK(<scope>), ctx-
>SCOPE_STACK(<scope>)->size(ctx->SCOPE_STACK(<scope>)) - <negIndex> - 1) ))-><attr.name> = <expr>;
<else>
<if(index)>
```

```
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get(ctx->SCOPE_STACK(<scope>),
(ANTLR3_UINT32)<index> ) ))-><attr.name> = <expr>;
<else>
 (SCOPE_TOP(<scope>))-><attr.name>=<expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "ctx->SCOPE_STACK(<scope>)"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<scope>.<attr.name>
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>=<expr>;
<else>
<attr.name>=<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"



// not sure the next are the right approach
//
```

```
tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText(<scope>))"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>->getType(<scope>))"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>->getLine(<scope>))"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>->getCharPositionInLine(<scope>))"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>->getChannel(<scope>))"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>->getTokenIndex(<scope>))"
tokenLabelPropertyRef_tree(scope,attr) ::= "(<scope>->tree)"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>->getText(<scope>)->toInt32(<scope>->getText(<scope>)))"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(STRSTREAM->toStringSS(STRSTREAM, <scope>.start, <scope>.start))
<else>
(STRSTREAM->toStringTT(STRSTREAM, <scope>.start, <scope>.stop))
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>->getType(<scope>))"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>->getLine(<scope>))"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>->getCharPositionInLine(<scope>))"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>->getChannel(<scope>))"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>->getTokenIndex(<scope>))"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText(<scope>))"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop"
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
INPUT->toStringSS(INPUT, ADAPTOR->getTokenStartIndex(ADAPTOR, retval.start), ADAPTOR-
>getTokenStopIndex(ADAPTOR, retval.start))
<else>
STRSTREAM->toStringTT(STRSTREAM, retval.start, LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "LEXER->getText(LEXER)"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
```

```
lexerRulePropertyRef_line(scope,attr) ::= "LEXSTATE->tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "LEXSTATE->tokenStartCharPositionInLine"
lexerRulePropertyRef_channel(scope,attr) ::= "LEXSTATE->channel"
lexerRulePropertyRef_start(scope,attr) ::= "LEXSTATE->tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(LEXER->getCharIndex(LEXER)-1)"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_int(scope,attr) ::= "LEXER->getText(LEXER)->toInt32(LEXER->getText(LEXER))"


// setting $st and $tree is allowed in local rule. everything else is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree=<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st=<expr>;"


/** How to deal with an @after for C targets. Because we cannot rely on
*  any garbage collection, after code is executed even in backtracking
*  mode. Must be documented clearly.
*/
execAfter(action) ::= <<
{
   <action>
}
>>

/** How to execute an action (when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if ( <actions.(actionScope).synpredgate> )
{
   <action>
}
<else>
if ( BACKTRACKING == 0 )
{
   <action>
}
<endif>
<else>
{
   <action>
}
<endif>
>>

// M I S C (properties, etc...)

bitsetDeclare(name, words64) ::= <<
```

```
/** Bitset defining follow set for error recovery in rule state: <name>  */
static ANTLR3_BITWORD <name>_bits[] = { <words64:{it |ANTLR3_UINT64_LIT(<it>)}; separator=", "> };
static  ANTLR3_BITSET_LIST <name> = { <name>_bits, <length(words64)> };
>>

bitset(name, words64) ::= <<
antlr3BitsetSetAPI(&<name>);<\n>
>>

codeFileExtension() ::= ".c"

true_value() ::= "ANTLR3_TRUE"
false_value() ::= "ANTLR3_FALSE"
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/C.stg

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```
* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr3.ST;
using Antlr3.ST.Language;
>>

@genericParser.members() ::= <<
<@super.members()>
private StringTemplateGroup _templateGroup = new StringTemplateGroup("<name>Templates",
typeof(AngleBracketTemplateLexer) );

public StringTemplateGroup TemplateGroup
{
 get { return _templateGroup; }
 set { _templateGroup = value; }
}
>>

ruleReturnBaseType() ::= <%
Template<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<StringTemplate, <labelType>>
%>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Template},elemType="StringTemplate",...)>
>>

rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)
{
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>
```

```
replaceTextInLine() ::= <<
<if(TREE_PARSER)>
((TokenRewriteStream)input.TokenStream).Replace(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start),
 retval.Template);
<else>
((TokenRewriteStream)input).Replace(
 retval.Start.TokenIndex,
 input.LT(-1).TokenIndex,
 retval.Template);
<endif>
>>

rewriteTemplateAlt(it) ::= <<
// <it.description>
<if(it.pred)>
if (<it.pred>)
{
 retval.Template = <it.alt>;
}<\n>
<else>
{
 retval.Template = <it.alt>;
}<\n>
<endif>
>>

rewriteEmptyTemplate(alts) ::= <<
null;
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <%
TemplateGroup.GetInstanceOf("<name>"<optionalArguments(args)>)
%>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
TemplateGroup.GetInstanceOf(<expr><optionalArguments(args)>)
%>
```

```
/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
new StringTemplate(TemplateGroup, "<template>"<optionalArguments(args)>)
%>

optionalArguments(args) ::= <<
<if(args)>,
 new Dictionary\<string, object>() { <args:optionalArgument(); separator=", "> }
<endif>
>>

optionalArgument(it) ::= <<
{"<it.name>", <it.value>}
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>).SetAttribute("<attrName>",<expr>);
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
new StringTemplate(TemplateGroup,<stringExpr>)
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp3/ST.stg
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/*
[The "BSD license"]
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2. Redistributions in binary form must reproduce the above copyright
   notice, this list of conditions and the following disclaimer in the
   documentation and/or other materials provided with the distribution.

```
group AST;

@outputFile.imports() ::= <<
<@super.imports()>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
<!protected TreeAdaptor adaptor = new CommonTreeAdaptor();<\n>!>
setTreeAdaptor: function(adaptor) {
   this.adaptor = adaptor;
   <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
},
getTreeAdaptor: function() {
   return this.adaptor;
},
>>

@returnScope.ruleReturnMembers() ::= <<
getTree: function() { return this.tree; }
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var root_0 = null;<\n>
>>

ruleLabelDefs() ::= <<
```

```
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{var <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{var <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
   :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleTokenStream(this.adaptor,"token <it>");};
separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
   :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"rule <it>");};
separator="\n">
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = this.adaptor.nil();<\n>
<endif>
<endif>
<endif>
>>

// T r a c k i n g  R u l e  E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>
```

```
/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.getTree());
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem=label+".getTree()",...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.getTree());
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem=label+".getTree()",...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
   referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<
```

```
// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = this.adaptor.nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = this.adaptor.rulePostProcessing(root_0);
this.input.replaceChildren(this.adaptor.getParent(retval.start),
                    this.adaptor.getChildIndex(retval.start),
                    this.adaptor.getChildIndex(_last),
                    retval.tree);
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
   :{var stream_<it>=new org.antlr.runtime.tree.RewriteRule<rewriteElementType>Stream(this.adaptor,"token
<it>",<it>);};
   separator="\n"
>
<referencedTokenListLabels
   :{var stream_<it>=new org.antlr.runtime.tree.RewriteRule<rewriteElementType>Stream(this.adaptor,"token
<it>", list_<it>);};
   separator="\n"
>
<referencedWildcardLabels
```

```
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"wildcard <it>",<it>);};
  separator="\n"
>
<referencedWildcardListLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"wildcard <it>",list_<it>);};
  separator="\n"
>
<referencedRuleLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"token
<it>",<it>!=null?<it>.tree:null);};
  separator="\n"
>
<referencedRuleListLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"token <it>",list_<it>);};
  separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | stream_<el>.hasNext()}; separator="||"> ) {
  <alt>
}
<referencedElementsDeep:{el | stream_<el>.reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if ( !(<referencedElements:{el | stream_<el>.hasNext()}; separator="||">) ) {
   throw new org.antlr.runtime.tree.RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
   <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
   <a.alt>
}<\n>
<else>
{
   <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
var root_<treeLevel> = this.adaptor.nil();
<root:rewriteElement()>
<children:rewriteElement()>
this.adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
```

```
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
this.adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<createRewriteNodeFromElement(...)>, root_<treeLevel>);<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
this.adaptor.addChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"
```

```
rewriteRuleRef(rule) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>);<\n>
>>

rewriteNodeAction(action) ::= <<
this.adaptor.addChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
this.adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
>>
```

```
createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
this.adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
>>
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/JavaScript/AST.stg

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Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/ObjCTarget.java
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```
csharpVisibilityMap ::= [
 "private":"private",
 "protected":"protected",
 "public":"public",
 "fragment":"private",
 default:"private"
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,PARSER,TREE_PARSER, actionScope, actions,
   docComment, recognizer,
   name, tokens, tokenNames, rules, cyclicDFAs,
  bitsets, buildTemplate, buildAST, rewriteMode, profile,
  backtracking, synpreds, memoize, numRules,
  fileName, ANTLRVersion, generatedTimestamp, trace,
  scopes, superClass, literals) ::=
<<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------

// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<if(trace)>
#define ANTLR_TRACE
<endif>
<@debugPreprocessor()>
// The variable 'variable' is assigned but its value is never used.
#pragma warning disable 168, 219
// Unreachable code detected.
#pragma warning disable 162
// Missing XML comment for publicly visible type or member 'Type_or_Member'
#pragma warning disable 1591

<actions.(actionScope).header>

<@imports>
using System.Collections.Generic;
using Antlr.Runtime;
using Antlr.Runtime.Misc;
<if(TREE_PARSER)>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
using ConditionalAttribute = System.Diagnostics.ConditionalAttribute;
<@end>
<if(actions.(actionScope).namespace)>
namespace <actions.(actionScope).namespace>
{
<endif>
<docComment>
<recognizer>
<if(actions.(actionScope).namespace)>
```

```
} // namespace <actions.(actionScope).namespace>
<endif>
>>

lexerInputStreamType() ::= <<
<actions.(actionScope).inputStreamType; null="ICharStream">
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Lexer
<endif>}) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">
 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.lexer.members>

   // delegates
   <grammar.delegates:
        {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
   // delegators
   <grammar.delegators:
        {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
   <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>()<! needed by subclasses !>
 {
  OnCreated();
 }

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
  : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
 {
 }

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
  : base(input, state)
 {
<if(memoize)>
<if(grammar.grammarIsRoot)>
  state.ruleMemo = new System.Collections.Generic.Dictionary\<int, int>[<numRules>+1];<\n><! index from 1..n !>
<endif>
<endif>
```

```
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, this.state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this);}; separator="\n">
  <grammar.delegators:
   {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>

  OnCreated();
 }
 public override string GrammarFileName { get { return "<fileName>"; } }

 private static readonly bool[] decisionCanBacktrack = new bool[0];

<if(grammar.hasDelegates)>
 public override <lexerInputStreamType()> CharStream
 {
  get
  {
   return base.CharStream;
  }
  set
  {
   base.CharStream = value;
   <grammar.directDelegates:
    {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
   <grammar.delegators:
    {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
   <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
  }
 }

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }
<endif>

<endif>
<if(filterMode)>
 <filteringNextToken()>
<endif>

 [Conditional("ANTLR_TRACE")]
 protected virtual void OnCreated() {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void EnterRule(string ruleName, int ruleIndex) {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void LeaveRule(string ruleName, int ruleIndex) {}

   <rules; separator="\n">

 <insertLexerSynpreds(synpreds)>

 #region DFA
 <cyclicDFAs:{dfa | DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">

 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>(this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif>);}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
 #endregion

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public override IToken NextToken()
{
 while (true)
 {
  if (input.LA(1) == CharStreamConstants.EndOfFile)
  {
   IToken eof = new CommonToken((ICharStream)input, CharStreamConstants.EndOfFile, TokenChannels.Default,
input.Index, input.Index);
   eof.Line = Line;
   eof.CharPositionInLine = CharPositionInLine;
   return eof;
  }
  state.token = null;
  state.channel = TokenChannels.Default;
  state.tokenStartCharIndex = input.Index;
  state.tokenStartCharPositionInLine = input.CharPositionInLine;
  state.tokenStartLine = input.Line;
  state.text = null;
  try
  {
   int m = input.Mark();
   state.backtracking=1;<! means we won't throw slow exception !>
   state.failed=false;
   mTokens();
   state.backtracking=0;
   <! mTokens backtracks with synpred at backtracking==2
      and we set the synpredgate to allow actions at level 1. !>
   if (state.failed)
   {
    input.Rewind(m);
    input.Consume();<! advance one char and try again !>
   }
   else
   {
    Emit();
    return state.token;
   }
  }
  catch (RecognitionException re)
  {
   // shouldn't happen in backtracking mode, but...
   ReportError(re);
   Recover(re);
  }
 }
}

public override void Memoize(IIntStream input, int ruleIndex, int ruleStartIndex)
{
 if (state.backtracking > 1)
  base.Memoize(input, ruleIndex, ruleStartIndex);
}

public override bool AlreadyParsedRule(IIntStream input, int ruleIndex)
{
 if (state.backtracking > 1)
  return base.AlreadyParsedRule(input, ruleIndex);

 return false;
}
>>

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"
```

```
/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, inputStreamType, superClass,
            labelType, members, rewriteElementType,
            filterMode, ASTLabelType="object") ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
<if(grammar.grammarIsRoot)>
 internal static readonly string[] tokenNames = new string[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
 };
<endif>
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">

<if(grammar.delegates)>
 // delegates
 <grammar.delegates:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<if(grammar.delegators)>
 // delegators
 <grammar.delegators:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>
<endif>

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }

<if(TREE_PARSER)>
 public override void SetTreeNodeStream(ITreeNodeStream input)
 {
  base.SetTreeNodeStream(input);
  <grammar.delegates:{g|<g:delegateName()>.SetTreeNodeStream(input);}; separator="\n">
 }
<endif>
<endif>

 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <@members()>
 public override string[] TokenNames { get { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; } }
 public override string GrammarFileName { get { return "<fileName>"; } }

 <members>

 [Conditional("ANTLR_TRACE")]
 protected virtual void OnCreated() {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void EnterRule(string ruleName, int ruleIndex) {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void LeaveRule(string ruleName, int ruleIndex) {}

 #region Rules
 <rules; separator="\n">
 #endregion Rules

<if(grammar.delegatedRules)>
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
 #region Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 <ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)>
<ruleDescriptor.name; format="id">(<ruleDescriptor.parameterScope:parameterScope()>) <!throws
RecognitionException !>{ <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name;
format="id">(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.name;
format="id">}; separator=", "><endif>); \}}; separator="\n">
 #endregion Delegated rules
<endif>

 <insertSynpreds(synpreds)>

<if(cyclicDFAs)>
 #region DFA
 <cyclicDFAs:{dfa | private DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">

 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>( this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif> );}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
 #endregion DFA
<endif>
```

```
<if(bitsets)>
 #region Follow sets
 private static class Follow
 {
  <bitsets:{it|<bitset(name={_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}; separator="\n">
 }
 #endregion Follow sets
<endif>
}
>>

@genericParser.members() ::= <<
#if ANTLR_DEBUG
private static readonly bool[] decisionCanBacktrack =
 new bool[]
 {
  false, // invalid decision
  <grammar.decisions:{d | <d.dfa.hasSynPred>}; wrap="\n", separator=", ">
 };
#else
private static readonly bool[] decisionCanBacktrack = new bool[0];
#endif
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
{
}
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : base(input, state)
{
<if(grammar.directDelegates)>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
<endif>
<if(grammar.indirectDelegates)>
 <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
<endif>
<if(grammar.delegators)>
 <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
<endif>
 <parserCtorBody()>
 OnCreated();
}
```

```
>>

// imported grammars are 'public' (can't be internal because their return scope classes must be accessible)
parserModifier(grammar, actions) ::= <<
<if(grammar.grammarIsRoot)><actions.(actionScope).modifier; null="public"><else>public<endif>
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new System.Collections.Generic.Dictionary\<int,
int>[<length(grammar.allImportedRules)>+1];<\n><! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Parser
<endif>}, labelType="IToken",
    members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="IToken", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Tree.<
if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif><endif>},
        members={<actions.treeparser.members>}) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
[Conditional("ANTLR_TRACE")]
protected virtual void EnterRule_<ruleName>_fragment() {}
```

```
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>_fragment() {}

// $ANTLR start <ruleName>
<ruleModifier(grammar,ruleDescriptor)> void
<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>)
{
 <ruleLabelDefs()>
 EnterRule_<ruleName>_fragment();
 EnterRule("<ruleName>_fragment", <ruleDescriptor.index>);
 TraceIn("<ruleName>_fragment", <ruleDescriptor.index>);
 try
 {
  <block>
 }
 finally
 {
  TraceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule_<ruleName>_fragment();
 }
}
// $ANTLR end <ruleName>
>>

insertLexerSynpreds(synpreds) ::= <<
<insertSynpreds(synpreds)>
>>

insertSynpreds(synpreds) ::= <<
<if(synpreds)>
#region Synpreds
private bool EvaluatePredicate(System.Action fragment)
{
 bool success = false;
 state.backtracking++;
 <@start()>
 try { DebugBeginBacktrack(state.backtracking);
 int start = input.Mark();
 try
 {
  fragment();
 }
 catch ( RecognitionException re )
 {
  System.Console.Error.WriteLine("impossible: "+re);
 }
 success = !state.failed;
 input.Rewind(start);
 } finally { DebugEndBacktrack(state.backtracking, success); }
 <@stop()>
 state.backtracking--;
 state.failed=false;
 return success;
}
#endregion Synpreds
<endif>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if (state.backtracking > 0 && AlreadyParsedRule(input, <ruleDescriptor.index>)) { <returnFromRule()> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) <returnFromRule()><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; <returnFromRule()>}<endif>
>>

ruleWrapperMap ::= [
 "bottomup":{<ruleWrapperBottomup()>},
 "topdown":{<ruleWrapperTopdown()>},
 default:""
]

ruleWrapperBottomup() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Bottomup() { return bottomup(); }
<endif>
>>

ruleWrapperTopdown() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Topdown() { return topdown(); }
<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
```

```
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(ruleDescriptor.returnScope)>

[Conditional("ANTLR_TRACE")]
protected virtual void EnterRule_<ruleName>() {}
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>() {}
<ruleWrapperMap.(ruleName)>
// $ANTLR start "<ruleName>"
// <fileName>:<description>
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)> <ruleName;
format="id">(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
 try { DebugEnterRule(GrammarFileName, "<ruleName>");
 DebugLocation(<ruleDescriptor.tree.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 <@preamble()>
 try
 {
  <ruleMemoization(name=ruleName)>
  <block>
  <ruleCleanUp()>
  <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch (RecognitionException re)
 {
  ReportError(re);
  Recover(input,re);
 <@setErrorReturnValue()>
 }
<endif>
<endif>
<endif>
```

```
 finally
 {
  TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
      <memoize()>
      <ruleScopeCleanUp()>
      <finally>
   }
 DebugLocation(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 } finally { DebugExitRule(GrammarFileName, "<ruleName>"); }
 <@postamble()>
 <returnFromRule()><\n>
}
// $ANTLR end "<ruleName>"
>>

// imported grammars need to have internal rules
ruleModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>internal<endif>
>>

// imported grammars need to have public return scopes
returnScopeModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>public<endif>
>>

catch(decl,action) ::= <<
catch (<e.decl>)
{
 <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new <returnType(ruleDescriptor)>();
retval.Start = (<labelType>)input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name; format="id"> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.Index;
<endif>
```

```
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_stack.Push(new <it>_scope());<it>_scopeInit(<it>_stack.Peek());};
separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_stack.Push(new
<it.name>_scope());<it.name>_scopeInit(<it.name>_stack.Peek());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_scopeAfter(<it>_stack.Peek());<it>_stack.Pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_scopeAfter(<it.name>_stack.Peek());<it.name>_stack.Pop();};
separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wil
dcardTreeListLabels]
   :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<ruleDescriptor.tokenListLabels
   :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<[ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it|List\<<ASTLabelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:ruleLabelDef(); separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<[ruleDescriptor.charListLabels,
 ruleDescriptor.charLabels]
 :{it|int <it.label.text> = 0;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.charListLabels:{it|List\<int> list_<it.label.text> = null;}; separator="\n"
>
>>
```

```
returnFromRule() ::= <%
return
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<! This comment is a hack to make sure the following
  single space appears in the output. !> <ruleDescriptor.singleValueReturnName>
<else>
<!!> retval
<endif>
<endif>
<endif>
;
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.Stop = (<labelType>)input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) { Memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<

[Conditional("ANTLR_TRACE")]
protected virtual void EnterRule_<ruleName>() {}
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>() {}

// $ANTLR start "<ruleName>"
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
   <ruleScopeSetUp()>
   <ruleDeclarations()>
  try
  {
<if(nakedBlock)>
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
<else>
  int _type = <ruleName>;
  int _channel = DefaultTokenChannel;
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
  <ruleCleanUp()>
  state.type = _type;
  state.channel = _channel;
  <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally
 {
  TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
       <ruleScopeCleanUp()>
       <memoize()>
   }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<

public override void mTokens()
{
 <block><\n>
}
>>

// S U B R U L E S
```

```
/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterSubRule(<decisionNumber>);
try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
} finally { DebugExitSubRule(<decisionNumber>); }
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
```

```
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  if (cnt<decisionNumber> >= 1)
   goto loop<decisionNumber>;

  <ruleBacktrackFailure()>
  EarlyExitException eee<decisionNumber> = new EarlyExitException( <decisionNumber>, input );
  DebugRecognitionException(eee<decisionNumber>);
  <@earlyExitException()>
  throw eee<decisionNumber>;
 }
 cnt<decisionNumber>++;
}
loop<decisionNumber>:
 ;

} finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
```

```
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch ( alt<decisionNumber> )
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  goto loop<decisionNumber>;
 }
}

loop<decisionNumber>:
 ;

} finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
 <@prealt()>
 DebugEnterAlt(<altNum>);
 <alt>
 break;<\n>
```

```
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(it) ::= <%
<@prematch()>
DebugLocation(<it.line>, <it.pos>);<\n>
<it.el><\n>
%>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label>=(<labelType>)<endif>Match(input,<token>,Follow._<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

listLabelElem(label,elem,elemType) ::= <<
if (list_<label>==null) list_<label>=new List\<<elemType; null={<labelType>}>\>();
list_<label>.Add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
```

```
<endif>
Match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<matchSetLabel()>
<endif>
if (<s>)
{
 input.Consume();
 <postmatchCode>
 <if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
}
else
{
 <ruleBacktrackFailure()>
 MismatchedSetException mse = new MismatchedSetException(null,input);
 DebugRecognitionException(mse);
 <@mismatchedSetException()>
<if(LEXER)>
 Recover(mse);
 throw mse;
<else>
 throw mse;
 <! use following code to make it recover inline; remove throw mse;
 recoverFromMismatchedSet(input,mse,Follow._set_in_<ruleName><elementIndex>);
 !>
<endif>
}<\n>
>>

matchSetUnchecked(s,label,elementIndex,postmatchCode=false) ::= <%
<if(label)>
<matchSetLabel()><\n>
<endif>
input.Consume();<\n>
<if(postmatchCode)>
<postmatchCode><\n>
```

```
<endif>
<if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
%>

matchSetLabel() ::= <%
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=(<labelType>)input.LT(1);
<endif>
%>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <%
<if(label)>
int <label>Start = CharIndex;<\n>
Match(<string>); <checkRuleBacktrackFailure()><\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start, CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
%>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
MatchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
```

```
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
PushFollow(Follow._<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name; format="id">(<args; separator=", ">);
PopFollow();
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem=label,elemType={<ASTLabelType>},...)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()><\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start<elementIndex>, CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
```

```
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
%>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
Match(EOF); <checkRuleBacktrackFailure()><\n>
<labelType> <label> = new <labelType>(input, EOF, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
%>

// used for left-recursive rules
recRuleDefArg()                       ::= "int <recRuleArg()>"
recRuleArg()                          ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()              ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down)
{
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
```

```
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if (!(<evalPredicate(...)>))
{
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
<if((!isTrue.(last(edges).labelExpr)) && (!last(edges).predicates))>
else
{
<if(eotPredictsAlt)>
 alt<decisionNumber> = <eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input, <k>);
 DebugRecognitionException(nvae);
 <@noViableAltException()>
 throw nvae;
<endif>
}
<endif>
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>
```

```
/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt>;<! if no edges, don't gen ELSE !>
<else>
else
{
 alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
 <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<else>
 {
  <ruleBacktrackFailure()>
  NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input, <k>);
  DebugRecognitionException(nvae);
  <@noViableAltException()>
  throw nvae;
 }
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it|case <it>:}; separator="\n">
 {
 <targetState>
 }
 break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
```

```
try
{
 alt<decisionNumber> = dfa<decisionNumber>.Predict(input);
}
catch (NoViableAltException nvae)
{
 DebugRecognitionException(nvae);
 throw;
}
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
private class DFA<dfa.decisionNumber> : DFA
{
 private const string DFA<dfa.decisionNumber>_eotS =
  "<dfa.javaCompressedEOT; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_eofS =
  "<dfa.javaCompressedEOF; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_minS =
  "<dfa.javaCompressedMin; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n\t\t\"">}>";
 private static readonly string[] DFA<dfa.decisionNumber>_transitionS =
  {
   <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
  };

 private static readonly short[] DFA<dfa.decisionNumber>_eot =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eotS);
 private static readonly short[] DFA<dfa.decisionNumber>_eof =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eofS);
 private static readonly char[] DFA<dfa.decisionNumber>_min =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
 private static readonly char[] DFA<dfa.decisionNumber>_max =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
 private static readonly short[] DFA<dfa.decisionNumber>_accept =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
 private static readonly short[] DFA<dfa.decisionNumber>_special =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_specialS);
 private static readonly short[][] DFA<dfa.decisionNumber>_transition;

 static DFA<dfa.decisionNumber>()
 {
  int numStates = DFA<dfa.decisionNumber>_transitionS.Length;
  DFA<dfa.decisionNumber>_transition = new short[numStates][];
  for ( int i=0; i \< numStates; i++ )
  {
   DFA<dfa.decisionNumber>_transition[i] =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
  }
 }

 public DFA<dfa.decisionNumber>( BaseRecognizer recognizer<if(dfa.specialStateSTs)>,
SpecialStateTransitionHandler specialStateTransition<endif> )
<if(dfa.specialStateSTs)>
  : base(specialStateTransition)
<endif>
 {
  this.recognizer = recognizer;
  this.decisionNumber = <dfa.decisionNumber>;
  this.eot = DFA<dfa.decisionNumber>_eot;
  this.eof = DFA<dfa.decisionNumber>_eof;
  this.min = DFA<dfa.decisionNumber>_min;
  this.max = DFA<dfa.decisionNumber>_max;
  this.accept = DFA<dfa.decisionNumber>_accept;
  this.special = DFA<dfa.decisionNumber>_special;
  this.transition = DFA<dfa.decisionNumber>_transition;
 }

 public override string Description { get { return "<dfa.description>"; } }

 public override void Error(NoViableAltException nvae)
 {
  DebugRecognitionException(nvae);
 }
}<\n>
<if(dfa.specialStateSTs)>
private int SpecialStateTransition<dfa.decisionNumber>(DFA dfa, int s, IIntStream _input)<! throws
NoViableAltException!>
{
 <if(LEXER)>
 IIntStream input = _input;
 <endif>
 <if(PARSER)>
 ITokenStream input = (ITokenStream)_input;
 <endif>
 <if(TREE_PARSER)>
 ITreeNodeStream input = (ITreeNodeStream)_input;
 <endif>
 int _s = s;
 s = -1;
 <! pull these outside the switch cases to save space on locals !>
 int LA<dfa.decisionNumber>_1 = input.LA(1);
 int index<dfa.decisionNumber>_1 = input.Index;
 switch (_s)
 {
 <dfa.specialStateSTs:{state |case <i0>:<! compressed special state numbers 0..n-1 !>
 <state>}; separator="\n">

 default:
  break;
 }

 if (s >= 0)
  return s;

<if(backtracking)>
 if (state.backtracking > 0) {state.failed=true; return -1;}
<endif>
 NoViableAltException nvae = new NoViableAltException(dfa.Description, <dfa.decisionNumber>, _s, input);
 dfa.Error(nvae);
 throw nvae;
}
<endif>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
<if(semPredState)>
 <! get next lookahead symbol to test edges, then rewind !>
 input.Rewind();
<endif>
 <edges; separator="\nelse ">
<if(semPredState)>
 <! return input cursor to state before we rewound !>
 input.Seek(index<decisionNumber>_1);
<endif>
 break;
}
```

```
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "EvaluatePredicate(<pred>_fragment)"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<k>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<k><ge()><lower> && LA<decisionNumber>_<k><le()><upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::=
"(input.LA(<k>)<ge()><lower> && input.LA(<k>)<le()><upper>)"

le() ::= "\<="
ge() ::= ">="

setTest(ranges) ::= <<
<ranges; separator="||">
```

```
>>

// A T T R I B U T E S

attributeScope(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
protected sealed partial class <scope.name>_scope
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
}
<if(scope.actions.scopeinit)>
protected void <scope.name>_scopeInit( <scope.name>_scope scope )
{
 <scope.actions.scopeinit>
}
<else>
protected virtual void <scope.name>_scopeInit( <scope.name>_scope scope ) {}
<endif>
<if(scope.actions.scopeafter)>
protected void <scope.name>_scopeAfter( <scope.name>_scope scope )
{
 <scope.actions.scopeafter>
}
<else>
protected virtual void <scope.name>_scopeAfter( <scope.name>_scope scope ) {}
<endif>
protected readonly ListStack\<<scope.name>_scope> <scope.name>_stack = new
ListStack\<<scope.name>_scope>();
<endif>
<endif>
>>

globalAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

ruleAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

returnStructName(it) ::= "<it.name>_return"

returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.returnScope.attributes && ruleDescriptor.hasMultipleReturnValues)>
 <ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
```

```
<elseif(ruleDescriptor.hasSingleReturnValue)>
 <ruleDescriptor.singleValueReturnType>
<else>
 void
<endif>
%>

/** Generate the C# type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
 <referencedRule.singleValueReturnType>
<else>
 void
<endif>
%>

delegateName(it) ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
default(<typeName>)
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;
%>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(scope.attributes && ruleDescriptor.hasMultipleReturnValues)>
<returnScopeModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> sealed partial class
<ruleDescriptor:returnStructName()> : <ruleReturnBaseType()><@ruleReturnInterfaces()>
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
 <@ruleReturnMembers()>
}
<endif>
>>

ruleReturnBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<labelType>>
%>

@returnScope.ruleReturnMembers() ::= <<
>>

parameterScope(scope) ::= <<
<scope.attributes:{it|<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= <<
<attr.name; format="id">
>>

parameterSetAttributeRef(attr,expr) ::= <<
<attr.name; format="id"> =<expr>;
>>

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id">
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id">
<else>
<scope>_stack.Peek().<attr.name; format="id">
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id"> = <expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id"> = <expr>;
<else>
<scope>_stack.Peek().<attr.name; format="id"> = <expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
```

```
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.Count>0 && $function::name.Equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name; format="id">:<initValue(attr.type)>)
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id">
<else>
<attr.name; format="id">
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id"> =<expr>;
<else>
<attr.name; format="id"> =<expr>;
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.Text:default(string))"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.Type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.Line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.CharPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.Channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.TokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int.Parse(<scope>.Text):0)"
```

```
ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Start):default(<labelType>))"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Stop):default(<labelType>))"
ruleLabelPropertyRef_tree(scope,attr) ::=
"(<scope>!=null?((<ASTLabelType>)<scope>.Tree):default(<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(<scope>.Start),
 input.TreeAdaptor.GetTokenStopIndex(<scope>.Start))):default(string))
<else>
(<scope>!=null?input.ToString(<scope>.Start,<scope>.Stop):default(string))
<endif>
%>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?<scope>.Template:null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
   "(<scope>!=null?<scope>.Type:0)"

lexerRuleLabelPropertyRef_line(scope,attr) ::=
   "(<scope>!=null?<scope>.Line:0)"

lexerRuleLabelPropertyRef_pos(scope,attr) ::=
   "(<scope>!=null?<scope>.CharPositionInLine:-1)"

lexerRuleLabelPropertyRef_channel(scope,attr) ::=
   "(<scope>!=null?<scope>.Channel:0)"

lexerRuleLabelPropertyRef_index(scope,attr) ::=
   "(<scope>!=null?<scope>.TokenIndex:0)"

lexerRuleLabelPropertyRef_text(scope,attr) ::=
   "(<scope>!=null?<scope>.Text:default(string))"

lexerRuleLabelPropertyRef_int(scope,attr) ::=
   "(<scope>!=null?int.Parse(<scope>.Text):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.Start"
rulePropertyRef_stop(scope,attr) ::= "retval.Stop"
rulePropertyRef_tree(scope,attr) ::= "retval.Tree"
rulePropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start))
<else>
input.ToString(retval.Start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr) ::= "retval.Template"

lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int.Parse(<scope>.Text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.Tree = <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.Template =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)<\n>
{<\n>
<@indentedAction()><\n>
}
<else>
<action>
<endif>
%>

@execAction.indentedAction() ::= <<
 <action>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static readonly BitSet <name> = new BitSet(new ulong[]{<words64:{it|<it>UL};separator=",">});
>>

codeFileExtension() ::= ".cs"
```

```
true_value() ::= "true"
false_value() ::= "false"

isTrue ::= [
 "true" : true,
 default : false
]
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp2/CSharp2.stg

# 1.42 pact-jvm-core-matchers 4.0.10

## 1.42.1 Available under license :

Apache-2.0

# 1.43 junit-platform-junit-platform-engine 1.7.2

## 1.43.1 Available under license :

```
import java.io.File
import java.net.URI

data class License(val name: String, val url: URI, val headerFile: File)
```

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# 1.46 micronaut-oracle-cloud 2.0.0

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* /opt/cola/permits/1241104371_1639440521.51/0/jsonassert-1-5-0-sources-jar/org/skyscreamer/jsonassert/comparator/JSONComparator.java
* /opt/cola/permits/1241104371_1639440521.51/0/jsonassert-1-5-0-sources-jar/org/skyscreamer/jsonassert/ArrayValueMatcher.java
* /opt/cola/permits/1241104371_1639440521.51/0/jsonassert-1-5-0-sources-jar/org/skyscreamer/jsonassert/comparator/AbstractComparator.java

# 1.50 jakarta-annotations-api 2.0.0

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# 1.52 lz4-and-xxhash 1.7.1

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# 1.54 jansi 1.17.1

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Found in path(s):
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/AnsiRenderer.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/AnsiMain.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/AnsiConsole.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/AnsiOutputStream.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/AnsiString.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/FilterPrintStream.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/AnsiPrintStream.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/HtmlAnsiOutputStream.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/WindowsAnsiOutputStream.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/Ansi.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/WindowsAnsiPrintStream.java
* /opt/ws_local/PERMITS_SQL/1082870243_1597967212.24/0/jansi-1-17-1-sources-1-jar/org/fusesource/jansi/AnsiRenderWriter.java

# 1.55 io-swagger-swagger-annotations 2.1.6

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Manifest-Version: 1.0
Automatic-Module-Name: io.swagger.v3.oas.annotations
Bnd-LastModified: 1607101094164
Build-Jdk: 1.8.0_275
Built-By: runner
Bundle-Description: swagger-annotations
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html
Bundle-ManifestVersion: 2
Bundle-Name: swagger-annotations
Bundle-SymbolicName: io.swagger.core.v3.swagger-annotations

```
Bundle-Version: 2.1.6
Created-By: Apache Maven Bundle Plugin
Export-Package: io.swagger.v3.oas.annotations;uses:="io.swagger.v3.oas
.annotations.enums,io.swagger.v3.oas.annotations.extensions,io.swagge
r.v3.oas.annotations.info,io.swagger.v3.oas.annotations.media,io.swag
ger.v3.oas.annotations.parameters,io.swagger.v3.oas.annotations.respo
nses,io.swagger.v3.oas.annotations.security,io.swagger.v3.oas.annotat
ions.servers,io.swagger.v3.oas.annotations.tags";version="2.1.6",io.s
wagger.v3.oas.annotations.headers;uses:="io.swagger.v3.oas.annotation
s.media";version="2.1.6",io.swagger.v3.oas.annotations.extensions;ver
sion="2.1.6",io.swagger.v3.oas.annotations.media;uses:="io.swagger.v3
.oas.annotations,io.swagger.v3.oas.annotations.extensions,io.swagger.
v3.oas.annotations.headers";version="2.1.6",io.swagger.v3.oas.annotat
ions.info;uses:="io.swagger.v3.oas.annotations.extensions";version="2
.1.6",io.swagger.v3.oas.annotations.tags;uses:="io.swagger.v3.oas.ann
otations,io.swagger.v3.oas.annotations.extensions";version="2.1.6",io
.swagger.v3.oas.annotations.links;uses:="io.swagger.v3.oas.annotation
s.extensions,io.swagger.v3.oas.annotations.servers";version="2.1.6",i
o.swagger.v3.oas.annotations.callbacks;uses:="io.swagger.v3.oas.annot
ations,io.swagger.v3.oas.annotations.extensions";version="2.1.6",io.s
wagger.v3.oas.annotations.security;uses:="io.swagger.v3.oas.annotatio
ns.enums,io.swagger.v3.oas.annotations.extensions";version="2.1.6",io
.swagger.v3.oas.annotations.parameters;uses:="io.swagger.v3.oas.annot
ations.extensions,io.swagger.v3.oas.annotations.media";version="2.1.6
",io.swagger.v3.oas.annotations.servers;uses:="io.swagger.v3.oas.anno
tations.extensions";version="2.1.6",io.swagger.v3.oas.annotations.res
ponses;uses:="io.swagger.v3.oas.annotations.extensions,io.swagger.v3.
oas.annotations.headers,io.swagger.v3.oas.annotations.links,io.swagge
r.v3.oas.annotations.media";version="2.1.6",io.swagger.v3.oas.annotat
ions.enums;version="2.1.6"
implementation-version: 2.1.6
Import-Package: io.swagger.v3.oas.annotations,io.swagger.v3.oas.annota
tions.enums,io.swagger.v3.oas.annotations.extensions,io.swagger.v3.oa
s.annotations.headers,io.swagger.v3.oas.annotations.info,io.swagger.v
3.oas.annotations.links,io.swagger.v3.oas.annotations.media,io.swagge
r.v3.oas.annotations.parameters,io.swagger.v3.oas.annotations.respons
es,io.swagger.v3.oas.annotations.security,io.swagger.v3.oas.annotatio
ns.servers,io.swagger.v3.oas.annotations.tags
mode: development
package: io.swagger
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"
Tool: Bnd-4.2.0.201903051501
url: https://github.com/swagger-api/swagger-core/modules/swagger-annot
ations
```

Found in path(s):

* /opt/cola/permits/1157297954_1654214799.9876926/0/swagger-annotations-2-1-6-jar/META-INF/MANIFEST.MF

# 1.56 jackson-module-afterburner 2.13.2

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org.apache.tomcat.util.json.JSONParser.jj is a public domain javacc grammar
for JSON written by Robert Fischer.
https://github.com/RobertFischer/json-parser

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The original XML Schemas for Java EE Deployment Descriptors:
- javaee_5.xsd
- javaee_web_services_1_2.xsd
- javaee_web_services_client_1_2.xsd
- javaee_6.xsd
- javaee_web_services_1_3.xsd
- javaee_web_services_client_1_3.xsd
- jsp_2_2.xsd
- web-app_3_0.xsd
- web-common_3_0.xsd
- web-fragment_3_0.xsd
- javaee_7.xsd
- javaee_web_services_1_4.xsd
- javaee_web_services_client_1_4.xsd
- jsp_2_3.xsd
- web-app_3_1.xsd
- web-common_3_1.xsd
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- javaee_8.xsd
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- jakarta_web-services_client_2_0.xsd
- jsp_3_0.xsd
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*
* <p>
* This class is used to encode and decode data in Base64 format as described in
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*
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* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/KeyToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/constructor/Construct.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/DocumentEndToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/introspector/MethodProperty.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/introspector/MissingProperty.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/util/PlatformFeatureDetector.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/MappingEndEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/scanner/ScannerImpl.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/BlockSequenceStartToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/StreamEndEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/comments/CommentType.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/nodes/NodeId.java

* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/emitter/EmitterState.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/constructor/DuplicateKeyException.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/resolver/Resolver.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/error/YAMLException.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/ScalarEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/nodes/SequenceNode.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/reader/StreamReader.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/extensions/compactnotation/CompactData.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/nodes/CollectionNode.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/BlockMappingStartToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/FlowEntryToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/nodes/AnchorNode.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/composer/Composer.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/constructor/Constructor.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/TypeDescription.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/DocumentStartToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/constructor/SafeConstructor.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/representer/Represent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/nodes/MappingNode.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/parser/ParserImpl.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/error/MissingEnvironmentVariableException.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/DirectiveToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/ScalarToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/introspector/BeanAccess.java

* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/DocumentStartEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/ImplicitTuple.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/Event.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/TagTuple.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/serializer/NumberAnchorGenerator.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/extensions/compactnotation/PackageCompactConstructor.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/ValueToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/introspector/FieldProperty.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/constructor/BaseConstructor.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/representer/BaseRepresenter.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/introspector/Property.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/reader/ReaderException.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/env/EnvScalarConstructor.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/extensions/compactnotation/CompactConstructor.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/comments/CommentEventsCollector.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/nodes/Tag.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/parser/VersionTagsTuple.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/emitter/Emitable.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/scanner/Constant.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/SequenceStartEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/MappingStartEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/util/ArrayUtils.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/CollectionStartEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/composer/ComposerException.java

* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/representer/SafeRepresenter.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/util/EnumUtils.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/reader/UnicodeReader.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/parser/Production.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/TagToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/error/MarkedYAMLException.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/FlowMappingEndToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/SequenceEndEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/scanner/Scanner.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/resolver/ResolverTuple.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/serializer/AnchorGenerator.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/emitter/ScalarAnalysis.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/BlockEndToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/WhitespaceToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/Token.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/util/ArrayStack.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/AliasToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/serializer/SerializerException.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/util/UriEncoder.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/introspector/GenericProperty.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/BlockEntryToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/AliasEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/parser/Parser.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/FlowMappingStartToken.java

* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/nodes/ScalarNode.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/representer/Representer.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/tokens/CommentToken.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/LoaderOptions.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/serializer/Serializer.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/events/NodeEvent.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/emitter/EmitterException.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/Yaml.java
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* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/external/com/google/gdata/util/common/base/Escaper.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/external/com/google/gdata/util/common/base/UnicodeEscaper.java
* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/org/yaml/snakeyaml/external/com/google/gdata/util/common/base/PercentEscaper.java
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```
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```

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* /opt/cola/permits/1421456044_1663656140.5096798/0/snakeyaml-1-31-sources-1-jar/META-INF/maven/org.yaml/snakeyaml/pom.xml

# 1.61 javax.inject:javax.inject 1

## 1.61.1 Available under license :

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```
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```

Found in path(s):

* /opt/cola/permits/1299411403_1650627395.55/0/javax-inject-1-sources-jar/javax/inject/Provider.java
* /opt/cola/permits/1299411403_1650627395.55/0/javax-inject-1-sources-jar/javax/inject/Named.java
* /opt/cola/permits/1299411403_1650627395.55/0/javax-inject-1-sources-jar/javax/inject/Qualifier.java
* /opt/cola/permits/1299411403_1650627395.55/0/javax-inject-1-sources-jar/javax/inject/Inject.java
* /opt/cola/permits/1299411403_1650627395.55/0/javax-inject-1-sources-jar/javax/inject/package-info.java
* /opt/cola/permits/1299411403_1650627395.55/0/javax-inject-1-sources-jar/javax/inject/Scope.java
* /opt/cola/permits/1299411403_1650627395.55/0/javax-inject-1-sources-jar/javax/inject/Singleton.java

# 1.62 slf4j-api-module 1.7.29

## 1.62.1 Available under license :

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```
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*/

Found in path(s):
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/BasicMarker.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/MessageFormatter.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/BasicMDCAdapter.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/FormattingTuple.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/IMarkerFactory.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/spi/LocationAwareLogger.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/MDC.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/Util.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/SubstituteLogger.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/LoggerFactory.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/impl/StaticMDCBinder.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/spi/LoggerFactoryBinder.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/Logger.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/impl/StaticMarkerBinder.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/SubstituteLoggerFactory.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/NOPLogger.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/BasicMarkerFactory.java

* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/NOPMDCAdapter.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/spi/MarkerFactoryBinder.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/ILoggerFactory.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/NOPLoggerFactory.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/NamedLoggerBase.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/spi/MDCAdapter.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/MarkerFactory.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/impl/StaticLoggerBinder.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/helpers/MarkerIgnoringBase.java
* /opt/ws_local/PERMITS_SQL/1014221182_1593546679.56/0/slf4j-api-1-7-29-sources-jar/org/slf4j/Marker.java

# 1.63 joda-time v2.10.8

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       xmlns="http://maven.apache.org/POM/4.0.0"
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* /opt/cola/permits/1340031928_1654757805.4736652/0/kafka-avro-serializer-6-2-1-jar/META-INF/maven/io.confluent/kafka-avro-serializer/pom.xml

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# 1.66 json-p 1.0.4

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# 1.67 arrow-core-extensions 0.9.0

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## 1.68 junit-jupiter-junit-jupiter-engine 5.7.0

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```
import java.io.File
import java.net.URI

data class License(val name: String, val url: URI, val headerFile: File)
```

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# 1.71 kafka-schema-serializer 6.2.1

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```
<project xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xmlns="http://maven.apache.org/POM/4.0.0"
     xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/maven-v4_0_0.xsd">

  <modelVersion>4.0.0</modelVersion>

  <parent>
    <groupId>io.confluent</groupId>
    <artifactId>kafka-schema-registry-parent</artifactId>
    <version>6.2.1</version>
  </parent>

  <licenses>
    <license>
      <name>Apache License 2.0</name>
      <url>http://www.apache.org/licenses/LICENSE-2.0.html</url>
      <distribution>repo</distribution>
    </license>
  </licenses>

  <artifactId>kafka-schema-serializer</artifactId>
  <packaging>jar</packaging>
  <name>kafka-schema-serializer</name>

  <dependencies>
    <dependency>
      <groupId>org.apache.kafka</groupId>
      <artifactId>kafka_${kafka.scala.version}</artifactId>
      <scope>provided</scope>
    </dependency>
    <dependency>
      <groupId>io.confluent</groupId>
      <artifactId>kafka-schema-registry-client</artifactId>
      <version>${io.confluent.schema-registry.version}</version>
    </dependency>
    <dependency>
      <groupId>junit</groupId>
      <artifactId>junit</artifactId>
      <scope>test</scope>
    </dependency>
  </dependencies>
</project>
```

Found in path(s):

* /opt/cola/permits/1340031452_1654753709.1294904/0/kafka-schema-serializer-6-2-1-jar/META-

INF/maven/io.confluent/kafka-schema-serializer/pom.xml

# 1.72 junit-platform-junit-platform-commons 1.7.0

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# 1.73 javax-ws-rs-api 2.0.1

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## 1.74 zstd-jni 1.4.9-1

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```
Manifest-Version: 1.0
Automatic-Module-Name: com.github.luben.zstd_jni
Bnd-LastModified: 1615191527618
Bundle-Description: JNI bindings for Zstd native library that provides
 fast and high compression lossless algorithm for Java and all JVM la
nguages.
Bundle-License: https://opensource.org/licenses/BSD-2-Clause;descripti
on=BSD 2-Clause License
Bundle-ManifestVersion: 2
Bundle-Name: zstd-jni
Bundle-NativeCode: aix/ppc64/libzstd-jni.so;osname=AIX;processor=ppc64
, darwin/x86_64/libzstd-jni.dylib;osname=MacOS;osname=MacOSX;processo
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;processor=aarch64, freebsd/amd64/libzstd-jni.so;osname=FreeBSD;proce
ssor=amd64, freebsd/i386/libzstd-jni.so;osname=FreeBSD;processor=i386
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amd64/libzstd-jni.so;osname=Linux;processor=amd64, linux/arm/libzstd-
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32;processor=x86
Bundle-SymbolicName: com.github.luben.zstd-jni
Bundle-Vendor: com.github.luben
Bundle-Version: 1.4.9.1
Created-By: 1.8.0_275 (Debian)
Export-Package: com.github.luben.zstd;version="1.4.9.1",com.github.lub
en.zstd.util;version="1.4.9.1"
Implementation-Title: zstd-jni
Implementation-Vendor: com.github.luben
Implementation-Vendor-Id: com.github.luben
Implementation-Version: 1.4.9-1
Import-Package: org.osgi.framework;resolution:=optional
Private-Package: linux.amd64,linux.i386,linux.aarch64,linux.arm,linux.
ppc64,linux.ppc64le,linux.mips64,linux.s390x,aix.ppc64,darwin.x86_64,
darwin.aarch64,win.amd64,win.x86,freebsd.amd64,freebsd.i386
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"
Specification-Title: zstd-jni
Specification-Vendor: com.github.luben
Specification-Version: 1.4.9-1
Tool: Bnd-4.0.0.201805111645
```

Found in path(s):

* /opt/cola/permits/1183892379_1627494642.79/0/zstd-jni-1-4-9-1-1-jar/META-INF/MANIFEST.MF

# 1.75 beanshell 2.0b6

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## 1.77 jakarta-ws-rs-api 2.1.6

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# 1.84 osgi-resource-locator-bundle 1.0.3

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# 1.85 mockito 4.0.0

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# 1.86 jackson-module:-guice 2.13.2

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# Jackson JSON processor

Jackson is a high-performance, Free/Open Source JSON processing library.
It was originally written by Tatu Saloranta (tatu.saloranta@iki.fi), and has
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It is currently developed by a community of developers, as well as supported
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# 1.87 abegocore 1.0.3

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Manifest-Version: 1.0
Bnd-LastModified: 1446804256758
Build-Jdk: 1.8.0_60
Built-By: ub

```
Bundle-Description: Efficient and customizable TreeLayout Algorithm in J
ava.
Bundle-DocURL: http://abego-software.de
Bundle-License: http://www.abego-software.de/legal/apl-v10.html
Bundle-ManifestVersion: 2
Bundle-Name: abego TreeLayout Core
Bundle-SymbolicName: org.abego.treelayout.core
Bundle-Vendor: abego Software GmbH, Germany
Bundle-Version: 1.0.3
Created-By: Apache Maven Bundle Plugin
Export-Package: org.abego.treelayout.util;uses:="org.abego.treelayout";v
ersion="1.0.3",org.abego.treelayout;version="1.0.3"
Implementation-Title: abego TreeLayout Core
Implementation-Vendor: abego Software GmbH, Germany
Implementation-Vendor-Id: org.abego.treelayout
Implementation-Version: 1.0.3
Import-Package: sun.misc;resolution:=optional
Specification-Title: abego TreeLayout Core
Specification-Vendor: abego Software GmbH, Germany
Specification-Version: 1.0.3
Tool: Bnd-1.50.0
```

