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Contents

1.1 acpid 2.0.28
1.1.1 Available under license
1.2 amzn-drivers-ena 1.5.0
1.2.1 Available under license
1.3 asn1crypto 0.24.0
1.3.1 Available under license
1.4 attr 2.4.47
1.4.1 Available under license
1.5 base-files 3.0.14
1.5.1 Available under license
1.6 base-passwd 3.5.29
1.6.1 Available under license
1.7 bash 4.4.12
1.7.1 Available under license
1.8 bash-completion 2.7
1.8.1 Available under license
1.9 bc 1.06
1.9.1 Available under license
1.10 bind 9.11.4
1.10.1 Available under license
1.11 binutils 2.30
1.11.1 Available under license
1.12 boost 1.66.0
1.12.1 Available under license
1.13 busybox 1.27.2
1.13.1 Available under license

1.14 bzip2 1.0.6
1.14.1 Available under license
1.15 c-ares 1.12.0
1.15.1 Available under license
1.16 ca-certificates 20170717
1.16.1 Available under license
1.17 certifi 2018.1.18
1.17.1 Available under license
1.18 cgreen 1.0.0 :2c146fa3b5e33ecd5f4e513360f576f02323405b
1.18.1 Available under license
1.19 chardet 3.0.4
1.19.1 Available under license
1.20 cloud-init 0.7.6
1.20.1 Available under license
1.21 coreutils 8.29
1.21.1 Available under license
1.22 curl 7.58.0
1.22.1 Available under license
1.23 db 5.3.28 :r0
1.23.1 Available under license
1.24 diffutils 3.6
1.24.1 Available under license
1.25 dmidecode 3.1
1.25.1 Available under license
1.26 dosfstools 4.1
1.26.1 Available under license
1.27 DPDK-18.02.2 18.02.2
1.27.1 Available under license
1.28 e2fsprogs 1.43.8
1.28.1 Available under license
1.29 ecdsa 0.13
1.29.1 Available under license
1.30 efitools 1.7.0+git0649468475d20d8ca5634433c4912467cef3ce93
1.30.1 Available under license
1.31 efitools/lib 1.7.0+git0649468475d20d8ca5634433c4912467cef3ce93
1.31.1 Available under license
1.32 elfutils 0.173
1.32.1 Available under license
1.33 enum34 1.1.6

1.33.1 Available under license
1.34 ethtool 4.13
1.34.1 Available under license
1.35 eudev 3.2.5
1.35.1 Available under license
1.36 expat 2.2.5
1.36.1 Available under license
1.37 file 5.32
1.37.1 Available under license
1.38 freetype 2.9
1.38.1 Available under license
1.39 gcc 8.2.0
1.39.1 Available under license
1.40 gdb 8.0.1
1.40.1 Available under license
1.41 gdbm 1.14.1 :1.0
1.41.1 Available under license
1.42 glib-2.0 2.54.3 :0
1.42.1 Available under license
1.43 glibc 2.27
1.43.1 Available under license
1.44 glibc/gplv2-portions 2.25
1.44.1 Available under license
1.45 glibc/gplv3-portions 2.25
1.45.1 Available under license
1.46 gmp 6.1.2
1.46.1 Available under license
1.47 grub 2.02
1.47.1 Available under license
1.48 hostap-utils 0.4.7
1.48.1 Available under license
1.49 httping 2.4
1.49.1 Available under license
1.50 i2c-tools 4.0
1.50.1 Available under license
1.51 i40e 2.1.26
1.51.1 Available under license
1.52 i40evf 3.1.4
1.52.1 Available under license

1.53 init-ifupdown 1.0
1.53.1 Available under license
1.54 ipaddress 1.0.19
1.54.1 Available under license
1.55 iperf 2.0.5 :8.0
1.55.1 Available under license
1.56 iperf3 3.5
1.56.1 Available under license
1.57 iproute2 4.14.1
1.57.1 Available under license
1.58 iptables 1.6.2 :2.0
1.58.1 Available under license
1.59 iputils s20161105
1.59.1 Available under license
1.60 isc-dhcp 4.4.1
1.60.1 Available under license
1.61 ixgbe 5.3.4
1.61.1 Available under license
1.62 ixgbevf 3.1.2
1.62.1 Available under license
1.63 jansson 2.9
1.63.1 Available under license
1.64 jemalloc 5.1.0
1.64.1 Available under license
1.65 kbd 2.0.4 :1.0
1.65.1 Available under license
1.66 kexec-tools 2.0.16
1.66.1 Available under license
1.67 keymaps 1.0
1.67.1 Available under license
1.68 kmod 25
1.68.1 Available under license
1.69 libcap2 2.25
1.69.1 Available under license
1.70 libcpuid 0.4.0
1.70.1 Available under license
1.71 libdnet 1.12
1.71.1 Available under license
1.72 libevent 2.1.8-stable

1.72.1 Available under license
1.73 libffi 3.2.1
1.73.1 Available under license
1.74 libffi/doc 3.2.1
1.74.1 Available under license
1.75 libffi/msvcc.sh 3.2.1
1.75.1 Available under license
1.76 libgcrypt 1.8.2 :1.0
1.76.1 Available under license
1.77 libgcrypt 1.5.3
1.77.1 Available under license
1.78 libgcrypt_GPLv2 1.5.3
1.78.1 Available under license
1.79 libgnutls30 3.6.1
1.79.1 Available under license
1.80 libgpg-error 1.27 :0
1.80.1 Available under license
1.81 libmnl 1.0.4
1.81.1 Available under license
1.82 libmpc 1.1.0 :1.0
1.82.1 Available under license
1.83 libnl 3.4.0 :1.0
1.83.1 Available under license
1.84 libpcap 1.8.1
1.84.1 Available under license
1.85 libsodium 1.0.16 :1.el7
1.85.1 Available under license
1.86 libstdc++6 8.2.0-1ubuntu2~18.04
1.86.1 Available under license
1.87 libtasn1 4.13
1.87.1 Available under license
1.88 libunistring 0.9.9
1.88.1 Available under license
1.89 libusb 1.0.21
1.89.1 Available under license
1.90 libuv 1.11.0 :1
1.90.1 Available under license
1.91 libwebsockets 2.1.0
1.91.1 Available under license