Found in path(s):
* /opt/cola/permits/1162863034_1649022203.09/0/org-abego-treelayout-core-1-0-3-jar/META-INF/MANIFEST.MF

# 1.88 kotlin-logging 1.6.26

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# 1.92 json-smart 2.4.7

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Found in path(s):

```
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/writer/DefaultMapper.java
```

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```

Found in path(s):

```
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/JSONStyle.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/parser/JSONParserByteArray.java
```

* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/JSONStreamAware.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/writer/JsonReaderI.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/JStylerObj.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/parser/JSONParserStream.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/parser/JSONParser.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/JSONAwareEx.java
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* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/JSONStreamAwareEx.java
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* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/parser/ParseException.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/JSONValue.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/parser/JSONParserMemory.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/writer/DefaultMapperCollection.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/JSONNavi.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/writer/BeansMapper.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/writer/CollectionMapper.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/writer/ArraysMapper.java
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* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/writer/FakeMapper.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/parser/JSONParserBase.java
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* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/writer/JsonReader.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/JSONObject.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/net/minidev/json/parser/JSONParserInputStream.java
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-

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Found in path(s):
* /opt/cola/permits/1183889917_1627493840.74/0/json-smart-2-4-7-sources-1-jar/META-INF/maven/net.minidev/json-smart/pom.xml

# 1.93 jackson-datatype-guava 2.13.2

## 1.93.1 Available under license :

# 1.94 junit-jupiter-junit-jupiter-api 5.7.2

## 1.94.1 Available under license :

import java.io.File
import java.net.URI

data class License(val name: String, val url: URI, val headerFile: File)
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# 1.98 pact-jvm-consumer-junit5 4.0.10

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```
Manifest-Version: 1.0
Bnd-LastModified: 1593602041104
Build-Jdk: 1.8.0_151
Built-By: frantuma
Bundle-Description: Sonatype helps open source projects to set up Mave
n repositories on https://oss.sonatype.org/
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html
Bundle-ManifestVersion: 2
Bundle-Name: swagger-annotations
Bundle-SymbolicName: io.swagger.annotations
Bundle-Version: 1.6.2
Created-By: Apache Maven Bundle Plugin
Export-Package: io.swagger.annotations;version="1.6.2"
implementation-version: 1.6.2
mode: development
package: io.swagger
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.7))"
Tool: Bnd-3.3.0.201609221906
url: https://github.com/swagger-api/swagger-core/modules/swagger-annot
ations
```

Found in path(s):
* /opt/cola/permits/1170799104_1654737045.2729578/0/swagger-annotations-1-6-2-jar/META-INF/MANIFEST.MF

# 1.100 kotlinx-io-jvm 0.1.16

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```

From network_io/unix/inet_ntop.c, network_io/unix/inet_pton.c:

```
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```

From dso/aix/dso.c:

```
*  Based on libdl (dlfcn.c/dlfcn.h) which is
*  Copyright (c) 1992,1993,1995,1996,1997,1988
*  Jens-Uwe Mager, Helios Software GmbH, Hannover, Germany.
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```

From strings/apr_strnatcmp.c, include/apr_strings.h:

```
 strnatcmp.c -- Perform 'natural order' comparisons of strings in C.
 Copyright (C) 2000 by Martin Pool <mbp@humbug.org.au>

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```
/* ABSENT */
class Some

// COMMENTS: 0
```

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JSCRE - in runtime/third_party/jscre
Ant - in third_party/apache_ant
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- Path: compiler/backend/src/org/jetbrains/kotlin/codegen/optimization/common/MethodAnalyzer.kt
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*/

package org.jetbrains.kotlin.copyright

import junit.framework.AssertionFailedError
import org.jetbrains.kotlin.idea.copyright.UpdateKotlinCopyright
import org.jetbrains.kotlin.idea.test.KotlinLightCodeInsightFixtureTestCase
import org.jetbrains.kotlin.idea.test.PluginTestCaseBase
import org.jetbrains.kotlin.test.InTextDirectivesUtils
import org.junit.Assert
import java.io.File

abstract class AbstractUpdateKotlinCopyrightTest : KotlinLightCodeInsightFixtureTestCase() {
  fun doTest(path: String) {
      myFixture.configureByFile(fileName())

      val fileText = myFixture.file.text.trim()
      val expectedNumberOfComments = InTextDirectivesUtils.getPrefixedInt(fileText, "// COMMENTS: ") ?: run {
          if (fileText.isNotEmpty()) {
              throw AssertionFailedError("Every test should assert number of comments with `COMMENTS`
directive")
          } else {
              0
          }
      }

      val comments = UpdateKotlinCopyright.getExistentComments(myFixture.file)
      for (comment in comments) {
          val commentText = comment.text
      when {
        commentText.contains("PRESENT") -> {
        }
        commentText.contains("ABSENT") -> {
          throw AssertionFailedError("Unexpected comment found: `$commentText`")
        }
        else -> {
          throw AssertionFailedError("A comment with bad directive found: `$commentText`")
        }
      }
    }

    Assert.assertEquals(
      "Wrong number of comments found:\n${comments.joinToString(separator = "\n") { it.text }}\n",
      expectedNumberOfComments, comments.size
    )
  }

  override fun getTestDataPath() = File(PluginTestCaseBase.getTestDataPathBase(), "/copyright").path + File.separator
}
```

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import groovy.util.Node
import groovy.util.XmlParser
import org.gradle.api.DefaultTask
import org.gradle.api.file.RegularFileProperty
import org.gradle.api.provider.Property
import org.gradle.api.tasks.Input
import org.gradle.api.tasks.InputFile
import org.gradle.api.tasks.OutputFile
import org.gradle.api.tasks.TaskAction
import java.util.*
```

```
abstract class WriteCopyrightToFile : DefaultTask() {
    @InputFile
    val path = project.file("${project.rootDir}/.idea/copyright/apache.xml")

    @get:OutputFile
    abstract val outputFile: RegularFileProperty

    @get:Input
    val commented: Property<Boolean> = project.objects.property(Boolean::class.java).convention(true)

    @TaskAction
    fun write() {
        val file = outputFile.asFile.get()
        file.writeText(if (commented.get()) readCopyrightCommented() else readCopyright())
    }

    private fun readCopyright(): String {
        assert(path.exists()) {
            "File $path with copyright not found"
        }

        val xmlParser = XmlParser()
        val node = xmlParser.parse(path)
        assert(node.attribute("name") == "CopyrightManager") {
            "Format changed occasionally?"
        }

        val copyrightBlock = node.children().filterIsInstance<Node>().single()
        val noticeNode = copyrightBlock.children().filterIsInstance<Node>().single { it.attribute("name") == "notice" }
        return noticeNode.attribute("value").toString().replace("&#36;today.year",
GregorianCalendar()[Calendar.YEAR].toString())
    }

    private fun readCopyrightCommented(): String {
        return "/*\n" + readCopyright().prependIndent(" * ") + "\n */"
    }
}
```

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zlib.h -- interface of the 'zlib' general purpose compression library
version 1.2.11, January 15th, 2017

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```
/* PRESENT 1 */
/* PRESENT 2 */
// PRESENT 3
/** ABSENT */
package/* ABSENT 1 */ normal
/* ABSENT 2 */

// COMMENTS: 3
```

ASM: a very small and fast Java bytecode manipulation framework

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com.sun.xml.bind:jaxb-impl

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org.samba.jcifs:jcifs

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org.junit.platform:junit-platform-launcher

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org.mozilla:rhino
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package normal

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/* PRESENT */

foo()

// COMMENTS: 1
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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java6/CommentCollectingParser.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationDataType.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java7/CommentCollectingParser.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java8/CommentCollectingParser.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java8/CommentCollectingParserFactory.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java7/CommentCollectingParserFactory.java

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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/apt/InterceptingJavaFileManager.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/apt/Javac6BaseFileObjectWrapper.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/apt/LombokFileObjects.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java7/CommentCollectingScanner.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java7/CommentCollectingScannerFactory.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/CompilerMessageSuppressor.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleAccessors.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/debug/DebugSnapshot.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleExtensionMethod.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleValue.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/PatchExtensionMethod.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleExtensionMethod.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleValue.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleWither.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleWither.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/debug/DebugSnapshotStore.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/debug/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleFieldDefaults.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/handlers/HandlerUtil.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleBuilder.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleBuilder.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacImportList.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/debug/ProblemReporter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/BubblingConfigurationResolver.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/FlagUsageType.java

* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/Augments.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/launch/AnnotationProcessor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationSource.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleDelegate.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/EclipseAugments.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/launch/Agent.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationProblemReporter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationApp.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleAccessors.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationResolverFactory.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacAugments.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/Tolerate.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/StringConfigurationSource.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationKeysLoader.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ExampleValueString.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationParser.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/FieldAugment.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/SpiLoadUtil.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/CommentInfo.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/EclipseLocationProvider.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/IdeFinder.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/runtimeDependencies/CreateLombokRuntimeApp.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/EclipseFinder.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/PatchDiagnostics.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-

jar/lombok/experimental/PackagePrivate.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/JavacResolver.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/PatchExtensionMethodCompletionProposalPortal.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/NonFinal.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/PublicApiCreatorApp.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/PatchExtensionMethodCompletionProposal.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/ResolutionResetNeeded.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/bytecode/PoolConstantsApp.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/PatchDelegatePortal.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/ExtensionMethodCompletionProposal.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/HandlerPriority.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/DeferUntilPostDiet.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/PatchValEclipse.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacASTAdapter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/PrintAST.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacTransformer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/EclipseASTVisitor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/TransformEclipseAST.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/EclipseNode.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/EclipseAnnotationHandler.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/EclipseLocation.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacASTVisitor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacAnnotationHandler.java

* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/Main.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/PatchValEclipsePortal.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/SetGeneratedByVisitor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/RunAllTests.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacResolution.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/transform/TestLombokFilesIdempotent.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleEqualsAndHashCode.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/DirectoryRunner.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/Javac.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/transform/TestSourceFiles.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/EclipseHandlerUtil.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/TypeResolver.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/ant/DelombokTaskImpl.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacAST.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/EclipsePatcher.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/apt/LombokProcessor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/Delombok.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/JavacHandlerUtil.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/TypeLibrary.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/ant/DelombokTask.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/transform/TestWithDelombok.java

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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleSetter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleGetter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/handlers/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/EqualsAndHashCode.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleCleanup.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleSynchronized.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/bytecode/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandlePrintAST.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/HandlerLibrary.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleToString.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/AgentLauncher.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleSetter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/package-info.java

* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleGetter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleEqualsAndHashCode.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleSynchronized.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/runtimeDependencies/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleData.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleSneakyThrows.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandlePrintAST.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/IdeLocation.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/HandlerLibrary.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/AbstractRunTests.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleCleanup.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleData.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/RunTestsViaDelombok.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/AnnotationProcessor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleSneakyThrows.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleToString.java

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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/launch/PatchFixesHider.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleVal.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/TreeMirrorMaker.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/NoArgsConstructor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleConstructor.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/FileSystemSourceCache.java

* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/launch/ShadowClassLoader.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/LombokTestSource.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/launch/Main.java

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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/IdeLocationProvider.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/LombokApp.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/STSLocationProvider.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/STSFinder.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/CorruptedIdeLocationException.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Lombok.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/WindowsDriveInfo.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/apt/package-info.java

* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/UnicodeEscapeWriter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/DelombokApp.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/AccessLevel.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/STSLocation.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/package-info.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/EclipseASTAdapter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/runtimeDependencies/RuntimeDependencyInfo.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/AppleNativeLook.java

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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/SneakyThrows.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Cleanup.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/ToString.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Setter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacNode.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/Eclipse.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Getter.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/AnnotationValues.java

* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/LombokNode.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Data.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/EclipseAST.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Synchronized.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/NonNull.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/DelombokResult.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/AST.java

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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/extern/slf4j/Slf4j.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/extern/java/Log.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/extern/log4j/Log4j.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/LombokOptions.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/extern/apachecommons/CommonsLog.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/RequiredArgsConstructor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/AllArgsConstructor.java

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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseJavaUtilSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseGuavaSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/singulars/JavacJavaUtilSetSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/EclipseLoaderPatcherTransplants.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleUtilityClass.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseJavaUtilListSetSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/singulars/JavacGuavaMapSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/JavacSingularsRecipes.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/handlers/Singulars.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/TestSingulars.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/apt/Processor.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-
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jar/lombok/eclipse/handlers/EclipseSingularsRecipes.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/singulars/JavacJavaUtilSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseJavaUtilSetSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseJavaUtilMapSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/singulars/JavacGuavaTableSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/singulars/JavacJavaUtilMapSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/debug/AssertionLogger.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseGuavaSetListSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseGuavaTableSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Singular.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/UtilityClass.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Generated.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/Helper.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/singulars/JavacJavaUtilListSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleUtilityClass.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/GuavaTypeMap.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/CallSuperType.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseGuavaMapSingularizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/EclipseLoaderPatcher.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/RunCoreTests.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/singulars/EclipseJavaUtilListSingularizer.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/CompilerMessageMatcher.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/Value.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/extern/slf4j/XSlf4j.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/ExtensionMethod.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/CapturingDiagnosticListener.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/Accessors.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/Delegate.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/experimental/Delegate.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/bytecode/SneakyThrowsRemover.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/agent/PatchDelegate.java
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* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/JbdsLocation.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java8/CommentCollectingTokenizer.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/EclipseImportList.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/JbdsFinder.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationResolver.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/JavaIdentifiers.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/LombokImmutableList.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/debug/FileLog.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/extern/log4j/Log4j2.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/java8/CommentCollectingScanner.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/ConfigurationValueParser.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/eclipse/JbdsLocationProvider.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/JavacTreeMaker.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/LombokOptionsFactory.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/configuration/TypeName.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/FormatPreferenceScanner.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/Javac6BasedLombokOptions.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/ImportList.java
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/transform/RunTransformTests.java
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/handlers/HandleHelper.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/eclipse/handlers/HandleHelper.java
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/handlers/SneakyThrowsAndCleanupDependencyInfo.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/delombok/DocCommentIntegrator.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/javac/apt/MessagerDiagnosticsReceiver.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/InstallException.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/core/DiagnosticsReceiver.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/InstallerGUI.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/UninstallException.java
* /opt/cola/permits/1274701640_1649800585.95/0/gsrc-lombok-1-16-8-sources-jar/lombok/installer/Installer.java

# 1.107 commons-codec 1.15

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# 1.108 arrow-type-classes 0.9.0

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# 1.110 asm-tree 9.1

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```
Manifest-Version: 1.0
Bundle-DocURL: http://asm.ow2.org
Bundle-License: BSD-3-Clause;link=https://asm.ow2.io/LICENSE.txt
Bundle-ManifestVersion: 2
Bundle-Name: org.objectweb.asm.tree
Bundle-RequiredExecutionEnvironment: J2SE-1.5
Bundle-SymbolicName: org.objectweb.asm.tree
Bundle-Version: 9.1.0
Export-Package: org.objectweb.asm.tree;version="9.1";uses:="org.object
web.asm"
Implementation-Title: Tree API of ASM, a very small and fast Java byte
```

code manipulation framework
Implementation-Version: 9.1
Import-Package: org.objectweb.asm;version="[9.1,10)"
Module-Requires: org.objectweb.asm;transitive=true

Found in path(s):
* /opt/cola/permits/1183890441_1627493647.83/0/asm-tree-9-1-jar/META-INF/MANIFEST.MF

# 1.111 error_prone_annotations 2.5.1

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Found in path(s):
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/FormatMethod.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/DoNotMock.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/RestrictedApi.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/CompatibleWith.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/FormatString.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/MustBeClosed.java

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* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/IncompatibleModifiers.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/CanIgnoreReturnValue.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/Var.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/CompileTimeConstant.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/ForOverride.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/Immutable.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/concurrent/LazyInit.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/RequiredModifiers.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/SuppressPackageLocation.java
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*/

Found in path(s):
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/CheckReturnValue.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/DoNotCall.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/concurrent/GuardedBy.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/OverridingMethodsMustInvokeSuper.java
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Found in path(s):
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/concurrent/UnlockMethod.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/NoAllocation.java
* /opt/cola/permits/1206721250_1632455727.58/0/error-prone-annotations-2-5-1-sources-2-jar/com/google/errorprone/annotations/concurrent/LockMethod.java

# 1.112 asm-commons 9.1

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```
Manifest-Version: 1.0
Bundle-DocURL: http://asm.ow2.org
Bundle-License: BSD-3-Clause;link=https://asm.ow2.io/LICENSE.txt
Bundle-ManifestVersion: 2
Bundle-Name: org.objectweb.asm.commons
```

Bundle-RequiredExecutionEnvironment: J2SE-1.5
Bundle-SymbolicName: org.objectweb.asm.commons
Bundle-Version: 9.1.0
Export-Package: org.objectweb.asm.commons;version="9.1";uses:="org.obj
ectweb.asm,org.objectweb.asm.signature,org.objectweb.asm.tree"
Implementation-Title: Usefull class adapters based on ASM, a very smal
l and fast Java bytecode manipulation framework
Implementation-Version: 9.1
Import-Package: org.objectweb.asm;version="[9.1,10)",org.objectweb.asm
.signature;version="[9.1,10)",org.objectweb.asm.tree;version="[9.1,10
)"
Module-Requires: org.objectweb.asm;transitive=true,org.objectweb.asm.t
ree;transitive=true,org.objectweb.asm.tree.analysis;transitive=true

Found in path(s):
* /opt/cola/permits/1183889887_1627494130.56/0/asm-commons-9-1-jar/META-INF/MANIFEST.MF

# 1.113 apache-groovy 3.0.8

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* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Contract.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/ReflectiveFeign.java

* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Headers.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Target.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/stream/StreamDecoder.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Client.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Request.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/auth/BasicAuthRequestInterceptor.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/codec/Decoder.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/template/QueryTemplate.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Capability.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Util.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/SynchronousMethodHandler.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/HeaderMap.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Body.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/codec/ErrorDecoder.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/AsyncClient.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/FeignException.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/MethodInfo.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/optionals/OptionalDecoder.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/template/UriTemplate.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/ExceptionPropagationPolicy.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/codec/DecodeException.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Types.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Param.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/RequestInterceptor.java
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* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/RequestTemplate.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/DefaultMethodHandler.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/template/Literal.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/RequestLine.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/querymap/FieldQueryMapEncoder.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/template/Template.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/Response.java

* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/querymap/BeanQueryMapEncoder.java
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* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/ReflectiveAsyncFeign.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/auth/Base64.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/AsyncInvocation.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/codec/StringDecoder.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/template/BodyTemplate.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/template/Expressions.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/template/TemplateChunk.java
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* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/AsyncJoinException.java
* /opt/cola/permits/1354450991_1656588134.6740043/0/feign-core-10-11-sources-1-jar/feign/QueryMapEncoder.java

## 1.115 guava-listenablefuture-only 9999.0-empty-to-avoid-conflict-with-guava

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# 1.117 jakarta-activation 1.2.0

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* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/annotation/CommittingLocal.java
* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/annotation/Error.java
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* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/annotation/View.java
* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/event/ExecutableMethodEventObserver.java
* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/annotation/Connecting.java
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* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/annotation/Recovered.java
* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/MapEventTransformerFactory.java

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* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/annotation/Replicating.java
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* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/event/EventObserverSupport.java
* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/annotation/CommittingRemote.java
* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/messaging/CoherenceTopicListenerProcessor.java
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* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/annotation/MapEventTransformerBinding.java
* /opt/cola/permits/1340858891_1654724814.0259602/0/micronaut-coherence-1-0-0-sources-jar/io/micronaut/coherence/CoherenceFactory.java

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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableBiMapFauxverideShim.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AbstractFuture.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SortedIterable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RangeSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SortedIterables.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableSortedMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularImmutableSortedMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/GeneralRange.java
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*/
/**
* Holder for web specializations of methods of {@code Doubles}. Intended to be empty for regular
* version.
*/

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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/DoublesMethodsForWeb.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/thirdparty/publicsuffix/TrieParser.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/SequentialExecutor.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/CharMatcher.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/net/PercentEscaper.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/Doubles.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Joiner.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/Booleans.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Converter.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/Longs.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/Floats.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/Ints.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FluentIterable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/io/FileBackedOutputStream.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/UnicodeEscaper.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ListenableFutureTask.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/net/InetAddresses.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/Bytes.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/Escaper.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/Chars.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Stopwatch.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/MultiReader.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/Shorts.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/JdkBackedImmutableSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/ImmutableSupplier.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ExecutionSequencer.java
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*/
/*
 * This method was rewritten in Java from an intermediate step of the Murmur hash function in
 * http://code.google.com/p/smhasher/source/browse/trunk/MurmurHash3.cpp, which contained the
 * following header:
 *
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 */

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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingListMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/collect/RowSortedTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingSortedSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SortedMapDifference.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingImmutableCollection.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/MinMaxPriorityQueue.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractSequentialIterator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/UnmodifiableListIterator.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/eventbus/Subscriber.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/TrustedListenableFutureTask.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/eventbus/Dispatcher.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/MoreObjects.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ListenerCallQueue.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/math/Quantiles.java

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*/
/*
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  * and released to the public domain, as explained at
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  *
  * As of 2010/06/11, this method is identical to the (package private) hash method in OpenJDK 7's
  * java.util.HashMap class.
  */
```

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```

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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Java8Usage.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ListenableScheduledFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/BaseEncoding.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/package-info.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/Element.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/xml/package-info.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ServiceManager.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FilteredKeyMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/ImmutableTypeToInstanceMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/reflect/Parameter.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/LongAddable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/MutableTypeToInstanceMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/TypeToInstanceMap.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/ChecksumHashFunction.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/ClassPath.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/FileWriteMode.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/StandardSystemProperty.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableRangeMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/ByteSource.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/math/Stats.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/AbstractByteHasher.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/Invokable.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/AbstractInvocationHandler.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/SipHashFunction.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/math/StatsAccumulator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/LongAddables.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/math/LinearTransformation.java

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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingBlockingDeque.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TreeRangeMap.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingImmutableList.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableEnumMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingImmutableMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingNavigableMap.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RangeMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/DescendingImmutableSortedSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TransformedListIterator.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/DescendingMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FilteredKeySetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/CompactHashSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractSortedKeySortedSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/EvictingQueue.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FilteredEntryMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingImmutableSet.java

* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/CompactLinkedHashMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FilteredSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/CompactLinkedHashSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FilteredMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FilteredKeyListMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularImmutableAsList.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/CompactHashMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TransformedIterator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FilteredEntrySetMultimap.java
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingObject.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractMapBasedMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TreeMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/MutableClassToInstanceMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/collect/AbstractMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ClassToInstanceMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Synchronized.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/EnumHashBiMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Multisets.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingConcurrentMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingCollection.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractMapBasedMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ListMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ReverseOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/LinkedListMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Multimaps.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ConcurrentHashMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractSortedSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Interner.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/LinkedHashMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Multimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/HashMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/NullsLastOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SingletonImmutableSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TreeMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/collect/ComparatorOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractListMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/NullsFirstOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableList.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingQueue.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractIterator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Iterables.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingIterator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Lists.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingListIterator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/MapDifference.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/LinkedHashMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularImmutableSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractMapEntry.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/package-info.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Sets.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/HashMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Multiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractBiMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/NaturalOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingList.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/collect/UsingToStringOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Iterators.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ByFunctionOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/LexicographicalOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ArrayListMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/BiMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingMapEntry.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingSortedSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/CompoundOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SortedSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ExplicitOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingSortedMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ReverseNaturalOrdering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/EnumBiMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Maps.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Ordering.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingMultiset.java
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/IncidentEdgeSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/CompactHashing.java
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/MultimapBuilder.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/MoreFiles.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableMapEntry.java
No license file was found, but licenses were detected in source scan.

*/
/**
* Outer class that exists solely to let us write {@code Partially.GwtIncompatible} instead of plain
* {@code GwtIncompatible}. This is more accurate for {@link Futures#catching}, which is available
* under GWT but with a slightly different signature.
*
* <p>We can't use {@code PartiallyGwtIncompatible} because then the GWT compiler wouldn't recognize
* it as a {@code GwtIncompatible} annotation. And for {@code Futures.catching}, we need the GWT
* compiler to autostrip the normal server method in order to expose the special, inherited GWT
* version.
*/

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Partially.java
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/eventbus/SubscriberExceptionHandler.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Utf8.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/thirdparty/publicsuffix/PublicSuffixType.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/eventbus/SubscriberExceptionContext.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/WrappingScheduledExecutorService.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/HashingInputStream.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Verify.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/collect/AbstractTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Runnables.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/TypeVisitor.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/CharSequenceReader.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/FilteredMultimapValues.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/VerifyException.java
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SparseImmutableTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/MapMakerInternalMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/html/HtmlEscapers.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/ArrayBasedUnicodeEscaper.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ForwardingFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/JdkFutureAdapters.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ForwardingListenableFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/annotations/GwtCompatible.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/net/InternetDomainName.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/net/HostSpecifier.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Splitter.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/Escapers.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/annotations/GwtIncompatible.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/ReferenceEntry.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/ArrayBasedCharEscaper.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/ArrayBasedEscaperMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/TypeResolver.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/LineProcessor.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/DenseImmutableTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/SettableFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Callables.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AbstractExecutionThreadService.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/net/UrlEscapers.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ForwardingFluentFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Cut.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/Platform.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/MapMaker.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/ByteArrayDataInput.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Platform.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/CacheBuilder.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AbstractService.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularImmutableTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/xml/XmlEscapers.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/io/ByteProcessor.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/ByteArrayDataOutput.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/UnsignedBytes.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Service.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/SignedBytes.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AbstractIdleService.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/LocalCache.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/OverflowAvoidingLockSupport.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/Java8Compatibility.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/math/BigDecimalMath.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/Java8Compatibility.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/ImmutableNetwork.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TopKSelector.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/RecursiveDeleteOption.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/PredecessorsFunction.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/Network.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/MutableGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/Graphs.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/Graph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/InsecureRecursiveDeleteException.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/SuccessorsFunction.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/ImmutableGraph.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableSortedMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularImmutableList.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableEnumSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ComputationException.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ComparisonChain.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularImmutableSortedSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractIndexedListIterator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SingletonImmutableTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableAsList.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ArrayTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ForwardingTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/EmptyImmutableSetMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/DiscreteDomain.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableClassToInstanceMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableSortedSetFauxverideShim.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TableCollectors.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AtomicDoubleArray.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/Striped64.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/thirdparty/publicsuffix/PublicSuffixPatterns.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/StandardRowSortedTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableBiMap.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableSortedSet.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Range.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableListMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/CollectPreconditions.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableEntry.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularImmutableBiMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Tables.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Table.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/StandardTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TreeBasedTable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/HashBasedTable.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Serialization.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableMapValues.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ArrayListMultimapGwtSerializationDependencies.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/GraphConstants.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/ImmutableValueGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/MapRetrievalCache.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/AbstractDirectedNetworkConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/DirectedMultiNetworkConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/StandardMutableNetwork.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/StandardNetwork.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/NetworkConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/MultiEdgesConnecting.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/GraphBuilder.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/MutableValueGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/ForwardingNetwork.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/MoreCollectors.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/EndpointPair.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/DirectedGraphConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/collect/CollectCollectors.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/AbstractGraphBuilder.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Comparators.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/AbstractGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/StandardValueGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/LinkedHashMultimapGwtSerializationDependencies.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/AbstractNetwork.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/GraphConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/AbstractUndirectedNetworkConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/NetworkBuilder.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/ValueGraphBuilder.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/ForwardingValueGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/EdgesConnecting.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableMultisetGwtSerializationDependencies.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/MapIteratorCache.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/UndirectedGraphConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RangeGwtSerializationDependencies.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/ValueGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/ForwardingGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/StandardMutableValueGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/HashMultimapGwtSerializationDependencies.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/EndpointPairIterator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/UndirectedNetworkConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/UndirectedMultiNetworkConnections.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/graph/StandardMutableGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/DirectedNetworkConnections.java
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Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/AbstractBaseGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/BaseGraph.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/graph/Traverser.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ClosingFuture.java
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/**
* Holder for web specializations of methods of {@code Shorts}. Intended to be empty for regular

* version.
*/

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/ShortsMethodsForWeb.java
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/**
* Holder for extra methods of {@code Objects} only in web. Intended to be empty for regular
* version.
*/

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/ExtraObjectsMethodsForWeb.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Streams.java
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Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/FarmHashFingerprint64.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Platform.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AsyncCallable.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/ReaderInputStream.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/InterruptibleTask.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AggregateFutureState.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ConsumingQueueIterator.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/LittleEndianByteArray.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/CombinedFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/MacHashFunction.java
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Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableSortedAsList.java
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Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ForwardingBlockingQueue.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ThreadFactoryBuilder.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/SortedLists.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/UncaughtExceptionHandlers.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/annotations/package-info.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Monitor.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/annotations/Beta.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Atomics.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/base/Strings.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Ascii.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ContiguousSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/package-info.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/net/package-info.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Equivalence.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ListeningExecutorService.java
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* the License.
*/
/*
 * This method was rewritten in Java from an intermediate step of the Murmur hash function in
 * http://code.google.com/p/smhasher/source/browse/trunk/MurmurHash3.cpp, which contained the
 * following header:
 *
 * MurmurHash3 was written by Austin Appleby, and is placed in the public domain. The author
 * hereby disclaims copyright to this source code.
 */

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/SmallCharMatcher.java
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* the License.
*/
/**
* Holder for web specializations of methods of {@code Ints}. Intended to be empty for regular
* version.
*/

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/IntsMethodsForWeb.java
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*

```
/**
  * Returns an array containing all of the elements in the specified collection. This method
  * returns the elements in the order they are returned by the collection's iterator. The returned
  * array is "safe" in that no references to it are maintained by the collection. The caller is
  * thus free to modify the returned array.
  *
  * <p>This method assumes that the collection size doesn't change while the method is running.
  *
  * <p>TODO(kevinb): support concurrently modified collections?
  *
  * @param c the collection for which to return an array of elements
  */
```

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ObjectArrays.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/JdkBackedImmutableBiMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/JdkBackedImmutableMap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/BaseImmutableMultimap.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/collect/IndexedImmutableSet.java
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*/
/**
  * Not supported. <b>You are attempting to create a map that may contain a non-{@code Comparable}
  * key.</b> Proper calls will resolve to the version in {@code ImmutableSortedMap}, not this dummy
  * version.
  *
  * @throws UnsupportedOperationException always
  * @deprecated <b>Pass a key of type {@code Comparable} to use {@link
  *     ImmutableSortedMap#of(Comparable, Object)}.</b>
  */
```

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/ImmutableSortedMapFauxverideShim.java
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```

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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/RemovalListener.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ForwardingExecutorService.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/ExecutionError.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/package-info.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/UnsignedInts.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Uninterruptibles.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/ForwardingCache.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/Murmur3_128HashFunction.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/LoadingCache.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/BloomFilterStrategies.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/CacheLoader.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/Types.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/FutureCallback.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/TypeParameter.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularContiguousSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/PrimitiveSink.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AbstractScheduledService.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Optional.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/AbstractCache.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/BoundType.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/AbstractHasher.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/Queues.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/DescendingImmutableSortedMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/Hasher.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/Enums.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/RegularImmutableMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/UnsignedLong.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/HashCode.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/math/BigIntegerMath.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/UncheckedExecutionException.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/AbstractCompositeHashFunction.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/AbstractSortedMultiset.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/UnsignedInteger.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/ParseRequest.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/AbstractLoadingCache.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/FunctionalEquivalence.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/CycleDetectingLockFactory.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/cache/ForwardingLoadingCache.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/TreeRangeSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/Funnels.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/AbstractNonStreamingHashFunction.java
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jar/com/google/common/hash/HashingOutputStream.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/net/HostAndPort.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/math/LongMath.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/hash/Hashing.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/collect/EmptyContiguousSet.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/math/MathPreconditions.java
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/*
 * This following method is a modified version of one found in
 * http://gee.cs.oswego.edu/cgi-bin/viewcvs.cgi/jsr166/src/test/tck/AbstractExecutorServiceTest.java?revision=1.30
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 *
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 */

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/MoreExecutors.java
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*/
/**
* Holder for web specializations of methods of {@code Floats}. Intended to be empty for regular
* version.
*/

Found in path(s):
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/primitives/FloatsMethodsForWeb.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/PatternCompiler.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/CommonPattern.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/JdkPattern.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/FuturesGetChecked.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AggregateFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/base/CaseFormat.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/annotations/VisibleForTesting.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/Futures.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/GwtFuturesCatchingSpecialization.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/AbstractTransformFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/CharEscaperBuilder.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/TimeoutFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/SimpleTimeLimiter.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/FakeTimeLimiter.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/escape/CharEscaper.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/FluentFuture.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/TimeLimiter.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/reflect/TypeToken.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/io/PatternFilenameFilter.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-

jar/com/google/common/util/concurrent/AbstractCatchingFuture.java
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* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/GwtFluentFutureCatchingSpecialization.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/UncheckedTimeoutException.java
* /opt/cola/permits/1162863591_1620924149.63/0/guava-30-1-1-jre-sources-jar/com/google/common/util/concurrent/CollectionFuture.java

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# 1.124 j2objc-annotations 1.3

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* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-jar/com/google/j2objc/annotations/RetainedWith.java
* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-jar/com/google/j2objc/annotations/Property.java
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Found in path(s):
* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-jar/com/google/j2objc/annotations/Weak.java
* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-jar/com/google/j2objc/annotations/AutoreleasePool.java
* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-jar/com/google/j2objc/annotations/WeakOuter.java

# 1.125 asm-based-accessors-helper-used-by-json-smart 2.4.7

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* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/TypePath.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Frame.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/RecordComponentWriter.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/AnnotationVisitor.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/ModuleVisitor.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/ModuleWriter.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/CurrentFrame.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/AnnotationWriter.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/ConstantDynamic.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/ClassWriter.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/signature/SignatureVisitor.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Attribute.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Opcodes.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Handle.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/MethodTooLargeException.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/signature/SignatureReader.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/TypeReference.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Context.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Label.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Type.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/signature/SignatureWriter.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/FieldVisitor.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Handler.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/SymbolTable.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/ClassReader.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Edge.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/RecordComponentVisitor.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Constants.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/Symbol.java

* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/FieldWriter.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/MethodWriter.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/MethodVisitor.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/ClassTooLargeException.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/ByteVector.java
* /opt/cola/permits/1150153141_1627681655.27/0/asm-9-1-sources-1-jar/org/objectweb/asm/ClassVisitor.java

# 1.129 jackson-xc 2.13.2

## 1.129.1 Available under license :

# 1.130 opentest4j-opentest4j 1.2.0

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# 1.131 antlr-4-tool 4.7.2

## 1.131.1 Available under license :

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```
/*
This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>(<line>,<column>)"
```

```
message(id, text) ::= "error <id> : <text>"

report(location, message, type) ::= "<location> : <type> <message.id> : <message.text>"

wantsSingleLineMessage() ::= "true"
```

Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/messages/formats/vs2005.stg
No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
*  Copyright (c) 2012-2016 Terence Parr
*  Copyright (c) 2012-2016 Sam Harwell
*  Copyright (c) 2014 Eric Vergnaud
*  All rights reserved.
*
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*  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
*  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** ANTLR tool checks output templates are compatible with tool code generation.
*  For now, a simple string match used on x.y of x.y.z scheme.
*  Must match Tool.VERSION during load to templates.
*
*  REQUIRED.
*/
```

```
pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from antlr4 import *
from io import StringIO
from typing.io import TextIO
import sys

<namedActions.header>
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
   from .<file.parserName> import <file.parserName>
else:
   from <file.parserName> import <file.parserName>
<header>

# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

   <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
   pass

# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
   pass

}; separator="\n">

>>
```

```
VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
    from .<file.parserName> import <file.parserName>
else:
    from <file.parserName> import <file.parserName>
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

    <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    return self.visitChildren(ctx)

}; separator="\n">

del <file.parserName>
>>



fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
if __name__ is not None and "." in __name__:
    from .<superClass> import <superClass>
else:
    from <superClass> import <superClass>

<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

    grammarFileName = "<parser.grammarFileName>"
    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    sharedContextCache = PredictionContextCache()

    literalNames = [ <parser.literalNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

    ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

    EOF = <TokenLabelType()>.EOF
    <if(parser.tokens)>
    <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
    <endif>

    <parser:(ctor)()>

    <namedActions.members>

    <funcs; separator="\n">


<if(sempredFuncs)>
    def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
        if self._predicates == None:
            self._predicates = dict()
<parser.sempredFuncs.values:{f |
        self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
        pred = self._predicates.get(ruleIndex, None)
        if pred is None:
            raise Exception("No predicate with index:" + str(ruleIndex))
        else:
            return pred(localctx, predIndex)

    <sempredFuncs.values; separator="\n">
<endif>



>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx:RuleContext, ruleIndex:int, actionIndex:int):
  if self._actions is None:
     actions = dict()
<recog.actionFuncs.values:{f|
     actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
     self._actions = actions
  action = self._actions.get(ruleIndex, None)
  if action is not None:
     action(localctx, actionIndex)
  else:
     raise Exception("No registered action for:" + str(ruleIndex))

<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
  if self._predicates is None:
     preds = dict()
<recog.sempredFuncs.values:{f|
     preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
     self._predicates = preds
  pred = self._predicates.get(ruleIndex, None)
  if pred is not None:
     return pred(localctx, predIndex)
  else:
     raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<
def __init__(self, input:TokenStream, output:TextIO = sys.stdout):
  super().__init__(input, output)
  self.checkVersion("<file.ANTLRVersion>")
  self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
  self._predicates = None

>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx:<r.ctxType> , actionIndex:int):
<actions:{index|
<if(first(actions))>
```

```
    if actionIndex == <index>:
        <actions.(index)>
<elseif(rest(actions))>
    elif actionIndex == <index>:
        <actions.(index)>
<endif> }; separator="\n">
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx:<r.ctxType>, predIndex:int):
    <actions:{index|
<if(first(actions))>
    if predIndex == <index>:
        return <actions.(index)>
<elseif(rest(actions))>
    elif predIndex == <index>:
        return <actions.(index)>
<endif> }; separator="\n">

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name><if(a.type)>:<a.type><endif>}>):

    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
    self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    <if(exceptions)>
    <exceptions; separator="\n">
    <else>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
```

```
  <endif>
  finally:
      <finallyAction>
      self.exitRule()
  return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p:int=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
  _parentctx = self._ctx
  _parentState = self.state
  localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
  _prevctx = localctx
  _startState = <currentRule.startState>
  self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
  <namedActions.init>
  <locals; separator="\n">
  try:
      <code>
      <postamble; separator="\n">
      <namedActions.after>
  except RecognitionException as re:
      localctx.exception = re
      self._errHandler.reportError(self, re)
      self._errHandler.recover(self, re)
  finally:
      <finallyAction>
      self.unrollRecursionContexts(_parentctx)
  return localctx

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
```

```
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>

>>

LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  pass
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
  <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>



LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
  <alts; separator="\n">
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
```

```
    <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
    <alts; separator="\n">
    self.state = <choice.stateNumber> <! loopback/exit decision !>
    self._errHandler.sync(self)
    <iteration>
    if not (<loopExpr>):
        break

>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
    <alt>
    pass
}; separator="\nel">

>>

OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
    <alt>
}; separator="\nel">

>>

StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
```

```
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  if _alt==1<if(!choice.ast.greedy)>+1<endif>:
      <iteration>
      <alts> <! should only be one !>
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">
  else:
      <error>
  self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator=" or ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> and ((1 \<\< <offsetShiftVar(s.varName, bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>
```

```
isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>

cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>

InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)
>>

MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l |     <labelref(l)> = }><else>    <endif>self._errHandler.recoverInline(self)
else:
  self._errHandler.reportMatch(self)
  self.consume()
>>
```

```
Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
   from antlr4.error.Errors import FailedPredicateException
   raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
   <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"
```

```
TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type()"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText((<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "self._input.getText((localctx.start, self._input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "localctx"
ThisRulePropertyRef_parser(r)  ::= "self"

NonLocalAttrRef(s)     ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)      ::= <<
def <t.name>(self):
   return self.getToken(<parser.name>.<t.name>, 0)
>>

// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
   return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t)  ::= <<
```

```
def <t.name>(self, i:int=None):
    if i is None:
        return self.getTokens(<parser.name>.<t.name>)
    else:
        return self.getToken(<parser.name>.<t.name>, i)
>>

ContextRuleGetterDecl(r)       ::= <<
def <r.name>(self):
    return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)

>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
    return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
def <r.name>(self, i:int=None):
    if i is None:
        return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
    else:
        return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)

>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
*  r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

    def __init__(self, parser, parent:ParserRuleContext=None, invokingState:int=-1<struct.ctorAttrs:{a | ,
<a.name><if(a.type)>:<a.type><endif>=None}>):
        super().__init__(parent, invokingState)
        self.parser = parser
        <attrs:{a | <a>}; separator="\n">
        <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

    <getters:{g | <g>}; separator="\n\n">

    def getRuleIndex(self):
        return <parser.name>.RULE_<struct.derivedFromName>

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
    def copyFrom(self, ctx:ParserRuleContext):
        super().copyFrom(ctx)
        <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
    <dispatchMethods; separator="\n">
    <extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name>(<currentRule.name; format="cap">Context):

    def __init__(self, parser, ctx:ParserRuleContext): # actually a <parser.name>.<currentRule.name;
format="cap">Context
        super().__init__(parser)
        <attrs:{a | <a>}; separator="\n">
        self.copyFrom(ctx)

    <getters:{g | <g>}; separator="\n">

    <dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener:ParseTreeListener):
    if hasattr( listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">" ):
        listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor:ParseTreeVisitor):
    if hasattr( visitor, "visit<struct.derivedFromName; format="cap">" ):
        return visitor.visit<struct.derivedFromName; format="cap">(self)
```

```
   else:
       return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                 ::= "self._ctx.stop = self._input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
   self.triggerExitRuleEvent()
_prevctx = localctx
>>
```

```
LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
from antlr4 import *
from io import StringIO
from typing.io import TextIO
import sys

<namedActions.header>

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
if __name__ is not None and "." in __name__:
   from .<superClass> import <superClass>
else:
   from <superClass> import <superClass>

<endif>
<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

   atn = ATNDeserializer().deserialize(serializedATN())

   decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

<if(lexer.channels)>
   <lexer.channels:{c| <c> = <lexer.channels.(c)>}; separator="\n">

<endif>
<if(rest(lexer.modes))>
   <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

<endif>
   <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

   channelNames = [ u"DEFAULT_TOKEN_CHANNEL", u"HIDDEN"<if (lexer.channels)>, <lexer.channels:{c|
u"<c>"}; separator=", ", wrap, anchor><endif> ]

   modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ]

   literalNames = [ "\<INVALID>",
           <lexer.literalNames:{t | <t>}; separator=", ", wrap, anchor> ]
```

```
    symbolicNames = [ "\<INVALID>",
            <lexer.symbolicNames:{t | <t>}; separator=", ", wrap, anchor> ]

    ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

    grammarFileName = "<lexer.grammarFileName>"

    def __init__(self, input=None, output:TextIO = sys.stdout):
        super().__init__(input, output)
        self.checkVersion("<lexerFile.ANTLRVersion>")
        self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
        self._actions = None
        self._predicates = None

    <namedActions.members>

    <dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
    with StringIO() as buf:
        buf.write("<model.serialized; wrap={")<\n>        buf.write("}>")
        return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<pythonTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"
```

Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/codegen/Python3/Python3.stg
No license file was found, but licenses were detected in source scan.

```
*  Copyright (c) 2015 Janyou
*  All rights reserved.
*
*  Redistribution and use in source and binary forms, with or without
*  modification, are permitted provided that the following conditions
*  are met:
*
*  1. Redistributions of source code must retain the above copyright
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*  THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
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*  OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
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*  INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
*  NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
*  DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
*  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
*  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

SwiftTypeInitMap ::= [
 "Int":"0",
 "Int64":"0",
 "Float":"0.0",
 "Double":"0.0",
 "Bool":"false",
 default:"nil" // anything other than a primitive type is an object
]
SwiftTypeMap ::= [
 "int":"Int",
 "float":"Float",
 "long":"Int64",
 "double":"Double",
 "bool":"Bool",
 "boolean":"Bool",
 default : key
]
// args must be <object-model-object>, <fields-resulting-in-STs>

accessLevelOpenOK(obj) ::= "<obj.accessLevel; null=\"open\">"
accessLevelNotOpen(obj) ::= "<obj.accessLevel; null=\"public\">"
```

```
ParserFile(file, parser, namedActions,contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4

<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
* This interface defines a complete listener for a parse tree produced by
* {@link <file.parserName>}.
*/
<accessLevelNotOpen(file)> protocol <file.grammarName>Listener: ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
* Enter a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
- Parameters:
  - ctx: the parse tree
*/
func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)
/**
<if(file.listenerLabelRuleNames.(lname))>
* Exit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
- Parameters:
  - ctx: the parse tree
*/
func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)}; separator="\n">
```

```
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>

import Antlr4



/**
* This class provides an empty implementation of {@link <file.grammarName>Listener},
* which can be extended to create a listener which only needs to handle a subset
* of the available methods.
*/
<accessLevelOpenOK(file)> class <file.grammarName>BaseListener: <file.grammarName>Listener {
    <accessLevelNotOpen(file)> init() { \}
 <file.listenerNames:{lname |

/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
<accessLevelOpenOK(file)> func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) { \}
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
<accessLevelOpenOK(file)> func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) { \}}; separator="\n">

 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func enterEveryRule(_ ctx: ParserRuleContext) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func exitEveryRule(_ ctx: ParserRuleContext) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func visitTerminal(_ node: TerminalNode) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func visitErrorNode(_ node: ErrorNode) { }
}
>>

VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
* This interface defines a complete generic visitor for a parse tree produced
* by {@link <file.parserName>}.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
<accessLevelOpenOK(file)> class <file.grammarName>Visitor\<T>: ParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
* Visit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
* Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
- Parameters:
 - ctx: the parse tree
- returns: the visitor result
*/
<accessLevelOpenOK(file)> func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) -> T {
 fatalError(#function + " must be overridden")
\}
```

```
}; separator="\n">
}
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
* This class provides an empty implementation of {@link <file.grammarName>Visitor},
* which can be extended to create a visitor which only needs to handle a subset
* of the available methods.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
<accessLevelOpenOK(file)> class <file.grammarName>BaseVisitor\<T>: AbstractParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation returns the result of calling
* {@link #visitChildren\} on {@code ctx\}.\</p>
*/
<accessLevelOpenOK(file)> func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) -> T? { return visitChildren(ctx) \}}; separator="\n">
}
>>

fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<!//@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})!>
<accessLevelOpenOK(parser)> class <parser.name>: <superClass; null="Parser"> {

 internal static var _decisionToDFA: [DFA] = {
        var decisionToDFA = [DFA]()
        let length = <parser.name>._ATN.getNumberOfDecisions()
        for i in 0..\<length {
         <!// decisionToDFA[i] = DFA(<parser.name>._ATN.getDecisionState(i)!, i);!>
          decisionToDFA.append(DFA(<parser.name>._ATN.getDecisionState(i)!, i))
         }
         return decisionToDFA
    }()

 internal static let _sharedContextCache = PredictionContextCache()

 <if(parser.tokens)>
 <accessLevelNotOpen(parser)>
 enum Tokens: Int {
  case EOF = -1, <parser.tokens:{k | <k> = <parser.tokens.(k)>}; separator=", ", wrap, anchor>
 }
          <endif>

 <accessLevelNotOpen(parser)>
 static let <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>

 <accessLevelNotOpen(parser)>
 static let ruleNames: [String] = [
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 ]

 <vocabulary(parser.literalNames, parser.symbolicNames,
                 accessLevelNotOpen(parser))>

 override <accessLevelOpenOK(parser)>
 func getGrammarFileName() -> String { return "<parser.grammarFileName; format="java-escape">" }

 override <accessLevelOpenOK(parser)>
 func getRuleNames() -> [String] { return <parser.name>.ruleNames }

 override <accessLevelOpenOK(parser)>
 func getSerializedATN() -> String { return <parser.name>._serializedATN }

 override <accessLevelOpenOK(parser)>
 func getATN() -> ATN { return <parser.name>._ATN }

 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 override <accessLevelOpenOK(parser)>
 func sempred(_ _localctx: RuleContext?, _ ruleIndex: Int,  _ predIndex: Int)throws -> Bool {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case  <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
     default: return true
  }
  <!return true;!>
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>

 <accessLevelNotOpen(parser)>
 static let _serializedATN = <parser.name>ATN().jsonString

 <accessLevelNotOpen(parser)>
 static let _ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
}
>>

vocabulary(literalNames, symbolicNames, accessLevel) ::= <<
private static let _LITERAL_NAMES: [String?] = [
 <literalNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
]
private static let _SYMBOLIC_NAMES: [String?] = [
 <symbolicNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
]
<accessLevel>
static let VOCABULARY = Vocabulary(_LITERAL_NAMES, _SYMBOLIC_NAMES)
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
override <accessLevelOpenOK(parser)>
func action(_ _localctx: RuleContext?,  _ ruleIndex: Int, _ actionIndex: Int) throws {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((_localctx as <f.ctxType>?), actionIndex)
  }; separator="\n">
 default: break
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
override <accessLevelOpenOK(parser)>
func sempred(_ _localctx: RuleContext?, _  ruleIndex: Int,_   predIndex: Int) throws -> Bool {
 switch (ruleIndex) {
```

```
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
 default: return true
 }
 <!return true;!>
}
<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<

override <accessLevelOpenOK(parser)>
func getVocabulary() -> Vocabulary {
   return <p.name>.VOCABULARY
}

override <accessLevelNotOpen(parser)>
init(_ input:TokenStream) throws {
   RuntimeMetaData.checkVersion("4.7.2", RuntimeMetaData.VERSION)
 try super.init(input)
 _interp = ParserATNSimulator(self,<p.name>._ATN,<p.name>._decisionToDFA,
<parser.name>._sharedContextCache)
}

>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private func <r.name>_action(_ _localctx: <r.ctxType>?,  _ actionIndex: Int) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
  }; separator="\n">
  default: break
 }
}
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private func <r.name>_sempred(_ _localctx: <r.ctxType>!,  _ predIndex: Int) throws -> Bool {
 switch (predIndex) {
 <actions:{index|
   case <index>:return <actions.(index)>}; separator="\n">
     default: return true
 }
 <!return true;!>
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<
<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">
@discardableResult
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else> <accessLevelOpenOK(parser)> func
<endif><currentRule.name>(<if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType> {
 var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>)
 try enterRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>)
 <namedActions.init>
 <locals; separator="\n">
 defer {
     <finallyAction>
     try! exitRule()
   }
 do {
<if(currentRule.hasLookaheadBlock)>
  var _alt:Int
<endif>
   <code>
  <postamble; separator="\n">
   <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch ANTLRException.recognition(let re) {
  _localctx.exception = re
  _errHandler.reportError(self, re)
  try _errHandler.recover(self, re)
 }
 <endif>

 return _localctx
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else> <accessLevelNotOpen(parser)> final <endif>
func <currentRule.name>( <if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType>   {
 return try <currentRule.name>(0<currentRule.args:{a | , <a.name>}>)
}
@discardableResult
private func <currentRule.name>(_ _p<args:{a | , <a>}>: Int) throws -> <currentRule.ctxType>   {
 let _parentctx: ParserRuleContext? = _ctx
 var _parentState: Int = getState()
 var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>)
 var  _prevctx: <currentRule.ctxType> = _localctx
 var _startState: Int = <currentRule.startState>
 try enterRecursionRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p)
 <namedActions.init>
 <locals; separator="\n">
 defer {
     <finallyAction>
     try! unrollRecursionContexts(_parentctx)
   }
 do {
<if(currentRule.hasLookaheadBlock)>
  var _alt: Int
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
  }
 catch ANTLRException.recognition(let re) {
  _localctx.exception = re
  _errHandler.reportError(self, re)
  try _errHandler.recover(self, re)
 }

 return _localctx;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx =  <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
try enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
```

```
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<!//{!>
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
<!//}!>
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt | <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 <error>
}
>>

LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 break
}
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>)
```

```
try _errHandler.sync(self)
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>)
 try _errHandler.sync(self)
 <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>) <! alt block decision !>
try _errHandler.sync(self)
<preamble; separator="\n">
repeat {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 <iteration>
} while (<loopExpr>)
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch(try getInterpreter().adaptivePredict(_input,<choice.decision>, _ctx)) {
<alts:{alt |
case <i>:
 <alt>
 break}; separator="\n">
default: break
}
>>

OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
default: break
}
```

```
>>

StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
_alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
while (_alt != <choice.exitAlt> && _alt != ATN.INVALID_ALT_NUMBER) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>)
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
}
>>

PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
try _errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
repeat {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
} while (_alt != <choice.exitAlt> && _alt !=  ATN.INVALID_ALT_NUMBER)
>>

Sync(s) ::= "sync(<s.expecting.name>);"

ThrowNoViableAlt(t) ::= "throw ANTLRException.recognition(e: NoViableAltException(self))"

TestSetInline(s) ::= <<
<!<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">!>
//closure
{ () -> Bool in
     <if(rest(s.bitsets))>var<else>let<endif> testSet: Bool = <first(s.bitsets):{bits |
<if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}>
         <rest(s.bitsets):{bits | testSet = testSet || <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s,
bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator="\n">
     return testSet
}()
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <<
<!(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1 \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1 \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)!>
{  () -> Bool in
   <! let test: Bool = (<testShiftInRange({<offsetShift(s.varName, bits.shift)>})>)!>
  <!var temp: Int64 =  Int64(<offsetShift(s.varName, bits.shift)>)!>
  <!temp = (temp \< 0) ? (64 + (temp % 64 )) : (temp % 64)!>
  <!let test1: Int64 = (Int64(1) \<\< temp)!>
  <!var test2: Int64 = (<first(bits.ttypes):{ttype | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)}>)!>
  <!<rest(bits.ttypes):{ttype | test2 = test2 | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)};
separator="\n">!>
  let testArray: [Int] = [<s.varName>, <bits.ttypes:{ttype |<parserName(ttype)>}; separator=",">]
  <!var test2: Int64 = Utils.testBitLeftShiftArray(testArray)!>
   return  Utils.testBitLeftShiftArray(testArray, <bits.shift>)
}()
>>

isZero ::= [
"0": true,
default: false
]
parserName(ttype) ::= <%
<parser.name>.Tokens.<ttype>.rawValue
%>
offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName> == <parser.name>.Tokens.<ttype>.rawValue}; separator=" || ">
%>

cases(ttypes) ::= <<
<trunc(ttypes): {t | case .<t>:fallthrough}  ; separator="\n">
<last(ttypes): {t | case .<t>:}  ; separator="\n">
>>
```

```
InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>)
<if(r.labels)>
try {
  let assignmentValue = try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)
  <r.labels:{l | <labelref(l)> = assignmentValue} ; separator="\n">
    }()
<else>try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)<endif>
>>

MatchToken(m) ::= <<
setState(<m.stateNumber>)
<if(m.labels)>
try {
  let assignmentValue = try match(<parser.name>.Tokens.<m.name>.rawValue)
  <m.labels:{l | <labelref(l)> = assignmentValue}  ; separator="\n">
    }()
<else>try match(<parser.name>.Tokens.<m.name>.rawValue)<endif>
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>)
<if(m.labels)><m.labels:{l | <labelref(l)> = }>try _input.LT(1)<endif>
<capture>
if (<if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>)) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>try _errHandler.recoverInline(self)<if(m.labels)> as
Token<endif>
}
else {
 _errHandler.reportMatch(self)
 try consume()
}
>>

Wildcard(w) ::= <<
setState(<w.stateNumber>)
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>try matchWildcard();
>>

// ACTION STUFF
```

```
Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>)
if (!(<chunks>)) {
   throw ANTLRException.recognition(e:FailedPredicateException(self, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>))
}
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg)      ::= "_type = <arg>"
LexerChannelCommand(arg)   ::= "_channel = <arg>"
LexerModeCommand(arg)      ::= "_mode = <arg>"
LexerPushModeCommand(arg)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getText()! : \"\")"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getType() : 0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getLine() : 0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getCharPositionInLine() : 0)"
```

```
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getChannel() : 0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getTokenIndex() : 0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> != nil ? Int(<ctx(t)>.<t.label>!.getText()!) : 0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.start?.description ?? \"\") : \"\")"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.stop?.description ?? \"\") : \"\")"
RulePropertyRef_text(r)  ::= "(<ctx(r)>.<r.label> != nil ? try
_input.getText(<ctx(r)>.<r.label>!.start,<ctx(r)>.<r.label>!.stop) : \"\")"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"

ThisRulePropertyRef_start(r) ::= "_localctx.start"
ThisRulePropertyRef_stop(r)  ::= "_localctx.stop"
ThisRulePropertyRef_text(r)  ::= "(try _input.getText(_localctx.start, try _input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "_localctx"
ThisRulePropertyRef_parser(r)  ::= "self"

NonLocalAttrRef(s)   ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks)   ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "<t.name>: <SwiftTypeMap.(TokenLabelType())>!"
TokenTypeDecl(t) ::= "var <t.name>: Int = 0"
TokenListDecl(t) ::= "<t.name>: [Token] = [Token]()"
RuleContextDecl(r) ::= "<r.name>: <r.ctxName>!"
RuleContextListDecl(rdecl) ::= "<rdecl.name>: [<rdecl.ctxName>] = [<rdecl.ctxName>]()"

ContextTokenGetterDecl(t) ::= <<
 <accessLevelOpenOK(parser)>
 func <t.name>() -> TerminalNode? {
  return getToken(<parser.name>.Tokens.<t.name>.rawValue, 0)
 }
>>
ContextTokenListGetterDecl(t) ::= <<
 <accessLevelOpenOK(parser)>
 func <t.name>() -> [TerminalNode] {
  return getTokens(<parser.name>.Tokens.<t.name>.rawValue)
 }
>>
ContextTokenListIndexedGetterDecl(t) ::= <<
 <accessLevelOpenOK(parser)>
 func <t.name>(_ i:Int) -> TerminalNode? {
  return getToken(<parser.name>.Tokens.<t.name>.rawValue, i)
 }
>>
ContextRuleGetterDecl(r) ::= <<
```

```
 <accessLevelOpenOK(parser)>
 func <r.name>() -> <r.ctxName>? {
  return getRuleContext(<r.ctxName>.self, 0)
 }
>>
ContextRuleListGetterDecl(r) ::= <<
 <accessLevelOpenOK(parser)>
 func <r.name>() -> [<r.ctxName>] {
  return getRuleContexts(<r.ctxName>.self)
 }
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
 <accessLevelOpenOK(parser)>
 func <r.name>(_ i: Int) -> <r.ctxName>? {
  return getRuleContext(<r.ctxName>.self, i)
 }
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = try _input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = try _input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
         superClass={ParserRuleContext}) ::= <<

<accessLevelNotOpen(parser)> class <struct.name>:
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
 <attrs:{a | <accessLevelOpenOK(parser)> var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <! <if(ctorAttrs)> <accessLevelNotOpen(parser)> init(_ parent: ParserRuleContext,_ invokingState: Int) {
super.init(parent, invokingState)  }<endif> !>
 <if(ctorAttrs)>
 <accessLevelNotOpen(parser)> convenience init(_ parent: ParserRuleContext?, _ invokingState: Int<ctorAttrs:{a | ,
_ <a>}>) {
  self.init(parent, invokingState)
  <struct.ctorAttrs:{a | self.<a.name> = <a.name>;}; separator="\n">
 }
 <endif>

 override <accessLevelOpenOK(parser)>
 func getRuleIndex() -> Int {
  return <parser.name>.RULE_<struct.derivedFromName>
 }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 <! <accessLevelNotOpen(parser)> init() { }!>
 <accessLevelOpenOK(parser)>
 func copyFrom(_ ctx: <struct.name>) {
  super.copyFrom(ctx)
  <struct.attrs:{a | self.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
<accessLevelNotOpen(parser)> class <struct.name>: <currentRule.name; format="cap">Context {
 <attrs:{a | <accessLevelNotOpen(parser)> var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">

 <accessLevelNotOpen(parser)>
 init(_ ctx: <currentRule.name; format="cap">Context) {
  super.init()
  copyFrom(ctx)
 }
 <dispatchMethods; separator="\n">
}
>>

ListenerDispatchMethod(method) ::= <<
override <accessLevelOpenOK(parser)>
func <if(method.isEnter)>enter<else>exit<endif>Rule(_ listener: ParseTreeListener) {
 if let listener = listener as? <parser.grammarName>Listener {
  listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)
 }
}
>>

VisitorDispatchMethod(method) ::= <<
override <accessLevelOpenOK(parser)>
func accept\<T>(_ visitor: ParseTreeVisitor\<T>) -> T? {
 if let visitor = visitor as? <parser.grammarName>Visitor {
     return visitor.visit<struct.derivedFromName; format="cap">(self)
 }
 else if let visitor = visitor as? <parser.grammarName>BaseVisitor {
    return visitor.visit<struct.derivedFromName; format="cap">(self)
 }
 else {
     return visitor.visitChildren(self)
 }
}
>>

AttributeDecl(d) ::= "<d.name>: <SwiftTypeMap.(d.type)><if(d.initValue)> = <d.initValue><else>!<endif>"

/** If we don't know location of label def x, use this template (_localctx as! <x.ctx.name> */
labelref(x) ::= "<if(!x.isLocal)>_localctx.castdown(<x.ctx.name>.self).<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr?    */
ctx(actionChunk) ::= "_localctx.castdown(<actionChunk.ctx.name>.self)"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                 ::= "_ctx!.stop = try _input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.append(_prevctx)
<else>
_localctx.<label> = _prevctx
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = <currentAltLabel; format="cap">Context(  <ruleName; format="cap">Context(_parentctx,
_parentState))
<if(label)>
<if(isListLabel)>
(_localctx as! <currentAltLabel; format="cap">Context).<label>.append(_prevctx)
<else>
(_localctx as! <currentAltLabel; format="cap">Context).<label> = _prevctx
<endif>
<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>
```

```
recRuleReplaceContext(ctxName) ::= <<
_localctx = <ctxName>Context(_localctx)
_ctx = _localctx
_prevctx = _localctx
>>

recRuleSetPrevCtx() ::= <<
if _parseListeners != nil {
  try triggerExitRuleEvent()
}
_prevctx = _localctx
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
<!package <lexerFile.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4

<lexer>
>>
Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<accessLevelOpenOK(lexer)> class <lexer.name>: <superClass; null="Lexer"> {

 internal static var _decisionToDFA: [DFA] = {
        var decisionToDFA = [DFA]()
        let length = <lexer.name>._ATN.getNumberOfDecisions()
        for i in 0..\<length {
          <! decisionToDFA[i] = DFA(<lexer.name>._ATN.getDecisionState(i)!, i);!>
             decisionToDFA.append(DFA(<lexer.name>._ATN.getDecisionState(i)!, i))
        }
         return decisionToDFA
    }()

 internal static let _sharedContextCache = PredictionContextCache()

 <accessLevelNotOpen(lexer)>
 static let <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>

 <if(lexer.channels)>
 <accessLevelNotOpen(lexer)>
 static let <lexer.channels:{k | <k>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>
 <endif>
 <if(rest(lexer.modes))>
```

```
<accessLevelNotOpen(lexer)>
static let <rest(lexer.modes):{m| <m>=<i>}; separator=", ", wrap, anchor>
<endif>
<accessLevelNotOpen(lexer)>
static let channelNames: [String] = [
 "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ", wrap, anchor><endif>
]

<accessLevelNotOpen(lexer)>
static let modeNames: [String] = [
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
]

<accessLevelNotOpen(lexer)>
static let ruleNames: [String] = [
 <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
]

<vocabulary(lexer.literalNames, lexer.symbolicNames,
            accessLevelNotOpen(lexer))>

<namedActions.members>

override <accessLevelOpenOK(lexer)>
func getVocabulary() -> Vocabulary {
 return <lexer.name>.VOCABULARY
}

<accessLevelNotOpen(lexer)>
required init(_ input: CharStream) {
   RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION)
 super.init(input)
 _interp = LexerATNSimulator(self, <lexer.name>._ATN, <lexer.name>._decisionToDFA, <lexer.name>._sharedContextCache)
}

override <accessLevelOpenOK(lexer)>
func getGrammarFileName() -> String { return "<lexer.grammarFileName>" }

override <accessLevelOpenOK(lexer)>
func getRuleNames() -> [String] { return <lexer.name>.ruleNames }

override <accessLevelOpenOK(lexer)>
func getSerializedATN() -> String { return <lexer.name>._serializedATN }

override <accessLevelOpenOK(lexer)>
func getChannelNames() -> [String] { return <lexer.name>.channelNames }
```

```
 override <accessLevelOpenOK(lexer)>
 func getModeNames() -> [String] { return <lexer.name>.modeNames }

 override <accessLevelOpenOK(lexer)>
 func getATN() -> ATN { return <lexer.name>._ATN }

 <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
 <atn>

 <accessLevelNotOpen(lexer)>
 static let _serializedATN: String = <lexer.name>ATN().jsonString

 <accessLevelNotOpen(lexer)>
 static let _ATN: ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
}
>>

/** Don't need to define anything. The tool generates a XParserATN.swift file (and same for lexer)
*  which is referenced from static field _serializedATN.  This json string is passed to
*  deserializeFromJson(). Note this is not the "serialization as array of ints" that other targets
*  do. It is more or less the output of ATNPrinter which gets read back in.
*/
SerializedATN(model) ::= <<
>>

/** Using a type to init value map, try to init a type; if not in table
* must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<SwiftTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".swift"
```

Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/codegen/Swift/Swift.stg
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* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/codegen/Cpp/Cpp.stg
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NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY

```
/*
This file contains the actual layout of the messages emitted by ANTLR.
This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "(<id>) <text>"

report(location, message, type) ::= "<type>(<message.id>): <location> <message.text>"

wantsSingleLineMessage() ::= "false"
```

Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/messages/formats/antlr.stg
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Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/META-INF/maven/org.antlr/antlr4/pom.xml
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*/

/** templates used to generate make-compatible dependencies */

/** Generate "f : x, y, z" dependencies for input
*  dependencies and generated files. in and out
*  are File objects.  For example, you can say
*  <f.canonicalPath>
*/
dependencies(grammarFileName,in,out) ::= <<
<if(in)><grammarFileName>: <in; separator=", "><endif>
<out:{f | <f> : <grammarFileName>}; separator="\n">
>>
```

Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/depend.stg
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atn(startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph ATN {
rankdir=LR;
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

dfa(name, startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph <name>  {
<if(rankdir)>rankdir=<rankdir>;<endif>
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

decision-rank(states) ::= <<
{rank=same; rankdir=TB; <states:{s | s<s>}; separator="; ">}
>>

edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

action-edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

epsilon-edge(src,label,target,arrowhead,transitionIndex,loopback=false) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontname="Times-Italic",
label="&epsilon;"<if(loopback)>, style="dashed"<endif>];
>>

state(state, label, name, transitions) ::= <%
<name>[fontsize=11,
   label="
```

```
    <! rest(transition) tests for decision states: these nodes have a non-empty set of transitions after the first one. !>
    <if(rest(transitions))>
      {
      <! Label on the left side of the record node. !>
      <label>
      |
      <! Named ports in order on right side of record node, no display text. !>
      {<transitions:{t|\<p<i0>>}; separator="|">}}
    <else>
      <label>
    <endif>
    "
  <if(rest(transitions))>
    , shape=record, fixedsize=false
  <else>
    , shape=circle, fixedsize=true, width=.55
  <endif>
  , peripheries=1];
%>

stopstate(name,label,actionIndex,useBox) ::= <<
<name>[fontsize=11, label="<label><if(actionIndex)>,\naction:<actionIndex><endif>",
<if(useBox)>shape=polygon,sides=4,peripheries=2,fixedsize=false<else>shape=doublecircle, fixedsize=true,
width=.6<endif>];
>>
```

Found in path(s):

* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/dot/graphs.stg

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*/

/** ANTLR tool checks output templates are compatible with tool code generation.
*  For now, a simple string match used on x.y of x.y.z scheme.
*  Must match Tool.VERSION during load to templates.
*
*  REQUIRED.
*/

javascriptTypeInitMap ::= [
 "bool":"false",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"{}" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');
<if(file.genListener)>
var <file.grammarName>Listener = require('./<file.grammarName>Listener').<file.grammarName>Listener;
<endif>
<if(file.genVisitor)>
var <file.grammarName>Visitor = require('./<file.grammarName>Visitor').<file.grammarName>Visitor;
<endif>

<namedActions.header>
<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');
```

```
// This class defines a complete listener for a parse tree produced by <file.parserName>.
function <file.grammarName>Listener() {
 antlr4.tree.ParseTreeListener.call(this);
 return this;
}

<file.grammarName>Listener.prototype = Object.create(antlr4.tree.ParseTreeListener.prototype);
<file.grammarName>Listener.prototype.constructor = <file.grammarName>Listener;

<file.listenerNames:{lname |
// Enter a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.enter<lname; format="cap"> = function(ctx) {
\};

// Exit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.exit<lname; format="cap"> = function(ctx) {
\};

}; separator="\n">

exports.<file.grammarName>Listener = <file.grammarName>Listener;
>>



VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

function <file.grammarName>Visitor() {
 antlr4.tree.ParseTreeVisitor.call(this);
 return this;
}

<file.grammarName>Visitor.prototype = Object.create(antlr4.tree.ParseTreeVisitor.prototype);
<file.grammarName>Visitor.prototype.constructor = <file.grammarName>Visitor;

<file.visitorNames:{lname |
// Visit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Visitor.prototype.visit<lname; format="cap"> = function(ctx) {
 return this.visitChildren(ctx);
\};

}; separator="\n">

exports.<file.grammarName>Visitor = <file.grammarName>Visitor;
>>
```

```
fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
// jshint ignore: start
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<if(superClass)>
var <superClass> = require('./<superClass>').<superClass>;
<endif>

var grammarFileName = "<parser.grammarFileName; format="java-escape">";

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

var sharedContextCache = new antlr4.PredictionContextCache();

var literalNames = [ <parser.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

function <parser.name> (input) {
 <superClass; null="antlr4.Parser">.call(this, input);
   this._interp = new antlr4.atn.ParserATNSimulator(this, atn, decisionsToDFA, sharedContextCache);
   this.ruleNames = ruleNames;
   this.literalNames = literalNames;
   this.symbolicNames = symbolicNames;
 <namedActions.members>
   return this;
}

<parser.name>.prototype = Object.create(<superClass; null="antlr4.Parser">.prototype);
<parser.name>.prototype.constructor = <parser.name>;

Object.defineProperty(<parser.name>.prototype, "atn", {
 get : function() {
  return atn;
 }
});

<parser.name>.EOF = antlr4.Token.EOF;
```

```
<if(parser.tokens)>
<parser.tokens:{k | <parser.name>.<k> = <parser.tokens.(k)>;}; separator="\n", wrap, anchor>
<endif>

<parser.rules:{r | <parser.name>.RULE_<r.name> = <r.index>;}; separator="\n", wrap, anchor>

<funcs; separator="\n">

<if(sempredFuncs)>
<parser.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch(ruleIndex) {
 <parser.sempredFuncs.values:{f | case <f.ruleIndex>:
  return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
   default:
       throw "No predicate with index:" + ruleIndex;
  }
};

<sempredFuncs.values; separator="\n">
<endif>

exports.<parser.name> = <parser.name>;

>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
<lexer.name>.prototype.action = function(localctx, ruleIndex, actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 this.<f.name>_action(localctx, actionIndex);
 break;}; separator="\n">
 default:
  throw "No registered action for:" + ruleIndex;
 }
};

<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
<lexer.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch (ruleIndex) {
  <recog.sempredFuncs.values:{f| case <f.ruleIndex>:
 return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
    default:
     throw "No registered predicate for:" + ruleIndex;
    }
};

<sempredFuncs.values; separator="\n">
<endif>
>>



/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<

<lexer.name>.prototype.<r.name>_action = function(localctx , actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 default:
  throw "No registered action for:" + actionIndex;
 }
};
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
<if (r.factory.g.lexer)><lexer.name><else><parser.name><endif>.prototype.<r.name>_sempred = function(localctx,
predIndex) {
 switch(predIndex) {
  <actions:{index| case <index>:
 return <actions.(index)>;}; separator="\n">
  default:
   throw "No predicate with index:" + predIndex;
 }
};

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<! Define fields of this parser to export the context classes !>
```

```
<parser.name>.<currentRule.ctxType> = <currentRule.ctxType>;

<parser.name>.prototype.<currentRule.name> = function(<currentRule.args:{a | <a.name>}; separator=", ">) {

  var localctx = new <currentRule.ctxType>(this, this._ctx, this.state<currentRule.args:{a | , <a.name>}>);
  this.enterRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>);
  <namedActions.init>
  <locals; separator="\n">
  try {
    <code>
    <postamble; separator="\n">
    <namedActions.after>
  <if(exceptions)>
  <exceptions; separator="\n">
  <else>
  } catch (re) {
   if(re instanceof antlr4.error.RecognitionException) {
      localctx.exception = re;
      this._errHandler.reportError(this, re);
      this._errHandler.recover(this, re);
    } else {
     throw re;
    }
  }<endif> finally {
    <finallyAction>
    this.exitRule();
  }
  return localctx;
};

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<parser.name>.prototype.<currentRule.name> = function(_p<if(currentRule.args)>, <args:{a | , <a>}><endif>) {
 if(_p===undefined) {
    _p = 0;
 }
  var _parentctx = this._ctx;
  var _parentState = this.state;
  var localctx = new <currentRule.ctxType>(this, this._ctx, _parentState<args:{a | , <a.name>}>);
  var _prevctx = localctx;
  var _startState = <currentRule.startState>;
  this.enterRecursionRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p);
  <namedActions.init>
  <locals; separator="\n">
  try {
      <code>
      <postamble; separator="\n">
      <namedActions.after>
  } catch( error) {
      if(error instanceof antlr4.error.RecognitionException) {
        localctx.exception = error;
        this._errHandler.reportError(this, error);
        this._errHandler.recover(this, error);
    } else {
     throw error;
    }
  } finally {
      <finallyAction>
      this.unrollRecursionContexts(_parentctx)
  }
  return localctx;
};

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(this, localctx);<endif>
this.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = this._input.LT(1);<endif>
<preamble; separator="\n">
switch(this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  break;}; separator="\n">
default:
  <error>
```

```
}
>>

LL1OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
switch (this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 break;
}
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
if(<expr>) {
   <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
while(<loopExpr>) {
   <alts; separator="\n">
   this.state = <choice.loopBackStateNumber>;
   this._errHandler.sync(this);
   <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
<preamble; separator="\n">
do {
   <alts; separator="\n">
   this.state = <choice.stateNumber>; <! loopback/exit decision !>
   this._errHandler.sync(this);
   <iteration>
} while(<loopExpr>);
>>
```

```
// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
switch(la_) {
<alts:{alt |
case <i>:
   <alt>
   break;
}; separator="\n">
}
>>

OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
<alts:{alt |
if(la_===<i><if(!choice.ast.greedy)>+1<endif>) {
   <alt>
}; separator="\n} else ">
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx)
while(_alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER) {
   if(_alt===1<if(!choice.ast.greedy)>+1<endif>) {
       <iteration>
       <alts> <! should only be one !>
   }
   this.state = <choice.loopBackStateNumber>;
   this._errHandler.sync(this);
   _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
}

>>

PlusBlock(choice, alts, error) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
```

```
var _alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 this.state = <choice.loopBackStateNumber>; <! loopback/exit decision !>
 this._errHandler.sync(this);
 _alt = this._interp.adaptivePredict(this._input,<choice.decision>, this._ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER );
>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "throw new antlr4.error.NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>

// Javascript language spec - shift operators are 32 bits long max
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x1f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> && ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) !== 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>
```

```
// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>===<parser.name>.<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <parser.name>.<t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
this.state = <r.stateNumber>;
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>this.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>);
>>

MatchToken(m) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this.match(<parser.name>.<m.name>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>this._input.LT(1);<endif>
<capture>
<if(invert)>if(<m.varName>\<=0 || <expr>)<else>if(!(<expr>))<endif> {
   <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this._errHandler.recoverInline(this);
}
else {
 this._errHandler.reportMatch(this);
   this.consume();
}
>>

Wildcard(w) ::= <<
this.state = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>this.matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"
```

```
ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
this.state = <p.stateNumber>;
if (!( <chunks>)) {
   throw new antlr4.error.FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
}
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "this.skip()"
LexerMoreCommand()  ::= "this.more()"
LexerPopModeCommand() ::= "this.popMode()"
LexerTypeCommand(arg, grammar)      ::= "this._type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "this._channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "this._mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "this.pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>===null ? null : <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.type)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : parseInt(<ctx(t)>.<t.label>.text))"
```

```
RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(<ctx(r)>.<r.label>===null ? null : this._input.getText(new
antlr4.Interval(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "this"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "this._input.getText(new antlr4.Interval(localctx.start, this._input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "localctx"
ThisRulePropertyRef_parser(r)  ::= "this"

NonLocalAttrRef(s)     ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.push(<labelref(a.label)>);"

TokenDecl(t) ::= "this.<t.name> = null; // <TokenLabelType()>"
TokenTypeDecl(t) ::= "var <t.name> = 0; // <TokenLabelType()> type"
TokenListDecl(t) ::= "this.<t.name> = []; // of <TokenLabelType()>s"
RuleContextDecl(r) ::= "this.<r.name> = null; // <r.ctxName>"
RuleContextListDecl(rdecl) ::= "this.<rdecl.name> = []; // of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)      ::= <<
<t.name> = function() {
   return this.getToken(<parser.name>.<t.name>, 0);
};
>>

// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
   return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t)  ::= <<
<t.name> = function(i) {
 if(i===undefined) {
  i = null;
 }
   if(i===null) {
       return this.getTokens(<parser.name>.<t.name>);
   } else {
       return this.getToken(<parser.name>.<t.name>, i);
   }
};
```

```
>>

ContextRuleGetterDecl(r)       ::= <<
<r.name> = function() {
   return this.getTypedRuleContext(<r.ctxName>,0);
};
>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
   return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
<r.name> = function(i) {
   if(i===undefined) {
       i = null;
   }
   if(i===null) {
       return this.getTypedRuleContexts(<r.ctxName>);
   } else {
       return this.getTypedRuleContext(<r.ctxName>,i);
   }
};
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = this._input.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
function <struct.name>(parser, parent, invokingState<struct.ctorAttrs:{a | , <a.name>}>) {
 if(parent===undefined) {
     parent = null;
 }
 if(invokingState===undefined || invokingState===null) {
  invokingState = -1;
 }
 <if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.call(this, parent,
invokingState);
   this.parser = parser;
   this.ruleIndex = <parser.name>.RULE_<struct.derivedFromName>;
   <attrs:{a | <a>}; separator="\n">
   <struct.ctorAttrs:{a | this.<a.name> = <a.name> || null;}; separator="\n">
   return this;
}

<struct.name>.prototype =
Object.create(<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
<struct.name>.prototype.copyFrom = function(ctx) {
<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype.copyFrom.call(this,
ctx);
   <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
};
<endif>
<dispatchMethods; separator="\n">
<extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
function <struct.name>(parser, ctx) {
 <currentRule.name; format="cap">Context.call(this, parser);
   <attrs:{a | <a>;}; separator="\n">
   <currentRule.name; format="cap">Context.prototype.copyFrom.call(this, ctx);
   return this;
}

<struct.name>.prototype = Object.create(<currentRule.name; format="cap">Context.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<! Define fields of this parser to export this struct/context class !>
<parser.name>.<struct.name> = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">
<dispatchMethods; separator="\n">
```

```
>>

ListenerDispatchMethod(method) ::= <<
<struct.name>.prototype.<if(method.isEnter)>enter<else>exit<endif>Rule = function(listener) {
   if(listener instanceof <parser.grammarName>Listener ) {
       listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(this);
 }
};

>>

VisitorDispatchMethod(method) ::= <<
<struct.name>.prototype.accept = function(visitor) {
   if ( visitor instanceof <parser.grammarName>Visitor ) {
       return visitor.visit<struct.derivedFromName; format="cap">(this);
   } else {
       return visitor.visitChildren(this);
   }
};

>>

AttributeDecl(d) ::= "this.<d.name> = <if(d.initValue)><d.initValue><else>null<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "this.precpred(this._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                 ::= "this._ctx.stop = this._input.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = new <ctxName>Context(this, _parentctx, _parentState);
<if(label)>localctx.<label> = _prevctx;<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = new <currentAltLabel; format="cap">Context(this, new <ruleName; format="cap">Context(this,
_parentctx, _parentState));
<if(label)>
<if(isListLabel)>
localctx.<label>.push(_prevctx);
<else>
```

```
localctx.<label> = _prevctx;
<endif>
<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = new <ctxName>Context(this, localctx);
this._ctx = localctx;
_prevctx = localctx;
>>

recRuleSetPrevCtx() ::= <<
if(this._parseListeners!==null) {
   this.triggerExitRuleEvent();
}
_prevctx = localctx;
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
var antlr4 = require('antlr4/index');

<namedActions.header>

<lexer>

>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
var <superClass> = require('./<superClass>').<superClass>;
<endif>

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

function <lexer.name>(input) {
 <if(superClass)><superClass><else>antlr4.Lexer<endif>.call(this, input);
   this._interp = new antlr4.atn.LexerATNSimulator(this, atn, decisionsToDFA, new
antlr4.PredictionContextCache());
   return this;
}
```

```
<lexer.name>.prototype = Object.create(<if(superClass)><superClass><else>antlr4.Lexer<endif>.prototype);
<lexer.name>.prototype.constructor = <lexer.name>;

Object.defineProperty(<lexer.name>.prototype, "atn", {
    get : function() {
        return atn;
    }
});

<lexer.name>.EOF = antlr4.Token.EOF;
<lexer.tokens:{k | <lexer.name>.<k> = <lexer.tokens.(k)>;}; separator="\n", wrap, anchor>

<if(lexer.channels)>
<lexer.channels:{c| <lexer.name>.<c> = <lexer.channels.(c)>;}; separator="\n">

<endif>
<if(rest(lexer.modes))>
<rest(lexer.modes):{m| <lexer.name>.<m> = <i>;}; separator="\n">

<endif>
<lexer.name>.prototype.channelNames = [ "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>,
<lexer.channels:{c| "<c>"}; separator=", ", wrap, anchor><endif> ];

<lexer.name>.prototype.modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.literalNames = [ <lexer.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

<lexer.name>.prototype.symbolicNames = [ <lexer.symbolicNames:{t | <t>}; null="null", separator=", ", wrap,
anchor> ];

<lexer.name>.prototype.ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.grammarFileName = "<lexer.grammarFileName>";

<namedActions.members>

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>

exports.<lexer.name> = <lexer.name>;

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

var serializedATN = ["<model.serialized; wrap={",<\n>    "}>"].join("");

>>
```

```
/** Using a type to init value map, try to init a type; if not in table
* must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<javacriptTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".js"
```

Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/codegen/JavaScript/JavaScript.stg
No license file was found, but licenses were detected in source scan.

```
/*
This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the format that mimicks GCC output.
*/
```

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "<text> [error <id>]"

report(location, message, type) ::= "<location> <type>: <message>"

wantsSingleLineMessage() ::= "true"

Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/messages/formats/gnu.stg
No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
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*  Copyright (c) 2012-2016 Sam Harwell
*  Copyright (c) 2014 Eric Vergnaud
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*  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
*  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** ANTLR tool checks output templates are compatible with tool code generation.
*  For now, a simple string match used on x.y of x.y.z scheme.
*  Must match Tool.VERSION during load to templates.
*
```

```
*  REQUIRED.
*/

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO
import sys

<namedActions.header>
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>

# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

   <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx):
   pass

# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx):
   pass

}; separator="\n">

>>
```

```
VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

    <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx):
    return self.visitChildren(ctx)

}; separator="\n">

>>



fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
from .<superClass> import <superClass>

<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

    grammarFileName = "<parser.grammarFileName>"

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    sharedContextCache = PredictionContextCache()

    literalNames = [ <parser.literalNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    symbolicNames = [ <parser.symbolicNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]
    <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

    ruleNames =  [ <parser.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

    EOF = <TokenLabelType()>.EOF
    <if(parser.tokens)>
    <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
    <endif>

    <parser:(ctor)()>

    <namedActions.members>

    <funcs; separator="\n">



<if(sempredFuncs)>
    def sempred(self, localctx, ruleIndex, predIndex):
        if self._predicates == None:
            self._predicates = dict()
<parser.sempredFuncs.values:{f |
        self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
        pred = self._predicates.get(ruleIndex, None)
        if pred is None:
            raise Exception("No predicate with index:" + str(ruleIndex))
        else:
            return pred(localctx, predIndex)

    <sempredFuncs.values; separator="\n">
<endif>




>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx, ruleIndex, actionIndex):
    if self._actions is None:
        actions = dict()
<recog.actionFuncs.values:{f|
        actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
        self._actions = actions
    action = self._actions.get(ruleIndex, None)
    if action is not None:
        action(localctx, actionIndex)
    else:
        raise Exception("No registered action for:" + str(ruleIndex))
```

```
<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx, ruleIndex, predIndex):
   if self._predicates is None:
       preds = dict()
<recog.sempredFuncs.values:{f|
       preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
       self._predicates = preds
   pred = self._predicates.get(ruleIndex, None)
   if pred is not None:
       return pred(localctx, predIndex)
   else:
       raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<
def __init__(self, input, output=sys.stdout):
   super(<parser.name>, self).__init__(input, output=output)
   self.checkVersion("<file.ANTLRVersion>")
   self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
   self._predicates = None

>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx , actionIndex):
<actions:{index|
<if(first(actions))>
   if actionIndex == <index>:
       <actions.(index)>
<elseif(rest(actions))>
   elif actionIndex == <index>:
       <actions.(index)>
<endif> }; separator="\n">
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
```

```
*/
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx, predIndex):
   <actions:{index|
<if(first(actions))>
   if predIndex == <index>:
       return <actions.(index)>
<elseif(rest(actions))>
   elif predIndex == <index>:
       return <actions.(index)>
<endif> }; separator="\n">

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name>}>):

   localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
   self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
   <namedActions.init>
   <locals; separator="\n">
   try:
       <code>
       <postamble; separator="\n">
       <namedActions.after>
   <if(exceptions)>
   <exceptions; separator="\n">
   <else>
   except RecognitionException as re:
       localctx.exception = re
       self._errHandler.reportError(self, re)
       self._errHandler.recover(self, re)
   <endif>
   finally:
       <finallyAction>
       self.exitRule()
   return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
   _parentctx = self._ctx
   _parentState = self.state
   localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
   _prevctx = localctx
   _startState = <currentRule.startState>
   self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
   <namedActions.init>
   <locals; separator="\n">
   try:
       <code>
       <postamble; separator="\n">
       <namedActions.after>
   except RecognitionException as re:
       localctx.exception = re
       self._errHandler.reportError(self, re)
       self._errHandler.recover(self, re)
   finally:
       <finallyAction>
       self.unrollRecursionContexts(_parentctx)
   return localctx

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
```

```
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
   <alt>
   pass}; separator="\nel">
else:
   <error>

>>

LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
   <alt>
   pass}; separator="\nel">
else:
   pass
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
   <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>



LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
   <alts; separator="\n">
   self.state = <choice.loopBackStateNumber>
   self._errHandler.sync(self)
   <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
   <alts; separator="\n">
```

```
    self.state = <choice.stateNumber> <! loopback/exit decision !>
    self._errHandler.sync(self)
    <iteration>
    if not (<loopExpr>):
        break

>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
    <alt>
    pass
}; separator="\nel">

>>

OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
    <alt>
}; separator="\nel">

>>

StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
    if _alt==1<if(!choice.ast.greedy)>+1<endif>:
        <iteration>
        <alts> <! should only be one !>
    self.state = <choice.loopBackStateNumber>
    self._errHandler.sync(self)
    _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>
```

```
PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">
  else:
    <error>
  self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator=" or ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> and ((1 \<\< <offsetShiftVar(s.varName, bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
```

```
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>

cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>

InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)
>>

MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l |     <labelref(l)> = }><else>    <endif>self._errHandler.recoverInline(self)
else:
   self._errHandler.reportMatch(self)
   self.consume()
>>

Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"
```

```
ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
   from antlr4.error.Errors import FailedPredicateException
   raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
   <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type()"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
```

```
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText((<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "self._input.getText((localctx.start, self._input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "localctx"
ThisRulePropertyRef_parser(r)  ::= "self"

NonLocalAttrRef(s)     ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)      ::= <<
def <t.name>(self):
   return self.getToken(<parser.name>.<t.name>, 0)
>>

// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
   return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t)  ::= <<
def <t.name>(self, i=None):
   if i is None:
       return self.getTokens(<parser.name>.<t.name>)
   else:
       return self.getToken(<parser.name>.<t.name>, i)
>>

ContextRuleGetterDecl(r)       ::= <<
def <r.name>(self):
   return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)
```

```
>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
def <r.name>(self, i=None):
  if i is None:
    return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
  else:
    return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)

>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
*  r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

  def __init__(self, parser, parent=None, invokingState=-1<struct.ctorAttrs:{a | , <a.name>=None}>):
    super(<parser.name>.<struct.name>, self).__init__(parent, invokingState)
    self.parser = parser
    <attrs:{a | <a>}; separator="\n">
    <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

  <getters:{g | <g>}; separator="\n\n">

  def getRuleIndex(self):
    return <parser.name>.RULE_<struct.derivedFromName>
```

```
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
  def copyFrom(self, ctx):
      super(<parser.name>.<struct.name>, self).copyFrom(ctx)
      <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
  <dispatchMethods; separator="\n">
  <extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name>(<currentRule.name; format="cap">Context):

  def __init__(self, parser, ctx): # actually a <parser.name>.<currentRule.name; format="cap">Context)
      super(<parser.name>.<struct.name>, self).__init__(parser)
      <attrs:{a | <a>}; separator="\n">
      self.copyFrom(ctx)

  <getters:{g | <g>}; separator="\n">

  <dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener):
  if hasattr(listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">"):
      listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor):
  if hasattr(visitor, "visit<struct.derivedFromName; format="cap">"):
      return visitor.visit<struct.derivedFromName; format="cap">(self)
  else:
      return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"
```

```
// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                 ::= "self._ctx.stop = self._input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>



recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
   self.triggerExitRuleEvent()
_prevctx = localctx
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO
import sys

<namedActions.header>
```

```
<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
from .<superClass> import <superClass>

<endif>

<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

   atn = ATNDeserializer().deserialize(serializedATN())

   decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

<if(lexer.channels)>
   <lexer.channels:{c| <c> = <lexer.channels.(c)>}; separator="\n">

<endif>
<if(rest(lexer.modes))>
   <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

<endif>
   <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

   channelNames = [ u"DEFAULT_TOKEN_CHANNEL", u"HIDDEN"<if (lexer.channels)>, <lexer.channels:{c|
u"<c>"}; separator=", ", wrap, anchor><endif> ]

   modeNames = [ <lexer.modes:{m| u"<m>"}; separator=", ", wrap, anchor> ]

   literalNames = [ u"\<INVALID>",
           <lexer.literalNames:{t | u<t>}; separator=", ", wrap, anchor> ]

   symbolicNames = [ u"\<INVALID>",
           <lexer.symbolicNames:{t | u<t>}; separator=", ", wrap, anchor> ]

   ruleNames = [ <lexer.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

   grammarFileName = u"<lexer.grammarFileName>"

   def __init__(self, input=None, output=sys.stdout):
      super(<lexer.name>, self).__init__(input, output=output)
      self.checkVersion("<lexerFile.ANTLRVersion>")
      self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
      self._actions = None
```

```
        self._predicates = None

    <namedActions.members>

    <dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
    with StringIO() as buf:
        buf.write(u"<model.serialized; wrap={")<\n>        buf.write(u"}>")
        return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<pythonTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"
```

Found in path(s):
* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/codegen/Python2/Python2.stg
No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
*  Copyright (c) 2012-2016 Terence Parr
*  Copyright (c) 2012-2016 Sam Harwell
*  All rights reserved.
*
*  Redistribution and use in source and binary forms, with or without
*  modification, are permitted provided that the following conditions
*  are met:
*
*  1. Redistributions of source code must retain the above copyright
*     notice, this list of conditions and the following disclaimer.
*  2. Redistributions in binary form must reproduce the above copyright
*     notice, this list of conditions and the following disclaimer in the
*     documentation and/or other materials provided with the distribution.
*  3. The name of the author may not be used to endorse or promote products
*    derived from this software without specific prior written permission.
*
*  THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
*  IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
*  OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
*  IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,
*  INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
*  NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
*  DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
*  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
*  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** How to generate rules derived from left-recursive rules.
*  These rely on recRuleAltPredicate(),
*  recRuleArg(), recRuleSetResultAction(), recRuleSetReturnAction()
*  templates in main language.stg
*/
group LeftRecursiveRules;

recRule(ruleName, argName, primaryAlts, opAlts, setResultAction,
    userRetvals, leftRecursiveRuleRefLabels) ::=
<<
<ruleName><if(userRetvals)> returns [<userRetvals>]<endif>
  :  ( {} <primaryAlts:{alt | <alt.altText> }; separator="\n      | ">
     )
     (
       <opAlts; separator="\n      | ">
     )*
  ;
>>

recRuleAlt(alt, precOption, opPrec, pred) ::= <<
{<pred>}?\<<precOption>=<opPrec>\> <alt.altText>
>>
```

Found in path(s):

* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/LeftRecursiveRules.stg

No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
*  Copyright (c) 2013 Terence Parr
*  Copyright (c) 2013 Sam Harwell
*  All rights reserved.
*
```

```
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.IO;
using System.Text;
using System.Diagnostics;
using System.Collections.Generic;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using DFA = Antlr4.Runtime.Dfa.DFA;

<parser>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>
```

```
ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using IParseTreeListener = Antlr4.Runtime.Tree.IParseTreeListener;
using IToken = Antlr4.Runtime.IToken;

/// \<summary>
/// This interface defines a complete listener for a parse tree produced by
/// \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Listener : IParseTreeListener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context context);
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

BaseListenerFile(file, header, namedActions) ::= <<
```

```
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>

using Antlr4.Runtime.Misc;
using IErrorNode = Antlr4.Runtime.Tree.IErrorNode;
using ITerminalNode = Antlr4.Runtime.Tree.ITerminalNode;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;

/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Listener"/>,
/// which can be extended to create a listener which only needs to handle a subset
/// of the available methods.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseListener : I<file.grammarName>Listener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}}; separator="\n">

 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void EnterEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void ExitEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitTerminal([NotNull] ITerminalNode node) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitErrorNode([NotNull] IErrorNode node) { }
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;

/// \<summary>
/// This interface defines a complete generic visitor for a parse tree produced
/// by \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Visitor\<Result> : IParseTreeVisitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);}; separator="\n">
}
```

```
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;

/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Visitor{Result}"/>,
/// which can be extended to create a visitor which only needs to handle a subset
/// of the available methods.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseVisitor\<Result> : AbstractParseTreeVisitor\<Result>,
I<file.grammarName>Visitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>
/// The default implementation returns the result of calling \<see
cref="AbstractParseTreeVisitor{Result\}.VisitChildren(IRuleNode)"/>
/// on \<paramref name="context"/>.
/// \</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
public virtual Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { return VisitChildren(context); \}}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
```

```
>>

fileHeader(grammarFileName, ANTLRVersion) ::= <<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------

// Generated from <grammarFileName> by ANTLR <ANTLRVersion>

// Unreachable code detected
#pragma warning disable 0162
// The variable '...' is assigned but its value is never used
#pragma warning disable 0219
// Missing XML comment for publicly visible type or member '...'
#pragma warning disable 1591
// Ambiguous reference in cref attribute
#pragma warning disable 419

>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(parser.name)> : <superClass; null="Parser"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
 <if(parser.tokens)>
 public const int
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 public const int
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
 public static readonly string[] ruleNames = {
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };

 <vocabulary(parser.literalNames, parser.symbolicNames)>
 public override string GrammarFileName { get { return "<parser.grammarFileName>"; } }

 public override string[] RuleNames { get { return ruleNames; } }

 public override string SerializedAtn { get { return new string(_serializedATN); } }

 static <csIdentifier.(parser.name)>() {
  decisionToDFA = new DFA[_ATN.NumberOfDecisions];
  for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
   decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
  }
 }

 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case <f.ruleIndex>: return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
private static readonly string[] _LiteralNames = {
 <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
private static readonly string[] _SymbolicNames = {
 <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
public static readonly IVocabulary DefaultVocabulary = new Vocabulary(_LiteralNames, _SymbolicNames);

[NotNull]
public override IVocabulary Vocabulary
{
 get
 {
  return DefaultVocabulary;
 }
```

```
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
public override void Action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex> : <f.name>_action(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, actionIndex); break;};
separator="\n">
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex> : return <f.name>_sempred(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, predIndex);};
separator="\n">
 }
 return true;
}
<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(parser) ::= <<
 public <csIdentifier.(parser.name)>(ITokenStream input) : this(input, Console.Out, Console.Error) { }

 public <csIdentifier.(parser.name)>(ITokenStream input, TextWriter output, TextWriter errorOutput)
 : base(input, output, errorOutput)
{
 Interpreter = new ParserATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
}
>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>: <actions.(index)> break;}; separator="\n">
 }
}
>>
```

```
/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private bool <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>: return <actions.(index)>;}; separator="\n">
 }
 return true;
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<if(ruleCtx)>
<ruleCtx>
<endif>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 <endif>
 finally {
  <finallyAction>
  ExitRule();
 }
 return _localctx;
}
>>

LeftFactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterLeftFactoredRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 finally {
  <finallyAction>
  ExitRule();
 }
 return _localctx;
}
>>

// This behaves similar to RuleFunction (enterRule is called, and no adjustments
// are made to the parse tree), but since it's still a variant no context class
// needs to be generated.
LeftUnfactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
```

```
 EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 finally {
  <finallyAction>
  ExitRule();
 }
 return _localctx;
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 return <csIdentifier.(currentRule.name)>(0<currentRule.args:{a | , <csIdentifier.(a.name)>}>);
}

private <currentRule.ctxType> <csIdentifier.(currentRule.name)>(int _p<args:{a | , <a>}>) {
 ParserRuleContext _parentctx = Context;
 int _parentState = State;
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, _parentState<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 EnterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
```

```
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 finally {
  <finallyAction>
  UnrollRecursionContexts(_parentctx);
 }
 return _localctx;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
EnterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>
```

```
LL1OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 break;
}
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 State = <choice.stateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 <iteration>
} while ( <loopExpr> );
>>

// LL(*) stuff
```

```
AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i>:
 <alt>
 break;}; separator="\n">
}
>>

OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
_alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
}
>>

PlusBlock(choice, alts, error) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 State = <choice.loopBackStateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
} while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER );
>>

Sync(s) ::= "Sync(<s.expecting.name>);"

ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator=" || ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1L \<\< <offsetShift(s.varName, bits.shift)>) & (<bits.ttypes:{ttype | (1L \<\< <offsetShift(tokenType.(ttype), bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<tokenType.(ttype)>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <tokenType.(t)>:}; separator="\n">
>>
```

```
InvokeRule(r, argExprsChunks) ::= <<
State = <r.stateNumber>; <if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><csIdentifier.(r.name)>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>);
>>

MatchToken(m) ::= <<
State = <m.stateNumber>; <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>Match(<tokenType.(m.name)>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
State = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>TokenStream.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>ErrorHandler.RecoverInline(this);
}
else {
 ErrorHandler.ReportMatch(this);
   Consume();
}
>>

Wildcard(w) ::= <<
State = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>MatchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
State = <p.stateNumber>;
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "Skip();"
LexerMoreCommand()  ::= "More();"
LexerPopModeCommand() ::= "PopMode();"

LexerTypeCommand(arg, grammar)      ::= "_type = <tokenType.(arg)>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <channelName.(arg)>;"
LexerModeCommand(arg, grammar)      ::= "_mode = <modeName.(arg)>;"
LexerPushModeCommand(arg, grammar)  ::= "PushMode(<modeName.(arg)>);"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
LocalRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
RetValueRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<csIdentifier.(a.name)>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<csIdentifier.(tokenType.(t.name))>"
LabelRef(t) ::= "<ctx(t)>.<csIdentifier.(t.name)>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(csIdentifier.(t.name))>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<csIdentifier.(s.name)> = <rhsChunks>;"

TokenLabelType() ::= "<file.TokenLabelType; null={IToken}>"
InputSymbolType() ::= "<file.InputSymbolType; null={IToken}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Text:null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Type:0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Line:0)"
TokenPropertyRef_pos(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.CharPositionInLine:0)"
TokenPropertyRef_channel(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Channel:0)"
TokenPropertyRef_index(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.TokenIndex:0)"
TokenPropertyRef_int(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?int.Parse(<ctx(t)>.<tokenType.(t.label)>.Text):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Start):null)"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_text(r)  ::=
"(<ctx(r)>.<r.label>!=null?TokenStream.GetText(<ctx(r)>.<r.label>.Start,<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "this"
```

```
ThisRulePropertyRef_start(r) ::= "_localctx.Start"
ThisRulePropertyRef_stop(r)  ::= "_localctx.Stop"
ThisRulePropertyRef_text(r)  ::= "TokenStream.GetText(_localctx.Start, TokenStream.LT(-1))"
ThisRulePropertyRef_ctx(r)  ::= "_localctx"
ThisRulePropertyRef_parser(r)  ::= "this"

NonLocalAttrRef(s)   ::= <%((<s.ruleName;
format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)>%>
SetNonLocalAttr(s, rhsChunks)   ::=
 <%((<s.ruleName; format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)> =
<rhsChunks>;%>

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.Add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <csIdentifier.(tokenType.(t.name))>"
TokenTypeDecl(t) ::= "int <csIdentifier.(tokenType.(t.name))>;"
TokenListDecl(t) ::= "IList\<IToken> <csIdentifier.(tokenType.(t.name))> = new List\<IToken>()"
RuleContextDecl(r) ::= "<r.ctxName> <csIdentifier.(r.name)>"
RuleContextListDecl(rdecl) ::= "IList\<<rdecl.ctxName>> <csIdentifier.(rdecl.name)> = new
List\<<rdecl.ctxName>>()"

contextGetterCollection(elementType) ::= <%
<elementType>[]
%>

ContextTokenGetterDecl(t)      ::=
   "public ITerminalNode <csIdentifier.(tokenType.(t.name))>() { return
GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, 0); }"
ContextTokenListGetterDecl(t)  ::= <<
public <contextGetterCollection("ITerminalNode")> <csIdentifier.(tokenType.(t.name))>() { return
GetTokens(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>); }
>>
ContextTokenListIndexedGetterDecl(t)  ::= <<
public ITerminalNode <csIdentifier.(tokenType.(t.name))>(int i) {
 return GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, i);
}
>>
ContextRuleGetterDecl(r)       ::= <<
public <r.ctxName> <csIdentifier.(r.name)>() {
 return GetRuleContext\<<r.ctxName>\>(0);
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public <contextGetterCollection({<r.ctxName>})> <csIdentifier.(r.name)>() {
 return GetRuleContexts\<<r.ctxName>\>();
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
```

```
public <r.ctxName> <csIdentifier.(r.name)>(int i) {
 return GetRuleContext\<<r.ctxName>\>(i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenType.(tokenName)>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "_<label>"

CaptureNextToken(d) ::= "<d.varName> = TokenStream.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = TokenStream.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
          superClass={ParserRuleContext}) ::= <<
public partial class <struct.name> :
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) : base(parent, invokingState) {
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>)
  : base(parent, invokingState)
 {
  <struct.ctorAttrs:{a | this.<csIdentifier.(a.name)> = <csIdentifier.(a.name)>;}; separator="\n">
 }
 public override int RuleIndex { get { return RULE_<struct.derivedFromName>; } }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public virtual void CopyFrom(<struct.name> context) {
  base.CopyFrom(context);
  <struct.attrs:{a | this.<csIdentifier.(a.name)> = context.<csIdentifier.(a.name)>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
```

```
public partial class <struct.name> : <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context context) { CopyFrom(context); }
 <dispatchMethods; separator="\n">
}
>>

ListenerDispatchMethod(method) ::= <<
public override void <if(method.isEnter)>Enter<else>Exit<endif>Rule(IParseTreeListener listener) {
 I<parser.grammarName>Listener typedListener = listener as I<parser.grammarName>Listener;
 if (typedListener != null) typedListener.<if(method.isEnter)>Enter<else>Exit<endif><struct.derivedFromName;
format="cap">(this);
}
>>

VisitorDispatchMethod(method) ::= <<
public override TResult Accept\<TResult>(IParseTreeVisitor\<TResult> visitor) {
 I<parser.grammarName>Visitor\<TResult> typedVisitor = visitor as I<parser.grammarName>Visitor\<TResult>;
 if (typedVisitor != null) return typedVisitor.Visit<struct.derivedFromName; format="cap">(this);
 else return visitor.VisitChildren(this);
}
>>

AttributeDecl(d) ::= "<d.type> <csIdentifier.(d.name)><if(d.initValue)> = <d.initValue><endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)><typedContext(x.ctx)>.<endif><csIdentifier.(x.name)>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "<typedContext(actionChunk.ctx)>"

// only casts _localctx to the type when the cast isn't redundant (i.e. to a sub-context for a labeled alt)
typedContext(ctx) ::= "<if(ctx.provideCopyFrom)>((<ctx.name>)_localctx)<else>_localctx<endif>"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "Precpred(Context, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()                 ::= "Context.Stop = TokenStream.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.Add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
```

```
<endif>
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx, _parentState));
<if(label)>
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.Add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
Context = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( ParseListeners!=null )
 TriggerExitRuleEvent();
_prevctx = _localctx;
>>



LexerFile(file, lexer, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.IO;
using System.Text;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using DFA = Antlr4.Runtime.Dfa.DFA;

<lexer>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
```

```
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(lexer.name)> : <superClass; null="Lexer"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
 public const int
  <lexer.tokens:{k | <tokenType.(k)>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
 <if(lexer.channels)>
 public const int
  <lexer.channels:{k | <csIdentifier.(k)>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 <if(rest(lexer.modes))>
 public const int
  <rest(lexer.modes):{m | <m>=<i>}; separator=", ", wrap, anchor>;
 <endif>
 public static string[] channelNames = {
  "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ", wrap, anchor><endif>
 };

 public static string[] modeNames = {
  <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
 };

 public static readonly string[] ruleNames = {
  <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };

 <namedActions.members>

 public <csIdentifier.(lexer.name)>(ICharStream input)
 : this(input, Console.Out, Console.Error) { }

 public <csIdentifier.(lexer.name)>(ICharStream input, TextWriter output, TextWriter errorOutput)
 : base(input, output, errorOutput)
 {
  Interpreter = new LexerATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
 }

 <vocabulary(lexer.literalNames, lexer.symbolicNames)>

 public override string GrammarFileName { get { return "<lexer.grammarFileName>"; } }

 public override string[] RuleNames { get { return ruleNames; } }
 public override string[] ChannelNames { get { return channelNames; } }

 public override string[] ModeNames { get { return modeNames; } }

 public override string SerializedAtn { get { return new string(_serializedATN); } }

 static <csIdentifier.(lexer.name)>() {
  decisionToDFA = new DFA[_ATN.NumberOfDecisions];
  for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
   decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
  }
 }
 <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
 <atn>
}
>>



SerializedATN(model) ::= <<
private static char[] _serializedATN = {
 <model.serialized; separator=", ", wrap>,
};

public static readonly ATN _ATN =
 new ATNDeserializer().Deserialize(_serializedATN);



>>

initValue(typeName) ::= <<
default(<typeName>)
>>

codeFileExtension() ::= ".cs"

modeName ::= [
 "DEFAULT_MODE" : "DefaultMode",
 default : key
]

channelName ::= [
 "HIDDEN" : "Hidden",
 "DEFAULT_TOKEN_CHANNEL" : "DefaultTokenChannel",
 default : key
]

tokenType ::= [
 "EOF" : "Eof",
 default : key
]

csIdentifier ::= [
 "abstract" : "@abstract",
 "as" : "@as",
 "base" : "@base",
 "bool" : "@bool",
 "break" : "@break",
 "byte" : "@byte",
 "case" : "@case",
 "catch" : "@catch",
 "char" : "@char",
 "checked" : "@checked",
 "class" : "@class",
 "const" : "@const",
 "continue" : "@continue",
 "decimal" : "@decimal",
 "default" : "@default",
 "delegate" : "@delegate",
 "do" : "@do",
 "double" : "@double",
 "else" : "@else",
 "enum" : "@enum",
 "event" : "@event",
 "explicit" : "@explicit",
 "extern" : "@extern",
 "false" : "@false",
 "finally" : "@finally",
 "fixed" : "@fixed",
 "float" : "@float",
 "for" : "@for",
 "foreach" : "@foreach",
 "goto" : "@goto",
 "if" : "@if",
 "implicit" : "@implicit",
 "in" : "@in",
 "int" : "@int",
 "interface" : "@interface",
 "internal" : "@internal",
 "is" : "@is",
 "lock" : "@lock",
 "long" : "@long",
 "namespace" : "@namespace",
 "new" : "@new",
 "null" : "@null",
 "object" : "@object",
 "operator" : "@operator",
 "out" : "@out",
 "override" : "@override",
 "params" : "@params",
 "private" : "@private",
 "protected" : "@protected",
 "public" : "@public",
 "readonly" : "@readonly",
 "ref" : "@ref",
 "return" : "@return",
 "sbyte" : "@sbyte",
 "sealed" : "@sealed",
 "short" : "@short",
 "sizeof" : "@sizeof",
 "stackalloc" : "@stackalloc",
 "static" : "@static",
 "string" : "@string",
 "struct" : "@struct",
 "switch" : "@switch",
 "this" : "@this",
 "throw" : "@throw",
 "true" : "@true",
 "try" : "@try",
 "typeof" : "@typeof",
 "uint" : "@uint",
 "ulong" : "@ulong",
 "unchecked" : "@unchecked",
 "unsafe" : "@unsafe",
 "ushort" : "@ushort",
 "using" : "@using",
 "virtual" : "@virtual",
 "values" : "@values",
 "void" : "@void",
 "volatile" : "@volatile",
 "while" : "@while",
 default : key
]
```

Found in path(s):

* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/codegen/CSharp/CSharp.stg

No license file was found, but licenses were detected in source scan.

```
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*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
```

Found in path(s):

* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/codegen/Cpp/Files.stg

No license file was found, but licenses were detected in source scan.

```
/*
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*  DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
*  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
*  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

javaTypeInitMap ::= [
 "int":"0",
 "long":"0",
 "float":"0.0f",
 "double":"0.0",
 "boolean":"false",
 "byte":"0",
 "short":"0",
 "char":"0",
 default:"null" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.misc.*;
import org.antlr.v4.runtime.tree.*;
import java.util.List;
import java.util.Iterator;
import java.util.ArrayList;

<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeListener;
```

```
/**
* This interface defines a complete listener for a parse tree produced by
* {@link <file.parserName>}.
*/
public interface <file.grammarName>Listener extends ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
* Enter a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
*/
void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);
/**
<if(file.listenerLabelRuleNames.(lname))>
* Exit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
*/
void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>

import org.antlr.v4.runtime.ParserRuleContext;
import org.antlr.v4.runtime.tree.ErrorNode;
import org.antlr.v4.runtime.tree.TerminalNode;

/**
* This class provides an empty implementation of {@link <file.grammarName>Listener},
* which can be extended to create a listener which only needs to handle a subset
* of the available methods.
*/
public class <file.grammarName>BaseListener implements <file.grammarName>Listener {
 <file.listenerNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
@Override public void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
@Override public void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}}; separator="\n">

 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void enterEveryRule(ParserRuleContext ctx) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void exitEveryRule(ParserRuleContext ctx) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void visitTerminal(TerminalNode node) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void visitErrorNode(ErrorNode node) { }
}
>>

VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeVisitor;
```

```
/**
* This interface defines a complete generic visitor for a parse tree produced
* by {@link <file.parserName>}.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
public interface <file.grammarName>Visitor\<T> extends ParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
* Visit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
* Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
* @return the visitor result
*/
T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.AbstractParseTreeVisitor;

/**
* This class provides an empty implementation of {@link <file.grammarName>Visitor},
* which can be extended to create a visitor which only needs to handle a subset
* of the available methods.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
public class <file.grammarName>BaseVisitor\<T> extends AbstractParseTreeVisitor\<T> implements
<file.grammarName>Visitor\<T> {
 <file.visitorNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation returns the result of calling
* {@link #visitChildren\} on {@code ctx\}.\</p>
*/
@Override public T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { return visitChildren(ctx); \}}; separator="\n">
}
>>

fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <parser.name> extends <superClass; null="Parser"> {
 static { RuntimeMetaData.checkVersion("<file.ANTLRVersion>", RuntimeMetaData.VERSION); }

 protected static final DFA[] _decisionToDFA;
 protected static final PredictionContextCache _sharedContextCache =
  new PredictionContextCache();
 <if(parser.tokens)>
 public static final int
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 public static final int
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
 private static String[] makeRuleNames() {
  return new String[] {
   <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
  };
 }
 public static final String[] ruleNames = makeRuleNames();

 <vocabulary(parser.literalNames, parser.symbolicNames)>

 @Override
 public String getGrammarFileName() { return "<parser.grammarFileName; format="java-escape">"; }

 @Override
 public String[] getRuleNames() { return ruleNames; }

 @Override
 public String getSerializedATN() { return _serializedATN; }

 @Override
 public ATN getATN() { return _ATN; }
 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
private static String[] makeLiteralNames() {
 return new String[] {
  <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
 };
}
private static final String[] _LITERAL_NAMES = makeLiteralNames();
private static String[] makeSymbolicNames() {
 return new String[] {
  <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
 };
}
private static final String[] _SYMBOLIC_NAMES = makeSymbolicNames();
public static final Vocabulary VOCABULARY = new VocabularyImpl(_LITERAL_NAMES,
_SYMBOLIC_NAMES);

/**
* @deprecated Use {@link #VOCABULARY} instead.
*/
@Deprecated
public static final String[] tokenNames;
static {
 tokenNames = new String[_SYMBOLIC_NAMES.length];
 for (int i = 0; i \< tokenNames.length; i++) {
  tokenNames[i] = VOCABULARY.getLiteralName(i);
  if (tokenNames[i] == null) {
   tokenNames[i] = VOCABULARY.getSymbolicName(i);
  }

  if (tokenNames[i] == null) {
   tokenNames[i] = "\<INVALID>";
  }
 }
}

@Override
@Deprecated
public String[] getTokenNames() {
 return tokenNames;
}

@Override

public Vocabulary getVocabulary() {
 return VOCABULARY;
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
@Override
public void action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((<f.ctxType>)_localctx, actionIndex);
 break;}; separator="\n">
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
@Override
public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
 }
 return true;
}
<sempredFuncs.values; separator="\n">
<endif>
>>
```

```
parser_ctor(p) ::= <<
public <p.name>(TokenStream input) {
 super(input);
 _interp = new ParserATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
}
>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 }
}
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private boolean <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>:
 return <actions.(index)>;}; separator="\n">
 }
 return true;
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=",">) throws RecognitionException {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>);
 enterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch (RecognitionException re) {
  _localctx.exception = re;
  _errHandler.reportError(this, re);
  _errHandler.recover(this, re);
 }
 <endif>
 finally {
  <finallyAction>
  exitRule();
 }
 return _localctx;
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=", ">) throws RecognitionException {
 return <currentRule.name>(0<currentRule.args:{a | , <a.name>}>);
}

private <currentRule.ctxType> <currentRule.name>(int _p<args:{a | , <a>}>) throws RecognitionException {
 ParserRuleContext _parentctx = _ctx;
 int _parentState = getState();
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 enterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
```

```
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  _errHandler.reportError(this, re);
  _errHandler.recover(this, re);
 }
 finally {
  <finallyAction>
  unrollRecursionContexts(_parentctx);
 }
 return _localctx;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>
```

```
LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 break;
}
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 <iteration>
} while ( <loopExpr> );
>>

// LL(*) stuff
```

```
AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i>:
 <alt>
 break;}; separator="\n">
}
>>

OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
_alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
}
>>

PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER );
>>

Sync(s) ::= "sync(<s.expecting.name>);"

ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator=" || ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1L \<\< <offsetShift(s.varName, bits.shift)>) & (<bits.ttypes:{ttype | (1L \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <t>:}; separator="\n">
>>
```

```
InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>);
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>
);
>>

MatchToken(m) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>match(<m.name>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }>_input.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = (Token)}><endif>_errHandler.recoverInline(this);
}
else {
 if ( _input.LA(1)==Token.EOF ) matchedEOF = true;
 _errHandler.reportMatch(this);
 consume();
}
>>

Wildcard(w) ::= <<
setState(<w.stateNumber>);
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>);
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>
```

```
ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip();"
LexerMoreCommand()  ::= "more();"
LexerPopModeCommand() ::= "popMode();"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>;"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>;"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>);"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>;"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getText():null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getType():0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getLine():0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getCharPositionInLine():0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getChannel():0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getTokenIndex():0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label>!=null?Integer.valueOf(<ctx(t)>.<t.label>.getText()):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.start):null)"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_text(r)  ::=
"(<ctx(r)>.<r.label>!=null?_input.getText(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "this"

ThisRulePropertyRef_start(r) ::= "_localctx.start"
```

```
ThisRulePropertyRef_stop(r)  ::= "_localctx.stop"
ThisRulePropertyRef_text(r)  ::= "_input.getText(_localctx.start, _input.LT(-1))"
ThisRulePropertyRef_ctx(r)  ::= "_localctx"
ThisRulePropertyRef_parser(r)  ::= "this"

NonLocalAttrRef(s)   ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks)   ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>;"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <t.name>"
TokenTypeDecl(t) ::= "int <t.name>;"
TokenListDecl(t) ::= "List\<Token> <t.name> = new ArrayList\<Token>()"
RuleContextDecl(r) ::= "<r.ctxName> <r.name>"
RuleContextListDecl(rdecl) ::= "List\<<rdecl.ctxName>> <rdecl.name> = new ArrayList\<<rdecl.ctxName>>()"

ContextTokenGetterDecl(t)      ::=
   "public TerminalNode <t.name>() { return getToken(<parser.name>.<t.name>, 0); }"
ContextTokenListGetterDecl(t)  ::=
   "public List\<TerminalNode> <t.name>() { return getTokens(<parser.name>.<t.name>); }"
ContextTokenListIndexedGetterDecl(t)  ::= <<
public TerminalNode <t.name>(int i) {
 return getToken(<parser.name>.<t.name>, i);
}
>>
ContextRuleGetterDecl(r)       ::= <<
public <r.ctxName> <r.name>() {
 return getRuleContext(<r.ctxName>.class,0);
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public List\<<r.ctxName>\> <r.name>() {
 return getRuleContexts(<r.ctxName>.class);
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <r.name>(int i) {
 return getRuleContext(<r.ctxName>.class,i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"
```

```
ImplicitTokenLabel(tokenName) ::= "<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = _input.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = _input.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers)
 ::= <<
public static class <struct.name> extends
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)> implements
<interfaces; separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) { super(parent, invokingState);
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>) {
  super(parent, invokingState);
  <struct.ctorAttrs:{a | this.<a.name> = <a.name>;}; separator="\n">
 }
 @Override public int getRuleIndex() { return RULE_<struct.derivedFromName>; }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public void copyFrom(<struct.name> ctx) {
  super.copyFrom(ctx);
  <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public static class <struct.name> extends <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context ctx) { copyFrom(ctx); }
 <dispatchMethods; separator="\n">
}
>>

ListenerDispatchMethod(method) ::= <<
@Override
public void <if(method.isEnter)>enter<else>exit<endif>Rule(ParseTreeListener listener) {
 if ( listener instanceof <parser.grammarName>Listener )
((<parser.grammarName>Listener)listener).<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName;
format="cap">(this);
}
>>

VisitorDispatchMethod(method) ::= <<
@Override
public \<T> T accept(ParseTreeVisitor\<? extends T> visitor) {
 if ( visitor instanceof <parser.grammarName>Visitor ) return ((<parser.grammarName>Visitor\<? extends
T>)visitor).visit<struct.derivedFromName; format="cap">(this);
 else return visitor.visitChildren(this);
}
>>

AttributeDecl(d) ::= "<d.type> <d.name><if(d.initValue)> = <d.initValue><endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>((<x.ctx.name>)_localctx).<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "((<actionChunk.ctx.name>)_localctx)"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()                 ::= "_ctx.stop = _input.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx,
_parentState));
<if(label)>
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
```

```
<endif>
<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
_ctx = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( _parseListeners!=null ) triggerExitRuleEvent();
_prevctx = _localctx;
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
package <lexerFile.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.Lexer;
import org.antlr.v4.runtime.CharStream;
import org.antlr.v4.runtime.Token;
import org.antlr.v4.runtime.TokenStream;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.misc.*;

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <lexer.name> extends <superClass; null="Lexer"> {
 static { RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION); }

 protected static final DFA[] _decisionToDFA;
 protected static final PredictionContextCache _sharedContextCache =
  new PredictionContextCache();
 <if(lexer.tokens)>
 public static final int
  <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 <if(lexer.channels)>
```

```
public static final int
 <lexer.channels:{c | <c>=<lexer.channels.(c)>}; separator=", ", wrap, anchor>;
<endif>
<if(rest(lexer.modes))>
public static final int
 <rest(lexer.modes):{m | <m>=<i>}; separator=", ", wrap, anchor>;
<endif>
public static String[] channelNames = {
 "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ",
wrap, anchor><endif>
};

public static String[] modeNames = {
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
};

private static String[] makeRuleNames() {
 return new String[] {
  <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };
}
public static final String[] ruleNames = makeRuleNames();

<vocabulary(lexer.literalNames, lexer.symbolicNames)>

<namedActions.members>

public <lexer.name>(CharStream input) {
 super(input);
 _interp = new LexerATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
}

@Override
public String getGrammarFileName() { return "<lexer.grammarFileName>"; }

@Override
public String[] getRuleNames() { return ruleNames; }

@Override
public String getSerializedATN() { return _serializedATN; }

@Override
public String[] getChannelNames() { return channelNames; }

@Override
public String[] getModeNames() { return modeNames; }

@Override
```

```
 public ATN getATN() { return _ATN; }

 <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
 <atn>
}
>>

SerializedATN(model) ::= <<
<if(rest(model.segments))>
<! requires segmented representation !>
private static final int _serializedATNSegments = <length(model.segments)>;
<model.segments:{segment|private static final String _serializedATNSegment<i0> =
 "<segment; wrap={"+<\n><\t>"}>";}; separator="\n">
public static final String _serializedATN = Utils.join(
 new String[] {
  <model.segments:{segment | _serializedATNSegment<i0>}; separator=",\n">
 },
 ""
);
<else>
<! only one segment, can be inlined !>
public static final String _serializedATN =
 "<model.serialized; wrap={"+<\n><\t>"}>";
<endif>
public static final ATN _ATN =
 new ATNDeserializer().deserialize(_serializedATN.toCharArray());
static {
 _decisionToDFA = new DFA[_ATN.getNumberOfDecisions()];
 for (int i = 0; i \< _ATN.getNumberOfDecisions(); i++) {
  _decisionToDFA[i] = new DFA(_ATN.getDecisionState(i), i);
 }
<! org.antlr.v4.tool.DOTGenerator dot = new org.antlr.v4.tool.DOTGenerator(null);!>
<! System.out.println(dot.getDOT(_ATN.decisionToState.get(0), ruleNames, false));!>
<! System.out.println(dot.getDOT(_ATN.ruleToStartState[2], ruleNames, false));!>
}
>>

/** Using a type to init value map, try to init a type; if not in table
* must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".java"
```

Found in path(s):

* /opt/cola/permits/1294101088_1649016484.9/0/antlr4-4-7-2-jar/org/antlr/v4/tool/templates/codegen/Java/Java.stg

# 1.132 settings-api 2.2.2

## 1.132.1 Available under license :

No license file was found, but licenses were detected in source scan.

```
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
 <modelVersion>4.0.0</modelVersion>
 <groupId>com.nordstrom.tools</groupId>
 <artifactId>settings</artifactId>
 <version>2.2.2</version>
 <packaging>jar</packaging>

 <name>Settings API</name>
 <description>Core implementation and interfaces for defining context-specific settings</description>
 <url>https://github.com/Nordstrom/Settings</url>

 <licenses>
   <license>
     <name>The Apache License, Version 2.0</name>
     <url>http://www.apache.org/licenses/LICENSE-2.0.txt</url>
   </license>
 </licenses>

 <developers>
   <developer>
     <name>Scott Babcock</name>
     <email>scoba@hotmail.com</email>
     <organization>Nordstrom</organization>
     <organizationUrl>https://shop.nordstrom.com</organizationUrl>
   </developer>
 </developers>

 <properties>
   <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
   <maven.compiler.source>1.8</maven.compiler.source>
   <maven.compiler.target>1.8</maven.compiler.target>
   <logback.version>1.2.2</logback.version>
   <slf4j.version>1.7.25</slf4j.version>
   <testng.version>6.10</testng.version>
   <java-utils.version>1.7.2</java-utils.version>
   <maven-source-plugin.version>3.0.1</maven-source-plugin.version>
   <javadoc-plugin.version>2.10.4</javadoc-plugin.version>
   <gpg-plugin.version>1.6</gpg-plugin.version>
   <staging-plugin.version>1.6.7</staging-plugin.version>
   <release-plugin.version>2.5.3</release-plugin.version>
```

```
    <commons-lang3.version>3.5</commons-lang3.version>
    <commons-config.version>2.2</commons-config.version>
    <commons-beanutils.version>1.9.3</commons-beanutils.version>
    <sonar.language>java</sonar.language>
    <jacoco.version>0.7.9</jacoco.version>
    <skipSigning>true</skipSigning>
  </properties>

  <scm>
    <connection>scm:git:https://github.com/Nordstrom/Settings.git</connection>
    <developerConnection>scm:git:https://github.com/Nordstrom/Settings.git</developerConnection>
    <url>https://github.com/Nordstrom/Settings/tree/master</url>
    <tag>settings-2.2.2</tag>
  </scm>

  <distributionManagement>
    <snapshotRepository>
      <id>ossrh</id>
      <url>https://oss.sonatype.org/content/repositories/snapshots</url>
    </snapshotRepository>
    <repository>
      <id>ossrh</id>
      <url>https://oss.sonatype.org/service/local/staging/deploy/maven2/</url>
    </repository>
  </distributionManagement>

  <dependencyManagement>
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        <groupId>ch.qos.logback</groupId>
        <artifactId>logback-classic</artifactId>
        <version>${logback.version}</version>
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        <groupId>ch.qos.logback</groupId>
        <artifactId>logback-core</artifactId>
        <version>${logback.version}</version>
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        <groupId>org.slf4j</groupId>
        <artifactId>slf4j-api</artifactId>
        <version>${slf4j.version}</version>
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        <groupId>org.testng</groupId>
        <artifactId>testng</artifactId>
        <version>${testng.version}</version>
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        <artifactId>java-utils</artifactId>
        <version>${java-utils.version}</version>
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        <artifactId>commons-lang3</artifactId>
        <version>${commons-lang3.version}</version>
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        <version>${commons-config.version}</version>
      </dependency>
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        <version>${commons-beanutils.version}</version>
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    </dependency>
    <dependency>
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    </dependency>
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    </dependency>
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    </dependency>
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  </dependencies>

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          <version>${gpg-plugin.version}</version>
        </plugin>
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          <artifactId>nexus-staging-maven-plugin</artifactId>
          <version>${staging-plugin.version}</version>
        </plugin>
        <plugin>
          <groupId>org.apache.maven.plugins</groupId>
          <artifactId>maven-release-plugin</artifactId>
          <version>${release-plugin.version}</version>
        </plugin>
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    </pluginManagement>
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        <artifactId>jacoco-maven-plugin</artifactId>
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              <goal>prepare-agent</goal>
            </goals>
          </execution>
          <execution>
            <id>report</id>
            <phase>prepare-package</phase>
        <goals>
          <goal>report</goal>
        </goals>
      </execution>
    </executions>
  </plugin>
  <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-source-plugin</artifactId>
    <version>${maven-source-plugin.version}</version>
    <executions>
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        <goals>
          <goal>jar</goal>
        </goals>
      </execution>
    </executions>
  </plugin>
  <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-javadoc-plugin</artifactId>
    <version>${javadoc-plugin.version}</version>
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    </executions>
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    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-gpg-plugin</artifactId>
    <executions>
      <execution>
        <id>sign-artifacts</id>
        <phase>verify</phase>
        <goals>
          <goal>sign</goal>
        </goals>
        <configuration>
          <keyname>${gpg.keyname}</keyname>
          <passphraseServerId>${gpg.keyname}</passphraseServerId>
          <skip>${skipSigning}</skip>
        </configuration>
      </execution>
    </executions>
   </plugin>
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    <groupId>org.sonatype.plugins</groupId>
    <artifactId>nexus-staging-maven-plugin</artifactId>
    <extensions>true</extensions>
    <configuration>
     <serverId>ossrh</serverId>
     <nexusUrl>https://oss.sonatype.org/</nexusUrl>
     <autoReleaseAfterClose>true</autoReleaseAfterClose>
    </configuration>
   </plugin>
   <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-release-plugin</artifactId>
    <configuration>
     <autoVersionSubmodules>true</autoVersionSubmodules>
     <useReleaseProfile>false</useReleaseProfile>
     <releaseProfiles>release</releaseProfiles>
     <goals>deploy</goals>
    </configuration>
   </plugin>
  </plugins>
 </build>

 <profiles>
  <profile>
   <id>signing</id>
   <properties>
    <skipSigning>false</skipSigning>
   </properties>
  </profile>
 </profiles>
</project>
```

Found in path(s):

* /opt/cola/permits/1274704683_1649800573.66/0/settings-2-2-2-sources-jar/META-INF/maven/com.nordstrom.tools/settings/pom.xml

# 1.133 dmfs/optional 0.3

## 1.133.1 Available under license :

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*/

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* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/NullSafe.java
* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/Absent.java
* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/Present.java
* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/Optional.java
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*/

Found in path(s):
* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/First.java
* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/iter/OptItor.java
* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/decorators/Mapped.java
* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/iter/OptIter.java

# 1.134 generex 1.0.2

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Found in path(s):
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/README.md
No license file was found, but licenses were detected in source scan.

```
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
 <modelVersion>4.0.0</modelVersion>
 <groupId>com.github.mifmif</groupId>
 <artifactId>generex</artifactId>
 <version>1.0.2</version>
 <name>Generex</name>
 <url>https://github.com/mifmif/Generex/tree/master</url>
 <description>Generex A Java Library for regex to Strings generation</description>
 <packaging>jar</packaging>
 <licenses>
  <license>
   <name>The Apache Software License, Version 2.0</name>
   <url>http://www.apache.org/licenses/LICENSE-2.0.txt</url>
   <distribution>repo</distribution>
  </license>
 </licenses>
 <developers>
  <developer>
   <id>mifmif</id>
   <name>MIFRAH Youssef</name>
   <email>mifmif.com@gmail.com</email>
  </developer>
  <developer>
   <id>mkolisnyk</id>
   <name>mkolisnyk</name>
   <email>kolesnik.nickolay@gmail.com</email>
  </developer>
 </developers>

 <parent>
  <groupId>org.sonatype.oss</groupId>
  <artifactId>oss-parent</artifactId>
  <version>7</version>
 </parent>

 <properties>
  <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
  <maven.pmd.excludes>**/generated-sources/**</maven.pmd.excludes>
 </properties>
 <scm>
  <connection>scm:git:git@github.com:mifmif/Generex.git</connection>
  <developerConnection>scm:git:git@github.com:mifmif/Generex.git</developerConnection>
  <url>https://github.com/mifmif/Generex.git</url>
 </scm>
 <ciManagement>
  <url>https://travis-ci.org/mifmif/Generex/builds</url>
  <system>Travis</system>
  <notifiers>
   <notifier>
    <address>mifmif.com@gmail.com</address>
    <type>mail</type>
   </notifier>
   <notifier>
    <address>kolesnik.nickolay@gmail.com</address>
    <type>mail</type>
   </notifier>
  </notifiers>
 </ciManagement>

 <distributionManagement>
  <snapshotRepository>
   <id>ossrh</id>
   <url>https://oss.sonatype.org/content/repositories/snapshots</url>
  </snapshotRepository>
  <repository>
   <id>ossrh</id>
   <url>https://oss.sonatype.org/service/local/staging/deploy/maven2/</url>
  </repository>
 </distributionManagement>


 <build>
  <sourceDirectory>src/main/java</sourceDirectory>
  <testSourceDirectory>src/test/java</testSourceDirectory>
  <resources>
   <resource>
    <directory>src</directory>
    <excludes>
     <exclude>**/*.java</exclude>
    </excludes>
   </resource>
   <resource>
    <directory>target/dependency</directory>
    <excludes>
    <exclude>**/*.java</exclude>
   </excludes>
  </resource>
  <resource>
   <directory>src/main/resources</directory>
   <includes>
    <include>**/*.properties</include>
   </includes>
  </resource>
 </resources>
 <plugins>
  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-install-plugin</artifactId>
   <version>2.5.2</version>
   <configuration>
    <file>target/${project.artifactId}-${project.version}.jar</file>
    <groupId>${project.groupId}</groupId>
    <artifactId>${project.artifactId}</artifactId>
    <version>${project.version}</version>
    <packaging>maven-plugin</packaging>
   </configuration>
  </plugin>

  <plugin>
   <artifactId>maven-compiler-plugin</artifactId>
   <version>3.5.1</version>
   <configuration>
    <source>1.5</source>
    <target>1.5</target>
   </configuration>
  </plugin>
  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-jar-plugin</artifactId>
   <version>3.0.2</version>
   <configuration>
    <excludes>
     <exclude>*</exclude>
     <exclude>com/thoughtworks/**/*</exclude>
     <exclude>freemarker/**/*</exclude>
     <exclude>ftl/**/*</exclude>
     <exclude>i18n/**/*</exclude>
     <exclude>style/**/*</exclude>
     <exclude>junit/**/*</exclude>
     <exclude>licenses/**/*</exclude>
     <exclude>META-INF/maven/**/*</exclude>
     <exclude>org/codehaus/**/*</exclude>
     <exclude>org/hamcrest/**/*</exclude>
     <exclude>org/jbehave/**/*</exclude>
     <exclude>org/junit/**/*</exclude>
     <exclude>org/testng/**/*</exclude>
     <exclude>org/xmlpull/**/*</exclude>
     <exclude>stories/**/*</exclude>
     <exclude>style/**/*</exclude>
     <exclude>tests/**/*</exclude>
    </excludes>
    <archive>
     <manifest>
      <addClasspath>false</addClasspath>
      <addDefaultImplementationEntries>true</addDefaultImplementationEntries>
      <addDefaultSpecificationEntries>true</addDefaultSpecificationEntries>
      <addExtensions>false</addExtensions>
      <classpathLayoutType>simple</classpathLayoutType>
     </manifest>
    </archive>
   </configuration>
  </plugin>
  <plugin>
   <artifactId>maven-assembly-plugin</artifactId>
   <version>2.6</version>
   <configuration>
    <descriptors>
     <descriptor>./sources.xml</descriptor>
    </descriptors>
   </configuration>
  </plugin>
  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-dependency-plugin</artifactId>
   <version>2.10</version>
  </plugin>
  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-javadoc-plugin</artifactId>
   <version>2.10.3</version>
   <configuration>
    <show>private</show>
    <nohelp>false</nohelp>
    <failOnError>false</failOnError>
    <sourcepath>src/main/java</sourcepath>
   </configuration>
  </plugin>
  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-release-plugin</artifactId>
   <configuration>
    <tagNameFormat>v@{project.version}</tagNameFormat>
    <preparationGoals>package install:install-file</preparationGoals>
    <scmCommentPrefix>#3</scmCommentPrefix>
   </configuration>
  </plugin>
  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-deploy-plugin</artifactId>
   <version>2.8.2</version>
   <configuration>
    <skip>true</skip>
   </configuration>
  </plugin>


  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-source-plugin</artifactId>
   <version>3.0.1</version>
   <executions>
    <execution>
     <goals>
      <goal>jar-no-fork</goal>
     </goals>
    </execution>
   </executions>
  </plugin>


  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-javadoc-plugin</artifactId>
   <executions>
    <execution>
     <id>attach-javadocs</id>
     <goals>
      <goal>jar</goal>
     </goals>
    </execution>
   </executions>
  </plugin>


  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-gpg-plugin</artifactId>
   <executions>
```

```
  <execution>
   <id>sign-artifacts</id>
   <phase>deploy</phase>
   <goals>
    <goal>sign</goal>
   </goals>
  </execution>
 </executions>

</plugin>


<plugin>
 <groupId>org.sonatype.plugins</groupId>
 <artifactId>nexus-staging-maven-plugin</artifactId>
 <version>1.6.3</version>
 <executions>
  <execution>
   <id>default-deploy</id>
   <phase>deploy</phase>
   <goals>
    <goal>deploy</goal>
   </goals>
  </execution>
 </executions>
 <extensions>true</extensions>
 <configuration>
  <serverId>ossrh</serverId>
  <nexusUrl>https://oss.sonatype.org/</nexusUrl>
 </configuration>
</plugin>
<plugin>
 <groupId>org.apache.maven.plugins</groupId>
 <artifactId>maven-pmd-plugin</artifactId>
 <version>3.6</version>
 <configuration>
  <failOnViolation>true</failOnViolation>
  <excludeRoots>
   <excludeRoot>target/generated-sources/plugin</excludeRoot>
  </excludeRoots>
  <excludes>
   <exclude>**/HelpMojo.java</exclude>
  </excludes>
 </configuration>
 <executions>
  <execution>
   <goals>
    <goal>check</goal>
    <goal>cpd-check</goal>
   </goals>
   <configuration>
    <failOnViolation>true</failOnViolation>
    <excludes>
     <exclude>**/HelpMojo.java</exclude>
    </excludes>
   </configuration>
  </execution>
 </executions>
</plugin>
<plugin>
 <groupId>org.apache.maven.plugins</groupId>
 <artifactId>maven-checkstyle-plugin</artifactId>
 <version>2.10</version>
 <configuration>
  <excludes>**/test/java/**/*.java</excludes>
  <configLocation>./sun_checks.xml</configLocation>
  <suppressionsLocation>./checkstyle-suppressions.xml</suppressionsLocation>
  <failOnViolation>true</failOnViolation>
 </configuration>
 <executions>
  <execution>
   <goals>
    <goal>check</goal>
   </goals>
  </execution>
 </executions>
</plugin>
<plugin>
 <groupId>org.codehaus.mojo</groupId>
 <artifactId>cobertura-maven-plugin</artifactId>
 <version>2.6</version>
 <configuration>
  <check>
   <haltOnFailure>false</haltOnFailure>
   <totalBranchRate>80</totalBranchRate>
   <totalLineRate>80</totalLineRate>
   <packageLineRate>80</packageLineRate>
   <packageBranchRate>80</packageBranchRate>
  </check>
  <instrumentation>
   <excludes>
    <exclude>**/HelpMojo.class</exclude>
   </excludes>
  </instrumentation>
 </configuration>
 <executions>
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  <execution>
   <id>verification</id>
   <phase>verify</phase>
   <goals>
    <goal>check</goal>
    <goal>cobertura</goal>
   </goals>
  </execution>
 </executions>
</plugin>
<plugin>
 <groupId>org.codehaus.mojo</groupId>
 <artifactId>javancss-maven-plugin</artifactId>
 <version>2.0</version>
 <configuration>
  <encoding>${project.build.sourceEncoding}</encoding>
  <ccnLimit>10</ccnLimit>
  <ncssLimit>100</ncssLimit>
  <failOnViolation>true</failOnViolation>
  <excludes>
   <exclude>**/tests/**/*.*</exclude>
  </excludes>
 </configuration>
 <executions>
  <execution>
   <goals>
    <goal>check</goal>
   </goals>
  </execution>
 </executions>
</plugin>
<plugin>
 <groupId>org.codehaus.mojo</groupId>
 <artifactId>findbugs-maven-plugin</artifactId>
 <version>3.0.3</version>
 <configuration>
  <encoding>${project.build.sourceEncoding}</encoding>
  <failOnError>true</failOnError>
  <excludeFilterFile>findBugsExclude.xml</excludeFilterFile>
 </configuration>
 <executions>
  <execution>
   <goals>
    <goal>check</goal>
   </goals>
  </execution>
 </executions>
</plugin>
```

```
   <plugin>
    <groupId>org.codehaus.mojo</groupId>
    <artifactId>jdepend-maven-plugin</artifactId>
    <version>2.0</version>
   </plugin>
  </plugins>
 </build>
 <dependencies>
  <dependency>
   <groupId>dk.brics.automaton</groupId>
   <artifactId>automaton</artifactId>
   <version>1.11-8</version>
  </dependency>
  <dependency>
   <groupId>junit</groupId>
   <artifactId>junit</artifactId>
   <version>4.12</version>
   <scope>test</scope>
  </dependency>
  <dependency>
   <groupId>org.hamcrest</groupId>
   <artifactId>hamcrest-junit</artifactId>
   <version>2.0.0.0</version>
   <scope>test</scope>
  </dependency>
 </dependencies>
</project>
```

Found in path(s):
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/pom.xml
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Found in path(s):
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/src/main/java/com/mifmif/common/regex/util/Iterable.java
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/src/main/java/com/mifmif/common/regex/GenerexIterator.java
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/src/main/java/com/mifmif/common/regex/util/Iterator.java
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/src/main/java/com/mifmif/common/regex/Node.java
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/src/main/java/com/mifmif/common/regex/Main.java
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/src/main/java/com/mifmif/common/regex/Generex.java
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*/

Found in path(s):
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/src/test/java/com/mifmif/common/regex/GenerexUnitTest.java
No license file was found, but licenses were detected in source scan.

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Found in path(s):
* /opt/cola/permits/1162863542_1620923914.63/0/mifmif-generex-1-0-2-0-ge910243-tar-gz/mifmif-Generex-e910243/src/test/java/com/mifmif/common/regex/GenerexIteratorUnitTest.java

# 1.135 testcontainers-bom 1.15.3

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ibmcom/db2:11.5.0.0a
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neo4j:3.5.0-enterprise
a
b
mcr.microsoft.com/mssql/server:2017-CU12

# 1.136 google-guice 4.2.1

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# 1.137 kotlinx-coroutines-jdk 1.3.2-1.3.60

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# 1.138 cloudevents---kafka-transport-binding 2.1.1

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Found in path(s):
* /opt/cola/permits/1337069740_1654221784.6351657/0/cloudevents-kafka-2-1-1-jar/META-INF/maven/io.cloudevents/cloudevents-kafka/pom.xml