1.92 libxml2 2.9.8
1.92.1 Available under license
1.93 libxslt 1.1.29
1.93.1 Available under license
1.94 libyaml 0.1.6
1.94.1 Available under license
1.95 Linux 3.10.62
1.95.1 Available under license
1.96 Linux-PAM 1.3.0
1.96.1 Available under license
1.97 logrotate 3.13.0
1.97.1 Available under license
1.98 lrzsz 0.12.20
1.98.1 Available under license
1.99 lxml 3.4.4
1.99.1 Available under license
1.100 minicom 2.7.1
1.100.1 Available under license
1.101 mpfr4 3.1.5 :1
1.101.1 Available under license
1.102 mtd-utils 2.0.1
1.102.1 Available under license
1.103 mtools 4.0.18 :5.el7
1.103.1 Available under license
1.104 ncclient 0.5.3
1.104.1 Available under license
1.105 ncurses 6.1+20180630
1.105.1 Available under license
1.106 ndisc6 1.0.4+git4c794b5512d23c649def1f94a684225dcbb6ac3e
1.106.1 Available under license
1.107 net-tools 1.60-26
1.107.1 Available under license
1.108 netbase 5.4
1.108.1 Available under license
1.109 nettle 3.4
1.109.1 Available under license
1.110 nmap 7.60 :1ubuntu5
1.110.1 Available under license
1.111 NTP 4.2.8p12

1.111.1 Available under license
1.112 oct-zip-drv 3.1.0-p5
1.112.1 Available under license
1.113 open-vm-tools 10.1.5
1.113.1 Available under license
1.114 openssh 7.6p1
1.114.1 Available under license
1.115 opkg-utils 0.3.6
1.115.1 Available under license
1.116 oprofile 1.1.0 :r0
1.116.1 Available under license
1.117 PAM Radius 1.3.17
1.117.1 Available under license
1.118 pam_tacplus 1.3.8
1.118.1 Available under license
1.119 paramiko 1.15.2
1.119.1 Available under license
1.120 parted 3.2
1.120.1 Available under license
1.121 pciutils 3.5.6
1.121.1 Available under license
1.122 pcre 8.41
1.122.1 Available under license
1.123 perl 5.24.4
1.123.1 Available under license
1.124 popt 1.16
1.124.1 Available under license
1.125 ppp 2.4.7 :r0
1.125.1 Available under license
1.126 PPPoE 3.11
1.126.1 Available under license
1.127 pps-tools 1.0.2
1.127.1 Available under license
1.128 prettytable 0.7.2
1.128.1 Available under license
1.129 procps 3.3.15
1.129.1 Available under license
1.130 protobuf-c 1.3.0
1.130.1 Available under license

1.131 pyasn1 0.4.2
1.131.1 Available under license
1.132 pycparser 2.18
1.133 pycrypto 2.6.1
1.133.1 Available under license
1.134 python 2.7.14
1.134.1 Available under license
1.135 python-cffi 1.11.5
1.135.1 Available under license
1.136 python-cryptography 2.1.4
1.136.1 Available under license
1.137 python-idna 2.6
1.138 python-jsonpatch 1.23
1.138.1 Available under license
1.139 python-jsonpointer 2.0
1.139.1 Available under license
1.140 python-ndg-httpsclient 0.4.4
1.140.1 Available under license
1.141 python-pbr 3.1.1 :2.el7ost
1.141.1 Available under license
1.142 python-pip 9.0.3
1.142.1 Available under license
1.143 python-ply 3.11 :1.0
1.143.1 Available under license
1.144 python-pyopenssl 17.5.0
1.144.1 Available under license
1.145 python-pysocks 1.6.8 :5.el7
1.145.1 Available under license
1.146 python-six 1.11.0
1.146.1 Available under license
1.147 PyYAML 3.12
1.147.1 Available under license
1.148 quagga 0.99.23
1.148.1 Available under license
1.149 quickassist 2.6.0
1.149.1 Available under license
1.150 radvd 1:2.11-1
1.150.1 Available under license
1.151 readline 7.0

1.151.1 Available under license
1.152 requests 2.18.4
1.153 run-postinsts 1.0
1.153.1 Available under license
1.154 sbsigntool 0.6-951ee95a301674c046f55330cd7460e1314deff2 :0ubuntu4~12.04.1
1.154.1 Available under license
1.155 setuptools 39.0.0
1.155.1 Available under license
1.156 shadow 4.6
1.156.1 Available under license
1.157 shadow-securetty 4.6
1.158 shared-mime-info 1.9 :2
1.158.1 Available under license
1.159 slang 2.3.2
1.159.1 Available under license
1.160 socklog 2.1.0
1.160.1 Available under license
1.161 speedtest-cli 1.0.0
1.161.1 Available under license
1.162 strongswan 5.6.3 :1ubuntu2
1.162.1 Available under license
1.163 stuntman 1.2.1
1.163.1 Available under license
1.164 sysklogd 1.5.1 :r0
1.164.1 Available under license
1.165 syslinux 6.03
1.165.1 Available under license
1.166 tar 1.30
1.166.1 Available under license
1.167 tcpdump 4.9.2
1.167.1 Available under license
1.168 tpm-quote-tools 1.0.1
1.168.1 Available under license
1.169 tpm-tools 1.3.8 :6.el7
1.169.1 Available under license
1.170 traceroute 2.0.21
1.170.1 Available under license
1.171 trousers 0.3.13

1.171.1 Available under license
1.172 tzdata 2018d :1
1.172.1 Available under license
1.173 u-boot 2013.07
1.173.1 Available under license
1.174 urllib3 1.22
1.175 usbutils 009
1.175.1 Available under license
1.176 util-linux 2.31
1.176.1 Available under license
1.177 vim 7.4
1.178 WALinuxAgent 2.2.21
1.178.1 Available under license
1.179 wget 1.19.5
1.179.1 Available under license
1.180 wireless-tools 30.pre9 :r0.0
1.180.1 Available under license
1.181 xz 5.2.3 :0
1.181.1 Available under license
1.182 zlib 1.2.11
1.182.1 Available under license

1.1 acpid 2.0.28

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1.2 amzn-drivers-ena 1.5.0

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1.3 asn1crypto 0.24.0

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1.6 base-passwd 3.5.29

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* configure.ac, Makefile.am: The original versions were derived from the ones in the XML Catalog Manager project, version 2.2.

Author: Julio Merino <jmmv@users.sourceforge.net>

* atf-c/ui.c: The format_paragraph and format_text functions were derived form the ones in the Monotone project, revision 3a0982da308228d796df35f98d787c5cff2bb5b6.

Author: Julio Merino <jmmv@NetBSD.org>

* atf-c++/detail/io.hpp, atf-c++/detail/io.cpp, atf-c++/detail/io_test.cpp: These files were derived from the file_handle, systembuf, pipe and pistream classes and tests found in the Boost.Process library.

Author: Julio Merino <jmmv84@gmail.com>

* admin/check-style.sh, admin/check-style-common.awk, admin/check-style-cpp.awk, admin/check-style-shell.awk: These files, except the first one, were first implemented in the Buildtool project. They were later adapted to be part of Boost.Process and, during that process, the shell script was created.

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==========
vim: filetype=text:textwidth=75:expandtab:shiftwidth=2:softtabstop=2

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<xsl:stylesheet version="1.0"
 xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:db="http://docbook.org/ns/docbook">

 <xsl:template name="isc.copyright.format">
   <xsl:param name="text"/>
   <xsl:value-of select="$isc.copyright.leader"/>
   <xsl:value-of select="normalize-space(substring-before($text, '&#10;'))"/>
   <xsl:text>&#10;</xsl:text>
   <xsl:variable name="rest" select="substring-after($text, '&#10;')"/>
   <xsl:if test="translate($rest, '&#9;&#32;', '')">
     <xsl:call-template name="isc.copyright.format">
       <xsl:with-param name="text" select="$rest"/>
     </xsl:call-template>
   </xsl:if>
 </xsl:template>

 <xsl:variable name="isc.copyright.text">
   <xsl:text>
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   </xsl:text>
 </xsl:variable>

 <xsl:variable name="isc.copyright">
   <xsl:call-template name="isc.copyright.format">
     <xsl:with-param name="text">
       <xsl:for-each select="book/info/copyright | refentry/docinfo/copyright">
   <xsl:text>Copyright (C) </xsl:text>
   <xsl:call-template name="copyright.years">
     <xsl:with-param name="years" select="year"/>
   </xsl:call-template>
   <xsl:text> </xsl:text>
   <xsl:value-of select="holder"/>
         <xsl:value-of select="$isc.copyright.breakline"/>
   <xsl:text>&#10;</xsl:text>
 </xsl:for-each>
 <xsl:value-of select="$isc.copyright.text"/>
     </xsl:with-param>
   </xsl:call-template>
 </xsl:variable>
</xsl:stylesheet>