# 1.139 antlr 4.7.2

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Found in path(s):
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*/

```
/** The definitive ANTLR v3 tree grammar to walk/visit ANTLR v4 grammars.
*  Parses trees created by ANTLRParser.g.
*
*  Rather than have multiple tree grammars, one for each visit, I'm
*  creating this generic visitor that knows about context. All of the
*  boilerplate pattern recognition is done here. Then, subclasses can
*  override the methods they care about. This prevents a lot of the same
*  context tracking stuff like "set current alternative for current
*  rule node" that is repeated in lots of tree filters.
*/
tree grammar GrammarTreeVisitor;
options {
 language      = Java;
 tokenVocab    = ANTLRParser;
 ASTLabelType  = GrammarAST;
}

// Include the copyright in this source and also the generated source
@header {
/*
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*/
package org.antlr.v4.parse;
```

```
import org.antlr.v4.Tool;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.lang.reflect.InvocationTargetException;
import java.lang.reflect.Method;
}

@members {
public String grammarName;
public GrammarAST currentRuleAST;
public String currentModeName = LexerGrammar.DEFAULT_MODE_NAME;
public String currentRuleName;
public GrammarAST currentOuterAltRoot;
public int currentOuterAltNumber = 1; // 1..n
public int rewriteEBNFLevel = 0;

public GrammarTreeVisitor() { this(null); }

// Should be abstract but can't make gen'd parser abstract;
// subclasses should implement else everything goes to stderr!
public ErrorManager getErrorManager() { return null; }

public void visitGrammar(GrammarAST t) { visit(t, "grammarSpec"); }
public void visit(GrammarAST t, String ruleName) {
 CommonTreeNodeStream nodes = new CommonTreeNodeStream(new GrammarASTAdaptor(), t);
 setTreeNodeStream(nodes);
 try {
  Method m = getClass().getMethod(ruleName);
  m.invoke(this);
 }
 catch (Throwable e) {
  ErrorManager errMgr = getErrorManager();
  if ( e instanceof InvocationTargetException ) {
   e = e.getCause();
  }
  //e.printStackTrace(System.err);
  if ( errMgr==null ) {
   System.err.println("can't find rule "+ruleName+
          " or tree structure error: "+t.toStringTree()
          );
   e.printStackTrace(System.err);
  }
  else errMgr.toolError(ErrorType.INTERNAL_ERROR, e);
 }
}

public void discoverGrammar(GrammarRootAST root, GrammarAST ID) { }
public void finishPrequels(GrammarAST firstPrequel) { }
public void finishGrammar(GrammarRootAST root, GrammarAST ID) { }

public void grammarOption(GrammarAST ID, GrammarAST valueAST) { }
public void ruleOption(GrammarAST ID, GrammarAST valueAST) { }
public void blockOption(GrammarAST ID, GrammarAST valueAST) { }
public void defineToken(GrammarAST ID) { }
public void defineChannel(GrammarAST ID) { }
public void globalNamedAction(GrammarAST scope, GrammarAST ID, ActionAST action) { }
public void importGrammar(GrammarAST label, GrammarAST ID) { }

public void modeDef(GrammarAST m, GrammarAST ID) { }

public void discoverRules(GrammarAST rules) { }
public void finishRules(GrammarAST rule) { }
public void discoverRule(RuleAST rule, GrammarAST ID, List<GrammarAST> modifiers,
    ActionAST arg, ActionAST returns, GrammarAST thrws,
    GrammarAST options, ActionAST locals,
    List<GrammarAST> actions,
    GrammarAST block) { }
public void finishRule(RuleAST rule, GrammarAST ID, GrammarAST block) { }
public void discoverLexerRule(RuleAST rule, GrammarAST ID, List<GrammarAST> modifiers,
                GrammarAST block) { }
public void finishLexerRule(RuleAST rule, GrammarAST ID, GrammarAST block) { }
public void ruleCatch(GrammarAST arg, ActionAST action) { }
public void finallyAction(ActionAST action) { }
public void discoverOuterAlt(AltAST alt) { }
public void finishOuterAlt(AltAST alt) { }
public void discoverAlt(AltAST alt) { }
public void finishAlt(AltAST alt) { }

public void ruleRef(GrammarAST ref, ActionAST arg) { }
public void tokenRef(TerminalAST ref) { }
public void elementOption(GrammarASTWithOptions t, GrammarAST ID, GrammarAST valueAST) { }
public void stringRef(TerminalAST ref) { }
public void wildcardRef(GrammarAST ref) { }
public void actionInAlt(ActionAST action) { }
public void sempredInAlt(PredAST pred) { }
public void label(GrammarAST op, GrammarAST ID, GrammarAST element) { }
public void lexerCallCommand(int outerAltNumber, GrammarAST ID, GrammarAST arg) { }
public void lexerCommand(int outerAltNumber, GrammarAST ID) { }

protected void enterGrammarSpec(GrammarAST tree) { }
protected void exitGrammarSpec(GrammarAST tree) { }

protected void enterPrequelConstructs(GrammarAST tree) { }
protected void exitPrequelConstructs(GrammarAST tree) { }

protected void enterPrequelConstruct(GrammarAST tree) { }
protected void exitPrequelConstruct(GrammarAST tree) { }

protected void enterOptionsSpec(GrammarAST tree) { }
protected void exitOptionsSpec(GrammarAST tree) { }

protected void enterOption(GrammarAST tree) { }
protected void exitOption(GrammarAST tree) { }

protected void enterOptionValue(GrammarAST tree) { }
protected void exitOptionValue(GrammarAST tree) { }

protected void enterDelegateGrammars(GrammarAST tree) { }
protected void exitDelegateGrammars(GrammarAST tree) { }

protected void enterDelegateGrammar(GrammarAST tree) { }
protected void exitDelegateGrammar(GrammarAST tree) { }

protected void enterTokensSpec(GrammarAST tree) { }
protected void exitTokensSpec(GrammarAST tree) { }

protected void enterTokenSpec(GrammarAST tree) { }
protected void exitTokenSpec(GrammarAST tree) { }

protected void enterChannelsSpec(GrammarAST tree) { }
protected void exitChannelsSpec(GrammarAST tree) { }

protected void enterChannelSpec(GrammarAST tree) { }
protected void exitChannelSpec(GrammarAST tree) { }

protected void enterAction(GrammarAST tree) { }
protected void exitAction(GrammarAST tree) { }

protected void enterRules(GrammarAST tree) { }
protected void exitRules(GrammarAST tree) { }

protected void enterMode(GrammarAST tree) { }
protected void exitMode(GrammarAST tree) { }

protected void enterLexerRule(GrammarAST tree) { }
protected void exitLexerRule(GrammarAST tree) { }

protected void enterRule(GrammarAST tree) { }
protected void exitRule(GrammarAST tree) { }

protected void enterExceptionGroup(GrammarAST tree) { }
protected void exitExceptionGroup(GrammarAST tree) { }

protected void enterExceptionHandler(GrammarAST tree) { }
protected void exitExceptionHandler(GrammarAST tree) { }

protected void enterFinallyClause(GrammarAST tree) { }
protected void exitFinallyClause(GrammarAST tree) { }

protected void enterLocals(GrammarAST tree) { }
protected void exitLocals(GrammarAST tree) { }

protected void enterRuleReturns(GrammarAST tree) { }
protected void exitRuleReturns(GrammarAST tree) { }

protected void enterThrowsSpec(GrammarAST tree) { }
protected void exitThrowsSpec(GrammarAST tree) { }

protected void enterRuleAction(GrammarAST tree) { }
protected void exitRuleAction(GrammarAST tree) { }

protected void enterRuleModifier(GrammarAST tree) { }
protected void exitRuleModifier(GrammarAST tree) { }

protected void enterLexerRuleBlock(GrammarAST tree) { }
protected void exitLexerRuleBlock(GrammarAST tree) { }

protected void enterRuleBlock(GrammarAST tree) { }
protected void exitRuleBlock(GrammarAST tree) { }

protected void enterLexerOuterAlternative(AltAST tree) { }
protected void exitLexerOuterAlternative(AltAST tree) { }

protected void enterOuterAlternative(AltAST tree) { }
protected void exitOuterAlternative(AltAST tree) { }

protected void enterLexerAlternative(GrammarAST tree) { }
protected void exitLexerAlternative(GrammarAST tree) { }

protected void enterLexerElements(GrammarAST tree) { }
protected void exitLexerElements(GrammarAST tree) { }

protected void enterLexerElement(GrammarAST tree) { }
protected void exitLexerElement(GrammarAST tree) { }

protected void enterLabeledLexerElement(GrammarAST tree) { }
protected void exitLabeledLexerElement(GrammarAST tree) { }

protected void enterLexerBlock(GrammarAST tree) { }
protected void exitLexerBlock(GrammarAST tree) { }

protected void enterLexerAtom(GrammarAST tree) { }
protected void exitLexerAtom(GrammarAST tree) { }

protected void enterActionElement(GrammarAST tree) { }
protected void exitActionElement(GrammarAST tree) { }

protected void enterAlternative(AltAST tree) { }
protected void exitAlternative(AltAST tree) { }

protected void enterLexerCommand(GrammarAST tree) { }
protected void exitLexerCommand(GrammarAST tree) { }

protected void enterLexerCommandExpr(GrammarAST tree) { }
protected void exitLexerCommandExpr(GrammarAST tree) { }

protected void enterElement(GrammarAST tree) { }
protected void exitElement(GrammarAST tree) { }

protected void enterAstOperand(GrammarAST tree) { }
protected void exitAstOperand(GrammarAST tree) { }

protected void enterLabeledElement(GrammarAST tree) { }
protected void exitLabeledElement(GrammarAST tree) { }

protected void enterSubrule(GrammarAST tree) { }
protected void exitSubrule(GrammarAST tree) { }

protected void enterLexerSubrule(GrammarAST tree) { }
protected void exitLexerSubrule(GrammarAST tree) { }

protected void enterBlockSuffix(GrammarAST tree) { }
protected void exitBlockSuffix(GrammarAST tree) { }

protected void enterEbnfSuffix(GrammarAST tree) { }
protected void exitEbnfSuffix(GrammarAST tree) { }

protected void enterAtom(GrammarAST tree) { }
protected void exitAtom(GrammarAST tree) { }

protected void enterBlockSet(GrammarAST tree) { }
protected void exitBlockSet(GrammarAST tree) { }

protected void enterSetElement(GrammarAST tree) { }
protected void exitSetElement(GrammarAST tree) { }

protected void enterBlock(GrammarAST tree) { }
protected void exitBlock(GrammarAST tree) { }

protected void enterRuleref(GrammarAST tree) { }
protected void exitRuleref(GrammarAST tree) { }

protected void enterRange(GrammarAST tree) { }
protected void exitRange(GrammarAST tree) { }

protected void enterTerminal(GrammarAST tree) { }
protected void exitTerminal(GrammarAST tree) { }

protected void enterElementOptions(GrammarAST tree) { }
protected void exitElementOptions(GrammarAST tree) { }

protected void enterElementOption(GrammarAST tree) { }
protected void exitElementOption(GrammarAST tree) { }

 @Override
 public void traceIn(String ruleName, int ruleIndex)  {
  System.err.println("enter "+ruleName+": "+input.LT(1));
 }

 @Override
 public void traceOut(String ruleName, int ruleIndex)  {
  System.err.println("exit "+ruleName+": "+input.LT(1));
 }
}

grammarSpec
@init {
 enterGrammarSpec($start);
}
@after {
 exitGrammarSpec($start);
}
   :   ^( GRAMMAR ID {grammarName=$ID.text;}
     {discoverGrammar((GrammarRootAST)$GRAMMAR, $ID);}
      prequelConstructs
     {finishPrequels($prequelConstructs.firstOne);}
      rules mode*
     {finishGrammar((GrammarRootAST)$GRAMMAR, $ID);}
   )
 ;

prequelConstructs returns [GrammarAST firstOne=null]
@init {
 enterPrequelConstructs($start);
}
@after {
 exitPrequelConstructs($start);
}
```

```
 : {$firstOne=$start;} prequelConstruct+
 |
 ;

prequelConstruct
@init {
 enterPrequelConstructs($start);
}
@after {
 exitPrequelConstructs($start);
}
 :   optionsSpec
   |   delegateGrammars
   |   tokensSpec
   |   channelsSpec
   |   action
   ;

optionsSpec
@init {
 enterOptionsSpec($start);
}
@after {
 exitOptionsSpec($start);
}
 : ^(OPTIONS option*)
   ;

option
@init {
 enterOption($start);
 boolean rule = inContext("RULE ...");
 boolean block = inContext("BLOCK ...");
}
@after {
 exitOption($start);
}
   :   ^(a=ASSIGN ID v=optionValue)
    {
    if ( block ) blockOption($ID, $v.start); // most specific first
    else if ( rule ) ruleOption($ID, $v.start);
    else grammarOption($ID, $v.start);
    }
   ;

optionValue returns [String v]
@init {
 enterOptionValue($start);
 $v = $start.token.getText();
}
@after {
 exitOptionValue($start);
}
   :   ID
   |   STRING_LITERAL
   |   INT
   ;

delegateGrammars
@init {
 enterDelegateGrammars($start);
}
@after {
 exitDelegateGrammars($start);
}
 :   ^(IMPORT delegateGrammar+)
 ;

delegateGrammar
@init {
 enterDelegateGrammar($start);
}
@after {
 exitDelegateGrammar($start);
}
   :   ^(ASSIGN label=ID id=ID) {importGrammar($label, $id);}
   |   id=ID       {importGrammar(null, $id);}
   ;

tokensSpec
@init {
 enterTokensSpec($start);
}
@after {
 exitTokensSpec($start);
}
 :   ^(TOKENS_SPEC tokenSpec+)
 ;

tokenSpec
@init {
 enterTokenSpec($start);
}
@after {
 exitTokenSpec($start);
}
```

```
 : ID     {defineToken($ID);}
 ;

channelsSpec
@init {
 enterChannelsSpec($start);
}
@after {
 exitChannelsSpec($start);
}
 :   ^(CHANNELS channelSpec+)
 ;

channelSpec
@init {
 enterChannelSpec($start);
}
@after {
 exitChannelSpec($start);
}
 : ID     {defineChannel($ID);}
 ;

action
@init {
 enterAction($start);
}
@after {
 exitAction($start);
}
 : ^(AT sc=ID? name=ID ACTION) {globalNamedAction($sc, $name, (ActionAST)$ACTION);}
 ;

rules
@init {
 enterRules($start);
}
@after {
 exitRules($start);
}
   : ^(RULES {discoverRules($RULES);} (rule|lexerRule)* {finishRules($RULES);})
   ;

mode
@init {
 enterMode($start);
}
@after {
 exitMode($start);
}
 : ^( MODE ID {currentModeName=$ID.text; modeDef($MODE, $ID);} lexerRule* )
 ;

lexerRule
@init {
 enterLexerRule($start);
 List<GrammarAST> mods = new ArrayList<GrammarAST>();
 currentOuterAltNumber=0;
}
@after {
 exitLexerRule($start);
}
 : ^( RULE TOKEN_REF
   {currentRuleName=$TOKEN_REF.text; currentRuleAST=$RULE;}
   (^(RULEMODIFIERS m=FRAGMENT {mods.add($m);}))?
      {discoverLexerRule((RuleAST)$RULE, $TOKEN_REF, mods, (GrammarAST)input.LT(1));}
      lexerRuleBlock
      {
      finishLexerRule((RuleAST)$RULE, $TOKEN_REF, $lexerRuleBlock.start);
      currentRuleName=null; currentRuleAST=null;
      }
      )
 ;

rule
@init {
 enterRule($start);
 List<GrammarAST> mods = new ArrayList<GrammarAST>();
 List<GrammarAST> actions = new ArrayList<GrammarAST>(); // track roots
 currentOuterAltNumber=0;
}
@after {
 exitRule($start);
}
 :   ^( RULE RULE_REF {currentRuleName=$RULE_REF.text; currentRuleAST=$RULE;}
   (^(RULEMODIFIERS (m=ruleModifier{mods.add($m.start);})+))?
   ARG_ACTION?
      ret=ruleReturns?
      thr=throwsSpec?
      loc=locals?
      ( opts=optionsSpec
     |   a=ruleAction {actions.add($a.start);}
     )*
      {discoverRule((RuleAST)$RULE, $RULE_REF, mods, (ActionAST)$ARG_ACTION,
          $ret.start!=null?(ActionAST)$ret.start.getChild(0):null,
          $thr.start, $opts.start,
            $loc.start!=null?(ActionAST)$loc.start.getChild(0):null,
            actions, (GrammarAST)input.LT(1));}
       ruleBlock exceptionGroup
       {finishRule((RuleAST)$RULE, $RULE_REF, $ruleBlock.start); currentRuleName=null; currentRuleAST=null;}
       )
   ;

exceptionGroup
@init {
 enterExceptionGroup($start);
}
@after {
 exitExceptionGroup($start);
}
   : exceptionHandler* finallyClause?
   ;

exceptionHandler
@init {
 enterExceptionHandler($start);
}
@after {
 exitExceptionHandler($start);
}
 : ^(CATCH ARG_ACTION ACTION) {ruleCatch($ARG_ACTION, (ActionAST)$ACTION);}
 ;

finallyClause
@init {
 enterFinallyClause($start);
}
@after {
 exitFinallyClause($start);
}
 : ^(FINALLY ACTION)    {finallyAction((ActionAST)$ACTION);}
 ;

locals
@init {
 enterLocals($start);
}
@after {
 exitLocals($start);
}
 : ^(LOCALS ARG_ACTION)
 ;

ruleReturns
```

```
@init {
 enterRuleReturns($start);
}
@after {
 exitRuleReturns($start);
}
 : ^(RETURNS ARG_ACTION)
 ;

throwsSpec
@init {
 enterThrowsSpec($start);
}
@after {
 exitThrowsSpec($start);
}
   : ^(THROWS ID+)
   ;

ruleAction
@init {
 enterRuleAction($start);
}
@after {
 exitRuleAction($start);
}
 : ^(AT ID ACTION)
 ;

ruleModifier
@init {
 enterRuleModifier($start);
}
@after {
 exitRuleModifier($start);
}
   : PUBLIC
   | PRIVATE
   | PROTECTED
   | FRAGMENT
   ;

lexerRuleBlock
@init {
 enterLexerRuleBlock($start);
}
@after {
 exitLexerRuleBlock($start);
```

```
}
   : ^( BLOCK
     ( {
      currentOuterAltRoot = (GrammarAST)input.LT(1);
    currentOuterAltNumber++;
    }
      lexerOuterAlternative
     )+
    )
   ;

ruleBlock
@init {
 enterRuleBlock($start);
}
@after {
 exitRuleBlock($start);
}
   : ^( BLOCK
     ( {
      currentOuterAltRoot = (GrammarAST)input.LT(1);
    currentOuterAltNumber++;
    }
      outerAlternative
     )+
    )
   ;

lexerOuterAlternative
@init {
 enterLexerOuterAlternative((AltAST)$start);
 discoverOuterAlt((AltAST)$start);
}
@after {
 finishOuterAlt((AltAST)$start);
 exitLexerOuterAlternative((AltAST)$start);
}
 : lexerAlternative
 ;


outerAlternative
@init {
 enterOuterAlternative((AltAST)$start);
 discoverOuterAlt((AltAST)$start);
}
@after {
 finishOuterAlt((AltAST)$start);
 exitOuterAlternative((AltAST)$start);
}
 : alternative
 ;

lexerAlternative
@init {
 enterLexerAlternative($start);
}
@after {
 exitLexerAlternative($start);
}
 : ^(LEXER_ALT_ACTION lexerElements lexerCommand+)
   |   lexerElements
   ;

lexerElements
@init {
 enterLexerElements($start);
}
@after {
 exitLexerElements($start);
}
   : ^(ALT lexerElement+)
   ;

lexerElement
@init {
 enterLexerElement($start);
}
@after {
 exitLexerElement($start);
}
 : labeledLexerElement
 | lexerAtom
 | lexerSubrule
 |   ACTION       {actionInAlt((ActionAST)$ACTION);}
 |   SEMPRED      {sempredInAlt((PredAST)$SEMPRED);}
 |   ^(ACTION elementOptions) {actionInAlt((ActionAST)$ACTION);}
 |   ^(SEMPRED elementOptions) {sempredInAlt((PredAST)$SEMPRED);}
 | EPSILON
 ;

labeledLexerElement
@init {
 enterLabeledLexerElement($start);
}
@after {
 exitLabeledLexerElement($start);
}
   :   ^((ASSIGN|PLUS_ASSIGN) ID (lexerAtom|block))
 ;

lexerBlock
@init {
 enterLexerBlock($start);
}
@after {
 exitLexerBlock($start);
}
 : ^(BLOCK optionsSpec? lexerAlternative+)
   ;

lexerAtom
@init {
 enterLexerAtom($start);
}
@after {
 exitLexerAtom($start);
}
   :   terminal
   |   ^(NOT blockSet)
   |   blockSet
   |   ^(WILDCARD elementOptions)
   |   WILDCARD
   | LEXER_CHAR_SET
   |   range
   |   ruleref
   ;

actionElement
@init {
 enterActionElement($start);
}
@after {
 exitActionElement($start);
}
 : ACTION
 |   ^(ACTION elementOptions)
 |   SEMPRED
 |   ^(SEMPRED elementOptions)
 ;

alternative
@init {
 enterAlternative((AltAST)$start);
 discoverAlt((AltAST)$start);
}
@after {
 finishAlt((AltAST)$start);
 exitAlternative((AltAST)$start);
}
 : ^(ALT elementOptions? element+)
 | ^(ALT elementOptions? EPSILON)
   ;

lexerCommand
@init {
 enterLexerCommand($start);
}
@after {
 exitLexerCommand($start);
}
 : ^(LEXER_ACTION_CALL ID lexerCommandExpr)
       {lexerCallCommand(currentOuterAltNumber, $ID, $lexerCommandExpr.start);}
 | ID
       {lexerCommand(currentOuterAltNumber, $ID);}
 ;

lexerCommandExpr
@init {
 enterLexerCommandExpr($start);
}
@after {
 exitLexerCommandExpr($start);
}
 : ID
 | INT
 ;

element
@init {
 enterElement($start);
}
@after {
 exitElement($start);
}
 : labeledElement
 | atom
 | subrule
 |   ACTION      {actionInAlt((ActionAST)$ACTION);}
 |   SEMPRED      {sempredInAlt((PredAST)$SEMPRED);}
 |   ^(ACTION elementOptions) {actionInAlt((ActionAST)$ACTION);}
 |   ^(SEMPRED elementOptions) {sempredInAlt((PredAST)$SEMPRED);}
 | range
 | ^(NOT blockSet)
 | ^(NOT block)
 ;

astOperand
@init {
 enterAstOperand($start);
}
@after {
 exitAstOperand($start);
}
 : atom
 | ^(NOT blockSet)
 | ^(NOT block)
 ;

labeledElement
@init {
 enterLabeledElement($start);
}
@after {
 exitLabeledElement($start);
}
 : ^((ASSIGN|PLUS_ASSIGN) ID element) {label($start, $ID, $element.start);}
 ;

subrule
@init {
 enterSubrule($start);
}
@after {
 exitSubrule($start);
}
 : ^(blockSuffix block)
 |  block
   ;

lexerSubrule
@init {
 enterLexerSubrule($start);
}
@after {
 exitLexerSubrule($start);
}
 : ^(blockSuffix lexerBlock)
 |  lexerBlock
   ;
```

```
blockSuffix
@init {
 enterBlockSuffix($start);
}
@after {
 exitBlockSuffix($start);
}
   : ebnfSuffix
   ;

ebnfSuffix
@init {
 enterEbnfSuffix($start);
}
@after {
 exitEbnfSuffix($start);
}
 : OPTIONAL
  | CLOSURE
   | POSITIVE_CLOSURE
 ;

atom
@init {
 enterAtom($start);
}
@after {
 exitAtom($start);
}
 : ^(DOT ID terminal)
 | ^(DOT ID ruleref)
   | ^(WILDCARD elementOptions) {wildcardRef($WILDCARD);}
   | WILDCARD     {wildcardRef($WILDCARD);}
   |   terminal
   | blockSet
   |   ruleref
   ;

blockSet
@init {
 enterBlockSet($start);
}
@after {
 exitBlockSet($start);
}
 : ^(SET setElement+)
 ;
```

```
setElement
@init {
 enterSetElement($start);
}
@after {
 exitSetElement($start);
}
 : ^(STRING_LITERAL elementOptions)    {stringRef((TerminalAST)$STRING_LITERAL);}
 | ^(TOKEN_REF elementOptions)   {tokenRef((TerminalAST)$TOKEN_REF);}
 | STRING_LITERAL                    {stringRef((TerminalAST)$STRING_LITERAL);}
 | TOKEN_REF                        {tokenRef((TerminalAST)$TOKEN_REF);}
 | ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
  {
  stringRef((TerminalAST)$a);
  stringRef((TerminalAST)$b);
  }
      |       LEXER_CHAR_SET
 ;

block
@init {
 enterBlock($start);
}
@after {
 exitBlock($start);
}
   : ^(BLOCK optionsSpec? ruleAction* ACTION? alternative+)
   ;

ruleref
@init {
 enterRuleref($start);
}
@after {
 exitRuleref($start);
}
   : ^(RULE_REF arg=ARG_ACTION? elementOptions?)
    {
    ruleRef($RULE_REF, (ActionAST)$ARG_ACTION);
    if ( $arg!=null ) actionInAlt((ActionAST)$arg);
    }
   ;

range
@init {
 enterRange($start);
}
```

```
@after {
 exitRange($start);
}
   : ^(RANGE STRING_LITERAL STRING_LITERAL)
   ;

terminal
@init {
 enterTerminal($start);
}
@after {
 exitTerminal($start);
}
   :  ^(STRING_LITERAL elementOptions)
           {stringRef((TerminalAST)$STRING_LITERAL);}
   | STRING_LITERAL     {stringRef((TerminalAST)$STRING_LITERAL);}
   | ^(TOKEN_REF elementOptions) {tokenRef((TerminalAST)$TOKEN_REF);}
   | TOKEN_REF        {tokenRef((TerminalAST)$TOKEN_REF);}
   ;

elementOptions
@init {
 enterElementOptions($start);
}
@after {
 exitElementOptions($start);
}
   : ^(ELEMENT_OPTIONS elementOption[(GrammarASTWithOptions)$start.getParent()]*)
   ;

elementOption[GrammarASTWithOptions t]
@init {
 enterElementOption($start);
}
@after {
 exitElementOption($start);
}
   : ID        {elementOption(t, $ID, null);}
   |  ^(ASSIGN id=ID v=ID)   {elementOption(t, $id, $v);}
   |  ^(ASSIGN ID v=STRING_LITERAL) {elementOption(t, $ID, $v);}
   |  ^(ASSIGN ID v=ACTION)   {elementOption(t, $ID, $v);}
   |  ^(ASSIGN ID v=INT)    {elementOption(t, $ID, $v);}
   ;
```

Found in path(s):

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/GrammarTreeVisitor.g

No license file was found, but licenses were detected in source scan.

```
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*/

SwiftTypeInitMap ::= [
 "Int":"0",
 "Int64":"0",
 "Float":"0.0",
 "Double":"0.0",
 "Bool":"false",
 default:"nil" // anything other than a primitive type is an object
]
SwiftTypeMap ::= [
 "int":"Int",
 "float":"Float",
 "long":"Int64",
 "double":"Double",
 "bool":"Bool",
 "boolean":"Bool",
 default : key
]
// args must be <object-model-object>, <fields-resulting-in-STs>

accessLevelOpenOK(obj) ::= "<obj.accessLevel; null=\"open\">"
accessLevelNotOpen(obj) ::= "<obj.accessLevel; null=\"public\">"

ParserFile(file, parser, namedActions,contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4

<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
* This interface defines a complete listener for a parse tree produced by
* {@link <file.parserName>}.
*/
<accessLevelNotOpen(file)> protocol <file.grammarName>Listener: ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
* Enter a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
- Parameters:
  - ctx: the parse tree
*/
func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)
/**
<if(file.listenerLabelRuleNames.(lname))>
* Exit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
- Parameters:
  - ctx: the parse tree
*/
func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)}; separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>

import Antlr4



/**
* This class provides an empty implementation of {@link <file.grammarName>Listener},
* which can be extended to create a listener which only needs to handle a subset
* of the available methods.
*/
<accessLevelOpenOK(file)> class <file.grammarName>BaseListener: <file.grammarName>Listener {
    <accessLevelNotOpen(file)> init() { \}
 <file.listenerNames:{lname |

/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
<accessLevelOpenOK(file)> func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) { \}
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
<accessLevelOpenOK(file)> func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) { \}}; separator="\n">

 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func enterEveryRule(_ ctx: ParserRuleContext) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func exitEveryRule(_ ctx: ParserRuleContext) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func visitTerminal(_ node: TerminalNode) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func visitErrorNode(_ node: ErrorNode) { }
}
>>

VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
* This interface defines a complete generic visitor for a parse tree produced
* by {@link <file.parserName>}.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
<accessLevelOpenOK(file)> class <file.grammarName>Visitor\<T>: ParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
* Visit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
* Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
- Parameters:
 - ctx: the parse tree
- returns: the visitor result
*/
<accessLevelOpenOK(file)> func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) -> T {
 fatalError(#function + " must be overridden")
\}
}; separator="\n">
}
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
* This class provides an empty implementation of {@link <file.grammarName>Visitor},
* which can be extended to create a visitor which only needs to handle a subset
* of the available methods.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
<accessLevelOpenOK(file)> class <file.grammarName>BaseVisitor\<T>: AbstractParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation returns the result of calling
* {@link #visitChildren\} on {@code ctx\}.\</p>
*/
<accessLevelOpenOK(file)> func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) -> T? { return visitChildren(ctx) \}}; separator="\n">
}
>>

fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
```

```
<!//@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})!>
<accessLevelOpenOK(parser)> class <parser.name>: <superClass; null="Parser"> {

 internal static var _decisionToDFA: [DFA] = {
        var decisionToDFA = [DFA]()
        let length = <parser.name>._ATN.getNumberOfDecisions()
        for i in 0..\<length {
         <!// decisionToDFA[i] = DFA(<parser.name>._ATN.getDecisionState(i)!, i);!>
          decisionToDFA.append(DFA(<parser.name>._ATN.getDecisionState(i)!, i))
         }
         return decisionToDFA
   }()

 internal static let _sharedContextCache = PredictionContextCache()

 <if(parser.tokens)>
 <accessLevelNotOpen(parser)>
 enum Tokens: Int {
  case EOF = -1, <parser.tokens:{k | <k> = <parser.tokens.(k)>}; separator=", ", wrap, anchor>
 }
      <endif>

 <accessLevelNotOpen(parser)>
 static let <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>

 <accessLevelNotOpen(parser)>
 static let ruleNames: [String] = [
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 ]

 <vocabulary(parser.literalNames, parser.symbolicNames,
                  accessLevelNotOpen(parser))>

 override <accessLevelOpenOK(parser)>
 func getGrammarFileName() -> String { return "<parser.grammarFileName; format="java-escape">" }

 override <accessLevelOpenOK(parser)>
 func getRuleNames() -> [String] { return <parser.name>.ruleNames }

 override <accessLevelOpenOK(parser)>
 func getSerializedATN() -> String { return <parser.name>._serializedATN }

 override <accessLevelOpenOK(parser)>
 func getATN() -> ATN { return <parser.name>._ATN }

 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">
<if(sempredFuncs)>
 override <accessLevelOpenOK(parser)>
 func sempred(_ _localctx: RuleContext?, _ ruleIndex: Int,  _ predIndex: Int)throws -> Bool {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case  <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
     default: return true
  }
  <!return true;!>
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>

 <accessLevelNotOpen(parser)>
 static let _serializedATN = <parser.name>ATN().jsonString

 <accessLevelNotOpen(parser)>
 static let _ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
}
>>

vocabulary(literalNames, symbolicNames, accessLevel) ::= <<
private static let _LITERAL_NAMES: [String?] = [
 <literalNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
]
private static let _SYMBOLIC_NAMES: [String?] = [
 <symbolicNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
]
<accessLevel>
static let VOCABULARY = Vocabulary(_LITERAL_NAMES, _SYMBOLIC_NAMES)
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
override <accessLevelOpenOK(parser)>
func action(_ _localctx: RuleContext?,  _ ruleIndex: Int, _ actionIndex: Int) throws {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((_localctx as <f.ctxType>?), actionIndex)
  }; separator="\n">
 default: break
 }
}
```

```
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
override <accessLevelOpenOK(parser)>
func sempred(_ _localctx: RuleContext?, _  ruleIndex: Int,_   predIndex: Int) throws -> Bool {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
 default: return true
 }
 <!return true;!>
}
<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<

override <accessLevelOpenOK(parser)>
func getVocabulary() -> Vocabulary {
   return <p.name>.VOCABULARY
}

override <accessLevelNotOpen(parser)>
init(_ input:TokenStream) throws {
   RuntimeMetaData.checkVersion("4.7.2", RuntimeMetaData.VERSION)
 try super.init(input)
 _interp = ParserATNSimulator(self,<p.name>._ATN,<p.name>._decisionToDFA,
<parser.name>._sharedContextCache)
}

>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private func <r.name>_action(_ _localctx: <r.ctxType>?,  _ actionIndex: Int) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
  }; separator="\n">
  default: break
 }
}
>>
```

```
/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private func <r.name>_sempred(_ _localctx: <r.ctxType>!,  _ predIndex: Int) throws -> Bool {
 switch (predIndex) {
 <actions:{index|
   case <index>:return <actions.(index)>}; separator="\n">
     default: return true
 }
 <!return true;!>
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<
<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">
@discardableResult
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else> <accessLevelOpenOK(parser)> func
<endif><currentRule.name>(<if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType> {
 var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>)
 try enterRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>)
 <namedActions.init>
 <locals; separator="\n">
 defer {
     <finallyAction>
     try! exitRule()
   }
 do {
<if(currentRule.hasLookaheadBlock)>
  var _alt:Int
<endif>
   <code>
  <postamble; separator="\n">
   <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch ANTLRException.recognition(let re) {
  _localctx.exception = re
  _errHandler.reportError(self, re)
  try _errHandler.recover(self, re)
 }
 <endif>
 return _localctx
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else> <accessLevelNotOpen(parser)> final <endif>
func <currentRule.name>( <if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType>   {
 return try <currentRule.name>(0<currentRule.args:{a | , <a.name>}>)
}
@discardableResult
private func <currentRule.name>(_ _p<args:{a | , <a>}>: Int) throws -> <currentRule.ctxType>   {
 let _parentctx: ParserRuleContext? = _ctx
 var _parentState: Int = getState()
 var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>)
 var  _prevctx: <currentRule.ctxType> = _localctx
 var _startState: Int = <currentRule.startState>
 try enterRecursionRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p)
 <namedActions.init>
 <locals; separator="\n">
 defer {
     <finallyAction>
     try! unrollRecursionContexts(_parentctx)
   }
 do {
<if(currentRule.hasLookaheadBlock)>
  var _alt: Int
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch ANTLRException.recognition(let re) {
  _localctx.exception = re
  _errHandler.reportError(self, re)
  try _errHandler.recover(self, re)
 }

 return _localctx;
}
>>
```

```
CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx =  <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
try enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<!//{!>
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
<!//}!>
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt | <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 <error>
}
>>

LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 break
}
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
```

```
}
<!else if ( !(<followExpr>) ) <error>!>
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>)
 try _errHandler.sync(self)
 <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>) <! alt block decision !>
try _errHandler.sync(self)
<preamble; separator="\n">
repeat {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 <iteration>
} while (<loopExpr>)
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch(try getInterpreter().adaptivePredict(_input,<choice.decision>, _ctx)) {
<alts:{alt |
case <i>:
 <alt>
 break}; separator="\n">
default: break
}
>>

OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)) {
```

```
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
default: break
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
_alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
while (_alt != <choice.exitAlt> && _alt != ATN.INVALID_ALT_NUMBER) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>)
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
}
>>

PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
try _errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
repeat {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
} while (_alt != <choice.exitAlt> && _alt !=  ATN.INVALID_ALT_NUMBER)
>>

Sync(s) ::= "sync(<s.expecting.name>);"

ThrowNoViableAlt(t) ::= "throw ANTLRException.recognition(e: NoViableAltException(self))"

TestSetInline(s) ::= <<
<!<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">!>
//closure
{ () -> Bool in
    <if(rest(s.bitsets))>var<else>let<endif> testSet: Bool = <first(s.bitsets):{bits |
<if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}>
       <rest(s.bitsets):{bits | testSet = testSet || <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s,
bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator="\n">
    return testSet
}()
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <<
<!(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1 \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1 \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)!>
{  () -> Bool in
   <! let test: Bool = (<testShiftInRange({<offsetShift(s.varName, bits.shift)>})>)!>
  <!var temp: Int64 =  Int64(<offsetShift(s.varName, bits.shift)>)!>
  <!temp = (temp \< 0) ? (64 + (temp % 64 )) : (temp % 64)!>
  <!let test1: Int64 = (Int64(1) \<\< temp)!>
  <!var test2: Int64 = (<first(bits.ttypes):{ttype | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)}>)!>
  <!<rest(bits.ttypes):{ttype | test2 = test2 | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)};
separator="\n">!>
  let testArray: [Int] = [<s.varName>, <bits.ttypes:{ttype |<parserName(ttype)>}; separator=",">]
  <!var test2: Int64 = Utils.testBitLeftShiftArray(testArray)!>
   return  Utils.testBitLeftShiftArray(testArray, <bits.shift>)
}()
>>

isZero ::= [
"0": true,
default: false
]
parserName(ttype) ::= <%
<parser.name>.Tokens.<ttype>.rawValue
%>
offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName> == <parser.name>.Tokens.<ttype>.rawValue}; separator=" || ">
```

```
%>

cases(ttypes) ::= <<
<trunc(ttypes): {t | case .<t>:fallthrough}  ; separator="\n">
<last(ttypes): {t | case .<t>:}  ; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>)
<if(r.labels)>
try {
  let assignmentValue = try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)
  <r.labels:{l | <labelref(l)> = assignmentValue} ; separator="\n">
    }()
<else>try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)<endif>
>>

MatchToken(m) ::= <<
setState(<m.stateNumber>)
<if(m.labels)>
try {
  let assignmentValue = try match(<parser.name>.Tokens.<m.name>.rawValue)
  <m.labels:{l | <labelref(l)> = assignmentValue}  ; separator="\n">
    }()
<else>try match(<parser.name>.Tokens.<m.name>.rawValue)<endif>
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>)
<if(m.labels)><m.labels:{l | <labelref(l)> = }>try _input.LT(1)<endif>
<capture>
if (<if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>)) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>try _errHandler.recoverInline(self)<if(m.labels)> as
Token<endif>
}
else {
 _errHandler.reportMatch(self)
 try consume()
}
>>

Wildcard(w) ::= <<
```

```
setState(<w.stateNumber>)
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>try matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>)
if (!(<chunks>)) {
   throw ANTLRException.recognition(e:FailedPredicateException(self, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>))
}
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg)      ::= "_type = <arg>"
LexerChannelCommand(arg)   ::= "_channel = <arg>"
LexerModeCommand(arg)      ::= "_mode = <arg>"
LexerPushModeCommand(arg)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
```

```
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getText()! : \"\")"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getType() : 0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getLine() : 0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getCharPositionInLine() : 0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getChannel() : 0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getTokenIndex() : 0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> != nil ? Int(<ctx(t)>.<t.label>!.getText()!) : 0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.start?.description ?? \"\") : \"\")"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.stop?.description ?? \"\") : \"\")"
RulePropertyRef_text(r)  ::= "(<ctx(r)>.<r.label> != nil ? try
_input.getText(<ctx(r)>.<r.label>!.start,<ctx(r)>.<r.label>!.stop) : \"\")"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"

ThisRulePropertyRef_start(r) ::= "_localctx.start"
ThisRulePropertyRef_stop(r)  ::= "_localctx.stop"
ThisRulePropertyRef_text(r)  ::= "(try _input.getText(_localctx.start, try _input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "_localctx"
ThisRulePropertyRef_parser(r)  ::= "self"

NonLocalAttrRef(s)   ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks)   ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "<t.name>: <SwiftTypeMap.(TokenLabelType())>!"
TokenTypeDecl(t) ::= "var <t.name>: Int = 0"
TokenListDecl(t) ::= "<t.name>: [Token] = [Token]()"
RuleContextDecl(r) ::= "<r.name>: <r.ctxName>!"
RuleContextListDecl(rdecl) ::= "<rdecl.name>: [<rdecl.ctxName>] = [<rdecl.ctxName>]()"

ContextTokenGetterDecl(t) ::= <<
 <accessLevelOpenOK(parser)>
 func <t.name>() -> TerminalNode? {
  return getToken(<parser.name>.Tokens.<t.name>.rawValue, 0)
 }
>>
ContextTokenListGetterDecl(t) ::= <<
 <accessLevelOpenOK(parser)>
 func <t.name>() -> [TerminalNode] {
  return getTokens(<parser.name>.Tokens.<t.name>.rawValue)
 }
>>
ContextTokenListIndexedGetterDecl(t) ::= <<
```

```
 <accessLevelOpenOK(parser)>
 func <t.name>(_ i:Int) -> TerminalNode? {
  return getToken(<parser.name>.Tokens.<t.name>.rawValue, i)
 }
>>
ContextRuleGetterDecl(r) ::= <<
 <accessLevelOpenOK(parser)>
 func <r.name>() -> <r.ctxName>? {
  return getRuleContext(<r.ctxName>.self, 0)
 }
>>
ContextRuleListGetterDecl(r) ::= <<
 <accessLevelOpenOK(parser)>
 func <r.name>() -> [<r.ctxName>] {
  return getRuleContexts(<r.ctxName>.self)
 }
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
 <accessLevelOpenOK(parser)>
 func <r.name>(_ i: Int) -> <r.ctxName>? {
  return getRuleContext(<r.ctxName>.self, i)
 }
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = try _input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = try _input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
          superClass={ParserRuleContext}) ::= <<

<accessLevelNotOpen(parser)> class <struct.name>:
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
 <attrs:{a | <accessLevelOpenOK(parser)> var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <! <if(ctorAttrs)> <accessLevelNotOpen(parser)> init(_ parent: ParserRuleContext,_ invokingState: Int) {
```

```
super.init(parent, invokingState)  }<endif> !>
 <if(ctorAttrs)>
 <accessLevelNotOpen(parser)> convenience init(_ parent: ParserRuleContext?, _ invokingState: Int<ctorAttrs:{a | , _ <a>}>) {
  self.init(parent, invokingState)
  <struct.ctorAttrs:{a | self.<a.name> = <a.name>;}; separator="\n">
 }
 <endif>

 override <accessLevelOpenOK(parser)>
 func getRuleIndex() -> Int {
  return <parser.name>.RULE_<struct.derivedFromName>
 }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 <! <accessLevelNotOpen(parser)> init() { }!>
 <accessLevelOpenOK(parser)>
 func copyFrom(_ ctx: <struct.name>) {
  super.copyFrom(ctx)
  <struct.attrs:{a | self.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
<accessLevelNotOpen(parser)> class <struct.name>: <currentRule.name; format="cap">Context {
 <attrs:{a | <accessLevelNotOpen(parser)> var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">

 <accessLevelNotOpen(parser)>
 init(_ ctx: <currentRule.name; format="cap">Context) {
  super.init()
  copyFrom(ctx)
 }
 <dispatchMethods; separator="\n">
}
>>

ListenerDispatchMethod(method) ::= <<
override <accessLevelOpenOK(parser)>
func <if(method.isEnter)>enter<else>exit<endif>Rule(_ listener: ParseTreeListener) {
 if let listener = listener as? <parser.grammarName>Listener {
  listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)
 }
}
>>
```

```
VisitorDispatchMethod(method) ::= <<
override <accessLevelOpenOK(parser)>
func accept\<T>(_ visitor: ParseTreeVisitor\<T>) -> T? {
 if let visitor = visitor as? <parser.grammarName>Visitor {
     return visitor.visit<struct.derivedFromName; format="cap">(self)
 }
 else if let visitor = visitor as? <parser.grammarName>BaseVisitor {
     return visitor.visit<struct.derivedFromName; format="cap">(self)
 }
 else {
      return visitor.visitChildren(self)
 }
}
>>

AttributeDecl(d) ::= "<d.name>: <SwiftTypeMap.(d.type)><if(d.initValue)> = <d.initValue><else>!<endif>"

/** If we don't know location of label def x, use this template (_localctx as! <x.ctx.name> */
labelref(x) ::= "<if(!x.isLocal)>_localctx.castdown(<x.ctx.name>.self).<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr?    */
ctx(actionChunk) ::= "_localctx.castdown(<actionChunk.ctx.name>.self)"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                 ::= "_ctx!.stop = try _input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.append(_prevctx)
<else>
_localctx.<label> = _prevctx
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = <currentAltLabel; format="cap">Context(  <ruleName; format="cap">Context(_parentctx,
_parentState))
<if(label)>
<if(isListLabel)>
(_localctx as! <currentAltLabel; format="cap">Context).<label>.append(_prevctx)
```

```
<else>
(_localctx as! <currentAltLabel; format="cap">Context).<label> = _prevctx
<endif>
<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = <ctxName>Context(_localctx)
_ctx = _localctx
_prevctx = _localctx
>>

recRuleSetPrevCtx() ::= <<
if _parseListeners != nil {
  try triggerExitRuleEvent()
}
_prevctx = _localctx
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
<!package <lexerFile.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4

<lexer>
>>
Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<accessLevelOpenOK(lexer)> class <lexer.name>: <superClass; null="Lexer"> {

 internal static var _decisionToDFA: [DFA] = {
         var decisionToDFA = [DFA]()
         let length = <lexer.name>._ATN.getNumberOfDecisions()
         for i in 0..\<length {
           <! decisionToDFA[i] = DFA(<lexer.name>._ATN.getDecisionState(i)!, i);!>
              decisionToDFA.append(DFA(<lexer.name>._ATN.getDecisionState(i)!, i))
         }
          return decisionToDFA
    }()

 internal static let _sharedContextCache = PredictionContextCache()

 <accessLevelNotOpen(lexer)>
 static let <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>
```

```
<if(lexer.channels)>
<accessLevelNotOpen(lexer)>
static let <lexer.channels:{k | <k>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>
<endif>
<if(rest(lexer.modes))>
<accessLevelNotOpen(lexer)>
static let <rest(lexer.modes):{m| <m>=<i>}; separator=", ", wrap, anchor>
<endif>
<accessLevelNotOpen(lexer)>
static let channelNames: [String] = [
 "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ",
wrap, anchor><endif>
]

<accessLevelNotOpen(lexer)>
static let modeNames: [String] = [
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
]

<accessLevelNotOpen(lexer)>
static let ruleNames: [String] = [
 <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
]

<vocabulary(lexer.literalNames, lexer.symbolicNames,
                 accessLevelNotOpen(lexer))>

<namedActions.members>

override <accessLevelOpenOK(lexer)>
func getVocabulary() -> Vocabulary {
 return <lexer.name>.VOCABULARY
}

<accessLevelNotOpen(lexer)>
required init(_ input: CharStream) {
    RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION)
 super.init(input)
 _interp = LexerATNSimulator(self, <lexer.name>._ATN, <lexer.name>._decisionToDFA,
<lexer.name>._sharedContextCache)
}

override <accessLevelOpenOK(lexer)>
func getGrammarFileName() -> String { return "<lexer.grammarFileName>" }

override <accessLevelOpenOK(lexer)>
func getRuleNames() -> [String] { return <lexer.name>.ruleNames }
```

```
 override <accessLevelOpenOK(lexer)>
 func getSerializedATN() -> String { return <lexer.name>._serializedATN }

 override <accessLevelOpenOK(lexer)>
 func getChannelNames() -> [String] { return <lexer.name>.channelNames }

 override <accessLevelOpenOK(lexer)>
 func getModeNames() -> [String] { return <lexer.name>.modeNames }

 override <accessLevelOpenOK(lexer)>
 func getATN() -> ATN { return <lexer.name>._ATN }

 <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
 <atn>

 <accessLevelNotOpen(lexer)>
 static let _serializedATN: String = <lexer.name>ATN().jsonString

 <accessLevelNotOpen(lexer)>
 static let _ATN: ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
}
>>

/** Don't need to define anything. The tool generates a XParserATN.swift file (and same for lexer)
*  which is referenced from static field _serializedATN.  This json string is passed to
*  deserializeFromJson(). Note this is not the "serialization as array of ints" that other targets
*  do. It is more or less the output of ATNPrinter which gets read back in.
*/
SerializedATN(model) ::= <<
>>

/** Using a type to init value map, try to init a type; if not in table
* must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<SwiftTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".swift"
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/codegen/Swift/Swift.stg
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*/
/*
This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the format that mimicks GCC output.
*/

```
location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "<text> [error <id>]"

report(location, message, type) ::= "<location> <type>: <message>"

wantsSingleLineMessage() ::= "true"
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/messages/formats/gnu.stg
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```

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* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/codegen/Cpp/Cpp.stg

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*
```

```
/** How to generate rules derived from left-recursive rules.
*  These rely on recRuleAltPredicate(),
*  recRuleArg(), recRuleSetResultAction(), recRuleSetReturnAction()
*  templates in main language.stg
*/
group LeftRecursiveRules;

recRule(ruleName, argName, primaryAlts, opAlts, setResultAction,
       userRetvals, leftRecursiveRuleRefLabels) ::=
<<
<ruleName><if(userRetvals)> returns [<userRetvals>]<endif>
   :   ( {} <primaryAlts:{alt | <alt.altText> }; separator="\n        | ">
       )
       (
         <opAlts; separator="\n        | ">
       )*
   ;
>>

recRuleAlt(alt, precOption, opPrec, pred) ::= <<
{<pred>}?\<<precOption>=<opPrec>\> <alt.altText>
>>
```

Found in path(s):

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/LeftRecursiveRules.stg

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*/
/*
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The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>(<line>,<column>)"

message(id, text) ::= "error <id> : <text>"

report(location, message, type) ::= "<location> : <type> <message.id> : <message.text>"

wantsSingleLineMessage() ::= "true"
```

Found in path(s):

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/messages/formats/vs2005.stg

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*/

/** Find left-recursive rules */
tree grammar LeftRecursiveRuleWalker;

options {
 tokenVocab=ANTLRParser;
   ASTLabelType=GrammarAST;
}

@header {
package org.antlr.v4.parse;

import org.antlr.v4.misc.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
}

@members {
private String ruleName;
private int currentOuterAltNumber; // which outer alt of rule?
public int numAlts;  // how many alts for this rule total?

public void setAltAssoc(AltAST altTree, int alt) {}
public void binaryAlt(AltAST altTree, int alt) {}
public void prefixAlt(AltAST altTree, int alt) {}
public void suffixAlt(AltAST altTree, int alt) {}
public void otherAlt(AltAST altTree, int alt) {}
public void setReturnValues(GrammarAST t) {}
}
```

```
@rulecatch { }

// TODO: can get parser errors for not matching pattern; make them go away
public
rec_rule returns [boolean isLeftRec]
@init
{
 currentOuterAltNumber = 1;
}
 : ^( r=RULE id=RULE_REF {ruleName=$id.getText();}
   ruleModifier?
//   (ARG_ACTION)? shouldn't allow args, right?
   (^(RETURNS a=ARG_ACTION {setReturnValues($a);}))?
//       ( ^(THROWS .+) )? don't allow
       ( ^(LOCALS ARG_ACTION) )? // TODO: copy these to gen'd code
       ( ^(OPTIONS .*)
      |   ^(AT ID ACTION) // TODO: copy
      )*
   ruleBlock {$isLeftRec = $ruleBlock.isLeftRec;}
   exceptionGroup
  )
 ;

exceptionGroup
   : exceptionHandler* finallyClause?
   ;

exceptionHandler
 : ^(CATCH ARG_ACTION ACTION)
 ;

finallyClause
 : ^(FINALLY ACTION)
 ;

ruleModifier
   : PUBLIC
   | PRIVATE
   | PROTECTED
   ;

ruleBlock returns [boolean isLeftRec]
@init{boolean lr=false; this.numAlts = $start.getChildCount();}
 : ^( BLOCK
   (
    o=outerAlternative
    {if ($o.isLeftRec) $isLeftRec = true;}
    {currentOuterAltNumber++;}
   )+
  )
 ;

/** An alt is either prefix, suffix, binary, or ternary operation or "other" */
outerAlternative returns [boolean isLeftRec]
   :   (binary)=>          binary
                        {binaryAlt((AltAST)$start, currentOuterAltNumber); $isLeftRec=true;}
   |   (prefix)=>          prefix
                        {prefixAlt((AltAST)$start, currentOuterAltNumber);}
   |   (suffix)=>          suffix
                        {suffixAlt((AltAST)$start, currentOuterAltNumber); $isLeftRec=true;}
   |   nonLeftRecur        {otherAlt((AltAST)$start,  currentOuterAltNumber);}
   ;

binary
 : ^( ALT elementOptions? recurse element* recurse epsilonElement* )
      {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
 ;

prefix
 : ^( ALT elementOptions?
   element+
   recurse epsilonElement*
   )
       {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
 ;

suffix
   :   ^( ALT elementOptions? recurse element+ )
       {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
   ;

nonLeftRecur
   :   ^(ALT elementOptions? element+)
   ;

recurse
 : ^(ASSIGN ID recurseNoLabel)
 | ^(PLUS_ASSIGN ID recurseNoLabel)
 | recurseNoLabel
 ;

recurseNoLabel : {((CommonTree)input.LT(1)).getText().equals(ruleName)}? RULE_REF;

token returns [GrammarAST t=null]
 : ^(ASSIGN ID s=token {$t = $s.t;})
 | ^(PLUS_ASSIGN ID s=token {$t = $s.t;})
 | b=STRING_LITERAL         {$t = $b;}
   | ^(b=STRING_LITERAL elementOptions)  {$t = $b;}
   | ^(c=TOKEN_REF elementOptions)   {$t = $c;}
 | c=TOKEN_REF              {$t = $c;}
 ;

elementOptions
   : ^(ELEMENT_OPTIONS elementOption*)
   ;

elementOption
   : ID
   |   ^(ASSIGN ID ID)
   |   ^(ASSIGN ID STRING_LITERAL)
   |   ^(ASSIGN ID ACTION)
   |   ^(ASSIGN ID INT)
   ;

element
 : atom
 | ^(NOT element)
 | ^(RANGE atom atom)
 | ^(ASSIGN ID element)
 | ^(PLUS_ASSIGN ID element)
   | ^(SET setElement+)
   |   RULE_REF
 | ebnf
 | epsilonElement
 ;

epsilonElement
 : ACTION
 | SEMPRED
 | EPSILON
 | ^(ACTION elementOptions)
 | ^(SEMPRED elementOptions)
 ;

setElement
 : ^(STRING_LITERAL elementOptions)
 | ^(TOKEN_REF elementOptions)
 | STRING_LITERAL
 | TOKEN_REF
 ;

ebnf:   block
   |   ^( OPTIONAL block )
   |   ^( CLOSURE block )
   |   ^( POSITIVE_CLOSURE block )
   ;

block
   : ^(BLOCK ACTION? alternative+)
   ;

alternative
 : ^(ALT elementOptions? element+)
   ;