<!--
 - Local variables:
 - mode: sgml
```

- End:
-->

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[This is the first released version of the library GPL. It is
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Most GNU software, including some libraries, is covered by the ordinary

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However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

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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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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

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Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6.

Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also compile or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

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the documentation, and info on specific files will go into an AUTHORS
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++++++++++++++++

Dean Elsner wrote the original gas for vax. [more details?]

Jay Fenlason maintained gas for a while, adding support for
gdb-specific debug information and the 68k series machines, most of
the preprocessing pass, and extensive changes in messages.c,
input-file.c, write.c.

K. Richard Pixley maintained gas for a while, adding various
enhancements and many bug fixes, including merging support for several
processors, breaking gas up to handle multiple object file format
backends (including heavy rewrite, testing, an integration of the coff
and b.out backends), adding configuration including heavy testing and
verification of cross assemblers and file splits and renaming,
converted gas to strictly ansi C including full prototypes, added
support for m680[34]0 & cpu32, considerable work on i960 including a
coff port (including considerable amounts of reverse engineering), a
sparc opcode file rewrite, decstation, rs6000, and hp300hpux host
ports, updated "know" assertions and made them work, much other
reorganization, cleanup, and lint.

Ken Raeburn wrote the high-level BFD interface code to replace most of
the code in format-specific I/O modules.

The original Vax-VMS support was contributed by David L. Kashtan. Eric Youngdale and Pat Rankin have done much work with it since.

The Intel 80386 machine description was written by Eliot Dresselhaus.

Minh Tran-Le at IntelliCorp contributed some AIX 386 support.

The Motorola 88k machine description was contributed by Devon Bowen of Buffalo University and Torbjorn Granlund of the Swedish Institute of Computer Science.

Keith Knowles at the Open Software Foundation wrote the original MIPS back end (tc-mips.c, tc-mips.h), and contributed Rose format support that hasn't been merged in yet. Ralph Campbell worked with the MIPS code to support a.out format.

Support for the Zilog Z8k and Hitachi H8/300, H8/500 and SH processors (tc-z8k, tc-h8300, tc-h8500, tc-sh), and IEEE 695 object file format (obj-ieee), was written by Steve Chamberlain of Cygnus Solutions. Steve also modified the COFF back end (obj-coffbfd) to use BFD for some low-level operations, for use with the Hitachi, 29k and Zilog targets.

John Gilmore built the AMD 29000 support, added .include support, and simplified the configuration of which versions accept which pseudo-ops. He updated the 68k machine description so that Motorola's opcodes always produced fixed-size instructions (e.g. jsr), while synthetic instructions remained shrinkable (jbsr). John fixed many bugs, including true tested cross-compilation support, and one bug in relaxation that took a week and required the proverbial one-bit fix.

Ian Lance Taylor of Cygnus Solutions merged the Motorola and MIT syntaxes for the 68k, completed support for some COFF targets (68k, i386 SVR3, and SCO Unix), wrote the ECOFF support based on Michael Meissner's mips-tfile program, wrote the PowerPC and RS/6000 support, and made a few other minor patches. He handled the binutils releases for versions 2.7 through 2.9.

David Edelsohn contributed fixes for the PowerPC and AIX support.

Steve Chamberlain made gas able to generate listings.

Support for the HP9000/300 was contributed by Glenn Engel of HP.

Support for ELF format files has been worked on by Mark Eichin of Cygnus Solutions (original, incomplete implementation), Pete Hoogenboom at the University of Utah (HPPA mainly), Michael Meissner of the Open Software Foundation (i386 mainly), and Ken Raeburn of

Cygnus Solutions (sparc, initial 64-bit support).

Several engineers at Cygnus Solutions have also provided many small bug fixes and configuration enhancements.

The initial Alpha support was contributed by Carnegie-Mellon University. Additional work was done by Ken Raeburn of Cygnus Solutions. Richard Henderson then rewrote much of the Alpha support.

Ian Dall updated the support code for the National Semiconductor 32000 series, and added support for Mach 3 and NetBSD running on the PC532.

Klaus Kaempf ported the assembler and the binutils to openVMS/Alpha.

Steve Haworth contributed the support for the Texas Instruction c30 (tms320c30).

H.J. Lu has contributed many patches and much testing.

Alan Modra reworked much of the i386 backend, improving the error checking, updating the code, and improving the 16 bit support, using patches from the work of Martynas Kunigelis and H.J. Lu.

Many others have contributed large or small bugfixes and enhancements. If you've contributed significant work and are not mentioned on this list, and want to be, let us know. Some of the history has been lost; we aren't intentionally leaving anyone out.

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1.13 busybox 1.27.2

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Julian Seward, Cambridge, UK.
jseward@bzip.org
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1.14 bzip2 1.0.6

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--------------------------------------------------------------------------
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1.16 ca-certificates 20170717

1.16.1 Available under license :

Format: http://www.debian.org/doc/packaging-manuals/copyright-format/1.0/
Source: http://ftp.debian.org/debian/pool/main/c/ca-certificates/

Files: debian/*
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Makefile
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1.17 certifi 2018.1.18

1.17.1 Available under license :

This packge contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#
This is a bundle of X.509 certificates of public Certificate Authorities
(CA). These were automatically extracted from Mozilla's root certificates
file (certdata.txt). This file can be found in the mozilla source tree:
http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#
It contains the certificates in PEM format and therefore
can be directly used with curl / libcurl / php_curl, or with
an Apache+mod_ssl webserver for SSL client authentication.
Just configure this file as the SSLCACertificateFile.#

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@(#) $RCSfile: certdata.txt,v $ $Revision: 1.80 $ $Date: 2011/11/03 15:11:58 $
Metadata-Version: 1.1
Name: certifi
Version: 2018.1.18
Summary: Python package for providing Mozilla's CA Bundle.
Home-page: http://certifi.io/
Author: Kenneth Reitz
Author-email: me@kennethreitz.com
License: MPL-2.0
Description: Certifi: Python SSL Certificates
==========

`Certifi`_ is a carefully curated collection of Root Certificates for
validating the trustworthiness of SSL certificates while verifying the identity
of TLS hosts. It has been extracted from the `Requests`_ project.

Installation

``certifi`` is available on PyPI. Simply install it with ``pip``::

$ pip install certifi

Usage

To reference the installed certificate authority (CA) bundle, you can use the
built-in function::

>>> import certifi

>>> certifi.where()
'/usr/local/lib/python2.7/site-packages/certifi/cacert.pem'

Enjoy!

1024-bit Root Certificates
~~~~~~~~~~~~~~~~~~~~~~~~~~

Browsers and certificate authorities have concluded that 1024-bit keys are
unacceptably weak for certificates, particularly root certificates. For this
~~~~~~~~~~~~~~~~~~~~~~~~~~

reason, Mozilla has removed any weak (i.e. 1024-bit key) certificate from its bundle, replacing it with an equivalent strong (i.e. 2048-bit or greater key) certificate from the same CA. Because Mozilla removed these certificates from its bundle, ``certifi`` removed them as well.

In previous versions, ``certifi`` provided the ``certifi.old_where()`` function to intentionally re-add the 1024-bit roots back into your bundle. This was not recommended in production and therefore was removed. To assist in migrating old code, the function ``certifi.old_where()`` continues to exist as an alias of ``certifi.where()``. Please update your code to use ``certifi.where()`` instead. ``certifi.old_where()`` will be removed in 2018.

.. _`Certifi`: http://certifi.io/en/latest/
.. _`Requests`: http://docs.python-requests.org/en/latest/

Platform: UNKNOWN
Classifier: Development Status :: 5 - Production/Stable
Classifier: Intended Audience :: Developers
Classifier: License :: OSI Approved :: Mozilla Public License 2.0 (MPL 2.0)
Classifier: Natural Language :: English
Classifier: Programming Language :: Python
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Classifier: Programming Language :: Python :: 3
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Classifier: Programming Language :: Python :: 3.4
Classifier: Programming Language :: Python :: 3.5
Classifier: Programming Language :: Python :: 3.6
This packge contains a modified version of ca-bundle.crt:

ca-bundle.crt -- Bundle of CA Root Certificates

Certificate data from Mozilla as of: Thu Nov 3 19:04:19 2011#
This is a bundle of X.509 certificates of public Certificate Authorities
(CA). These were automatically extracted from Mozilla's root certificates
file (certdata.txt). This file can be found in the mozilla source tree:
http://mxr.mozilla.org/mozilla/source/security/nss/lib/ckfw/builtins/certdata.txt?raw=1#
It contains the certificates in PEM format and therefore
can be directly used with curl / libcurl / php_curl, or with
an Apache+mod_ssl webserver for SSL client authentication.
Just configure this file as the SSLCACertificateFile.#

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@(#) $RCSfile: certdata.txt,v $ $Revision: 1.80 $ $Date: 2011/11/03 15:11:58 $

1.18 cgreen 1.0.0 :2c146fa3b5e33ecd5f4e513360f576f02323405b

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1.19 chardet 3.0.4

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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That's all there is to it!

1.20 cloud-init 0.7.6

1.20.1 Available under license :

Format-Specification: http://svn.debian.org/wsvn/dep/web/deps/dep5.mdwn?op=file&rev=135
Name: cloud-init
Maintainer: Scott Moser <scott.moser@canonical.com>
Source: https://launchpad.net/cloud-init

This package was debianized by Soren Hansen <soren@ubuntu.com> on
Thu, 04 Sep 2008 12:49:15 +0200 as ec2-init. It was later renamed to
cloud-utils by Scott Moser <scott.moser@canonical.com>

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1.24 diffutils 3.6

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* by Roman Hodek <Roman.Hodek@informatik.uni-erlangen.de> */

1.27 DPDK-18.02.2 18.02.2

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1.28 e2fsprogs 1.43.8

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Theodore Ts'o
23-June-2007

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It is part of the main e2fsprogs distribution, which can be found at:

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Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

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This is the Debian GNU/Linux prepackaged version of the ss
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This package was put together by Yann Dirson <dirson@debian.org>,
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files of the EXT2 file system utilities. The EXT2 utilities were
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This is the Debian GNU/Linux prepackaged version of the static EXT2
file system consistency checker (e2fsck.static). The EXT2 utilities
were written by Theodore Ts'o <tytso@mit.edu> and Remy Card
<card@masi.ibp.fr>.

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Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

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This is the Debian GNU/Linux prepackaged version of the Common Error
Description library. It is currently distributed together with the EXT2 file
system utilities, which are otherwise packaged as "e2fsprogs".

This package was put together by Yann Dirson <dirson@debian.org>,
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Index: tdbsa/tdb.c
===================================================================
--- tdbsa.orig/tdb.c
+++ tdbsa/tdb.c
@@ -4,11 +4,11 @@ Rev: 23371
Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)
*/
 /*
-   Unix SMB/CIFS implementation.
+   trivial database library - standalone version

-   trivial database library - private includes
-
-   Copyright (C) Andrew Tridgell             2005
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    ** NOTE! The following LGPL license applies to the tdb
    ** library. This does NOT imply that all of Samba is released
#
# This is a Makefile stub which handles the creation of BSD shared
# libraries.
#
# In order to use this stub, the following makefile variables must be defined.
#
# BSDLIB_VERSION = 1.0
# BSDLIB_IMAGE = libce
# BSDLIB_MYDIR = et
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#

all:: image

real-subdirs:: Makefile
 @echo " MKDIR pic"
 @mkdir -p pic
```

```
BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic

image:  $(BSD_LIB)

$(BSD_LIB): $(OBJS)
 (cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
 $(MV) pic/$(BSD_LIB) .
 $(RM) -f ../$(BSD_LIB)
 (cd ..; $(LN) $(LINK_BUILD_FLAGS) \
  `echo $(my_dir) | sed -e 's;lib/;;'`/$(BSD_LIB) $(BSD_LIB))

install-shlibs install:: $(BSD_LIB)
 @echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
 @$(INSTALL_PROGRAM) $(BSD_LIB) \
  $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
 @-$(LDCONFIG)

install-strip: install

install-shlibs-strip: install-shlibs

uninstall-shlibs uninstall::
 $(RM) -f $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)

clean::
 $(RM) -rf pic
 $(RM) -f $(BSD_LIB)
 $(RM) -f ../$(BSD_LIB)
```

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Gadi Oxman, August 1995

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1.29 ecdsa 0.13

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1.30 efitools 1.7.0+git0649468475d20d8ca5634433c4912467cef3ce93

1.30.1 Available under license :

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efitools - useful tools for manipulating UEFI secure boot platforms

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That's all there is to it!

1.32 elfutils 0.173

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1.38 freetype 2.9

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2006-Jan-27

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always starting with `./').
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Don't put empty lines into this file!
#
.gitignore
#
builds/unix/pkg.m4
#
docs/FTL.TXT
docs/GPLv2.TXT
#
include/freetype/internal/fthash.h
#
src/base/fthash.c
src/base/md5.c
src/base/md5.h
#
src/bdf/bdf.c
src/bdf/bdf.h
src/bdf/bdfdrivr.c
src/bdf/bdfdrivr.h
src/bdf/bdferror.h
src/bdf/bdflib.c
src/bdf/module.mk
src/bdf/README
src/bdf/rules.mk
#
src/pcf/module.mk
src/pcf/pcf.c
src/pcf/pcf.h
src/pcf/pcfdrivr.c
src/pcf/pcfdrivr.h
src/pcf/pcferror.h
src/pcf/pcfread.c
src/pcf/pcfread.h

src/pcf/pcfutil.c
src/pcf/pcfutil.h
src/pcf/README
src/pcf/rules.mk
#
src/gzip/adler32.c
src/gzip/infblock.c
src/gzip/infblock.h
src/gzip/infcodes.c
src/gzip/infcodes.h
src/gzip/inffixed.h
src/gzip/inflate.c
src/gzip/inftrees.c
src/gzip/inftrees.h
src/gzip/infutil.c
src/gzip/infutil.h
src/gzip/zconf.h
src/gzip/zlib.h
src/gzip/zutil.c
src/gzip/zutil.h
#
src/tools/apinames.c
src/tools/ftrandom/ftrandom.c
#
EOF

1.39 gcc 8.2.0

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This is an attempt to acknowledge early contributions to the garbage
collector. Later contributions should instead be mentioned in
README.changes.