atom
 : ^(RULE_REF ARG_ACTION? elementOptions?)
   |  ^(STRING_LITERAL elementOptions)
 | STRING_LITERAL
   | ^(TOKEN_REF elementOptions)
 | TOKEN_REF
   | ^(WILDCARD elementOptions)
 | WILDCARD
 | ^(DOT ID element)
 ;
```

Found in path(s):

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/LeftRecursiveRuleWalker.g

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*/

/** ANTLR tool checks output templates are compatible with tool code generation.
*  For now, a simple string match used on x.y of x.y.z scheme.
*  Must match Tool.VERSION during load to templates.
*
*  REQUIRED.
*/

javascriptTypeInitMap ::= [
 "bool":"false",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"{}" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');
<if(file.genListener)>
var <file.grammarName>Listener = require('./<file.grammarName>Listener').<file.grammarName>Listener;
<endif>
<if(file.genVisitor)>
var <file.grammarName>Visitor = require('./<file.grammarName>Visitor').<file.grammarName>Visitor;
<endif>

<namedActions.header>
<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete listener for a parse tree produced by <file.parserName>.
function <file.grammarName>Listener() {
 antlr4.tree.ParseTreeListener.call(this);
 return this;
}

<file.grammarName>Listener.prototype = Object.create(antlr4.tree.ParseTreeListener.prototype);
<file.grammarName>Listener.prototype.constructor = <file.grammarName>Listener;

<file.listenerNames:{lname |
// Enter a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.enter<lname; format="cap"> = function(ctx) {
\};

// Exit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.exit<lname; format="cap"> = function(ctx) {
\};

}; separator="\n">

exports.<file.grammarName>Listener = <file.grammarName>Listener;
>>



VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

function <file.grammarName>Visitor() {
 antlr4.tree.ParseTreeVisitor.call(this);
 return this;
}

<file.grammarName>Visitor.prototype = Object.create(antlr4.tree.ParseTreeVisitor.prototype);
<file.grammarName>Visitor.prototype.constructor = <file.grammarName>Visitor;

<file.visitorNames:{lname |
// Visit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Visitor.prototype.visit<lname; format="cap"> = function(ctx) {
 return this.visitChildren(ctx);
\};

}; separator="\n">

exports.<file.grammarName>Visitor = <file.grammarName>Visitor;
>>
```

```
fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
// jshint ignore: start
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<if(superClass)>
var <superClass> = require('./<superClass>').<superClass>;
<endif>

var grammarFileName = "<parser.grammarFileName; format="java-escape">";

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

var sharedContextCache = new antlr4.PredictionContextCache();

var literalNames = [ <parser.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

function <parser.name> (input) {
 <superClass; null="antlr4.Parser">.call(this, input);
   this._interp = new antlr4.atn.ParserATNSimulator(this, atn, decisionsToDFA, sharedContextCache);
   this.ruleNames = ruleNames;
   this.literalNames = literalNames;
   this.symbolicNames = symbolicNames;
 <namedActions.members>
   return this;
}

<parser.name>.prototype = Object.create(<superClass; null="antlr4.Parser">.prototype);
<parser.name>.prototype.constructor = <parser.name>;

Object.defineProperty(<parser.name>.prototype, "atn", {
 get : function() {
  return atn;
 }
});

<parser.name>.EOF = antlr4.Token.EOF;
<if(parser.tokens)>
<parser.tokens:{k | <parser.name>.<k> = <parser.tokens.(k)>;}; separator="\n", wrap, anchor>
```

```
<endif>

<parser.rules:{r | <parser.name>.RULE_<r.name> = <r.index>;}; separator="\n", wrap, anchor>

<funcs; separator="\n">

<if(sempredFuncs)>
<parser.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch(ruleIndex) {
 <parser.sempredFuncs.values:{f | case <f.ruleIndex>:
  return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
   default:
       throw "No predicate with index:" + ruleIndex;
  }
};

<sempredFuncs.values; separator="\n">
<endif>

exports.<parser.name> = <parser.name>;

>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
<lexer.name>.prototype.action = function(localctx, ruleIndex, actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 this.<f.name>_action(localctx, actionIndex);
 break;}; separator="\n">
 default:
  throw "No registered action for:" + ruleIndex;
 }
};

<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
<lexer.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch (ruleIndex) {
  <recog.sempredFuncs.values:{f| case <f.ruleIndex>:
 return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
    default:
     throw "No registered predicate for:" + ruleIndex;
   }
};
```

```
<sempredFuncs.values; separator="\n">
<endif>
>>



/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<

<lexer.name>.prototype.<r.name>_action = function(localctx , actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 default:
  throw "No registered action for:" + actionIndex;
 }
};
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
<if (r.factory.g.lexer)><lexer.name><else><parser.name><endif>.prototype.<r.name>_sempred = function(localctx,
predIndex) {
 switch(predIndex) {
  <actions:{index| case <index>:
 return <actions.(index)>;}; separator="\n">
  default:
   throw "No predicate with index:" + predIndex;
 }
};

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<! Define fields of this parser to export the context classes !>
<parser.name>.<currentRule.ctxType> = <currentRule.ctxType>;
```

```
<parser.name>.prototype.<currentRule.name> = function(<currentRule.args:{a | <a.name>}; separator=", ">) {

  var localctx = new <currentRule.ctxType>(this, this._ctx, this.state<currentRule.args:{a | , <a.name>}>);
  this.enterRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>);
  <namedActions.init>
  <locals; separator="\n">
  try {
    <code>
    <postamble; separator="\n">
    <namedActions.after>
  <if(exceptions)>
  <exceptions; separator="\n">
  <else>
  } catch (re) {
   if(re instanceof antlr4.error.RecognitionException) {
      localctx.exception = re;
      this._errHandler.reportError(this, re);
      this._errHandler.recover(this, re);
    } else {
     throw re;
    }
  }<endif> finally {
    <finallyAction>
    this.exitRule();
  }
  return localctx;
};

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<parser.name>.prototype.<currentRule.name> = function(_p<if(currentRule.args)>, <args:{a | , <a>}><endif>) {
 if(_p===undefined) {
    _p = 0;
 }
  var _parentctx = this._ctx;
  var _parentState = this.state;
  var localctx = new <currentRule.ctxType>(this, this._ctx, _parentState<args:{a | , <a.name>}>);
  var _prevctx = localctx;
  var _startState = <currentRule.startState>;
  this.enterRecursionRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p);
  <namedActions.init>
  <locals; separator="\n">
  try {
     <code>
     <postamble; separator="\n">
     <namedActions.after>
  } catch( error) {
     if(error instanceof antlr4.error.RecognitionException) {
       localctx.exception = error;
       this._errHandler.reportError(this, error);
       this._errHandler.recover(this, error);
    } else {
     throw error;
    }
  } finally {
     <finallyAction>
     this.unrollRecursionContexts(_parentctx)
  }
  return localctx;
};

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(this, localctx);<endif>
this.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = this._input.LT(1);<endif>
<preamble; separator="\n">
switch(this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  break;}; separator="\n">
default:
  <error>
}
>>
```

```
LL1OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
switch (this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 break;
}
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
if(<expr>) {
   <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
while(<loopExpr>) {
   <alts; separator="\n">
   this.state = <choice.loopBackStateNumber>;
   this._errHandler.sync(this);
   <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
<preamble; separator="\n">
do {
   <alts; separator="\n">
   this.state = <choice.stateNumber>; <! loopback/exit decision !>
   this._errHandler.sync(this);
   <iteration>
} while(<loopExpr>);
>>

// LL(*) stuff
```

```
AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
switch(la_) {
<alts:{alt |
case <i>:
  <alt>
  break;
}; separator="\n">
}
>>

OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
<alts:{alt |
if(la_===<i><if(!choice.ast.greedy)>+1<endif>) {
  <alt>
}; separator="\n} else ">
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx)
while(_alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER) {
  if(_alt===1<if(!choice.ast.greedy)>+1<endif>) {
    <iteration>
    <alts> <! should only be one !>
  }
  this.state = <choice.loopBackStateNumber>;
  this._errHandler.sync(this);
  _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
}

>>

PlusBlock(choice, alts, error) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
var _alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 this.state = <choice.loopBackStateNumber>; <! loopback/exit decision !>
 this._errHandler.sync(this);
 _alt = this._interp.adaptivePredict(this._input,<choice.decision>, this._ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER );
>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "throw new antlr4.error.NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>

// Javascript language spec - shift operators are 32 bits long max
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x1f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> && ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) !== 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
```

```
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>===<parser.name>.<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <parser.name>.<t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
this.state = <r.stateNumber>;
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>this.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>);
>>

MatchToken(m) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this.match(<parser.name>.<m.name>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>this._input.LT(1);<endif>
<capture>
<if(invert)>if(<m.varName>\<=0 || <expr>)<else>if(!(<expr>))<endif> {
   <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this._errHandler.recoverInline(this);
}
else {
 this._errHandler.reportMatch(this);
   this.consume();
}
>>

Wildcard(w) ::= <<
this.state = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>this.matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"
```

```
SemPred(p, chunks, failChunks) ::= <<
this.state = <p.stateNumber>;
if (!( <chunks>)) {
  throw new antlr4.error.FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
}
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "this.skip()"
LexerMoreCommand()  ::= "this.more()"
LexerPopModeCommand() ::= "this.popMode()"
LexerTypeCommand(arg, grammar)      ::= "this._type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "this._channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "this._mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "this.pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>===null ? null : <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.type)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : parseInt(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.start)"
```

```
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(<ctx(r)>.<r.label>===null ? null : this._input.getText(new
antlr4.Interval(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "this"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "this._input.getText(new antlr4.Interval(localctx.start, this._input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "localctx"
ThisRulePropertyRef_parser(r)  ::= "this"

NonLocalAttrRef(s)     ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.push(<labelref(a.label)>);"

TokenDecl(t) ::= "this.<t.name> = null; // <TokenLabelType()>"
TokenTypeDecl(t) ::= "var <t.name> = 0; // <TokenLabelType()> type"
TokenListDecl(t) ::= "this.<t.name> = []; // of <TokenLabelType()>s"
RuleContextDecl(r) ::= "this.<r.name> = null; // <r.ctxName>"
RuleContextListDecl(rdecl) ::= "this.<rdecl.name> = []; // of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)      ::= <<
<t.name> = function() {
   return this.getToken(<parser.name>.<t.name>, 0);
};
>>

// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
   return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t)  ::= <<
<t.name> = function(i) {
 if(i===undefined) {
  i = null;
 }
   if(i===null) {
       return this.getTokens(<parser.name>.<t.name>);
   } else {
       return this.getToken(<parser.name>.<t.name>, i);
   }
};

>>
```

```
ContextRuleGetterDecl(r)       ::= <<
<r.name> = function() {
   return this.getTypedRuleContext(<r.ctxName>,0);
};
>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
   return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
<r.name> = function(i) {
   if(i===undefined) {
       i = null;
   }
   if(i===null) {
       return this.getTypedRuleContexts(<r.ctxName>);
   } else {
       return this.getTypedRuleContext(<r.ctxName>,i);
   }
};
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = this._input.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
function <struct.name>(parser, parent, invokingState<struct.ctorAttrs:{a | , <a.name>}>) {
 if(parent===undefined) {
     parent = null;
 }
 if(invokingState===undefined || invokingState===null) {
  invokingState = -1;
 }
 <if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.call(this, parent,
invokingState);
   this.parser = parser;
   this.ruleIndex = <parser.name>.RULE_<struct.derivedFromName>;
   <attrs:{a | <a>}; separator="\n">
   <struct.ctorAttrs:{a | this.<a.name> = <a.name> || null;}; separator="\n">
   return this;
}

<struct.name>.prototype =
Object.create(<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
<struct.name>.prototype.copyFrom = function(ctx) {
<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype.copyFrom.call(this,
ctx);
   <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
};
<endif>
<dispatchMethods; separator="\n">
<extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
function <struct.name>(parser, ctx) {
 <currentRule.name; format="cap">Context.call(this, parser);
   <attrs:{a | <a>;}; separator="\n">
   <currentRule.name; format="cap">Context.prototype.copyFrom.call(this, ctx);
   return this;
}

<struct.name>.prototype = Object.create(<currentRule.name; format="cap">Context.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<! Define fields of this parser to export this struct/context class !>
<parser.name>.<struct.name> = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">
<dispatchMethods; separator="\n">

>>
```

```
ListenerDispatchMethod(method) ::= <<
<struct.name>.prototype.<if(method.isEnter)>enter<else>exit<endif>Rule = function(listener) {
   if(listener instanceof <parser.grammarName>Listener ) {
       listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(this);
 }
};

>>

VisitorDispatchMethod(method) ::= <<
<struct.name>.prototype.accept = function(visitor) {
   if ( visitor instanceof <parser.grammarName>Visitor ) {
       return visitor.visit<struct.derivedFromName; format="cap">(this);
   } else {
       return visitor.visitChildren(this);
   }
};

>>

AttributeDecl(d) ::= "this.<d.name> = <if(d.initValue)><d.initValue><else>null<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "this.precpred(this._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                 ::= "this._ctx.stop = this._input.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = new <ctxName>Context(this, _parentctx, _parentState);
<if(label)>localctx.<label> = _prevctx;<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = new <currentAltLabel; format="cap">Context(this, new <ruleName; format="cap">Context(this,
_parentctx, _parentState));
<if(label)>
<if(isListLabel)>
localctx.<label>.push(_prevctx);
<else>
localctx.<label> = _prevctx;
<endif>
```

```
<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = new <ctxName>Context(this, localctx);
this._ctx = localctx;
_prevctx = localctx;
>>

recRuleSetPrevCtx() ::= <<
if(this._parseListeners!==null) {
  this.triggerExitRuleEvent();
}
_prevctx = localctx;
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
var antlr4 = require('antlr4/index');

<namedActions.header>

<lexer>

>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
var <superClass> = require('./<superClass>').<superClass>;
<endif>

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

function <lexer.name>(input) {
 <if(superClass)><superClass><else>antlr4.Lexer<endif>.call(this, input);
  this._interp = new antlr4.atn.LexerATNSimulator(this, atn, decisionsToDFA, new
antlr4.PredictionContextCache());
  return this;
}

<lexer.name>.prototype = Object.create(<if(superClass)><superClass><else>antlr4.Lexer<endif>.prototype);
<lexer.name>.prototype.constructor = <lexer.name>;
```

```
Object.defineProperty(<lexer.name>.prototype, "atn", {
    get : function() {
        return atn;
    }
});

<lexer.name>.EOF = antlr4.Token.EOF;
<lexer.tokens:{k | <lexer.name>.<k> = <lexer.tokens.(k)>;}; separator="\n", wrap, anchor>

<if(lexer.channels)>
<lexer.channels:{c| <lexer.name>.<c> = <lexer.channels.(c)>;}; separator="\n">

<endif>
<if(rest(lexer.modes))>
<rest(lexer.modes):{m| <lexer.name>.<m> = <i>;}; separator="\n">

<endif>
<lexer.name>.prototype.channelNames = [ "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>,
<lexer.channels:{c| "<c>"}; separator=", ", wrap, anchor><endif> ];

<lexer.name>.prototype.modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.literalNames = [ <lexer.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

<lexer.name>.prototype.symbolicNames = [ <lexer.symbolicNames:{t | <t>}; null="null", separator=", ", wrap,
anchor> ];

<lexer.name>.prototype.ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.grammarFileName = "<lexer.grammarFileName>";

<namedActions.members>

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>

exports.<lexer.name> = <lexer.name>;

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

var serializedATN = ["<model.serialized; wrap={",<\n>    "}>"].join("");

>>

/** Using a type to init value map, try to init a type; if not in table
```

```
* must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<javacriptTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".js"
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/codegen/JavaScript/JavaScript.stg
No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
*  Copyright (c) 2012-2016 Terence Parr
*  Copyright (c) 2012-2016 Sam Harwell
*  Copyright (c) 2014 Eric Vergnaud
*  All rights reserved.
*
*  Redistribution and use in source and binary forms, with or without
*  modification, are permitted provided that the following conditions
*  are met:
*
*  1. Redistributions of source code must retain the above copyright
*     notice, this list of conditions and the following disclaimer.
*  2. Redistributions in binary form must reproduce the above copyright
*     notice, this list of conditions and the following disclaimer in the
*     documentation and/or other materials provided with the distribution.
*  3. The name of the author may not be used to endorse or promote products
*     derived from this software without specific prior written permission.
*
*  THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
*  IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
*  OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
*  IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,
*  INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
*  NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
*  DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
*  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
*  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** ANTLR tool checks output templates are compatible with tool code generation.
*  For now, a simple string match used on x.y of x.y.z scheme.
*  Must match Tool.VERSION during load to templates.
*
```

```
*  REQUIRED.
*/

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO
import sys

<namedActions.header>
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>

# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

   <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx):
   pass

# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx):
   pass

}; separator="\n">

>>
```

```
VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

    <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx):
    return self.visitChildren(ctx)

}; separator="\n">

>>



fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
from .<superClass> import <superClass>

<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

    grammarFileName = "<parser.grammarFileName>"

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    sharedContextCache = PredictionContextCache()

    literalNames = [ <parser.literalNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    symbolicNames = [ <parser.symbolicNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]
```

```
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

  ruleNames =  [ <parser.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

  EOF = <TokenLabelType()>.EOF
  <if(parser.tokens)>
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
  <endif>

  <parser:(ctor)()>

  <namedActions.members>

  <funcs; separator="\n">



<if(sempredFuncs)>
  def sempred(self, localctx, ruleIndex, predIndex):
      if self._predicates == None:
          self._predicates = dict()
<parser.sempredFuncs.values:{f |
      self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
      pred = self._predicates.get(ruleIndex, None)
      if pred is None:
          raise Exception("No predicate with index:" + str(ruleIndex))
      else:
          return pred(localctx, predIndex)

  <sempredFuncs.values; separator="\n">
<endif>




>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx, ruleIndex, actionIndex):
  if self._actions is None:
      actions = dict()
<recog.actionFuncs.values:{f|
      actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
      self._actions = actions
  action = self._actions.get(ruleIndex, None)
  if action is not None:
      action(localctx, actionIndex)
  else:
      raise Exception("No registered action for:" + str(ruleIndex))
```

```
<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx, ruleIndex, predIndex):
  if self._predicates is None:
    preds = dict()
<recog.sempredFuncs.values:{f|
    preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
    self._predicates = preds
  pred = self._predicates.get(ruleIndex, None)
  if pred is not None:
    return pred(localctx, predIndex)
  else:
    raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<
def __init__(self, input, output=sys.stdout):
  super(<parser.name>, self).__init__(input, output=output)
  self.checkVersion("<file.ANTLRVersion>")
  self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
  self._predicates = None

>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx , actionIndex):
<actions:{index|
<if(first(actions))>
  if actionIndex == <index>:
    <actions.(index)>
<elseif(rest(actions))>
  elif actionIndex == <index>:
    <actions.(index)>
<endif> }; separator="\n">
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
```

```
*/
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx, predIndex):
    <actions:{index|
<if(first(actions))>
    if predIndex == <index>:
        return <actions.(index)>
<elseif(rest(actions))>
    elif predIndex == <index>:
        return <actions.(index)>
<endif> }; separator="\n">

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name>}>):

    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
    self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    <if(exceptions)>
    <exceptions; separator="\n">
    <else>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    <endif>
    finally:
        <finallyAction>
        self.exitRule()
    return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
    _parentctx = self._ctx
    _parentState = self.state
    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
    _prevctx = localctx
    _startState = <currentRule.startState>
    self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    finally:
        <finallyAction>
        self.unrollRecursionContexts(_parentctx)
    return localctx

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
```

```
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
    <alt>
    pass}; separator="\nel">
else:
    <error>

>>

LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
    <alt>
    pass}; separator="\nel">
else:
    pass
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
    <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>



LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
    <alts; separator="\n">
    self.state = <choice.loopBackStateNumber>
    self._errHandler.sync(self)
    <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
    <alts; separator="\n">
    self.state = <choice.stateNumber> <! loopback/exit decision !>
    self._errHandler.sync(self)
    <iteration>
    if not (<loopExpr>):
        break

>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
    <alt>
    pass
}; separator="\nel">

>>

OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
    <alt>
}; separator="\nel">

>>

StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
    if _alt==1<if(!choice.ast.greedy)>+1<endif>:
        <iteration>
        <alts> <! should only be one !>
    self.state = <choice.loopBackStateNumber>
    self._errHandler.sync(self)
    _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>
```

```
PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">
  else:
     <error>
  self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator=" or ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> and ((1 \<\< <offsetShiftVar(s.varName, bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
```

```
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>

cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>

InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
nks>)
>>

MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l |     <labelref(l)> = }><else>    <endif>self._errHandler.recoverInline(self)
else:
   self._errHandler.reportMatch(self)
   self.consume()
>>

Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"
```

```
ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
   from antlr4.error.Errors import FailedPredicateException
   raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
   <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type()"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
```

```
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText((<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "self._input.getText((localctx.start, self._input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "localctx"
ThisRulePropertyRef_parser(r)  ::= "self"

NonLocalAttrRef(s)     ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)      ::= <<
def <t.name>(self):
  return self.getToken(<parser.name>.<t.name>, 0)
>>

// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t)  ::= <<
def <t.name>(self, i=None):
  if i is None:
      return self.getTokens(<parser.name>.<t.name>)
  else:
      return self.getToken(<parser.name>.<t.name>, i)
>>

ContextRuleGetterDecl(r)       ::= <<
def <r.name>(self):
  return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)
```

```
>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
   return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
def <r.name>(self, i=None):
   if i is None:
       return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
   else:
       return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)

>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
*  r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

   def __init__(self, parser, parent=None, invokingState=-1<struct.ctorAttrs:{a | , <a.name>=None}>):
       super(<parser.name>.<struct.name>, self).__init__(parent, invokingState)
       self.parser = parser
       <attrs:{a | <a>}; separator="\n">
       <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

   <getters:{g | <g>}; separator="\n\n">

   def getRuleIndex(self):
       return <parser.name>.RULE_<struct.derivedFromName>
```

```
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
   def copyFrom(self, ctx):
       super(<parser.name>.<struct.name>, self).copyFrom(ctx)
       <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
   <dispatchMethods; separator="\n">
   <extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name>(<currentRule.name; format="cap">Context):

   def __init__(self, parser, ctx): # actually a <parser.name>.<currentRule.name; format="cap">Context)
       super(<parser.name>.<struct.name>, self).__init__(parser)
       <attrs:{a | <a>}; separator="\n">
       self.copyFrom(ctx)

   <getters:{g | <g>}; separator="\n">

   <dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener):
   if hasattr(listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">"):
       listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor):
   if hasattr(visitor, "visit<struct.derivedFromName; format="cap">"):
       return visitor.visit<struct.derivedFromName; format="cap">(self)
   else:
       return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"
```

```
// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                 ::= "self._ctx.stop = self._input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>


recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
   self.triggerExitRuleEvent()
_prevctx = localctx
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO
import sys

<namedActions.header>
```

```
<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
from .<superClass> import <superClass>

<endif>

<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

<if(lexer.channels)>
    <lexer.channels:{c| <c> = <lexer.channels.(c)>}; separator="\n">

<endif>
<if(rest(lexer.modes))>
    <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

<endif>
    <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

    channelNames = [ u"DEFAULT_TOKEN_CHANNEL", u"HIDDEN"<if (lexer.channels)>, <lexer.channels:{c|
u"<c>"}; separator=", ", wrap, anchor><endif> ]

    modeNames = [ <lexer.modes:{m| u"<m>"}; separator=", ", wrap, anchor> ]

    literalNames = [ u"\<INVALID>",
            <lexer.literalNames:{t | u<t>}; separator=", ", wrap, anchor> ]

    symbolicNames = [ u"\<INVALID>",
            <lexer.symbolicNames:{t | u<t>}; separator=", ", wrap, anchor> ]

    ruleNames = [ <lexer.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

    grammarFileName = u"<lexer.grammarFileName>"

    def __init__(self, input=None, output=sys.stdout):
        super(<lexer.name>, self).__init__(input, output=output)
        self.checkVersion("<lexerFile.ANTLRVersion>")
        self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
        self._actions = None
        self._predicates = None

    <namedActions.members>

    <dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
    with StringIO() as buf:
        buf.write(u"<model.serialized; wrap={")<\n>        buf.write(u"}>")
        return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<pythonTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"
```

Found in path(s):

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/codegen/Python2/Python2.stg

No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
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*  modification, are permitted provided that the following conditions
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*  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
*  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

javaTypeInitMap ::= [
 "int":"0",
 "long":"0",
 "float":"0.0f",
 "double":"0.0",
 "boolean":"false",
 "byte":"0",
 "short":"0",
 "char":"0",
 default:"null" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.misc.*;
import org.antlr.v4.runtime.tree.*;
import java.util.List;
import java.util.Iterator;
import java.util.ArrayList;

<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
```

```
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeListener;

/**
* This interface defines a complete listener for a parse tree produced by
* {@link <file.parserName>}.
*/
public interface <file.grammarName>Listener extends ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
* Enter a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
*/
void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);
/**
<if(file.listenerLabelRuleNames.(lname))>
* Exit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
*/
void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>

import org.antlr.v4.runtime.ParserRuleContext;
import org.antlr.v4.runtime.tree.ErrorNode;
import org.antlr.v4.runtime.tree.TerminalNode;

/**
* This class provides an empty implementation of {@link <file.grammarName>Listener},
* which can be extended to create a listener which only needs to handle a subset
* of the available methods.
*/
public class <file.grammarName>BaseListener implements <file.grammarName>Listener {
 <file.listenerNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
@Override public void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
@Override public void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}};
separator="\n">

 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void enterEveryRule(ParserRuleContext ctx) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void exitEveryRule(ParserRuleContext ctx) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void visitTerminal(TerminalNode node) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void visitErrorNode(ErrorNode node) { }
}
>>

VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
```

```
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeVisitor;

/**
* This interface defines a complete generic visitor for a parse tree produced
* by {@link <file.parserName>}.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
public interface <file.grammarName>Visitor\<T> extends ParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
* Visit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
* Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
* @return the visitor result
*/
T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.AbstractParseTreeVisitor;

/**
* This class provides an empty implementation of {@link <file.grammarName>Visitor},
* which can be extended to create a visitor which only needs to handle a subset
* of the available methods.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
public class <file.grammarName>BaseVisitor\<T> extends AbstractParseTreeVisitor\<T> implements
<file.grammarName>Visitor\<T> {
 <file.visitorNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation returns the result of calling
* {@link #visitChildren\} on {@code ctx\}.\</p>
*/
@Override public T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { return
visitChildren(ctx); \}}; separator="\n">
}
>>

fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <parser.name> extends <superClass; null="Parser"> {
 static { RuntimeMetaData.checkVersion("<file.ANTLRVersion>", RuntimeMetaData.VERSION); }

 protected static final DFA[] _decisionToDFA;
 protected static final PredictionContextCache _sharedContextCache =
  new PredictionContextCache();
 <if(parser.tokens)>
 public static final int
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 public static final int
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
 private static String[] makeRuleNames() {
  return new String[] {
   <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
  };
 }
 public static final String[] ruleNames = makeRuleNames();

 <vocabulary(parser.literalNames, parser.symbolicNames)>

 @Override
 public String getGrammarFileName() { return "<parser.grammarFileName; format="java-escape">"; }

 @Override
 public String[] getRuleNames() { return ruleNames; }
 @Override
 public String getSerializedATN() { return _serializedATN; }

 @Override
 public ATN getATN() { return _ATN; }

 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
private static String[] makeLiteralNames() {
 return new String[] {
  <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
 };
}
private static final String[] _LITERAL_NAMES = makeLiteralNames();
private static String[] makeSymbolicNames() {
 return new String[] {
  <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
 };
}
private static final String[] _SYMBOLIC_NAMES = makeSymbolicNames();
public static final Vocabulary VOCABULARY = new VocabularyImpl(_LITERAL_NAMES,
_SYMBOLIC_NAMES);

/**
* @deprecated Use {@link #VOCABULARY} instead.
*/
@Deprecated
public static final String[] tokenNames;
static {
 tokenNames = new String[_SYMBOLIC_NAMES.length];
 for (int i = 0; i \< tokenNames.length; i++) {
  tokenNames[i] = VOCABULARY.getLiteralName(i);
  if (tokenNames[i] == null) {
   tokenNames[i] = VOCABULARY.getSymbolicName(i);
  }

  if (tokenNames[i] == null) {
   tokenNames[i] = "\<INVALID>";
  }
 }
}

@Override
@Deprecated
public String[] getTokenNames() {
 return tokenNames;
}

@Override

public Vocabulary getVocabulary() {
 return VOCABULARY;
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
@Override
public void action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((<f.ctxType>)_localctx, actionIndex);
 break;}; separator="\n">
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
@Override
public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
 }
 return true;
```

```
}
<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<
public <p.name>(TokenStream input) {
 super(input);
 _interp = new ParserATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
}
>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 }
}
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private boolean <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>:
 return <actions.(index)>;}; separator="\n">
 }
 return true;
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=",">) throws RecognitionException {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>);
 enterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch (RecognitionException re) {
  _localctx.exception = re;
  _errHandler.reportError(this, re);
  _errHandler.recover(this, re);
 }
 <endif>
 finally {
  <finallyAction>
  exitRule();
 }
 return _localctx;
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=", ">) throws RecognitionException {
 return <currentRule.name>(0<currentRule.args:{a | , <a.name>}>);
}

private <currentRule.ctxType> <currentRule.name>(int _p<args:{a | , <a>}>) throws RecognitionException {
 ParserRuleContext _parentctx = _ctx;
 int _parentState = getState();
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 enterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  _errHandler.reportError(this, re);
  _errHandler.recover(this, re);
 }
 finally {
  <finallyAction>
  unrollRecursionContexts(_parentctx);
 }
 return _localctx;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>

LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 break;
}
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 <iteration>
} while ( <loopExpr> );
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i>:
 <alt>
 break;}; separator="\n">
}
>>

OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
_alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
}
>>

PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
```

```
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER );
>>

Sync(s) ::= "sync(<s.expecting.name>);"

ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1L \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1L \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<ttype>}; separator=" || ">
```

```
%>

cases(ttypes) ::= <<
<ttypes:{t | case <t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>);
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>
);
>>

MatchToken(m) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>match(<m.name>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }>_input.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = (Token)}><endif>_errHandler.recoverInline(this);
}
else {
 if ( _input.LA(1)==Token.EOF ) matchedEOF = true;
 _errHandler.reportMatch(this);
 consume();
}
>>

Wildcard(w) ::= <<
setState(<w.stateNumber>);
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
```

```
setState(<p.stateNumber>);
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip();"
LexerMoreCommand()  ::= "more();"
LexerPopModeCommand() ::= "popMode();"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>;"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>;"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>);"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>;"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getText():null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getType():0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getLine():0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getCharPositionInLine():0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getChannel():0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getTokenIndex():0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label>!=null?Integer.valueOf(<ctx(t)>.<t.label>.getText()):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.start):null)"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_text(r)  ::=
"(<ctx(r)>.<r.label>!=null?_input.getText(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "this"

ThisRulePropertyRef_start(r) ::= "_localctx.start"
ThisRulePropertyRef_stop(r)  ::= "_localctx.stop"
ThisRulePropertyRef_text(r)  ::= "_input.getText(_localctx.start, _input.LT(-1))"
ThisRulePropertyRef_ctx(r)  ::= "_localctx"
ThisRulePropertyRef_parser(r)  ::= "this"

NonLocalAttrRef(s)   ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks)   ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>;"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <t.name>"
TokenTypeDecl(t) ::= "int <t.name>;"
TokenListDecl(t) ::= "List\<Token> <t.name> = new ArrayList\<Token>()"
RuleContextDecl(r) ::= "<r.ctxName> <r.name>"
RuleContextListDecl(rdecl) ::= "List\<<rdecl.ctxName>> <rdecl.name> = new ArrayList\<<rdecl.ctxName>>()"

ContextTokenGetterDecl(t)      ::=
   "public TerminalNode <t.name>() { return getToken(<parser.name>.<t.name>, 0); }"
ContextTokenListGetterDecl(t)  ::=
   "public List\<TerminalNode> <t.name>() { return getTokens(<parser.name>.<t.name>); }"
ContextTokenListIndexedGetterDecl(t)  ::= <<
public TerminalNode <t.name>(int i) {
 return getToken(<parser.name>.<t.name>, i);
}
>>
ContextRuleGetterDecl(r)       ::= <<
public <r.ctxName> <r.name>() {
 return getRuleContext(<r.ctxName>.class,0);
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public List\<<r.ctxName>\> <r.name>() {
 return getRuleContexts(<r.ctxName>.class);
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <r.name>(int i) {
 return getRuleContext(<r.ctxName>.class,i);
}
>>

LexerRuleContext() ::= "RuleContext"
```

```
/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = _input.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = _input.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers)
 ::= <<
public static class <struct.name> extends
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)> implements
<interfaces; separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) { super(parent, invokingState);
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>) {
  super(parent, invokingState);
  <struct.ctorAttrs:{a | this.<a.name> = <a.name>;}; separator="\n">
 }
 @Override public int getRuleIndex() { return RULE_<struct.derivedFromName>; }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public void copyFrom(<struct.name> ctx) {
  super.copyFrom(ctx);
  <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public static class <struct.name> extends <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context ctx) { copyFrom(ctx); }
 <dispatchMethods; separator="\n">
}
>>
```

```
ListenerDispatchMethod(method) ::= <<
@Override
public void <if(method.isEnter)>enter<else>exit<endif>Rule(ParseTreeListener listener) {
 if ( listener instanceof <parser.grammarName>Listener )
((<parser.grammarName>Listener)listener).<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName;
format="cap">(this);
}
>>

VisitorDispatchMethod(method) ::= <<
@Override
public \<T> T accept(ParseTreeVisitor\<? extends T> visitor) {
 if ( visitor instanceof <parser.grammarName>Visitor ) return ((<parser.grammarName>Visitor\<? extends
T>)visitor).visit<struct.derivedFromName; format="cap">(this);
 else return visitor.visitChildren(this);
}
>>

AttributeDecl(d) ::= "<d.type> <d.name><if(d.initValue)> = <d.initValue><endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>((<x.ctx.name>)_localctx).<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "((<actionChunk.ctx.name>)_localctx)"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()                 ::= "_ctx.stop = _input.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx,
_parentState));
```

```
<if(label)>
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
_ctx = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( _parseListeners!=null ) triggerExitRuleEvent();
_prevctx = _localctx;
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
package <lexerFile.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.Lexer;
import org.antlr.v4.runtime.CharStream;
import org.antlr.v4.runtime.Token;
import org.antlr.v4.runtime.TokenStream;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.misc.*;

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <lexer.name> extends <superClass; null="Lexer"> {
 static { RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION); }

 protected static final DFA[] _decisionToDFA;
 protected static final PredictionContextCache _sharedContextCache =
  new PredictionContextCache();
```

```
<if(lexer.tokens)>
public static final int
 <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
<endif>
<if(lexer.channels)>
public static final int
 <lexer.channels:{c | <c>=<lexer.channels.(c)>}; separator=", ", wrap, anchor>;
<endif>
<if(rest(lexer.modes))>
public static final int
 <rest(lexer.modes):{m | <m>=<i>}; separator=", ", wrap, anchor>;
<endif>
public static String[] channelNames = {
 "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ", wrap, anchor><endif>
};

public static String[] modeNames = {
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
};

private static String[] makeRuleNames() {
 return new String[] {
  <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };
}
public static final String[] ruleNames = makeRuleNames();

<vocabulary(lexer.literalNames, lexer.symbolicNames)>

<namedActions.members>

public <lexer.name>(CharStream input) {
 super(input);
 _interp = new LexerATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
}

@Override
public String getGrammarFileName() { return "<lexer.grammarFileName>"; }

@Override
public String[] getRuleNames() { return ruleNames; }

@Override
public String getSerializedATN() { return _serializedATN; }

@Override
public String[] getChannelNames() { return channelNames; }
```

```
 @Override
 public String[] getModeNames() { return modeNames; }

 @Override
 public ATN getATN() { return _ATN; }

 <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
 <atn>
}
>>

SerializedATN(model) ::= <<
<if(rest(model.segments))>
<! requires segmented representation !>
private static final int _serializedATNSegments = <length(model.segments)>;
<model.segments:{segment|private static final String _serializedATNSegment<i0> =
 "<segment; wrap={"+<\n><\t>"}>";}; separator="\n">
public static final String _serializedATN = Utils.join(
 new String[] {
  <model.segments:{segment | _serializedATNSegment<i0>}; separator=",\n">
 },
 ""
);
<else>
<! only one segment, can be inlined !>
public static final String _serializedATN =
 "<model.serialized; wrap={"+<\n><\t>"}>";
<endif>
public static final ATN _ATN =
 new ATNDeserializer().deserialize(_serializedATN.toCharArray());
static {
 _decisionToDFA = new DFA[_ATN.getNumberOfDecisions()];
 for (int i = 0; i \< _ATN.getNumberOfDecisions(); i++) {
  _decisionToDFA[i] = new DFA(_ATN.getDecisionState(i), i);
 }
<! org.antlr.v4.tool.DOTGenerator dot = new org.antlr.v4.tool.DOTGenerator(null);!>
<! System.out.println(dot.getDOT(_ATN.decisionToState.get(0), ruleNames, false));!>
<! System.out.println(dot.getDOT(_ATN.ruleToStartState[2], ruleNames, false));!>
}
>>

/** Using a type to init value map, try to init a type; if not in table
* must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>
```

codeFileExtension() ::= ".java"

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/codegen/Java/Java.stg
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/RuleRefAST.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/LL1AltBlock.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/gui/JFileChooserConfirmOverwrite.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/LL1Loop.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/NotAST.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/SemPred.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/GrammarAST.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/ThrowEarlyExitException.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/ToolANTLRParser.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/CaptureNextTokenType.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/ElementFrequenciesVisitor.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/LeftRecursiveRuleFunction.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/RangeAST.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_start.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/LeftRecursiveRule.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/OptionalBlock.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/DispatchMethod.java

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_text.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/StructDecl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/Recognizer.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_start.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/BlankOutputModelFactory.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/VisitorDispatchMethod.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/GrammarInterpreterRuleContext.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/LL1OptionalBlock.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/gui/TreeTextProvider.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/ThrowRecognitionException.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_pos.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/QuantifierAST.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/MatchSet.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/VisitorFile.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/MatchNotSet.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/semantics/BlankActionSplitterListener.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/semantics/SymbolCollector.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/GrammarASTAdaptor.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/analysis/LeftRecursiveRuleAltInfo.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/TokenListDecl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/LexerFile.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_int.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/semantics/SemanticPipeline.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/Parser.java

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/target/Python3Target.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/TokenVocabParser.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/GrammarParserInterpreter.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/target/SwiftTarget.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/DefaultToolListener.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ANTLRMessage.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/RetValueRef.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/ContextTokenGetterDecl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/automata/TailEpsilonRemover.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/ThrowNoViableAlt.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/Decl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/OptionalBlockAST.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/GrammarToken.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/gui/TreeLayoutAdaptor.java
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* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/StarBlockAST.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/v4ParserException.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/LL1Choice.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/ElementListDecl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/LocalRef.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/AddToLabelList.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/OutputFile.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/TokenDecl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/target/CppTarget.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/unicode/UnicodeDataTemplateController.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/GrammarASTWithOptions.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/TokenTypeDecl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/BuildDependencyGenerator.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-

jar/org/antlr/v4/codegen/OutputModelController.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ANTLRToolListener.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/CodeGenPipeline.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/LabelType.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/RuleContextListDecl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/ast/SetAST.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/LabelElementPair.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/decl/AttributeDecl.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/InvokeRule.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/v3TreeGrammarException.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/target/JavaTarget.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/Rule.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/Choice.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_type.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/PlusBlock.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/gui/SystemFontMetrics.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/ArgAction.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/GrammarSemanticsMessage.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/RuleSempredFunction.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/RuleActionFunction.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/CaptureNextToken.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/ResyncToEndOfRuleBlock.java
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_stop.java
No license file was found, but licenses were detected in source scan.

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*/

// File      : A3Lexer.g
// Author    : Jim Idle (jimi@temporal-wave.com)
// Copyright : Free BSD - See @header clause below
// Version   : First implemented as part of ANTLR 3.2 this is the self
//             hosting ANTLR 3 Lexer.
//
// Description
// -----------
// This is the definitive lexer grammar for parsing ANTLR V3.x.x grammars. All other
// gramnmars are derived from this grammar via source code control integration (perforce)
// or by the gdiff tool.
//
// This grammar and its associated grmmmars A3Parser.g and A3Walker.g exhibit the following
// traits, which are recommended for all production quality grammars:
//
// 1) They are separate grammars, not composite grammars;
// 2) They implement all supporting methods in a superclass (at least this is recommended
//    for language targets that support inheritence;
// 3) All errors are pushed as far down the parsing chain as possible, which means
//    that the lexer tries to defer error reporting to the parser, and the parser
//    tries to defer error reporting to a semantic phase consisting of a single
//    walk of the AST. The reason for this is that the error messages produced
//    from later phases of the parse will generally have better context and so
//    be more useful to the end user. Consider the message: "Syntax error at 'options'"
//    vs: "You cannot specify two options{} sections in a single grammar file".
// 4) The lexer is 'programmed' to catch common mistakes such as unterminated literals
//    and report them specifically and not just issue confusing lexer mismatch errors.
//

/** Read in an ANTLR grammar and build an AST.  Try not to do
*  any actions, just build the tree.
*
*  The phases are:
*
*  A3Lexer.g (this file)
*              A3Parser.g
*              A3Verify.g (derived from A3Walker.g)
*  assign.types.g
*  define.g
*  buildnfa.g
*  antlr.print.g (optional)
*  codegen.g
*
*  Terence Parr
*  University of San Francisco
*  2005
*  Jim Idle (this v3 grammar)
*  Temporal Wave LLC
*  2009
*/
lexer grammar ANTLRLexer;

// ==============================================================================
// Note that while this grammar does not care about order of constructs
// that don't really matter, such as options before @header etc, it must first
// be parsed by the original v2 parser, before it replaces it. That parser does
// care about order of structures. Hence we are constrained by the v2 parser
// for at least the first bootstrap release that causes this parser to replace
// the v2 version.
// ==============================================================================

// -------
// Options
//
// V3 option directives to tell the tool what we are asking of it for this
// grammar.
//
options {

 // Target language is Java, which is the default but being specific
 // here as this grammar is also meant as a good example grammar for
 // for users.
 //
 language      = Java;

 // The super class that this lexer should expect to inherit from, and
 // which contains any and all support routines for the lexer. This is
 // commented out in this baseline (definitive or normative grammar)
 // - see the ANTLR tool implementation for hints on how to use the super
 //   class
 //
 //superclass    = AbstractA3Lexer;
}

tokens { SEMPRED; TOKEN_REF; RULE_REF; LEXER_CHAR_SET; ARG_ACTION; }

// Include the copyright in this source and also the generated source
//
@lexer::header {
/*
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*/
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.runtime.misc.Interval;
}


@members {
 public static final int COMMENTS_CHANNEL = 2;

   public CommonTokenStream tokens; // track stream we push to; need for context info
   public boolean isLexerRule = false;

 public void grammarError(ErrorType etype, org.antlr.runtime.Token token, Object... args) { }

 /** scan backwards from current point in this.tokens list
  *  looking for the start of the rule or subrule.
  *  Return token or null if for some reason we can't find the start.
  */
 public Token getRuleOrSubruleStartToken() {
     if ( tokens==null ) return null;
  int i = tokens.index();
       int n = tokens.size();
       if ( i>=n ) i = n-1; // seems index == n as we lex
  while ( i>=0 && i<n) {
   int ttype = tokens.get(i).getType();
   if ( ttype == LPAREN || ttype == TOKEN_REF || ttype == RULE_REF ) {
    return tokens.get(i);
   }
   i--;
  }
  return null;
 }
}

// --------
// Comments
//
// ANTLR comments can be multi or single line and we don't care
// which particularly. However we also accept Javadoc style comments
// of the form: /** ... */ and we do take care to distinguish those
// from ordinary multi-line comments
// Note how we guide the lexical PATH because we want to issue a decriptive
// error message in case of a standalone '/' character, which makes no
// sense in ANTLR source code. We alo trap unterminated multi-line comments
//
fragment DOC_COMMENT : ;
COMMENT
@init {

 // Record the start line and offsets as if we need to report an
```

```
  // unterminated comment, then we want to show the start of the comment
  // we think is broken, not the end, where people will have to try and work
  // it out themselves.
  //
  int startLine = $line;
  int offset    = getCharPositionInLine();
 }
   : // Eat the first character only, then see if we have a comment
     // or something silly.
     //
     '/'  // Comment introducer

     (
        // Single line comment, possibly with embedded src/line directives
        // in a similar style to the C pre-processor, allowing generated
        // code to refer the programmer back to the original source code
        // in case of error.
        //
        '/'
          (
              (' $ANTLR')=> ' $ANTLR' SRC
            | ~(NLCHARS)*
          )

       | // Multi-line comment, which may be a documentation comment
         // if it starts /** (note that we protect against accidentaly
         // recognizing a comment /**/ as a documentation comment
         //
         '*' (
              { input.LA(2) != '/'}?=> '*' { $type = DOC_COMMENT; }
            | { true }?=>  // Required to cover all alts with predicates
             )

             // Should we support embedded multiline comments here?
             //
             (
                 // Pick out end of multiline comment and exit the loop
                 // if we find it.
                 //
                 {    !(input.LA(1) == '*' && input.LA(2) == '/') }?

                   // Anything else other than the non-greedy match of
                   // the comment close sequence
                   //
                   .
             )*
          (
               // Look for the comment terminator, but if it is accidentally
               // unterminated, then we will hit EOF, which will trigger the
               // epsilon alt and hence we can issue an error message relative
               // to the start of the unterminated multi-line comment
               //
               '*/'

             | // Unterminated comment!
               //
               {
                 // ErrorManager.msg(Msg.UNTERMINATED_DOC_COMMENT, startLine, offset, $pos, startLine, offset, $pos, (Object)null);
               }
             )

       | // There was nothing that made sense following the opening '/' and so
         // we issue an error regarding the malformed comment
         //
         {
             // TODO: Insert error message relative to comment start
             //
         }
       )
       {
       // We do not wish to pass the comments in to the parser. If you are
       // writing a formatter then you will want to preserve the comments off
       // channel, but could just skip and save token space if not.
       //
       $channel=COMMENTS_CHANNEL;
       }
   ;

 ARG_OR_CHARSET
 options {k=1;}
   :  {isLexerRule}?=> LEXER_CHAR_SET {$type=LEXER_CHAR_SET;}
   |  {!isLexerRule}?=> ARG_ACTION
         {
         $type=ARG_ACTION;
         // Set the token text to our gathered string minus outer [ ]
         String t = $text;
         t = t.substring(1,t.length()-1);
         setText(t);
         }
   ;

 fragment
 LEXER_CHAR_SET
  : '['
   ( '\\' ~('\r'|'\n')
   | ~('\r'|'\n'|'\\'|']')
   )*
   ']'
  ;

 // --------------
 // Argument specs
 //
 // Certain argument lists, such as those specifying call parameters
 // to a rule invocation, or input parameters to a rule specification
 // are contained within square brackets. In the lexer we consume them
 // all at once and sort them out later in the grammar analysis.
 //
 fragment
 ARG_ACTION
  : '['
       (
             ARG_ACTION

         | ('"')=>ACTION_STRING_LITERAL

         | ('\'')=>ACTION_CHAR_LITERAL

         | ~('['|']')
       )*

       ']'
  ;

 // -------
 // Actions
 //
 // Other than making sure to distinguish between { and } embedded
 // within what we have assumed to be literals in the action code, the
 // job of the lexer is merely to gather the code within the action
 // (delimited by {}) and pass it to the parser as a single token.
 // We know that this token will be asked for its text somewhere
 // in the upcoming parse, so setting the text here to exclude
 // the delimiting {} is no additional overhead.
 //
 ACTION
  : NESTED_ACTION
   ( '?' {$type = SEMPRED;}
   ( (WSNLCHARS* '=>') => WSNLCHARS* '=>' // v3 gated sempred
    {
    Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
    t.setLine(state.tokenStartLine);
    t.setText(state.text);
    t.setCharPositionInLine(state.tokenStartCharPositionInLine);
    grammarError(ErrorType.V3_GATED_SEMPRED, t);
    }
   )?
   )?
  ;

 // ----------------
 // Action structure
 //
 // Many language targets use {} as block delimiters and so we
 // must recursively match {} delimited blocks to balance the
 // braces. Additionally, we must make some assumptions about
 // literal string representation in the target language. We assume
 // that they are delimited by ' or " and so consume these
 // in their own alts so as not to inadvertantly match {}.
 // This rule calls itself on matching a {
 //
 fragment
 NESTED_ACTION
 @init {

  // Record the start line and offsets as if we need to report an
  // unterminated block, then we want to show the start of the comment
  // we think is broken, not the end, where people will have to try and work
  // it out themselves.
  //
  int startLine = getLine();
  int offset    = getCharPositionInLine();
 }

   : // Action and other blocks start with opening {
     //
   '{'
     (
     // And now we can match one of a number of embedded
     // elements within the action until we find a
     // } that balances the opening {. If we do not find
     // the balanced } then we will hit EOF and can issue
     // an error message about the brace that we belive to
     // be mismatched. This won't be foolproof but we will
     // be able to at least report an error against the
     // opening brace that we feel is in error and this will
     // guide the user to the correction as best we can.
     //


         // An embedded {} block
        //
        NESTED_ACTION

        | // What appears to be a literal
         //
         ACTION_CHAR_LITERAL

        | // We have assumed that the target language has C/Java
         // type comments.
         //
         COMMENT

        | // What appears to be a literal
         //
         ACTION_STRING_LITERAL

     | // What appears to be an escape sequence
        //
        ACTION_ESC

     | // Some other single character that is not
        // handled above
        //
        ~('\\'|'"'|'\''|'/'|'{'|'}')

     )*

  (
     // Correctly balanced closing brace
     //
     '}'

   | // Looks like have an imblanced {} block, report
     // with respect to the opening brace.
     //
     {
         // TODO: Report imbalanced {}
         System.out.println("Block starting  at line " + startLine + " offset " + (offset+1) + " contains imbalanced {} or
 is missing a }");
     }
  )
   ;



 // Keywords
 // --------
 // keywords used to specify ANTLR v3 grammars. Keywords may not be used as
 // labels for rules or in any other context where they would be ambiguous
 // with the keyword vs some other identifier
 // OPTIONS, TOKENS, and CHANNELS must also consume the opening brace that captures
 // their option block, as this is the easiest way to parse it separate
 // to an ACTION block, despite it using the same {} delimiters.
 //
 OPTIONS      : 'options'  WSNLCHARS* '{'  ;
 TOKENS_SPEC  : 'tokens'   WSNLCHARS* '{'  ;
 CHANNELS     : 'channels' WSNLCHARS* '{'  ;

 IMPORT       : 'import'              ;
 FRAGMENT     : 'fragment'            ;
 LEXER        : 'lexer'               ;
 PARSER       : 'parser'              ;
 GRAMMAR      : 'grammar'             ;
 TREE_GRAMMAR : 'tree' WSNLCHARS* 'grammar' ;
 PROTECTED    : 'protected'           ;
 PUBLIC       : 'public'              ;
 PRIVATE      : 'private'             ;
 RETURNS      : 'returns'             ;
 LOCALS       : 'locals'              ;
 THROWS       : 'throws'              ;
 CATCH        : 'catch'               ;
 FINALLY      : 'finally'             ;
 MODE         : 'mode'                ;

 // -----------
 // Punctuation
 //
 // Character sequences used as separators, delimters, operators, etc
 //
 COLON        : ':'
                {
                // scan backwards, looking for a RULE_REF or TOKEN_REF.
                // which would indicate the start of a rule definition.
                // If we see a LPAREN, then it's the start of the subrule.
                // this.tokens is the token string we are pushing into, so
                // just loop backwards looking for a rule definition. Then
                // we set isLexerRule.
                Token t = getRuleOrSubruleStartToken();
                if ( t!=null ) {
                    if ( t.getType()==RULE_REF ) isLexerRule = false;
                    else if ( t.getType()==TOKEN_REF ) isLexerRule = true;
                    // else must be subrule; don't alter context
                }
                }
              ;
 COLONCOLON   : '::'                  ;
 COMMA        : ','                   ;
 SEMI        : ';'                   ;
 LPAREN      : '('                   ;
 RPAREN      : ')'                   ;
 RARROW      : '->'                  ;
 LT          : '<'                   ;
 GT          : '>'                   ;
 ASSIGN      : '='                   ;
 QUESTION    : '?'                   ;
 SYNPRED     : '=>'
      {
       Token t = new CommonToken(input, state.type, state.channel,
                         state.tokenStartCharIndex, getCharIndex()-1);
    t.setLine(state.tokenStartLine);
    t.setText(state.text);
    t.setCharPositionInLine(state.tokenStartCharPositionInLine);
    grammarError(ErrorType.V3_SYNPRED, t);
            $channel=HIDDEN;
    }
              ;
 STAR        : '*'                   ;
 PLUS        : '+'                   ;
 PLUS_ASSIGN  : '+='                  ;
 OR          : '|'                   ;
 DOLLAR      : '$'                   ;
 DOT      : '.'                   ; // can be WILDCARD or DOT in qid or imported rule ref
 RANGE       : '..'                  ;
 AT          : '@'                   ;
 POUND       : '#'                   ;
 NOT         : '~'                   ;
 RBRACE      : '}'                   ;

 /** Allow unicode rule/token names */
 ID   : a=NameStartChar NameChar*
    {
    if ( Grammar.isTokenName($a.text) ) $type = TOKEN_REF;
    else $type = RULE_REF;
    }
   ;

 fragment
 NameChar    :   NameStartChar
              |   '0'..'9'
              |   '_'
              |   '\u00B7'
              |   '\u0300'..'\u036F'
              |   '\u203F'..'\u2040'
              ;
```

```
fragment
NameStartChar
          :   'A'..'Z' | 'a'..'z'
          |   '\u00C0'..'\u00D6'
          |   '\u00D8'..'\u00F6'
          |   '\u00F8'..'\u02FF'
          |   '\u0370'..'\u037D'
          |   '\u037F'..'\u1FFF'
          |   '\u200C'..'\u200D'
          |   '\u2070'..'\u218F'
          |   '\u2C00'..'\u2FEF'
          |   '\u3001'..'\uD7FF'
          |   '\uF900'..'\uFDCF'
          |   '\uFDF0'..'\uFEFE'
          |   '\uFF00'..'\uFFFD'
          ; // ignores | ['\u10000-'\uEFFFF] ;

// ----------------------------
// Literals embedded in actions
//
// Note that we have made the assumption that the language used within
// actions uses the fairly standard " and ' delimiters for literals and
// that within these literals, characters are escaped using the \ character.
// There are some languages which do not conform to this in all cases, such
// as by using /string/ and so on. We will have to deal with such cases if
// if they come up in targets.
//

// Within actions, or other structures that are not part of the ANTLR
// syntax, we may encounter literal characters. Within these, we do
// not want to inadvertantly match things like '}' and so we eat them
// specifically. While this rule is called CHAR it allows for the fact that
// some languages may use/allow ' as the string delimiter.
//
fragment
ACTION_CHAR_LITERAL
 : '\'' (('\\')=>ACTION_ESC | ~'\'' )* '\''
 ;

// Within actions, or other structures that are not part of the ANTLR
// syntax, we may encounter literal strings. Within these, we do
// not want to inadvertantly match things like '}' and so we eat them
// specifically.
//
fragment
ACTION_STRING_LITERAL
 : '"' (('\\')=>ACTION_ESC | ~'"')* '"'
 ;
```

```
// Within literal strings and characters that are not part of the ANTLR
// syntax, we must allow for escaped character sequences so that we do not
// inadvertantly recognize the end of a string or character when the terminating
// delimiter has been esacped.
//
fragment
ACTION_ESC
 : '\\' .
 ;

// -------
// Integer
//
// Obviously (I hope) match an aribtrary long sequence of digits.
//
INT : ('0'..'9')+
   ;

// -----------
// Source spec
//
// A fragment rule for picking up information about an origrinating
// file from which the grammar we are parsing has been generated. This allows
// ANTLR to report errors against the originating file and not the generated
// file.
//
fragment
SRC : 'src' WSCHARS+ file=ACTION_STRING_LITERAL WSCHARS+ line=INT
     {
        // TODO: Add target specific code to change the source file name and current line number
        //
     }
   ;

// --------------
// Literal string
//
// ANTLR makes no disticintion between a single character literal and a
// multi-character string. All literals are single quote delimited and
// may contain unicode escape sequences of the form \uxxxx or \u{xxxxxx},
// where x is a valid hexadecimal number.
STRING_LITERAL
   :  '\'' ( ( ESC_SEQ | ~('\\'|'\''|'\r'|'\n') ) )*
      (    '\''
      |    // Unterminated string literal
           {
           Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
```

```
            t.setLine(state.tokenStartLine);
            t.setText(state.text);
            t.setCharPositionInLine(state.tokenStartCharPositionInLine);
            grammarError(ErrorType.UNTERMINATED_STRING_LITERAL, t);
            }
       )
   ;

// A valid hex digit specification
//
fragment
HEX_DIGIT : ('0'..'9'|'a'..'f'|'A'..'F') ;

// Any kind of escaped character that we can embed within ANTLR
// literal strings.
//
fragment
ESC_SEQ
   : '\\'
       (
             // The standard escaped character set such as tab, newline, etc...
       'b'|'t'|'n'|'f'|'r'|'\"'|'\\'

        | // A Java style Unicode escape sequence
          UNICODE_ESC

            | // A Swift/Hack style Unicode escape sequence
              UNICODE_EXTENDED_ESC

        | // An illegal escape seqeunce
          ~('b'|'t'|'n'|'f'|'r'|'\"'|'\\'|'u') // \x for any invalid x (make sure to match char here)
          {
              Token t = new CommonToken(input, state.type, state.channel, getCharIndex()-2, getCharIndex()-1);
              t.setText(t.getText());
              t.setLine(input.getLine());
              t.setCharPositionInLine(input.getCharPositionInLine()-2);
              grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t, input.substring(getCharIndex()-
2,getCharIndex()-1));
          }
       )
   ;

fragment
UNICODE_ESC
@init {

 // Flag to tell us whether we have a valid number of
 // hex digits in the escape sequence
 //
 int hCount = 0;
}
   :   'u' // Leadin for unicode escape sequence

       // We now require 4 hex digits. Note though
       // that we accept any number of characters
       // and issue an error if we do not get 4. We cannot
       // use an inifinite count such as + because this
       // might consume too many, so we lay out the lexical
       // options and issue an error at the invalid paths.
       //
     (
       (
          HEX_DIGIT  { hCount++; }
            (
                 HEX_DIGIT  { hCount++; }
              (
                   HEX_DIGIT  { hCount++; }
                   (
                       // Four valid hex digits, we are good
                       //
                       HEX_DIGIT { hCount++; }

                     | // Three valid digits
                   )

                 | // Two valid digits
              )

            | // One valid digit
        )
            )
        | // No valid hex digits at all
     )

     // Now check the digit count and issue an error if we need to
     //
     {
      if (hCount < 4) {
     Interval badRange = Interval.of(getCharIndex()-2-hCount, getCharIndex());
     String lastChar = input.substring(badRange.b, badRange.b);
     if ( lastChar.codePointAt(0)=='\' ) {
      badRange.b--;
     }
     String bad = input.substring(badRange.a, badRange.b);
     Token t = new CommonToken(input, state.type, state.channel, badRange.a, badRange.b);
     t.setLine(input.getLine());
    t.setCharPositionInLine(input.getCharPositionInLine()-hCount-2);
    grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t, bad);
     }
    }
   ;

fragment
UNICODE_EXTENDED_ESC
   :   'u{' // Leadin for unicode extended escape sequence

       HEX_DIGIT+ // One or more hexadecimal digits

       '}' // Leadout for unicode extended escape sequence

       // Now check the digit count and issue an error if we need to
       {
           int numDigits = getCharIndex()-state.tokenStartCharIndex-6;
           if (numDigits > 6) {
               Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-
1);
               t.setText(t.getText());
               t.setLine(input.getLine());
               t.setCharPositionInLine(input.getCharPositionInLine()-numDigits);
               grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t,
input.substring(state.tokenStartCharIndex,getCharIndex()-1));
   }
       }
   ;

// ----------
// Whitespace
//
// Characters and character constructs that are of no import
// to the parser and are used to make the grammar easier to read
// for humans.
//
WS
   : (
      ' '
       | '\t'
       | '\r'
       | '\n'
       | '\f'
     )+
     {$channel=HIDDEN;}
   ;

// A fragment rule for use in recognizing end of line in
// rules like COMMENT.
//
fragment
NLCHARS
   : '\n' | '\r'
   ;

// A fragment rule for recognizing traditional whitespace
// characters within lexer rules.
//
fragment
WSCHARS
   : ' ' | '\t' | '\f'
   ;

// A fragment rule for recognizing both traditional whitespace and
// end of line markers, when we don't care to distinguish but don't
// want any action code going on.
//
fragment
WSNLCHARS
   : ' ' | '\t' | '\f' | '\n' | '\r'
   ;

// This rule allows ANTLR 4 to parse grammars using the UTF-8 encoding with a
// byte order mark. Since this Unicode character doesn't appear as a token
// anywhere else in the grammar, we can simply skip all instances of it without
// problem. This rule will not break usage of \uFEFF inside a LEXER_CHAR_SET or
// STRING_LITERAL.
UnicodeBOM
   :   '\uFEFF' {skip();}
   ;

// -----------------
// Illegal Character
//
// This is an illegal character trap which is always the last rule in the
// lexer specification. It matches a single character of any value and being
// the last rule in the file will match when no other rule knows what to do
// about the character. It is reported as an error but is not passed on to the
// parser. This means that the parser to deal with the gramamr file anyway
// but we will not try to analyse or code generate from a file with lexical
// errors.
//
ERRCHAR
   : .
     {
        Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
        t.setLine(state.tokenStartLine);
        t.setText(state.text);
        t.setCharPositionInLine(state.tokenStartCharPositionInLine);
        String msg = getTokenErrorDisplay(t) + " came as a complete surprise to me";
        grammarError(ErrorType.SYNTAX_ERROR, t, msg);
        state.syntaxErrors++;
        skip();
      }
    ;
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/ANTLRLexer.g
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```
/** templates used to generate make-compatible dependencies */

/** Generate "f : x, y, z" dependencies for input
*  dependencies and generated files. in and out
*  are File objects.  For example, you can say
*  <f.canonicalPath>
*/
dependencies(grammarFileName,in,out) ::= <<
<if(in)><grammarFileName>: <in; separator=", "><endif>
<out:{f | <f> : <grammarFileName>}; separator="\n">
>>
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/depend.stg
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*/
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/ATNBuilder.java
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*
```

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*/

tree grammar ATNBuilder;
options {
 language     = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;
// filter       = true;
}

// Include the copyright in this source and also the generated source
@header {
/*
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   documentation and/or other materials provided with the distribution.
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   derived from this software without specific prior written permission.
*/
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import org.antlr.v4.automata.ATNFactory;
}

@members {
  ATNFactory factory;
  public ATNBuilder(TreeNodeStream input, ATNFactory factory) {
   this(input);
   this.factory = factory;
  }
}

dummy : block[null] ; // avoid error about no start rule

ruleBlock[GrammarAST ebnfRoot] returns [ATNFactory.Handle p]
@init {
  List<ATNFactory.Handle> alts = new ArrayList<ATNFactory.Handle>();
  int alt = 1;
  factory.setCurrentOuterAlt(alt);
}
  : ^(BLOCK
       (^(OPTIONS .*))?
       (   a=alternative
           {alts.add($a.p); factory.setCurrentOuterAlt(++alt);}
       )+
     )
   {$p = factory.block((BlockAST)$BLOCK, ebnfRoot, alts);}
  ;

block[GrammarAST ebnfRoot] returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> alts = new ArrayList<ATNFactory.Handle>();}
  : ^(BLOCK (^(OPTIONS .*))? (a=alternative {alts.add($a.p);})+)
   {$p = factory.block((BlockAST)$BLOCK, ebnfRoot, alts);}
  ;
```

```
alternative returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> els = new ArrayList<ATNFactory.Handle>();}
   : ^(LEXER_ALT_ACTION a=alternative lexerCommands)
       {$p = factory.lexerAltCommands($a.p,$lexerCommands.p);}
   | ^(ALT elementOptions? EPSILON)       {$p = factory.epsilon($EPSILON);}
   |   ^(ALT elementOptions? (e=element {els.add($e.p);})+) {$p = factory.alt(els);}
   ;

lexerCommands returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> cmds = new ArrayList<ATNFactory.Handle>();}
   :   (c=lexerCommand {if ($c.cmd != null) cmds.add($c.cmd);})+
       {
       $p = factory.alt(cmds);
       }
   ;

lexerCommand returns [ATNFactory.Handle cmd]
 : ^(LEXER_ACTION_CALL ID lexerCommandExpr)
       {$cmd = factory.lexerCallCommand($ID, $lexerCommandExpr.start);}
 | ID
       {$cmd = factory.lexerCommand($ID);}
 ;

lexerCommandExpr
 : ID
 | INT
 ;

element returns [ATNFactory.Handle p]
 : labeledElement    {$p = $labeledElement.p;}
 | atom      {$p = $atom.p;}
 | subrule      {$p = $subrule.p;}
 |   ACTION      {$p = factory.action((ActionAST)$ACTION);}
 |   SEMPRED      {$p = factory.sempred((PredAST)$SEMPRED);}
 |   ^(ACTION .)     {$p = factory.action((ActionAST)$ACTION);}
 |   ^(SEMPRED .)    {$p = factory.sempred((PredAST)$SEMPRED);}
   | ^(NOT b=blockSet[true])  {$p = $b.p;}
   | LEXER_CHAR_SET    {$p = factory.charSetLiteral($start);}
 ;

astOperand returns [ATNFactory.Handle p]
 : atom      {$p = $atom.p;}
 | ^(NOT blockSet[true])  {$p = $blockSet.p;}
 ;

labeledElement returns [ATNFactory.Handle p]
 : ^(ASSIGN ID element)     {$p = factory.label($element.p);}
 | ^(PLUS_ASSIGN ID element)   {$p = factory.listLabel($element.p);}
 ;

subrule returns [ATNFactory.Handle p]
 : ^(OPTIONAL block[$start])   {$p = $block.p;}
 | ^(CLOSURE block[$start])   {$p = $block.p;}
 | ^(POSITIVE_CLOSURE block[$start]) {$p = $block.p;}
 |  block[null]       {$p = $block.p;}
   ;

blockSet[boolean invert] returns [ATNFactory.Handle p]
@init {List<GrammarAST> alts = new ArrayList<GrammarAST>();}
 : ^(SET (setElement {alts.add($setElement.start);})+) {$p = factory.set($start, alts, $invert);}
 ;

/** Don't combine with atom otherwise it will build spurious ATN nodes */
setElement
 : ^(STRING_LITERAL .)
 | ^(TOKEN_REF .)
 | STRING_LITERAL
 | TOKEN_REF
 | ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
   |   LEXER_CHAR_SET
 ;

atom returns [ATNFactory.Handle p]
 : range     {$p = $range.p;}
 | ^(DOT ID terminal)  {$p = $terminal.p;}
 | ^(DOT ID ruleref)  {$p = $ruleref.p;}
   | ^(WILDCARD .)   {$p = factory.wildcard($start);}
   | WILDCARD    {$p = factory.wildcard($start);}
   | blockSet[false]   {$p = $blockSet.p;}
   |   terminal    {$p = $terminal.p;}
   |   ruleref     {$p = $ruleref.p;}
   ;

ruleref returns [ATNFactory.Handle p]
   : ^(RULE_REF ARG_ACTION? ^(ELEMENT_OPTIONS .*))  {$p = factory.ruleRef($RULE_REF);}
   | ^(RULE_REF ARG_ACTION?)        {$p = factory.ruleRef($RULE_REF);}
   | RULE_REF           {$p = factory.ruleRef($RULE_REF);}
   ;

range returns [ATNFactory.Handle p]
   : ^(RANGE a=STRING_LITERAL b=STRING_LITERAL) {$p = factory.range($a,$b);}
   ;

terminal returns [ATNFactory.Handle p]
   :  ^(STRING_LITERAL .)   {$p = factory.stringLiteral((TerminalAST)$start);}
   | STRING_LITERAL    {$p = factory.stringLiteral((TerminalAST)$start);}
```

```
  | ^(TOKEN_REF ARG_ACTION .) {$p = factory.tokenRef((TerminalAST)$start);}
  | ^(TOKEN_REF .)    {$p = factory.tokenRef((TerminalAST)$start);}
  | TOKEN_REF     {$p = factory.tokenRef((TerminalAST)$start);}
  ;

elementOptions
 : ^(ELEMENT_OPTIONS elementOption*)
 ;

elementOption
 : ID
 | ^(ASSIGN ID ID)
 | ^(ASSIGN ID STRING_LITERAL)
 | ^(ASSIGN ID ACTION)
 | ^(ASSIGN ID INT)
 ;
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/ATNBuilder.g
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```
*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

tree grammar BlockSetTransformer;
options {
 language     = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;
 output   = AST;
 filter   = true;
}

@header {
package org.antlr.v4.parse;
import org.antlr.v4.misc.Utils;
import org.antlr.v4.misc.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.util.List;
import java.util.Set;
import java.util.HashSet;
import java.util.ArrayList;
import org.antlr.v4.runtime.misc.IntervalSet;
}

@members {
public String currentRuleName;
public GrammarAST currentAlt;
public Grammar g;
public BlockSetTransformer(TreeNodeStream input, Grammar g) {
   this(input, new RecognizerSharedState());
   this.g = g;
}
}

topdown
   : ^(RULE (id=TOKEN_REF|id=RULE_REF) {currentRuleName=$id.text;} .+)
   | setAlt
   | ebnfBlockSet
   | blockSet
 ;

setAlt
 : {inContext("RULE BLOCK")}?
  ALT {currentAlt = $start;}
 ;

// (BLOCK (ALT (+ (BLOCK (ALT INT) (ALT ID)))))
```

```
ebnfBlockSet
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : ^(ebnfSuffix blockSet) -> ^(ebnfSuffix ^(BLOCK<BlockAST> ^(ALT<AltAST> blockSet)))
 ;

ebnfSuffix
@after {$tree = (GrammarAST)adaptor.dupNode($start);}
 : OPTIONAL
  | CLOSURE
   | POSITIVE_CLOSURE
 ;

blockSet
@init {
boolean inLexer = Grammar.isTokenName(currentRuleName);
}
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : {inContext("RULE")}? // top-level: rule block and > 1 alt
  ^(BLOCK ^(alt=ALT elementOptions? {((AltAST)$alt).altLabel==null}? setElement[inLexer]) ( ^(ALT
elementOptions? setElement[inLexer]) )+)
  -> ^(BLOCK<BlockAST>[$BLOCK.token] ^(ALT<AltAST>[$BLOCK.token,"ALT"] ^(SET[$BLOCK.token,
"SET"] setElement+)))
 | {!inContext("RULE")}? // if not rule block and > 1 alt
  ^(BLOCK ^(ALT elementOptions? setElement[inLexer]) ( ^(ALT elementOptions? setElement[inLexer]) )+)
  -> ^(SET[$BLOCK.token, "SET"] setElement+)
 ;

setElement[boolean inLexer]
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : ( ^(a=STRING_LITERAL elementOptions) {!inLexer ||
CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1}?
  |   a=STRING_LITERAL {!inLexer || CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1}?
  | {!inLexer}?=> ^(TOKEN_REF elementOptions)
  | {!inLexer}?=>   TOKEN_REF
  | {inLexer}?=>  ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
   {CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1 &&
    CharSupport.getCharValueFromGrammarCharLiteral($b.getText())!=-1}?
  )
 ;

elementOptions
 : ^(ELEMENT_OPTIONS elementOption*)
 ;

elementOption
 : ID
 | ^(ASSIGN id=ID v=ID)
 | ^(ASSIGN ID v=STRING_LITERAL)
 | ^(ASSIGN ID v=ACTION)
 | ^(ASSIGN ID v=INT)
 ;
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/BlockSetTransformer.g
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* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/codegen/Cpp/Files.stg

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```
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.IO;
using System.Text;
using System.Diagnostics;
using System.Collections.Generic;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using DFA = Antlr4.Runtime.Dfa.DFA;

<parser>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using IParseTreeListener = Antlr4.Runtime.Tree.IParseTreeListener;
using IToken = Antlr4.Runtime.IToken;

/// \<summary>
/// This interface defines a complete listener for a parse tree produced by
/// \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Listener : IParseTreeListener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context context);
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>

using Antlr4.Runtime.Misc;
using IErrorNode = Antlr4.Runtime.Tree.IErrorNode;
using ITerminalNode = Antlr4.Runtime.Tree.ITerminalNode;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;

/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Listener"/>,
/// which can be extended to create a listener which only needs to handle a subset
/// of the available methods.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseListener : I<file.grammarName>Listener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}}; separator="\n">

 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void EnterEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void ExitEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitTerminal([NotNull] ITerminalNode node) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitErrorNode([NotNull] IErrorNode node) { }
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;

/// \<summary>
/// This interface defines a complete generic visitor for a parse tree produced
/// by \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Visitor\<Result> : IParseTreeVisitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
```

```
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;

/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Visitor{Result}"/>,
/// which can be extended to create a visitor which only needs to handle a subset
/// of the available methods.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseVisitor\<Result> : AbstractParseTreeVisitor\<Result>,
I<file.grammarName>Visitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>
/// The default implementation returns the result of calling \<see
cref="AbstractParseTreeVisitor{Result\}.VisitChildren(IRuleNode)"/>
/// on \<paramref name="context"/>.
/// \</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
public virtual Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { return VisitChildren(context); \}}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

fileHeader(grammarFileName, ANTLRVersion) ::= <<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
```

```
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------

// Generated from <grammarFileName> by ANTLR <ANTLRVersion>

// Unreachable code detected
#pragma warning disable 0162
// The variable '...' is assigned but its value is never used
#pragma warning disable 0219
// Missing XML comment for publicly visible type or member '...'
#pragma warning disable 1591
// Ambiguous reference in cref attribute
#pragma warning disable 419

>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(parser.name)> : <superClass; null="Parser"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
 <if(parser.tokens)>
 public const int
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 public const int
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
 public static readonly string[] ruleNames = {
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };

 <vocabulary(parser.literalNames, parser.symbolicNames)>

 public override string GrammarFileName { get { return "<parser.grammarFileName>"; } }

 public override string[] RuleNames { get { return ruleNames; } }

 public override string SerializedAtn { get { return new string(_serializedATN); } }

 static <csIdentifier.(parser.name)>() {
  decisionToDFA = new DFA[_ATN.NumberOfDecisions];
  for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
   decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
  }
 }

 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case <f.ruleIndex>: return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
private static readonly string[] _LiteralNames = {
 <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
private static readonly string[] _SymbolicNames = {
 <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
public static readonly IVocabulary DefaultVocabulary = new Vocabulary(_LiteralNames, _SymbolicNames);

[NotNull]
public override IVocabulary Vocabulary
{
 get
 {
  return DefaultVocabulary;
 }
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
public override void Action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex> : <f.name>_action(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, actionIndex); break;};
separator="\n">
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex> : return <f.name>_sempred(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, predIndex);};
separator="\n">
 }
 return true;
}
<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(parser) ::= <<
 public <csIdentifier.(parser.name)>(ITokenStream input) : this(input, Console.Out, Console.Error) { }

 public <csIdentifier.(parser.name)>(ITokenStream input, TextWriter output, TextWriter errorOutput)
 : base(input, output, errorOutput)
{
 Interpreter = new ParserATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
}
>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>: <actions.(index)> break;}; separator="\n">
 }
}
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private bool <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>: return <actions.(index)>;}; separator="\n">
 }
 return true;
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<if(ruleCtx)>
<ruleCtx>
<endif>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 <endif>
 finally {
  <finallyAction>
  ExitRule();
 }
 return _localctx;
}
>>

LeftFactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterLeftFactoredRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 finally {
  <finallyAction>
  ExitRule();
 }
 return _localctx;
}
>>

// This behaves similar to RuleFunction (enterRule is called, and no adjustments
// are made to the parse tree), but since it's still a variant no context class
// needs to be generated.
LeftUnfactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 finally {
  <finallyAction>
  ExitRule();
 }
 return _localctx;
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 return <csIdentifier.(currentRule.name)>(0<currentRule.args:{a | , <csIdentifier.(a.name)>}>);
}

private <currentRule.ctxType> <csIdentifier.(currentRule.name)>(int _p<args:{a | , <a>}>) {
 ParserRuleContext _parentctx = Context;
 int _parentState = State;
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, _parentState<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 EnterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 finally {
  <finallyAction>
  UnrollRecursionContexts(_parentctx);
 }
 return _localctx;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
EnterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>

LL1OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
```

```
default:
 break;
}
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 State = <choice.stateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 <iteration>
} while ( <loopExpr> );
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i>:
 <alt>
 break;}; separator="\n">
}
>>

OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
_alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
}
>>

PlusBlock(choice, alts, error) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 State = <choice.loopBackStateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
```

```
} while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER );
>>

Sync(s) ::= "Sync(<s.expecting.name>);"

ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator=" || ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1L \<\< <offsetShift(s.varName, bits.shift)>) & (<bits.ttypes:{ttype | (1L \<\< <offsetShift(tokenType.(ttype), bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<tokenType.(ttype)>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <tokenType.(t)>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
State = <r.stateNumber>; <if(r.labels)><r.labels:{l | <labelref(l)> = }><endif><csIdentifier.(r.name)>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>);
>>

MatchToken(m) ::= <<
```

```
State = <m.stateNumber>; <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>Match(<tokenType.(m.name)>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
State = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>TokenStream.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>ErrorHandler.RecoverInline(this);
}
else {
 ErrorHandler.ReportMatch(this);
   Consume();
}
>>

Wildcard(w) ::= <<
State = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>MatchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
State = <p.stateNumber>;
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "Skip();"
LexerMoreCommand()  ::= "More();"
LexerPopModeCommand() ::= "PopMode();"
```

```
LexerTypeCommand(arg, grammar)      ::= "_type = <tokenType.(arg)>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <channelName.(arg)>;"
LexerModeCommand(arg, grammar)      ::= "_mode = <modeName.(arg)>;"
LexerPushModeCommand(arg, grammar)  ::= "PushMode(<modeName.(arg)>);"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
LocalRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
RetValueRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<csIdentifier.(a.name)>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<csIdentifier.(tokenType.(t.name))>"
LabelRef(t) ::= "<ctx(t)>.<csIdentifier.(t.name)>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(csIdentifier.(t.name))>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<csIdentifier.(s.name)> = <rhsChunks>;"

TokenLabelType() ::= "<file.TokenLabelType; null={IToken}>"
InputSymbolType() ::= "<file.InputSymbolType; null={IToken}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Text:null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Type:0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Line:0)"
TokenPropertyRef_pos(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.CharPositionInLine:0)"
TokenPropertyRef_channel(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Channel:0)"
TokenPropertyRef_index(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.TokenIndex:0)"
TokenPropertyRef_int(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?int.Parse(<ctx(t)>.<tokenType.(t.label)>.Text):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Start):null)"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_text(r)  ::=
"(<ctx(r)>.<r.label>!=null?TokenStream.GetText(<ctx(r)>.<r.label>.Start,<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "this"

ThisRulePropertyRef_start(r) ::= "_localctx.Start"
ThisRulePropertyRef_stop(r)  ::= "_localctx.Stop"
ThisRulePropertyRef_text(r)  ::= "TokenStream.GetText(_localctx.Start, TokenStream.LT(-1))"
ThisRulePropertyRef_ctx(r)  ::= "_localctx"
ThisRulePropertyRef_parser(r)  ::= "this"

NonLocalAttrRef(s)   ::= <%((<s.ruleName;
format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)>%>
```

```
SetNonLocalAttr(s, rhsChunks)   ::=
 <%((<s.ruleName; format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)> =
<rhsChunks>;%>

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.Add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <csIdentifier.(tokenType.(t.name))>"
TokenTypeDecl(t) ::= "int <csIdentifier.(tokenType.(t.name))>;"
TokenListDecl(t) ::= "IList\<IToken> <csIdentifier.(tokenType.(t.name))> = new List\<IToken>()"
RuleContextDecl(r) ::= "<r.ctxName> <csIdentifier.(r.name)>"
RuleContextListDecl(rdecl) ::= "IList\<<rdecl.ctxName>> <csIdentifier.(rdecl.name)> = new
List\<<rdecl.ctxName>>()"

contextGetterCollection(elementType) ::= <%
<elementType>[]
%>

ContextTokenGetterDecl(t)      ::=
   "public ITerminalNode <csIdentifier.(tokenType.(t.name))>() { return
GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, 0); }"
ContextTokenListGetterDecl(t)  ::= <<
public <contextGetterCollection("ITerminalNode")> <csIdentifier.(tokenType.(t.name))>() { return
GetTokens(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>); }
>>
ContextTokenListIndexedGetterDecl(t)  ::= <<
public ITerminalNode <csIdentifier.(tokenType.(t.name))>(int i) {
 return GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, i);
}
>>
ContextRuleGetterDecl(r)       ::= <<
public <r.ctxName> <csIdentifier.(r.name)>() {
 return GetRuleContext\<<r.ctxName>\>(0);
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public <contextGetterCollection({<r.ctxName>})> <csIdentifier.(r.name)>() {
 return GetRuleContexts\<<r.ctxName>\>();
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <csIdentifier.(r.name)>(int i) {
 return GetRuleContext\<<r.ctxName>\>(i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenType.(tokenName)>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "_<label>"

CaptureNextToken(d) ::= "<d.varName> = TokenStream.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = TokenStream.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
         superClass={ParserRuleContext}) ::= <<
public partial class <struct.name> :
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) : base(parent, invokingState) {
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>)
  : base(parent, invokingState)
 {
  <struct.ctorAttrs:{a | this.<csIdentifier.(a.name)> = <csIdentifier.(a.name)>;}; separator="\n">
 }
 public override int RuleIndex { get { return RULE_<struct.derivedFromName>; } }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public virtual void CopyFrom(<struct.name> context) {
  base.CopyFrom(context);
  <struct.attrs:{a | this.<csIdentifier.(a.name)> = context.<csIdentifier.(a.name)>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public partial class <struct.name> : <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context context) { CopyFrom(context); }
 <dispatchMethods; separator="\n">
}
>>
```

```
ListenerDispatchMethod(method) ::= <<
public override void <if(method.isEnter)>Enter<else>Exit<endif>Rule(IParseTreeListener listener) {
 I<parser.grammarName>Listener typedListener = listener as I<parser.grammarName>Listener;
 if (typedListener != null) typedListener.<if(method.isEnter)>Enter<else>Exit<endif><struct.derivedFromName; format="cap">(this);
}
>>

VisitorDispatchMethod(method) ::= <<
public override TResult Accept\<TResult>(IParseTreeVisitor\<TResult> visitor) {
 I<parser.grammarName>Visitor\<TResult> typedVisitor = visitor as I<parser.grammarName>Visitor\<TResult>;
 if (typedVisitor != null) return typedVisitor.Visit<struct.derivedFromName; format="cap">(this);
 else return visitor.VisitChildren(this);
}
>>

AttributeDecl(d) ::= "<d.type> <csIdentifier.(d.name)><if(d.initValue)> = <d.initValue><endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)><typedContext(x.ctx)>.<endif><csIdentifier.(x.name)>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "<typedContext(actionChunk.ctx)>"

// only casts _localctx to the type when the cast isn't redundant (i.e. to a sub-context for a labeled alt)
typedContext(ctx) ::= "<if(ctx.provideCopyFrom)>((<ctx.name>)_localctx)<else>_localctx<endif>"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "Precpred(Context, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()                 ::= "Context.Stop = TokenStream.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.Add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx, _parentState));
<if(label)>
```

```
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.Add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
Context = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( ParseListeners!=null )
 TriggerExitRuleEvent();
_prevctx = _localctx;
>>



LexerFile(file, lexer, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.IO;
using System.Text;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using DFA = Antlr4.Runtime.Dfa.DFA;

<lexer>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(lexer.name)> : <superClass; null="Lexer"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
```

```
public const int
 <lexer.tokens:{k | <tokenType.(k)>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
<if(lexer.channels)>
public const int
 <lexer.channels:{k | <csIdentifier.(k)>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>;
<endif>
<if(rest(lexer.modes))>
public const int
 <rest(lexer.modes):{m | <m>=<i>}; separator=", ", wrap, anchor>;
<endif>
public static string[] channelNames = {
 "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ", wrap, anchor><endif>
};

public static string[] modeNames = {
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
};

public static readonly string[] ruleNames = {
 <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
};

<namedActions.members>

public <csIdentifier.(lexer.name)>(ICharStream input)
: this(input, Console.Out, Console.Error) { }

public <csIdentifier.(lexer.name)>(ICharStream input, TextWriter output, TextWriter errorOutput)
: base(input, output, errorOutput)
{
 Interpreter = new LexerATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
}

<vocabulary(lexer.literalNames, lexer.symbolicNames)>

public override string GrammarFileName { get { return "<lexer.grammarFileName>"; } }

public override string[] RuleNames { get { return ruleNames; } }

public override string[] ChannelNames { get { return channelNames; } }

public override string[] ModeNames { get { return modeNames; } }

public override string SerializedAtn { get { return new string(_serializedATN); } }

static <csIdentifier.(lexer.name)>() {
 decisionToDFA = new DFA[_ATN.NumberOfDecisions];
```

```
  for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
   decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
  }
 }
 <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
 <atn>
}
>>


SerializedATN(model) ::= <<
private static char[] _serializedATN = {
 <model.serialized; separator=", ", wrap>,
};

public static readonly ATN _ATN =
 new ATNDeserializer().Deserialize(_serializedATN);


>>

initValue(typeName) ::= <<
default(<typeName>)
>>

codeFileExtension() ::= ".cs"

modeName ::= [
 "DEFAULT_MODE" : "DefaultMode",
 default : key
]

channelName ::= [
 "HIDDEN" : "Hidden",
 "DEFAULT_TOKEN_CHANNEL" : "DefaultTokenChannel",
 default : key
]

tokenType ::= [
 "EOF" : "Eof",
 default : key
]

csIdentifier ::= [
 "abstract" : "@abstract",
 "as" : "@as",
 "base" : "@base",
 "bool" : "@bool",
 "break" : "@break",
 "byte" : "@byte",
 "case" : "@case",
 "catch" : "@catch",
 "char" : "@char",
 "checked" : "@checked",
 "class" : "@class",
 "const" : "@const",
 "continue" : "@continue",
 "decimal" : "@decimal",
 "default" : "@default",
 "delegate" : "@delegate",
 "do" : "@do",
 "double" : "@double",
 "else" : "@else",
 "enum" : "@enum",
 "event" : "@event",
 "explicit" : "@explicit",
 "extern" : "@extern",
 "false" : "@false",
 "finally" : "@finally",
 "fixed" : "@fixed",
 "float" : "@float",
 "for" : "@for",
 "foreach" : "@foreach",
 "goto" : "@goto",
 "if" : "@if",
 "implicit" : "@implicit",
 "in" : "@in",
 "int" : "@int",
 "interface" : "@interface",
 "internal" : "@internal",
 "is" : "@is",
 "lock" : "@lock",
 "long" : "@long",
 "namespace" : "@namespace",
 "new" : "@new",
 "null" : "@null",
 "object" : "@object",
 "operator" : "@operator",
 "out" : "@out",
 "override" : "@override",
 "params" : "@params",
 "private" : "@private",
 "protected" : "@protected",
 "public" : "@public",
 "readonly" : "@readonly",
 "ref" : "@ref",
 "return" : "@return",
 "sbyte" : "@sbyte",
 "sealed" : "@sealed",
 "short" : "@short",
 "sizeof" : "@sizeof",
 "stackalloc" : "@stackalloc",
 "static" : "@static",
 "string" : "@string",
 "struct" : "@struct",
 "switch" : "@switch",
 "this" : "@this",
 "throw" : "@throw",
 "true" : "@true",
 "try" : "@try",
 "typeof" : "@typeof",
 "uint" : "@uint",
 "ulong" : "@ulong",
 "unchecked" : "@unchecked",
 "unsafe" : "@unsafe",
 "ushort" : "@ushort",
 "using" : "@using",
 "virtual" : "@virtual",
 "values" : "@values",
 "void" : "@void",
 "volatile" : "@volatile",
 "while" : "@while",
 default : key
]
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/codegen/CSharp/CSharp.stg
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*/

lexer grammar ActionSplitter;

options { filter=true; }
```

```
@header {
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
}

@members {
ActionSplitterListener delegate;

public ActionSplitter(CharStream input, ActionSplitterListener delegate) {
   this(input, new RecognizerSharedState());
   this.delegate = delegate;
}

/** force filtering (and return tokens). triggers all above actions. */
public List<Token> getActionTokens() {
   List<Token> chunks = new ArrayList<Token>();
   Token t = nextToken();
   while ( t.getType()!=Token.EOF ) {
       chunks.add(t);
       t = nextToken();
   }
   return chunks;
}

private boolean isIDStartChar(int c) {
 return c == '_' || Character.isLetter(c);
}
}

// ignore comments right away

COMMENT
   :   '/*' ( options {greedy=false;} : . )* '*/' {delegate.text($text);}
   ;

LINE_COMMENT
   : '//' ~('\n'|'\r')* '\r'? '\n' {delegate.text($text);}
   ;

SET_NONLOCAL_ATTR
 : '$' x=ID '::' y=ID WS? '=' expr=ATTR_VALUE_EXPR ';'
  {
  delegate.setNonLocalAttr($text, $x, $y, $expr);
  }
 ;
```

```
NONLOCAL_ATTR
 : '$' x=ID '::' y=ID {delegate.nonLocalAttr($text, $x, $y);}
 ;

QUALIFIED_ATTR
 : '$' x=ID '.' y=ID {input.LA(1)!='('}? {delegate.qualifiedAttr($text, $x, $y);}
 ;

SET_ATTR
 : '$' x=ID WS? '=' expr=ATTR_VALUE_EXPR ';'
  {
  delegate.setAttr($text, $x, $expr);
  }
 ;

ATTR
 : '$' x=ID {delegate.attr($text, $x);}
 ;

// Anything else is just random text
TEXT
@init {StringBuilder buf = new StringBuilder();}
@after {delegate.text(buf.toString());}
 : ( c=~('\\'| '$') {buf.append((char)$c);}
  | '\\$' {buf.append('$');}
  | '\\' c=~('$') {buf.append('\\').append((char)$c);}
  | {!isIDStartChar(input.LA(2))}? => '$' {buf.append('$');}
  )+
 ;

fragment
ID  : ('a'..'z'|'A'..'Z'|'_') ('a'..'z'|'A'..'Z'|'0'..'9'|'_')*
   ;

/** Don't allow an = as first char to prevent $x == 3; kind of stuff. */
fragment
ATTR_VALUE_EXPR
 : ~'=' (~';')*
 ;

fragment
WS : (' '|'\t'|'\n'|'\r')+
 ;
```

Found in path(s):

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/ActionSplitter.g

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*/

atn(startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph ATN {
rankdir=LR;
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

dfa(name, startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph <name>  {
<if(rankdir)>rankdir=<rankdir>;<endif>
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>
```

```
decision-rank(states) ::= <<
{rank=same; rankdir=TB; <states:{s | s<s>}; separator="; ">}
>>

edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

action-edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

epsilon-edge(src,label,target,arrowhead,transitionIndex,loopback=false) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontname="Times-Italic",
label="&epsilon;"<if(loopback)>, style="dashed"<endif>];
>>

state(state, label, name, transitions) ::= <%
<name>[fontsize=11,
  label="
     <! rest(transition) tests for decision states: these nodes have a non-empty set of transitions after the first one. !>
     <if(rest(transitions))>
        {
        <! Label on the left side of the record node. !>
        <label>
        |
        <! Named ports in order on right side of record node, no display text. !>
        {<transitions:{t|\<p<i0>>}; separator="|">}}
     <else>
        <label>
     <endif>
     "
  <if(rest(transitions))>
     , shape=record, fixedsize=false
  <else>
     , shape=circle, fixedsize=true, width=.55
  <endif>
  , peripheries=1];
%>

stopstate(name,label,actionIndex,useBox) ::= <<
<name>[fontsize=11, label="<label><if(actionIndex)>,\naction:<actionIndex><endif>",
<if(useBox)>shape=polygon,sides=4,peripheries=2,fixedsize=false<else>shape=doublecircle, fixedsize=true,
width=.6<endif>];
>>
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/dot/graphs.stg
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/GrammarTreeVisitor.java
No license file was found, but licenses were detected in source scan.

```
*  are met:
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*/

/** ANTLR tool checks output templates are compatible with tool code generation.
*  For now, a simple string match used on x.y of x.y.z scheme.
*  Must match Tool.VERSION during load to templates.
*
*  REQUIRED.
*/

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from antlr4 import *
from io import StringIO
from typing.io import TextIO
import sys

<namedActions.header>
```

```
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
    from .<file.parserName> import <file.parserName>
else:
    from <file.parserName> import <file.parserName>
<header>

# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

    <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    pass

# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    pass

}; separator="\n">

>>



VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
    from .<file.parserName> import <file.parserName>
else:
    from <file.parserName> import <file.parserName>
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

    <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    return self.visitChildren(ctx)
}; separator="\n">

del <file.parserName>
>>



fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
if __name__ is not None and "." in __name__:
    from .<superClass> import <superClass>
else:
    from <superClass> import <superClass>

<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

    grammarFileName = "<parser.grammarFileName>"

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    sharedContextCache = PredictionContextCache()

    literalNames = [ <parser.literalNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

    ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

    EOF = <TokenLabelType()>.EOF
    <if(parser.tokens)>
    <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
    <endif>

    <parser:(ctor)()>
    <namedActions.members>

    <funcs; separator="\n">



<if(sempredFuncs)>
    def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
        if self._predicates == None:
            self._predicates = dict()
<parser.sempredFuncs.values:{f |
        self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
        pred = self._predicates.get(ruleIndex, None)
        if pred is None:
            raise Exception("No predicate with index:" + str(ruleIndex))
        else:
            return pred(localctx, predIndex)

    <sempredFuncs.values; separator="\n">
<endif>




>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx:RuleContext, ruleIndex:int, actionIndex:int):
    if self._actions is None:
        actions = dict()
<recog.actionFuncs.values:{f|
        actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
        self._actions = actions
    action = self._actions.get(ruleIndex, None)
    if action is not None:
        action(localctx, actionIndex)
    else:
        raise Exception("No registered action for:" + str(ruleIndex))

<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
    if self._predicates is None:
        preds = dict()
<recog.sempredFuncs.values:{f|
        preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
        self._predicates = preds
    pred = self._predicates.get(ruleIndex, None)
    if pred is not None:
        return pred(localctx, predIndex)
    else:
        raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<
def __init__(self, input:TokenStream, output:TextIO = sys.stdout):
    super().__init__(input, output)
    self.checkVersion("<file.ANTLRVersion>")
    self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
    self._predicates = None

>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx:<r.ctxType> , actionIndex:int):
<actions:{index|
<if(first(actions))>
    if actionIndex == <index>:
        <actions.(index)>
<elseif(rest(actions))>
    elif actionIndex == <index>:
        <actions.(index)>
<endif> }; separator="\n">
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx:<r.ctxType>, predIndex:int):
    <actions:{index|
<if(first(actions))>
    if predIndex == <index>:
        return <actions.(index)>
<elseif(rest(actions))>
    elif predIndex == <index>:
        return <actions.(index)>
<endif> }; separator="\n">

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name><if(a.type)>:<a.type><endif>}>):

    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
    self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    <if(exceptions)>
    <exceptions; separator="\n">
    <else>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    <endif>
    finally:
        <finallyAction>
        self.exitRule()
    return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p:int=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
    _parentctx = self._ctx
    _parentState = self.state
    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
    _prevctx = localctx
    _startState = <currentRule.startState>
    self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    finally:
        <finallyAction>
        self.unrollRecursionContexts(_parentctx)
    return localctx

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
    <alt>
    pass}; separator="\nel">
else:
    <error>

>>

LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
    <alt>
    pass}; separator="\nel">
else:
    pass
>>

LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
    <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>



LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
    <alts; separator="\n">
    self.state = <choice.loopBackStateNumber>
    self._errHandler.sync(self)
    <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
    <alts; separator="\n">
    self.state = <choice.stateNumber> <! loopback/exit decision !>
    self._errHandler.sync(self)
    <iteration>
    if not (<loopExpr>):
        break

>>

// LL(*) stuff
```

```
AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
   <alt>
   pass
}; separator="\nel">

>>

OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
   <alt>
}; separator="\nel">

>>

StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
   if _alt==1<if(!choice.ast.greedy)>+1<endif>:
       <iteration>
       <alts> <! should only be one !>
   self.state = <choice.loopBackStateNumber>
   self._errHandler.sync(self)
   _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
   <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
   <alt>
}; separator="\nel">
```

```
    else:
        <error>
    self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
    self._errHandler.sync(self)
    _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator=" or ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> and ((1 \<\< <offsetShiftVar(s.varName, bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>

cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
```

```
>>

InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)
>>

MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l |     <labelref(l)> = }><else>    <endif>self._errHandler.recoverInline(self)
else:
   self._errHandler.reportMatch(self)
   self.consume()
>>

Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
   from antlr4.error.Errors import FailedPredicateException
   raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
>>
```

```
ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
   <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type()"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText((<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"

ThisRulePropertyRef_start(r) ::= "localctx.start"
```

```
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "self._input.getText((localctx.start, self._input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "localctx"
ThisRulePropertyRef_parser(r)  ::= "self"

NonLocalAttrRef(s)     ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)      ::= <<
def <t.name>(self):
  return self.getToken(<parser.name>.<t.name>, 0)
>>

// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t)  ::= <<
def <t.name>(self, i:int=None):
  if i is None:
      return self.getTokens(<parser.name>.<t.name>)
  else:
      return self.getToken(<parser.name>.<t.name>, i)
>>

ContextRuleGetterDecl(r)       ::= <<
def <r.name>(self):
  return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)

>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>
```

```
ContextRuleListIndexedGetterDecl(r)   ::= <<
def <r.name>(self, i:int=None):
   if i is None:
       return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
   else:
       return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)

>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
*  r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

   def __init__(self, parser, parent:ParserRuleContext=None, invokingState:int=-1<struct.ctorAttrs:{a | ,
<a.name><if(a.type)>:<a.type><endif>=None}>):
       super().__init__(parent, invokingState)
       self.parser = parser
       <attrs:{a | <a>}; separator="\n">
       <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

   <getters:{g | <g>}; separator="\n\n">

   def getRuleIndex(self):
       return <parser.name>.RULE_<struct.derivedFromName>

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
   def copyFrom(self, ctx:ParserRuleContext):
       super().copyFrom(ctx)
       <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
   <dispatchMethods; separator="\n">
   <extensionMembers; separator="\n">
```

```
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name>(<currentRule.name; format="cap">Context):

    def __init__(self, parser, ctx:ParserRuleContext): # actually a <parser.name>.<currentRule.name; format="cap">Context
        super().__init__(parser)
        <attrs:{a | <a>}; separator="\n">
        self.copyFrom(ctx)

    <getters:{g | <g>}; separator="\n">

    <dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener:ParseTreeListener):
    if hasattr( listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">" ):
        listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor:ParseTreeVisitor):
    if hasattr( visitor, "visit<struct.derivedFromName; format="cap">" ):
        return visitor.visit<struct.derivedFromName; format="cap">(self)
    else:
        return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                 ::= "self._ctx.stop = self._input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
```

```
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
   self.triggerExitRuleEvent()
_prevctx = localctx
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
from antlr4 import *
from io import StringIO
from typing.io import TextIO
import sys

<namedActions.header>

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
if __name__ is not None and "." in __name__:
   from .<superClass> import <superClass>
else:
   from <superClass> import <superClass>
```

```
<endif>
<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

   atn = ATNDeserializer().deserialize(serializedATN())

   decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

<if(lexer.channels)>
   <lexer.channels:{c| <c> = <lexer.channels.(c)>}; separator="\n">

<endif>
<if(rest(lexer.modes))>
   <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

<endif>
   <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

   channelNames = [ u"DEFAULT_TOKEN_CHANNEL", u"HIDDEN"<if (lexer.channels)>, <lexer.channels:{c|
u"<c>"}; separator=", ", wrap, anchor><endif> ]

   modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ]

   literalNames = [ "\<INVALID>",
           <lexer.literalNames:{t | <t>}; separator=", ", wrap, anchor> ]

   symbolicNames = [ "\<INVALID>",
           <lexer.symbolicNames:{t | <t>}; separator=", ", wrap, anchor> ]

   ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

   grammarFileName = "<lexer.grammarFileName>"

   def __init__(self, input=None, output:TextIO = sys.stdout):
      super().__init__(input, output)
      self.checkVersion("<lexerFile.ANTLRVersion>")
      self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
      self._actions = None
      self._predicates = None

   <namedActions.members>

   <dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>
```

```
SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
   with StringIO() as buf:
       buf.write("<model.serialized; wrap={")<\n>        buf.write("}>")
       return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<pythonTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"
```

Found in path(s):

* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/codegen/Python3/Python3.stg

No license file was found, but licenses were detected in source scan.

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* Use of this file is governed by the BSD 3-clause license that
* can be found in the LICENSE.txt file in the project root.
*/
/**
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*/

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/gui/GraphicsSupport.java
No license file was found, but licenses were detected in source scan.

```
/*
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*  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

tree grammar SourceGenTriggers;
options {
 language     = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;
}

@header {
package org.antlr.v4.codegen;
import org.antlr.v4.misc.Utils;
import org.antlr.v4.codegen.model.*;
import org.antlr.v4.codegen.model.decl.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.util.Collections;
import java.util.Map;
import java.util.HashMap;
}

@members {
 public OutputModelController controller;
   public boolean hasLookaheadBlock;
   public SourceGenTriggers(TreeNodeStream input, OutputModelController controller) {
    this(input);
    this.controller = controller;
   }
}

dummy : block[null, null] ;

block[GrammarAST label, GrammarAST ebnfRoot] returns [List<? extends SrcOp> omos]
   : ^( blk=BLOCK (^(OPTIONS .+))?
   {List<CodeBlockForAlt> alts = new ArrayList<CodeBlockForAlt>();}
     ( alternative {alts.add($alternative.altCodeBlock);} )+
    )
    {
    if ( alts.size()==1 && ebnfRoot==null) return alts;
    if ( ebnfRoot==null ) {
        $omos = DefaultOutputModelFactory.list(controller.getChoiceBlock((BlockAST)$blk, alts, $label));
    }
    else {
           Choice choice = controller.getEBNFBlock($ebnfRoot, alts);
           hasLookaheadBlock |= choice instanceof PlusBlock || choice instanceof StarBlock;
        $omos = DefaultOutputModelFactory.list(choice);
    }
    }
   ;

alternative returns [CodeBlockForAlt altCodeBlock, List<SrcOp> ops]
@init {
   boolean outerMost = inContext("RULE BLOCK");
}
```

```
@after {
  controller.finishAlternative($altCodeBlock, $ops, outerMost);
}
  : a=alt[outerMost] {$altCodeBlock=$a.altCodeBlock; $ops=$a.ops;}
 ;

alt[boolean outerMost] returns [CodeBlockForAlt altCodeBlock, List<SrcOp> ops]
@init {
 // set alt if outer ALT only (the only ones with alt field set to Alternative object)
 AltAST altAST = (AltAST)retval.start;
 if ( outerMost ) controller.setCurrentOuterMostAlt(altAST.alt);
}
 : {
  List<SrcOp> elems = new ArrayList<SrcOp>();
  // TODO: shouldn't we pass $start to controller.alternative()?
  $altCodeBlock = controller.alternative(controller.getCurrentOuterMostAlt(), outerMost);
  $altCodeBlock.ops = $ops = elems;
  controller.setCurrentBlock($altCodeBlock);
  }
  ^( ALT elementOptions? ( element {if ($element.omos!=null) elems.addAll($element.omos);} )+ )

 | ^(ALT elementOptions? EPSILON)
     {$altCodeBlock = controller.epsilon(controller.getCurrentOuterMostAlt(), outerMost);}
  ;

element returns [List<? extends SrcOp> omos]
 : labeledElement     {$omos = $labeledElement.omos;}
 | atom[null,false]   {$omos = $atom.omos;}
 | subrule       {$omos = $subrule.omos;}
 |   ACTION       {$omos = controller.action((ActionAST)$ACTION);}
 |   SEMPRED       {$omos = controller.sempred((ActionAST)$SEMPRED);}
 | ^(ACTION elementOptions)  {$omos = controller.action((ActionAST)$ACTION);}
 |   ^(SEMPRED elementOptions)  {$omos = controller.sempred((ActionAST)$SEMPRED);}
 ;

labeledElement returns [List<? extends SrcOp> omos]
 : ^(ASSIGN ID atom[$ID,false] )   {$omos = $atom.omos;}
 | ^(PLUS_ASSIGN ID atom[$ID,false])  {$omos = $atom.omos;}
 | ^(ASSIGN ID block[$ID,null] )   {$omos = $block.omos;}
 | ^(PLUS_ASSIGN ID block[$ID,null])  {$omos = $block.omos;}
 ;

subrule returns [List<? extends SrcOp> omos]
 : ^(OPTIONAL b=block[null,$OPTIONAL])
  {
  $omos = $block.omos;
  }
 | ( ^(op=CLOSURE b=block[null,null])
  | ^(op=POSITIVE_CLOSURE b=block[null,null])
  )
  {
  List<CodeBlockForAlt> alts = new ArrayList<CodeBlockForAlt>();
  SrcOp blk = $b.omos.get(0);
  CodeBlockForAlt alt = new CodeBlockForAlt(controller.delegate);
  alt.addOp(blk);
  alts.add(alt);
  SrcOp loop = controller.getEBNFBlock($op, alts); // "star it"
      hasLookaheadBlock |= loop instanceof PlusBlock || loop instanceof StarBlock;
      $omos = DefaultOutputModelFactory.list(loop);
  }
 |  block[null, null]     {$omos = $block.omos;}
   ;

blockSet[GrammarAST label, boolean invert] returns [List<SrcOp> omos]
   : ^(SET atom[label,invert]+) {$omos = controller.set($SET, $label, invert);}
   ;

/*
setElement
 : STRING_LITERAL
 | TOKEN_REF
 | ^(RANGE STRING_LITERAL STRING_LITERAL)
 ;
*/

// TODO: combine ROOT/BANG into one then just make new op ref'ing return value of atom/terminal...
// TODO: same for NOT
atom[GrammarAST label, boolean invert] returns [List<SrcOp> omos]
 : ^(NOT a=atom[$label, true])  {$omos = $a.omos;}
 | range[label]       {$omos = $range.omos;}
 | ^(DOT ID terminal[$label])
 | ^(DOT ID ruleref[$label])
   | ^(WILDCARD .)       {$omos = controller.wildcard($WILDCARD, $label);}
   | WILDCARD        {$omos = controller.wildcard($WILDCARD, $label);}
   |   terminal[label]     {$omos = $terminal.omos;}
   |   ruleref[label]     {$omos = $ruleref.omos;}
 | blockSet[$label, invert]  {$omos = $blockSet.omos;}
 ;

ruleref[GrammarAST label] returns [List<SrcOp> omos]
   : ^(RULE_REF ARG_ACTION? elementOptions?)  {$omos = controller.ruleRef($RULE_REF, $label,
$ARG_ACTION);}
   ;

range[GrammarAST label] returns [List<SrcOp> omos]
   : ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
   ;

terminal[GrammarAST label] returns [List<SrcOp> omos]
   :  ^(STRING_LITERAL .)   {$omos = controller.stringRef($STRING_LITERAL, $label);}
   | STRING_LITERAL     {$omos = controller.stringRef($STRING_LITERAL, $label);}
   | ^(TOKEN_REF ARG_ACTION .) {$omos = controller.tokenRef($TOKEN_REF, $label, $ARG_ACTION);}
   | ^(TOKEN_REF .)    {$omos = controller.tokenRef($TOKEN_REF, $label, null);}
   | TOKEN_REF     {$omos = controller.tokenRef($TOKEN_REF, $label, null);}
   ;

elementOptions
   : ^(ELEMENT_OPTIONS elementOption+)
   ;

elementOption
   : ID
   |  ^(ASSIGN ID ID)
   |  ^(ASSIGN ID STRING_LITERAL)
   |  ^(ASSIGN ID ACTION)
   |  ^(ASSIGN ID INT)
   ;
```

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/codegen/SourceGenTriggers.g
No license file was found, but licenses were detected in source scan.

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INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/parse/ANTLRLexer.java
No license file was found, but licenses were detected in source scan.