HISTORY -

Early versions of this collector were developed as a part of research
projects supported in part by the National Science Foundation
and the Defense Advance Research Projects Agency.

The garbage collector originated as part of the run-time system for
the Russell programming language implementation. The first version of the
garbage collector was written primarily by Al Demers. It was then refined
and mostly rewritten, primarily by Hans-J. Boehm, at Cornell U.,
the University of Washington, Rice University (where it was first used for
C and assembly code), Xerox PARC, SGI, and HP Labs. However, significant
contributions have also been made by many others.

Some other contributors:

More recent contributors are mentioned in the modification history in
README.changes. My apologies for any omissions.

The SPARC specific code was originally contributed by Mark Weiser.
The Encore Multimax modifications were supplied by
Kevin Kenny (kenny@m.cs.uiuc.edu). The adaptation to the IBM PC/RT is largely
due to Vernon Lee, on machines made available to Rice by IBM.
Much of the HP specific code and a number of good suggestions for improving the
generic code are due to Walter Underwood.
Robert Brazile (brazile@diamond.bbn.com) originally supplied the ULTRIX code.
Al Dosser (dosser@src.dec.com) and Regis Cridlig (Regis.Cridlig@cl.cam.ac.uk)
subsequently provided updates and information on variation between ULTRIX
systems. Parag Patel (parag@netcom.com) supplied the A/UX code.
Jesper Peterson(jep@mtiame.mtia.oz.au), Michel Schinz, and
Martin Tauchmann (martintauchmann@bigfoot.com) supplied the Amiga port.
Thomas Funke (thf@zelator.in-berlin.de(?)) and
Brian D.Carlstrom (bdc@clark.lcs.mit.edu) supplied the NeXT ports.
Douglas Steel (doug@wg.icl.co.uk) provided ICL DRS6000 code.
Bill Janssen (janssen@parc.xerox.com) supplied the SunOS dynamic loader
specific code. Manuel Serrano (serrano@cornas.inria.fr) supplied linux and
Sony News specific code. Al Dosser provided Alpha/OSF/1 code. He and
Dave Detlefs(detlefs@src.dec.com) also provided several generic bug fixes.
Alistair G. Crooks(agc@uts.amdahl.com) supplied the NetBSD and 386BSD ports.
Jeffrey Hsu (hsu@soda.berkeley.edu) provided the FreeBSD port.
Brent Benson (brent@jade.ssd.csd.harris.com) ported the collector to
a Motorola 88K processor running CX/UX (Harris NightHawk).
Ari Huttunen (Ari.Huttunen@hut.fi) generalized the OS/2 port to
nonIBM development environments (a nontrivial task).
Patrick Beard (beard@cs.ucdavis.edu) provided the initial MacOS port.
David Chase, then at Olivetti Research, suggested several improvements.
Scott Schwartz (schwartz@groucho.cse.psu.edu) supplied some of the
code to save and print call stacks for leak detection on a SPARC.
Jesse Hull and John Ellis supplied the C++ interface code.
Zhong Shao performed much of the experimentation that led to the
current typed allocation facility. (His dynamic type inference code hasn't
made it into the released version of the collector, yet.)

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For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

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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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When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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This license, the Lesser General Public License, applies to some
specially designated software---typically libraries---of the Free
Software Foundation and other authors who decide to use it. You can use
it too, but we suggest you first think carefully about whether this
license or the ordinary General Public License is the better strategy to
use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use,
not price. Our General Public Licenses are designed to make sure that
you have the freedom to distribute copies of free software (and charge
for this service if you wish); that you receive source code or can get
it if you want it; that you can change the software and use pieces of it
in new free programs; and that you are informed that you can do these
things.

To protect your rights, we need to make restrictions that forbid
distributors to deny you these rights or to ask you to surrender these
rights. These restrictions translate to certain responsibilities for
you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis
or for a fee, you must give the recipients all the rights that we gave
you. You must make sure that they, too, receive or can get the source
code. If you link other code with the library, you must provide
complete object files to the recipients, so that they can relink them
with the library after making changes to the library and recompiling
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We protect your rights with a two-step method: (1) we copyright the
library, and (2) we offer you this license, which gives you legal

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To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the @dfn{Lesser} General Public License because it does @emph{Less} to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free

programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a ``work based on the library'' and a ``work that uses the library''. The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

@iftex
@appendixsubsec TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION
@end iftex
@ifinfo
@center GNU LESSER GENERAL PUBLIC LICENSE
@center TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION
@end ifinfo

@enumerate 0
@item
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A ``library'' means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The ``Library'', below, refers to any such software library or work which has been distributed under these terms. A ``work based on the Library'' means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term ``modification''.)

``Source code'' for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated

interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

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You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

@enumerate a
@item
The modified work must itself be a software library.

@item
You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

@item
You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

@item
If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or

table, the facility still operates, and performs whatever part of
its purpose remains meaningful.