```
/*
This file contains the actual layout of the messages emitted by ANTLR.
This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "(<id>) <text>"

report(location, message, type) ::= "<type>(<message.id>): <location> <message.text>"
```

wantsSingleLineMessage() ::= "false"

Found in path(s):
* /opt/cola/permits/1192109359_1629132978.03/0/antlr4-4-7-2-sources-1-jar/org/antlr/v4/tool/templates/messages/formats/antlr.stg

# 1.140 java-utils 1.8.0

## 1.140.1 Available under license :

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```
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/maven-v4_0_0.xsd">
 <modelVersion>4.0.0</modelVersion>
 <groupId>com.nordstrom.tools</groupId>
 <artifactId>java-utils</artifactId>
 <packaging>jar</packaging>

 <name>Java Utils</name>
 <description>Nordstrom Java Utils is a small collection of general-purpose utility classes with wide
applicability.</description>
 <url>https://github.com/Nordstrom/Java-Utils</url>

 <licenses>
   <license>
     <name>The Apache License, Version 2.0</name>
     <url>http://www.apache.org/licenses/LICENSE-2.0.txt</url>
   </license>
 </licenses>

 <developers>
   <developer>
     <name>Scott Babcock</name>
     <email>scoba@hotmail.com</email>
     <organization>Nordstrom</organization>
     <organizationUrl>https://shop.nordstrom.com</organizationUrl>
   </developer>
 </developers>

 <properties>
   <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
   <maven.compiler.source>1.8</maven.compiler.source>
   <maven.compiler.target>1.8</maven.compiler.target>
   <testng.version>6.11</testng.version>
   <surefire-plugin.version>2.19.1</surefire-plugin.version>
   <source-plugin.version>3.0.1</source-plugin.version>
```

```
    <javadoc-plugin.version>2.10.4</javadoc-plugin.version>
    <gpg-plugin.version>1.6</gpg-plugin.version>
    <staging-plugin.version>1.6.7</staging-plugin.version>
    <release-plugin.version>2.5.3</release-plugin.version>
    <apache-derby.version>10.14.1.0</apache-derby.version>
  </properties>

  <scm>
    <connection>scm:git:https://github.com/Nordstrom/Java-Utils.git</connection>
    <developerConnection>scm:git:https://github.com/Nordstrom/Java-Utils.git</developerConnection>
    <url>https://github.com/Nordstrom/Java-Utils/tree/master</url>
    <tag>java-utils-1.8.0</tag>
  </scm>

  <distributionManagement>
    <snapshotRepository>
      <id>ossrh</id>
      <url>https://oss.sonatype.org/content/repositories/snapshots</url>
    </snapshotRepository>
    <repository>
      <id>ossrh</id>
      <url>https://oss.sonatype.org/service/local/staging/deploy/maven2/</url>
    </repository>
  </distributionManagement>

  <dependencyManagement>
    <dependencies>
      <dependency>
        <groupId>org.testng</groupId>
        <artifactId>testng</artifactId>
        <version>${testng.version}</version>
      </dependency>
      <dependency>
        <groupId>org.apache.derby</groupId>
        <artifactId>derby</artifactId>
        <version>${apache-derby.version}</version>
      </dependency>
    </dependencies>
  </dependencyManagement>

  <dependencies>
    <dependency>
      <groupId>org.testng</groupId>
      <artifactId>testng</artifactId>
      <scope>test</scope>
    </dependency>
    <dependency>
      <groupId>org.apache.derby</groupId>
  <artifactId>derby</artifactId>
  <scope>test</scope>
 </dependency>
</dependencies>

<build>
 <pluginManagement>
  <plugins>
   <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-source-plugin</artifactId>
    <version>${source-plugin.version}</version>
   </plugin>
   <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-surefire-plugin</artifactId>
    <version>${surefire-plugin.version}</version>
   </plugin>
   <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-javadoc-plugin</artifactId>
    <version>${javadoc-plugin.version}</version>
   </plugin>
   <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-gpg-plugin</artifactId>
    <version>${gpg-plugin.version}</version>
   </plugin>
   <plugin>
    <groupId>org.sonatype.plugins</groupId>
    <artifactId>nexus-staging-maven-plugin</artifactId>
    <version>${staging-plugin.version}</version>
   </plugin>
   <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-release-plugin</artifactId>
    <version>${release-plugin.version}</version>
   </plugin>
  </plugins>
 </pluginManagement>
 <plugins>
  <plugin>
   <groupId>org.apache.maven.plugins</groupId>
   <artifactId>maven-source-plugin</artifactId>
   <executions>
    <execution>
     <id>attach-sources</id>
     <goals>
```

```
        <goal>jar-no-fork</goal>
      </goals>
    </execution>
  </executions>
</plugin>
<plugin>
  <groupId>org.apache.maven.plugins</groupId>
  <artifactId>maven-surefire-plugin</artifactId>
</plugin>
<plugin>
  <groupId>org.apache.maven.plugins</groupId>
  <artifactId>maven-javadoc-plugin</artifactId>
  <executions>
    <execution>
      <id>attach-javadocs</id>
      <goals>
        <goal>jar</goal>
      </goals>
    </execution>
  </executions>
</plugin>
<plugin>
  <groupId>org.apache.maven.plugins</groupId>
  <artifactId>maven-gpg-plugin</artifactId>
  <executions>
    <execution>
      <id>sign-artifacts</id>
      <phase>verify</phase>
      <goals>
        <goal>sign</goal>
      </goals>
      <configuration>
        <keyname>${gpg.keyname}</keyname>
        <passphraseServerId>${gpg.keyname}</passphraseServerId>
        <skip>${skipSigning}</skip>
      </configuration>
    </execution>
  </executions>
</plugin>
<plugin>
  <groupId>org.sonatype.plugins</groupId>
  <artifactId>nexus-staging-maven-plugin</artifactId>
  <extensions>true</extensions>
  <configuration>
    <serverId>ossrh</serverId>
    <nexusUrl>https://oss.sonatype.org/</nexusUrl>
    <autoReleaseAfterClose>true</autoReleaseAfterClose>
  </configuration>
```

```
   </plugin>
   <plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-release-plugin</artifactId>
    <configuration>
     <autoVersionSubmodules>true</autoVersionSubmodules>
     <useReleaseProfile>false</useReleaseProfile>
     <releaseProfiles>release</releaseProfiles>
     <goals>deploy</goals>
    </configuration>
   </plugin>
  </plugins>
 </build>

 <profiles>
  <profile>
   <id>signing</id>
   <properties>
    <skipSigning>false</skipSigning>
   </properties>
  </profile>
 </profiles>
 <version>1.8.0</version>
</project>
```

Found in path(s):
* /opt/cola/permits/1274702573_1645234284.2/0/java-utils-1-8-0-sources-jar/META-INF/maven/com.nordstrom.tools/java-utils/pom.xml

# 1.141 apache-commons-collections 4.1

## 1.141.1 Available under license :

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* /opt/cola/permits/1162864060_1620923813.28/0/netty-transport-native-unix-common-4-1-37-final-sources-2-jar/io/netty/channel/unix/DomainSocketChannel.java
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* /opt/cola/permits/1162864060_1620923813.28/0/netty-transport-native-unix-common-4-1-37-final-sources-2-jar/io/netty/channel/unix/DomainSocketChannelConfig.java

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* /opt/cola/permits/1162864060_1620923813.28/0/netty-transport-native-unix-common-4-1-37-final-sources-2-jar/io/netty/channel/unix/SocketWritableByteChannel.java
* /opt/cola/permits/1162864060_1620923813.28/0/netty-transport-native-unix-common-4-1-37-final-sources-2-jar/io/netty/channel/unix/PeerCredentials.java
* /opt/cola/permits/1162864060_1620923813.28/0/netty-transport-native-unix-common-4-1-37-final-sources-2-jar/io/netty/channel/unix/Limits.java
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* /opt/cola/permits/1162864060_1620923813.28/0/netty-transport-native-unix-common-4-1-37-final-sources-2-jar/io/netty/channel/unix/IovArray.java
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jar/META-INF/maven/io.netty/netty-transport-native-unix-common/pom.xml

# 1.144 io-grpc-grpc-context 1.38.0

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Jackson is a high-performance, Free/Open Source JSON processing library. It was originally written by Tatu Saloranta (tatu.saloranta@iki.fi), and has been in development since 2007. It is currently developed by a community of developers, as well as supported commercially by FasterXML.com.

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## 1.146 iterators 1.5

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* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/SerialIterableIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/decorators/Reverse.java
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* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/decorators/Flattened.java
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* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/SingletonIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/filters/Distinct.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/CsvIterator.java
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* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/UnquotedSplit.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/ArrayIterable.java

# 1.147 pact-jvm-provider 4.0.10

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Found in path(s):

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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/FieldWriter.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/TypeReference.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/ClassReader.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/ClassTooLargeException.java

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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/signature/SignatureReader.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/ClassVisitor.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/SymbolTable.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/MethodWriter.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/Handle.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/ByteVector.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/Frame.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/ModuleVisitor.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/Type.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/CurrentFrame.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/ClassWriter.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/Opcodes.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/FieldVisitor.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/jar/asm/MethodTooLargeException.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/LatentMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/utility/visitor/StackAwareMethodVisitor.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/DeclaringMethodMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/attribute/package-info.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/FieldTypeMatcher.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bind/DeclaringTypeResolver.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/member/HandleInvocation.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bind/MethodNameEqualityResolver.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/constant/ClassConstant.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bind/annotation/package-info.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/dynamic/loading/ByteArrayClassLoader.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/asm/TypeConstantAdjustment.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/collection/ArrayAccess.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/asm/TypeReferenceAdjustment.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/TypeSortMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/FilterableList.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/dynamic/scaffold/InstrumentedType.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/utility/StreamDrainer.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/TypeCreation.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/MethodOverrideMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/DeclaringTypeMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/build/package-

info.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/DeclaringAnnotationMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bind/MethodDelegationBinder.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/MethodParametersMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/constant/SerializedConstant.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/type/TypeDefinition.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/field/FieldList.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/ModifierMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/collection/CollectionFactory.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/type/TypeVariableToken.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/modifier/MethodStrictness.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/MethodCall.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/utility/visitor/ExceptionTableSensitiveMethodVisitor.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/assign/package-info.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bind/package-info.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/build/ToStringPlugin.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/auxiliary/AuxiliaryType.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/HasSuperTypeMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/agent/builder/ResettableClassFileTransformer.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/dynamic/scaffold/subclass/package-info.java

* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/auxiliary/TypeProxy.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/field/package-info.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/utility/privilege/SetAccessibleAction.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/StubMethod.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/dynamic/scaffold/subclass/ConstructorStrategy.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/CachingMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/modifier/Visibility.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/DeclaringFieldMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/ElementMatchers.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/NamedElement.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/modifier/FieldManifestation.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/modifier/ProvisioningState.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/assign/reference/package-info.java
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jar/net/bytebuddy/asm/MemberSubstitution.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/dynamic/scaffold/inline/AbstractInliningDynamicTypeBuilder.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/MethodSortMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/DeclaredByType.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/attribute/FieldAttributeAppender.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/dynamic/scaffold/TypeValidation.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/assign/primitive/PrimitiveUnboxingDelegate.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bind/annotation/Super.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/utility/package-info.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bind/annotation/FieldProxy.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/enumeration/package-info.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/NullMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/build/BuildLogger.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/dynamic/scaffold/inline/DecoratingDynamicTypeBuilder.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/SuperMethodCall.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/ArrayTypeMatcher.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/SignatureTokenMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/MethodParameterTypeMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/implementation/bytecode/assign/primitive/PrimitiveTypeAwareAssigner.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/asm/AsmVisitorWrapper.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/dynamic/loading/InjectionClassLoader.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/CollectionItemMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/FailSafeMatcher.java
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/matcher/VisibilityMatcher.java
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* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/net/bytebuddy/description/annotation/AnnotationSource.java
No license file was found, but licenses were detected in source scan.

```
Manifest-Version: 1.0
Bundle-Description: Byte Buddy is a Java library for creating Java cla
 sses at run time.        This artifact is a build of Byte Buddy with
 all ASM dependencies repackaged into its own name space.
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.txt
Bundle-SymbolicName: net.bytebuddy.byte-buddy
Built-By: rafael
Bnd-LastModified: 1542907385818
Bundle-ManifestVersion: 2
Tool: Bnd-3.5.0.201709291849
Main-Class: net.bytebuddy.build.Plugin$Engine$Default
Export-Package: net.bytebuddy;version="1.9.5",net.bytebuddy.agent.buil
 der;version="1.9.5",net.bytebuddy.asm;version="1.9.5",net.bytebuddy.b
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 mplementation;version="1.9.5",net.bytebuddy.implementation.attribute;
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version="1.9.5",net.bytebuddy.implementation.auxiliary;version="1.9.5
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9.5",net.bytebuddy.jar.asm;version="1.9.5",net.bytebuddy.jar.asm.sign
ature;version="1.9.5",net.bytebuddy.jar.asm.commons;version="1.9.5"
Bundle-Name: Byte Buddy (without dependencies)
Bundle-Version: 1.9.5
Multi-Release: true
Created-By: Apache Maven Bundle Plugin
Build-Jdk: 1.8.0_191

Found in path(s):
* /opt/cola/permits/1274702924_1649800814.97/0/byte-buddy-1-9-5-sources-jar/META-INF/MANIFEST.MF

# 1.152 opentelemetry 0.9.1

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# 1.153 io-grpc-grpc-api 1.38.0

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# 1.155 atomicfu-common 0.14.1

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# 1.162 pact-jvm-core-support 4.0.10

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# 1.163 micrometer-bom 1.7.1

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*
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*
* Hosted at: https://github.com/classgraph/classgraph
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*
* Author: Michael J. Simons
*
* Hosted at: https://github.com/classgraph/classgraph
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*
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*
* Hosted at: https://github.com/classgraph/classgraph
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*
* Author: Luke Hutchison
*
* Hosted at: https://github.com/classgraph/classgraph
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* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ObjectTypedValueWrapper.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ClassGraph.java
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* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classloaderhandler/TomcatWebappClassLoaderBaseHandler.java
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* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ModulePathInfo.java
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* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classpath/CallStackReader.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/TypeArgument.java
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* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/AnnotationParameterValueList.java
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* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/utils/InputStreamOrByteBufferAdapter.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/TypeParameter.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ClassRefTypeSignature.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/json/ReferenceEqualityKey.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ArrayTypeSignature.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/MethodInfoList.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/concurrency/SingletonMap.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/json/ParameterizedTypeImpl.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/concurrency/WorkQueue.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classloaderhandler/PlexusClassWorldsClassRealmClassLoaderHandler.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/json/ClassFields.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/types/ParseException.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/json/JSONReference.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/Resource.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/fastzipfilereader/NestedJarHandler.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/recycler/Recycler.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/utils/Join.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/TypeVariableSignature.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ClassRefOrTypeVariableSignature.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classpath/ClasspathFinder.java

* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ClassInfo.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classloaderhandler/EquinoxClassLoaderHandler.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ScanResult.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classpath/ClasspathOrder.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ClasspathElementModule.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/fastzipfilereader/FastZipEntry.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/AnnotationParameterValue.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ClassGraphClassLoader.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/GraphvizDotfileGenerator.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/ScanSpec.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/json/JSONSerializer.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classloaderhandler/ParentLastDelegationOrderTestClassLoaderHandler.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/MappableInfoList.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/Scanner.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/BaseTypeSignature.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classloaderhandler/OSGiDefaultClassLoaderHandler.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/AnnotationInfoList.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/utils/CollectionUtils.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/classloaderhandler/JPMSClassLoaderHandler.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/recycler/RecycleOnClose.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/utils/FastPathResolver.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/utils/FileUtils.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/json/TypeResolutions.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/HasName.java

* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/FieldInfo.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/TypeSignature.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ClassGraphException.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ModuleRef.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/json/Id.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/io/github/classgraph/ClasspathElement.java
* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/json/JSONDeserializer.java

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*
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*
* Hosted at: https://github.com/classgraph/classgraph
*
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/*
* This file is part of ClassGraph.
*
* Author: Johno Crawford (johno@sulake.com)
*
* Hosted at: https://github.com/classgraph/classgraph
*
* --
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* /opt/cola/permits/1162864585_1620923804.39/0/classgraph-4-8-25-sources-1-jar/nonapi/io/github/classgraph/concurrency/AutoCloseableExecutorService.java
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## 1.166 kotlin 1.7.10

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# 1.167 okio 2.6.0

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* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/commonMain/okio/Timeout.kt
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* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/RealBufferedSink.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/BufferedSink.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/ForwardingSink.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/ForwardingSource.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/GzipSource.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/commonMain/okio/Segment.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/RealBufferedSource.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/Source.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/GzipSink.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/commonMain/okio/SegmentPool.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/InflaterSource.kt
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* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/commonMain/okio/PeekSource.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/DeprecatedOkio.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/DeprecatedUtf8.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/DeprecatedUpgrade.kt
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* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/commonMain/okio/Options.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/HashingSink.kt
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* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/commonMain/okio/internal/SegmentedByteString.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/commonMain/okio/internal/RealBufferedSource.kt

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* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/jvmMain/okio/ForwardingTimeout.kt
* /opt/cola/permits/1354450859_1656588145.2490468/0/okio-2-6-0-sources-1-jar/commonMain/okio/SegmentedByteString.kt
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# 1.168 project-lombok 1.18.6

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# 1.169 kqueue 4.1.37.Final

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* /opt/cola/permits/1162864942_1654206630.0690522/0/netty-transport-native-kqueue-4-1-37-final-jar/META-INF/maven/io.netty/netty-transport-native-kqueue/pom.xml

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```
Manifest-Version: 1.0
Implementation-Title: Netty/Transport/Native/KQueue
Bundle-Description: Netty is an asynchronous event-driven network appl
ication framework for    rapid development of maintainable high perfo
```

```
rmance protocol servers and    clients.
Automatic-Module-Name: io.netty.transport.kqueue
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0
Bundle-SymbolicName: io.netty.transport-native-kqueue
Implementation-Version: 4.1.37.Final
Built-By: norman
Bnd-LastModified: 1561713734751
Bundle-ManifestVersion: 2
Implementation-Vendor-Id: io.netty
Bundle-DocURL: http://netty.io/
Bundle-Vendor: The Netty Project
Import-Package: io.netty.buffer;version="[4.1,5)",io.netty.channel,io.
netty.channel.socket;version="[4.1,5)",io.netty.channel.unix;version=
"[4.1,5)",io.netty.util;version="[4.1,5)",io.netty.util.collection;ve
rsion="[4.1,5)",io.netty.util.concurrent;version="[4.1,5)",io.netty.u
til.internal;version="[4.1,5)",io.netty.util.internal.logging;version
="[4.1,5)",sun.nio.ch;resolution:=optional,org.eclipse.jetty.npn;vers
ion="[1,2)";resolution:=optional,org.eclipse.jetty.alpn;version="[1,2
)";resolution:=optional
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.6))"
Tool: Bnd-2.4.1.201501161923
Implementation-Vendor: The Netty Project
Export-Package: io.netty.channel.kqueue;uses:="io.netty.buffer,io.nett
y.channel,io.netty.channel.socket,io.netty.channel.unix,io.netty.util
.concurrent";version="4.1.37"
Bundle-Name: Netty/Transport/Native/KQueue
Bundle-Version: 4.1.37.Final
Created-By: Apache Maven Bundle Plugin
Build-Jdk: 1.8.0_181
Implementation-URL: http://netty.io/netty-transport-native-kqueue/
```

Found in path(s):
* /opt/cola/permits/1162864942_1654206630.0690522/0/netty-transport-native-kqueue-4-1-37-final-jar/META-INF/MANIFEST.MF

# 1.170 postgresql-jdbc-driver-pgjdbc 42.4.1

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# 1.171 bom 4.1.67.Final

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* https://github.com/eclipse-ee4j/jersey

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* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/UnexpectedCharacterException.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/LexerException.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/package-info.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/Greater.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-

jar/com/github/zafarkhaja/semver/expr/Expression.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/MetadataVersion.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/VersionParser.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/NormalVersion.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/Not.java
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# 1.177 io-grpc-grpc-core 1.38.0

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reactor.core.scheduler.ReactorBlockHoundIntegration

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* /opt/cola/permits/1414795136_1663054594.6906533/0/reactor-core-3-4-14-jar/META-INF/services/reactor.blockhound.integration.BlockHoundIntegration

# 1.180 guava-internalfuturefailureaccess-and-internalfutures 1.0.1

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* /opt/cola/permits/1130987386_1612872111.26/0/failureaccess-1-0-1-sources-jar/com/google/common/util/concurrent/internal/InternalFutureFailureAccess.java
* /opt/cola/permits/1130987386_1612872111.26/0/failureaccess-1-0-1-sources-jar/com/google/common/util/concurrent/internal/InternalFutures.java

## 1.181 ktor-server-core 1.2.6

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```

Found in path(s):

* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/AbstractClassTypeConstructor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/structure/javaTypes.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/JvmPackageScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/IncompatibleVersionErrorData.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/OverridingStrategy.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/Annotations.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/KotlinMetadataFinder.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KClassifierImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/structure/javaElements.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ClassifierDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/typeEnhancement/typeEnhancement.kt

* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/ErasedOverridabilityCondition.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/TypeIntersectionScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/TypeProjectionBase.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/context.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/AbstractTypeConstructor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/full/exceptions.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/AbstractTypeParameterDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/FlexibleTypeDeserializer.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/typeEnhancement/predefinedEnhancementInfo.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/constants/IntegerValueTypeConstructor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/MetadataPackageFragmentProvider.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/full/KClassifiers.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KotlinReflectionInternalError.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaTypeParameterDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/AbstractClassDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/RawType.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AbstractDeserializedPackageFragmentProvider.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/TypeCheckingProcedure.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/typeEnhancement/typeQualifiers.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/TypeSubstitutor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ClassifierDescriptorWithTypeParameters.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/KTypesJvm.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KTypeParameterImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/TypeCapabilities.kt

* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/SuperCallReceiverValue.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/context.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/GivenFunctionsMemberScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/KotlinTypeCheckerImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/TypeAliasDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/components/JavaPropertyInitializerEvaluator.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ValueDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/types/JavaTypeResolver.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/MemberSignature.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/TypeSubstitution.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaAnnotationDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/IntersectionTypeConstructor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/renderer/DescriptorRendererOptionsImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/DeserializationComponentsForJava.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AnnotationDeserializer.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/flexibleTypes.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/ClassicTypeCheckerContext.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/DescriptorEquivalenceForOverrides.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/KotlinTypeChecker.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/ErrorUtils.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/FunctionPlaceholders.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/renderer/ClassifierNamePolicy.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/SmartList.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/descriptors/DeserializedTypeParameterDescriptor.kt

* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/JavaFlexibleTypeDeserializer.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/full/KTypes.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/utils.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ClassConstructorDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/DFS.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/calls/inference/CapturedTypeConstructor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/types/RawType.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/dynamicTypes.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/CapturedTypeApproximation.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/constants/CompileTimeConstant.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/functions.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotationsImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/full/KClasses.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/methodSignatureBuilding.kt
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/moduleByClassLoader.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-

jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/SubstitutingScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/DeclarationDescriptorNonRootImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotationWithTarget.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/TypeParameterDescriptorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/CompositionTypeSubstitution.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/ReceiverValue.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/coreLib.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaStaticScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/AbstractScopeAdapter.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ValueParameterDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/incremental/components/LookupTracker.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/AbstractReceiverParameterDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/util.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/resolvers.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/DeserializedPackageFragment.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/DeclarationDescriptorVisitor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/pcollections/IntTreePMap.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KFunctionImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/StaticScopeForKotlinEnum.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PackageViewDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/AbstractBinaryClassAnnotationAndConstantLoader.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/name/FqNameUnsafe.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ScriptDescriptor.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/PropertySetterDescriptorImpl.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KParameterImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/DeclarationDescriptorNonRoot.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/StarProjectionImpl.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/JavaCallableMemberDescriptor.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/Visibility.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/LocalClassifierTypeSettings.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/ImplicitClassReceiver.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/FieldOverridabilityCondition.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaModifierListOwner.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/ReflectionObjectRenderer.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/storage/ObservableStorageManager.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ParameterDescriptor.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/components/TypeUsage.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/ReflectionFactoryImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/incremental/utils.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/DeserializedClassDataFinder.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AnnotatedCallableKind.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/DeclarationDescriptorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/JvmAnnotationNames.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/LazyPackageViewDescriptorImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotatedImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/ExtensionReceiver.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/jvm/JavaDescriptorResolver.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/LazyJavaAnnotations.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/MemberScopeImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KPackageImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/overridingUtils.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/ClassDeserializer.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/DescriptorFactory.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/TypeCheckingProcedureCallbacks.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/Receiver.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/SerializerExtensionProtocol.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-

jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/JavaPropertyDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/exceptionUtils.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PropertySetterDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/CastImplicitClassReceiver.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/descriptors/DeserializedAnnotations.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/Printer.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/LazyJavaPackageFragmentProvider.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/constants/constantValues.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/sources/JavaSourceElementFactory.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/header/KotlinClassHeader.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/name/Name.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/renderer/RenderingUtils.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/ClassDescriptorBase.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/components/ReflectAnnotationSource.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KProperty1Impl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/util/scopeUtils.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/incremental/components/LookupLocation.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/components/DescriptorResolverUtils.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/VariableDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaElement.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/LazyScopeAdapter.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/WrappedValues.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KProperty0Impl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/VariableDescriptorWithInitializerImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-

jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/ResolutionScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/constants/ConstantValueFactory.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/capitalizeDecapitalize.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/AbstractLazyTypeParameterDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/util.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/InnerClassesScopeWrapper.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/jvm/JvmPrimitiveType.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/DeclarationDescriptorWithSource.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/ClassTypeConstructorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/VariableAccessorDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PackageFragmentProvider.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/TypeCheckerProcedureCallbacksImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/SmartSet.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/JvmAnnotationNames.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/PropertyAccessorDescriptorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/SimpleFunctionDescriptorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/util/ModuleVisibilityHelper.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/ProtoContainer.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/ProtoEnumFlags.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/DeclarationDescriptorVisitorEmptyBodies.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/ErrorReporter.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/JavaMethodDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/KotlinJvmBinaryPackageSourceElement.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/storage/storage.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-

jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotationDescriptorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/strings.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/SourceElement.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/annotationUtil.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/Variance.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/functions/FunctionClassScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/functions/BuiltInFictitiousFunctionClassFactory.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/ReflectJvmMapping.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/TypeProjectionImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/functions/FunctionInvokeDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/VariableDescriptorWithAccessors.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/BinaryClassAnnotationAndConstantLoaderImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/DefaultBuiltIns.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/SimpleFunctionDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/JavaClassFinder.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/name/FqNamesUtil.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KTypeImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/specialBuiltinMembers.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/VariableDescriptorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/name/FqName.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/pcollections/IntTree.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/ModuleClassResolver.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/MemberComparator.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/KotlinJvmBinaryClass.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-

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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/JavaIncompatibilityRulesOverridabilityCondition.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/JavaClassDataFinder.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PropertyAccessorDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/DeserializedDescriptorResolver.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/CallableDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/DescriptorSubstitutor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ClassKind.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/pcollections/MapEntry.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PropertyDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/KotlinClassFinder.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/ModuleDescriptorImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/FakePureImplementationsProvider.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/ClassDataFinder.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/typeParameterUtils.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/descriptors/DeserializedPackageMemberScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/ReceiverParameterDescriptorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/DisjointKeysUnionTypeSubstitution.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/CompanionObjectMapping.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/ExternalOverridabilityCondition.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AnnotationAndConstantLoader.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ConstUtil.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/PackageFragmentDescriptorImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/KCallablesJvm.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-

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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PackageFragmentProviderImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/ValueParameterDescriptorImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/reflectLambda.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/ChainedMemberScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/components/RuntimeErrorReporter.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/propertiesConventionUtil.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/descriptors/DeserializedMemberScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/EmptyContainerForLocal.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/VisibilityUtil.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/DeclarationDescriptorWithVisibility.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KClassImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/TypeProjection.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/components/SignaturePropagator.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/storage/NoLock.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PropertyGetterDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AnnotationAndConstantLoaderImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/AbstractReceiverValue.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/components/JavaResolverCache.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/name/ClassId.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/MemberDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KProperty2Impl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/ImplicitReceiver.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/KotlinRetention.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/KClassesJvm.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/DeclaredMemberIndex.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/name/SpecialNames.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PackageFragmentDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/TypeParameterDescriptor.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotationUseSiteTarget.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/PrimitiveType.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/pcollections/ConsPStack.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/pcollections/HashPMap.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaPackageFragment.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/KDeclarationContainerImpl.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/DeclarationDescriptor.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/LazyClassReceiverParameterDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/JavaVisibilities.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-

jar/kotlin/reflect/jvm/internal/impl/load/kotlin/KotlinJvmBinarySourceElement.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/structure/annotationArguments.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaClassifierType.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaStaticClassScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ConstructorDescriptor.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/components/SamConversionResolver.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/BuiltInsLoader.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/full/KProperties.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/NewKotlinTypeChecker.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaWildcardType.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/IntersectionType.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaPackage.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/ClassConstructorDescriptorImpl.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-

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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaConstructor.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/components/ReflectKotlinClass.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/Modality.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/incremental/components/ExpectActualTracker.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaScope.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/JavaClassConstructorDescriptor.java
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/deserialization/AdditionalClassPartsProvider.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/util/modifierChecks.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/typeEnhancement/signatureEnhancement.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaValueParameter.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/components/ReflectKotlinClassFinder.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaMember.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/Substitutable.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/components/RuntimeModuleData.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaClassMemberScope.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/Visibilities.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/DeserializedPackageFragmentImpl.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/OverridingUtil.java
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/util/OperatorNameConventions.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/JavaClassesTracker.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/deserialization/PlatformDependentDeclarationFilter.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/runtime/structure/ReflectJavaClass.kt
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* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/InvalidModuleException.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/TypeAliasConstructorDescriptor.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/BuiltInsPackageFragment.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/name/NameUtils.kt
* /opt/cola/permits/1136972820_1613985925.71/0/kotlin-reflect-1-3-71-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/NewCapturedType.kt
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// A seemingly obvious way to come about this case would be to declare a special exception class, but the problem is that

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## 1.183 testng 6.14.3

## 1.184 kotlinx-coroutines-io-jvm 0.1.16

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```

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* /opt/cola/permits/1162864466_1620924146.81/0/kotlinx-coroutines-io-jvm-0-1-16-sources-1-jar/commonMain/kotlinx/coroutines/io/ByteChannelCtor.kt

## 1.185 cloudevents---api 2.1.1

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 -->
```

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* /opt/cola/permits/1337069596_1654221635.0898836/0/cloudevents-api-2-1-1-jar/META-

INF/maven/io.cloudevents/cloudevents-api/pom.xml

# 1.186 junit-foundation 9.1.2

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# 1.188 junit-jupiter-junit-jupiter-api 5.7.0

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# 1.189 jakarta-activation 1.1

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# 1.190 swagger-models 1.6.2

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package io.swagger.models;

import com.fasterxml.jackson.annotation.JsonAnyGetter;

```
import com.fasterxml.jackson.annotation.JsonAnySetter;

import java.util.LinkedHashMap;
import java.util.Map;

public class License {
  private Map<String, Object> vendorExtensions = new LinkedHashMap<String, Object>();
  private String name;
  private String url;

  public License name(String name) {
    setName(name);
    return this;
  }

  public License url(String url) {
    setUrl(url);
    return this;
  }

  public String getName() {
    return name;
  }

  public void setName(String name) {
    this.name = name;
  }

  public String getUrl() {
    return url;
  }

  public void setUrl(String url) {
    this.url = url;
  }

  @JsonAnyGetter
  public Map<String, Object> getVendorExtensions() {
    return vendorExtensions;
  }

  @JsonAnySetter
  public void setVendorExtension(String name, Object value) {
    if (name.startsWith("x-")) {
      vendorExtensions.put(name, value);
    }
  }
```

```
public void setVendorExtensions(Map<String, Object> vendorExtensions) {
    this.vendorExtensions = vendorExtensions;
}

@Override
public int hashCode() {
    final int prime = 31;
    int result = 1;
    result = prime * result + ((name == null) ? 0 : name.hashCode());
    result = prime * result + ((url == null) ? 0 : url.hashCode());
    result = prime * result + ((vendorExtensions == null) ? 0 : vendorExtensions.hashCode());
    return result;
}

@Override
public boolean equals(Object obj) {
    if (this == obj) {
        return true;
    }
    if (obj == null) {
        return false;
    }
    if (getClass() != obj.getClass()) {
        return false;
    }
    License other = (License) obj;
    if (name == null) {
        if (other.name != null) {
            return false;
        }
    } else if (!name.equals(other.name)) {
        return false;
    }
    if (url == null) {
        if (other.url != null) {
            return false;
        }
    } else if (!url.equals(other.url)) {
        return false;
    }
    if (vendorExtensions == null) {
        if (other.vendorExtensions != null) {
            return false;
        }
    } else if (!vendorExtensions.equals(other.vendorExtensions)) {
        return false;
    }
    return true;
```

```
  }
}
```

Found in path(s):

* /opt/cola/permits/1340031769_1654618404.1267035/0/swagger-models-1-6-2-sources-1-jar/io/swagger/models/License.java

No license file was found, but licenses were detected in source scan.

```
package io.swagger.models;

import com.fasterxml.jackson.annotation.JsonAnyGetter;
import com.fasterxml.jackson.annotation.JsonAnySetter;

import java.util.LinkedHashMap;
import java.util.Map;

public class Info {
  private String description;
  private String version;
  private String title;
  private String termsOfService;
  private Contact contact;
  private License license;
  private Map<String, Object> vendorExtensions = new LinkedHashMap<String, Object>();

  public Info version(String version) {
    this.setVersion(version);
    return this;
  }

  public Info title(String title) {
    this.setTitle(title);
    return this;
  }

  public Info description(String description) {
    this.setDescription(description);
    return this;
  }

  public Info termsOfService(String termsOfService) {
    this.setTermsOfService(termsOfService);
    return this;
  }

  public Info contact(Contact contact) {
    this.setContact(contact);
    return this;
```

```
}

public Info license(License license) {
    this.setLicense(license);
    return this;
}

public String getDescription() {
    return description;
}

public void setDescription(String description) {
    this.description = description;
}

public String getVersion() {
    return version;
}

public void setVersion(String version) {
    this.version = version;
}

public String getTitle() {
    return title;
}

public void setTitle(String title) {
    this.title = title;
}

public String getTermsOfService() {
    return termsOfService;
}

public void setTermsOfService(String termsOfService) {
    this.termsOfService = termsOfService;
}

public Contact getContact() {
    return contact;
}

public void setContact(Contact contact) {
    this.contact = contact;
}

public License getLicense() {
        return license;
    }

    public void setLicense(License license) {
        this.license = license;
    }

    public Info mergeWith(Info info) {
        if (info != null) {
            if (this.description == null) {
                this.description = info.description;
            }
            if (this.version == null) {
                this.version = info.version;
            }
            if (this.title == null) {
                this.title = info.title;
            }
            if (this.termsOfService == null) {
                this.termsOfService = info.termsOfService;
            }
            if (this.contact == null) {
                this.contact = info.contact;
            }
            if (this.license == null) {
                this.license = info.license;
            }
            if (this.vendorExtensions == null) {
                this.vendorExtensions = info.vendorExtensions;
            }
        }
        return this;
    }

    @JsonAnyGetter
    public Map<String, Object> getVendorExtensions() {
        return vendorExtensions;
    }

    @JsonAnySetter
    public void setVendorExtension(String name, Object value) {
        if (name.startsWith("x-")) {
            vendorExtensions.put(name, value);
        }
    }

  public void setVendorExtensions(Map<String, Object> vendorExtensions) {
        this.vendorExtensions = vendorExtensions;
```

```
}

@Override
public int hashCode() {
    final int prime = 31;
    int result = 1;
    result = prime * result + ((contact == null) ? 0 : contact.hashCode());
    result = prime * result
            + ((description == null) ? 0 : description.hashCode());
    result = prime * result + ((license == null) ? 0 : license.hashCode());
    result = prime * result
            + ((termsOfService == null) ? 0 : termsOfService.hashCode());
    result = prime * result + ((title == null) ? 0 : title.hashCode());
    result = prime * result
            + ((vendorExtensions == null) ? 0 : vendorExtensions.hashCode());
    result = prime * result + ((version == null) ? 0 : version.hashCode());
    return result;
}

@Override
public boolean equals(Object obj) {
    if (this == obj) {
        return true;
    }
    if (obj == null) {
        return false;
    }
    if (getClass() != obj.getClass()) {
        return false;
    }
    Info other = (Info) obj;
    if (contact == null) {
        if (other.contact != null) {
            return false;
        }
    } else if (!contact.equals(other.contact)) {
        return false;
    }
    if (description == null) {
        if (other.description != null) {
            return false;
        }
    } else if (!description.equals(other.description)) {
        return false;
    }
    if (license == null) {
        if (other.license != null) {
            return false;
            }
        } else if (!license.equals(other.license)) {
            return false;
        }
        if (termsOfService == null) {
            if (other.termsOfService != null) {
                return false;
            }
        } else if (!termsOfService.equals(other.termsOfService)) {
            return false;
        }
        if (title == null) {
            if (other.title != null) {
                return false;
            }
        } else if (!title.equals(other.title)) {
            return false;
        }
        if (vendorExtensions == null) {
            if (other.vendorExtensions != null) {
                return false;
            }
        } else if (!vendorExtensions.equals(other.vendorExtensions)) {
            return false;
        }
        if (version == null) {
            if (other.version != null) {
                return false;
            }
        } else if (!version.equals(other.version)) {
            return false;
        }
        return true;
    }
}
```

Found in path(s):
* /opt/cola/permits/1340031769_1654618404.1267035/0/swagger-models-1-6-2-sources-1-jar/io/swagger/models/Info.java

# 1.191 atomicfu 0.14.1

## 1.191.1 Available under license :

```
 =========================================================================
==  NOTICE file corresponding to the section 4 d of                    ==
==  the Apache License, Version 2.0,                                   ==
==  in this case for the kotlix.atomicfu library.                      ==
```

================================================================================

kotlinx.atoimcfu library.
Copyright 2017 JetBrains s.r.o and respective authors and developers

# 1.192 rocksdb-jni 5.18.4

## 1.192.1 Available under license :

No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RocksIteratorInterface.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/util/BytewiseComparator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/StatsLevel.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RocksIterator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/IndexType.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/DBOptionsInterface.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/TxnDBWritePolicy.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/EncodingType.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/CompactionPriority.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/WriteBatchInterface.java

* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/StatsCollectorInput.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RestoreOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Filter.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/OptionsUtil.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Transaction.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/CompressionOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/TransactionOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/BlockBasedTableConfig.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Statistics.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Env.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/EnvOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/IngestExternalFileOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ChecksumType.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Experimental.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Options.java.orig
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/MemoryUsageType.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/TickerType.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AbstractTransactionNotifier.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/WALRecoveryMode.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ClockCache.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/NativeComparatorWrapper.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AbstractCompactionFilterFactory.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/util/SizeUnit.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AbstractComparator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ComparatorType.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-

jar/org/rocksdb/TransactionalDB.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/BackupableDBOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RemoveEmptyValueCompactionFilter.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/BackupEngine.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/LRUCache.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Checkpoint.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/HistogramType.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/DirectSlice.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RocksMemEnv.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ColumnFamilyOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RateLimiterMode.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ColumnFamilyHandle.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AdvancedMutableColumnFamilyOptionsInterface.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Status.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/CompactionOptionsUniversal.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/StatisticsCollector.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/CompactionStyle.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Slice.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/WriteOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/PlainTableConfig.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/MemoryUtil.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/DBOptions.java.orig
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Options.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RocksObject.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/OptimisticTransactionOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AccessHint.java

* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Comparator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RocksCallbackObject.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/TransactionDB.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Logger.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/TransactionalOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/StatisticsCollectorCallback.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/WBWIRocksIterator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AbstractCompactionFilter.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/MutableColumnFamilyOptionsInterface.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/TtlDB.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Cache.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/DbPath.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RocksDB.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/BuiltinComparator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ReadOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/MutableColumnFamilyOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/WriteBatchWithIndex.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/TableFormatConfig.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/DirectComparator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AbstractSlice.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ColumnFamilyOptionsInterface.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ReadTier.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/TransactionDBOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/CompactRangeOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/CompactionOptionsFIFO.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/ColumnFamilyDescriptor.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AbstractWriteBatch.java

* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/util/ReverseBytewiseComparator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AdvancedColumnFamilyOptionsInterface.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RocksDBException.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/SstFileWriter.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/OptimisticTransactionDB.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/HistogramData.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RocksEnv.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/BackupInfo.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/SstFileManager.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/WriteBatch.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/Snapshot.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/DBOptions.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/CompressionType.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/BloomFilter.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/MemTableConfig.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/util/DirectBytewiseComparator.java
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/AbstractRocksIterator.java
No license file was found, but licenses were detected in source scan.

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Found in path(s):
* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/RateLimiter.java
No license file was found, but licenses were detected in source scan.

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* /opt/cola/permits/1162865544_1654673653.8172822/0/rocksdbjni-5-18-4-sources-jar/org/rocksdb/StringAppendOperator.java

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Amendment II

A well regulated militia, being necessary to the security of a free state, the right of the people to keep and bear arms, shall not be infringed.

Amendment III

No soldier shall, in time of peace be quartered in any house, without the consent of the owner, nor in time of war, but in a manner to be prescribed by law.

Amendment IV

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Amendment V

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Amendment VI

In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the state and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense.

Amendment VII

In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise reexamined in any court of the United States, than according to the rules of the common law.

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# 1.205 io-swagger-swagger-annotations 2.1.7

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```
Manifest-Version: 1.0
Bundle-Description: swagger-annotations
Automatic-Module-Name: io.swagger.v3.oas.annotations
Bundle-License: "Apache License 2.0";link="http://www.apache.org/licen
ses/LICENSE-2.0.html"
package: io.swagger
Bundle-SymbolicName: io.swagger.core.v3.swagger-annotations
implementation-version: 2.1.7
Built-By: runner
Bundle-ManifestVersion: 2
Bundle-DocURL: https://github.com/swagger-api/swagger-core/modules/swa
gger-annotations
Import-Package: io.swagger.v3.oas.annotations,io.swagger.v3.oas.annota
tions.enums,io.swagger.v3.oas.annotations.extensions,io.swagger.v3.oa
s.annotations.headers,io.swagger.v3.oas.annotations.info,io.swagger.v
3.oas.annotations.links,io.swagger.v3.oas.annotations.media,io.swagge
r.v3.oas.annotations.parameters,io.swagger.v3.oas.annotations.respons
es,io.swagger.v3.oas.annotations.security,io.swagger.v3.oas.annotatio
ns.servers,io.swagger.v3.oas.annotations.tags
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"
Bundle-Developers: fehguy;email="fehguy@gmail.com";name="Tony Tam",web
ron;email="webron@gmail.com";name="Ron Ratovsky"
url: https://github.com/swagger-api/swagger-core/modules/swagger-annot
ations
mode: development
Export-Package: io.swagger.v3.oas.annotations;uses:="io.swagger.v3.oas
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ger.v3.oas.annotations.parameters,io.swagger.v3.oas.annotations.respo
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otations.links,io.swagger.v3.oas.annotations.media";version="2.1.7",i
o.swagger.v3.oas.annotations.security;uses:="io.swagger.v3.oas.annota
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xtensions";version="2.1.7"
Bundle-Name: swagger-annotations
Bundle-Version: 2.1.7
Bundle-SCM: url="https://github.com/swagger-api/swagger-core/modules/s
wagger-annotations",connection="scm:git:git@github.com:swagger-api/sw
agger-core.git/modules/swagger-annotations",developer-connection="scm
:git:git@github.com:swagger-api/swagger-core.git/modules/swagger-anno
tations",tag=HEAD
Created-By: Apache Maven 3.6.3
Build-Jdk: 1.8.0_282
```

Found in path(s):
* /opt/cola/permits/1340076287_1654762415.7703397/0/swagger-annotations-2-1-7-jar/META-INF/MANIFEST.MF

# 1.206 javax-inject1-as-osgi-bundle 2.6.1

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* https://github.com/eclipse-ee4j/glassfish-ha-api
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* /opt/ws_local/PERMITS_SQL/1014842714_1591897072.99/0/annotations-4-1-1-4-sources-jar/android/annotation/TargetApi.java

# 1.208 ktor-bom 1.6.1

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* /opt/cola/permits/1162865313_1620924138.73/0/alpn-api-1-1-3-v20160715-sources-1-jar/org/eclipse/jetty/alpn/ALPN.java

# 1.210 jackson-jaxrs-base 2.13.2

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# 1.211 micronaut-sql-libraries 4.0.0

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```

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```
* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/BasicAutomata.java
* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/TransitionComparator.java
* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/DatatypesAutomatonProvider.java
* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/Automaton.java
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* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/StatePair.java
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* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/MinimizationOperations.java
* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/State.java
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* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/AutomatonProvider.java
* /opt/cola/permits/1162863214_1620924489.9/0/automaton-1-11-8-sources-6-jar/dk/brics/automaton/Transition.java

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It is currently developed by a community of developers, as well as supported
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# 1.216 jetbrains-kotlin-kotlin-stdlib-jdk8 1.3.71

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# 1.217 bean-validation-api 2.0.1

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# 1.221 apiguardian-apiguardian-api 1.1.0

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* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/internal/path/json/mapping/JsonObjectDeserializer.groovy
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/mapper/factory/DefaultJackson2ObjectMapperFactory.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/mapper/factory/DefaultGsonObjectMapperFactory.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/internal/path/json/ConfigurableJsonSlurper.groovy
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/internal/path/json/mapping/JsonPathJackson2ObjectDeserializer.groovy
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/path/json/config/JsonPathConfig.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/mapper/factory/DefaultJackson1ObjectMapperFactory.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/mapper/factory/GsonObjectMapperFactory.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/internal/path/json/JsonPrettifier.groovy
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/internal/path/json/JSONAssertion.groovy

* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/path/json/config/JsonParserType.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/path/json/exception/JsonPathException.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/path/json/JsonPath.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/path/json/mapping/JsonPathObjectDeserializer.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/mapper/factory/Jackson2ObjectMapperFactory.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/mapper/factory/Jackson1ObjectMapperFactory.java
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/internal/path/json/mapping/JsonPathGsonObjectDeserializer.groovy
* /opt/cola/permits/1183892205_1627493824.21/0/json-path-2-6-0-sources-1-jar/com/jayway/restassured/internal/path/json/mapping/JsonPathJackson1ObjectDeserializer.groovy

# 1.226 ktor-server-host-common 1.2.6

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# 1.231 jackson-core 2.13.2

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# 1.232 javabeans-activation-framework-api 1.2.2

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## 1.233 micronaut 3.3.3

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# 1.239 jackson-databind 2.13.2.1

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# 1.240 java-diff-utils 1.3.0

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Found in path(s):
* /opt/cola/permits/1131003422_1649015566.9/0/diffutils-1-3-0-jar/META-INF/maven/com.googlecode.java-diff-utils/diffutils/pom.xml
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```
Manifest-Version: 1.0
Archiver-Version: Plexus Archiver
Built-By: smitterm
Created-By: Apache Maven Bundle Plugin
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.txt
Bnd-LastModified: 1362404972142
Export-Package: difflib;uses:="difflib.myers";version="1.3.0",difflib.
myers;uses:=difflib;version="1.3.0"
Bundle-Version: 1.3.0
Bundle-Description: The DiffUtils library for computing diffs, applyin
g patches, generationg side-by-side view in Java.
Bundle-Name: java-diff-utils
Build-Jdk: 1.5.0_22
Bundle-ManifestVersion: 2
Bundle-SymbolicName: com.googlecode.java-diff-utils.diffutils
Tool: Bnd-1.50.0
```

Found in path(s):
* /opt/cola/permits/1131003422_1649015566.9/0/diffutils-1-3-0-jar/META-INF/MANIFEST.MF

# 1.241 kotlinx-coroutines-io 0.1.16

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# 1.242 junit-5-bill-of-materials 5.7.2

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import java.io.File
import java.net.URI

data class License(val name: String, val url: URI, val headerFile: File)
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  * Fixed warnings about generated constructors not explicitly initializing

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  * Added generation of field number constants.
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  * HPUX support.
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  * Detect whether zlib is new enough in configure script.
  * Fixes for Solaris 10 32/64-bit confusion.
Evan Jones <evanj@mit.edu>
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  * Optimize Java serialization of strings so that UTF-8 encoding happens only
    once per string per serialization call.
  * Clean up some Java warnings.
  * Fix bug with permanent callbacks that delete themselves when run.
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Kacper Kowalik <xarthisius.kk@gmail.com>
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  * Added atomicops for Solaris
Andrew Paprocki <andrew@ishiboo.com>
  * Fixed minor IBM xlC compiler build issues
  * Added atomicops for AIX (POWER)

# 1.244 disruptor-framework 3.4.4

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# 1.246 ktor-http-cio 1.2.6

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## 1.247 reactive-relational-database-connectivity-bill-of-materials Arabba-SR9

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