(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.)
@end enumerate

These requirements apply to the modified work as a whole. If
identifiable sections of that work are not derived from the Library,
and can be reasonably considered independent and separate works in
themselves, then this License, and its terms, do not apply to those
sections when you distribute them as separate works. But when you
distribute the same sections as part of a whole which is a work based
on the Library, the distribution of the whole must be on the terms of
this License, whose permissions for other licensees extend to the
entire whole, and thus to each and every part regardless of who wrote
it.

Thus, it is not the intent of this section to claim rights or contest
your rights to work written entirely by you; rather, the intent is to
exercise the right to control the distribution of derivative or
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In addition, mere aggregation of another work not based on the Library
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You may opt to apply the terms of the ordinary GNU General Public
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these notices.

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This option is useful when you wish to copy part of the code of
the Library into a program that is not a library.

@item
You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

@item
A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a ``work that uses the Library''. Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a ``work that uses the Library'' with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a ``work that uses the library''. The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a ``work that uses the Library'' uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

@item

As an exception to the Sections above, you may also combine or link a ``work that uses the Library'' with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

@enumerate a
@item
Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable ``work that uses the Library'', as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

@item
Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

@item
Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

@item
If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

@item
Verify that the user has already received a copy of these
materials or that you have already sent this user a copy.
@end enumerate

For an executable, the required form of the ``work that uses the
Library" must include any data and utility programs needed for
reproducing the executable from it. However, as a special exception,
the materials to be distributed need not include anything that is
normally distributed (in either source or binary form) with the major
components (compiler, kernel, and so on) of the operating system on
which the executable runs, unless that component itself accompanies the
executable.

It may happen that this requirement contradicts the license
restrictions of other proprietary libraries that do not normally
accompany the operating system. Such a contradiction means you cannot
use both them and the Library together in an executable that you
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facilities not covered by this License, and distribute such a combined
library, provided that the separate distribution of the work based on
the Library and of the other library facilities is otherwise
permitted, and provided that you do these two things:

@enumerate a
@item
Accompany the combined library with a copy of the same work
based on the Library, uncombined with any other library
facilities. This must be distributed under the terms of the
Sections above.

@item
Give prominent notice with the combined library of the fact
that part of it is a work based on the Library, and explaining
where to find the accompanying uncombined form of the same work.
@end enumerate

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@end enumerate

@iftex
@heading END OF TERMS AND CONDITIONS
@end iftex
@ifinfo
@center END OF TERMS AND CONDITIONS
@end ifinfo

@page
@appendixsubsec How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the ``copyright'' line and a pointer to where the full notice is found.

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@var{one line to give the library's name and an idea of what it does.}
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USA.
@end smallexample

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You should also get your employer (if you work as a programmer) or your
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`Frob' (a library for tweaking knobs) written by James Random Hacker.

@var{signature of Ty Coon}, 1 April 1990
Ty Coon, President of Vice
@end smallexample

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2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

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Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

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b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent

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* m4/ax_func_which_gethostbyname_r.m4

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```
#!/usr/bin/python
#
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#
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# it under the terms of the GNU General Public License as published by
# the Free Software Foundation; either version 3, or (at your option)
# any later version.

# This script adjusts the copyright notices at the top of source files
# so that they have the form:
#
#   Copyright XXXX-YYYY Free Software Foundation, Inc.
#
# It doesn't change code that is known to be maintained elsewhere or
# that carries a non-FSF copyright.
#
# The script also doesn't change testsuite files, except those in
# libstdc++-v3.  This is because libstdc++-v3 has a conformance testsuite,
# while most tests in other directories are just things that failed at some
# point in the past.
#
# Pass --this-year to the script if you want it to add the current year
# to all applicable notices.  Pass --quilt if you are using quilt and
# want files to be added to the quilt before being changed.
```

```
#
# By default the script will update all directories for which the
# output has been vetted.  You can instead pass the names of individual
# directories, including those that haven't been approved.  So:
#
#    update-copyright.py --this-year
#
# is the command that would be used at the beginning of a year to update
# all copyright notices (and possibly at other times to check whether
# new files have been added with old years).  On the other hand:
#
#    update-copyright.py --this-year libitm
#
# would run the script on just libitm/.
#
# Note that things like --version output strings must be updated before
# this script is run.  There's already a separate procedure for that.

import os
import re
import sys
import time
import subprocess

class Errors:
  def __init__ (self):
    self.num_errors = 0

  def report (self, filename, string):
    if filename:
      string = filename + ': ' + string
    sys.stderr.write (string + '\n')
    self.num_errors += 1

  def ok (self):
    return self.num_errors == 0

class GenericFilter:
  def __init__ (self):
    self.skip_files = set()
    self.skip_dirs = set()
    self.skip_extensions = set()
    self.fossilised_files = set()
    self.own_files = set()

    self.skip_files |= set ([
        # Skip licence files.
        'COPYING',
```

```
            'COPYING.LIB',
            'COPYING3',
            'COPYING3.LIB',
            'LICENSE',
            'fdl.texi',
            'gpl_v3.texi',
            'fdl-1.3.xml',
            'gpl-3.0.xml',

            # Skip auto- and libtool-related files
            'aclocal.m4',
            'compile',
            'config.guess',
            'config.sub',
            'depcomp',
            'install-sh',
            'libtool.m4',
            'ltmain.sh',
            'ltoptions.m4',
            'ltsugar.m4',
            'ltversion.m4',
            'lt~obsolete.m4',
            'missing',
            'mkdep',
            'mkinstalldirs',
            'move-if-change',
            'shlibpath.m4',
            'symlink-tree',
            'ylwrap',

            # Skip FSF mission statement, etc.
            'gnu.texi',
            'funding.texi',
            'appendix_free.xml',

            # Skip imported texinfo files.
            'texinfo.tex',
            ])


    def get_line_filter (self, dir, filename):
        if filename.startswith ('ChangeLog'):
            # Ignore references to copyright in changelog entries.
            return re.compile ('\t')

        return None

    def skip_file (self, dir, filename):
```

```
        if filename in self.skip_files:
            return True

        (base, extension) = os.path.splitext (os.path.join (dir, filename))
        if extension in self.skip_extensions:
            return True

        if extension == '.in':
            # Skip .in files produced by automake.
            if os.path.exists (base + '.am'):
                return True

            # Skip files produced by autogen
            if (os.path.exists (base + '.def')
                and os.path.exists (base + '.tpl')):
                return True

        # Skip configure files produced by autoconf
        if filename == 'configure':
            if os.path.exists (base + '.ac'):
                return True
            if os.path.exists (base + '.in'):
                return True

        return False

    def skip_dir (self, dir, subdir):
        return subdir in self.skip_dirs

    def is_fossilised_file (self, dir, filename):
        if filename in self.fossilised_files:
            return True
        # Only touch current current ChangeLogs.
        if filename != 'ChangeLog' and filename.find ('ChangeLog') >= 0:
            return True
        return False

    def by_package_author (self, dir, filename):
        return filename in self.own_files

class Copyright:
    def __init__ (self, errors):
        self.errors = errors

        # Characters in a range of years.  Include '.' for typos.
        ranges = '[0-9](?:[-0-9.,\s]|\s+and\s+)*[0-9]'

        # Non-whitespace characters in a copyright holder's name.
```

```
name = '[\w.,-]'

# Matches one year.
self.year_re = re.compile ('[0-9]+')

# Matches part of a year or copyright holder.
self.continuation_re = re.compile (ranges + '|' + name)

# Matches a full copyright notice:
self.copyright_re = re.compile (
    # 1: 'Copyright (C)', etc.
    '([Cc]opyright'
    '|[Cc]opyright\s+\([Cc]\)'
    '|[Cc]opyright\s+%s'
    '|[Cc]opyright\s+&copy;'
    '|[Cc]opyright\s+@copyright{}'
    '|copyright = u\''
    '|@set\s+copyright[\w-]+)'

    # 2: the years.  Include the whitespace in the year, so that
    # we can remove any excess.
    '(\s*(?:' + ranges + ',?'
    '|@value\{[^{}]*\})\s*)'

    # 3: 'by ', if used
    '(by\s+)?'

    # 4: the copyright holder.  Don't allow multiple consecutive
    # spaces, so that right-margin gloss doesn't get caught
    # (e.g. gnat_ugn.texi).
    '(' + name + '(?:\s?' + name + ')*)?')

# A regexp for notices that might have slipped by.  Just matching
# 'copyright' is too noisy, and 'copyright.*[0-9]' falls foul of
# HTML header markers, so check for 'copyright' and two digits.
self.other_copyright_re = re.compile ('copyright.*[0-9][0-9]',
                                      re.IGNORECASE)
self.comment_re = re.compile('#+|[*]+|;+|%+|//+|@c |dnl ')
self.holders = { '@copying': '@copying' }
self.holder_prefixes = set()

# True to 'quilt add' files before changing them.
self.use_quilt = False

# If set, force all notices to include this year.
self.max_year = None

# Goes after the year(s).  Could be ', '.
```

```
    self.separator = ' '

def add_package_author (self, holder, canon_form = None):
    if not canon_form:
        canon_form = holder
    self.holders[holder] = canon_form
    index = holder.find (' ')
    while index >= 0:
        self.holder_prefixes.add (holder[:index])
        index = holder.find (' ', index + 1)

def add_external_author (self, holder):
    self.holders[holder] = None

class BadYear():
    def __init__ (self, year):
        self.year = year

    def __str__ (self):
        return 'unrecognised year: ' + self.year

def parse_year (self, string):
    year = int (string)
    if len (string) == 2:
        if year > 70:
            return year + 1900
    elif len (string) == 4:
        return year
    raise self.BadYear (string)

def year_range (self, years):
    year_list = [self.parse_year (year)
                 for year in self.year_re.findall (years)]
    assert len (year_list) > 0
    return (min (year_list), max (year_list))

def set_use_quilt (self, use_quilt):
    self.use_quilt = use_quilt

def include_year (self, year):
    assert not self.max_year
    self.max_year = year

def canonicalise_years (self, dir, filename, filter, years):
    # Leave texinfo variables alone.
    if years.startswith ('@value'):
        return years
```

```
    (min_year, max_year) = self.year_range (years)

    # Update the upper bound, if enabled.
    if self.max_year and not filter.is_fossilised_file (dir, filename):
        max_year = max (max_year, self.max_year)

    # Use a range.
    if min_year == max_year:
        return '%d' % min_year
    else:
        return '%d-%d' % (min_year, max_year)

def strip_continuation (self, line):
    line = line.lstrip()
    match = self.comment_re.match (line)
    if match:
        line = line[match.end():].lstrip()
    return line

def is_complete (self, match):
    holder = match.group (4)
    return (holder
            and (holder not in self.holder_prefixes
                 or holder in self.holders))

def update_copyright (self, dir, filename, filter, file, line, match):
    orig_line = line
    next_line = None
    pathname = os.path.join (dir, filename)

    intro = match.group (1)
    if intro.startswith ('@set'):
        # Texinfo year variables should always be on one line
        after_years = line[match.end (2):].strip()
        if after_years != '':
            self.errors.report (pathname,
                                'trailing characters in @set: '
                                + after_years)
            return (False, orig_line, next_line)
    else:
        # If it looks like the copyright is incomplete, add the next line.
        while not self.is_complete (match):
            try:
                next_line = file.next()
            except StopIteration:
                break

            # If the next line doesn't look like a proper continuation,
```

```
        # assume that what we've got is complete.
        continuation = self.strip_continuation (next_line)
        if not self.continuation_re.match (continuation):
            break

        # Merge the lines for matching purposes.
        orig_line += next_line
        line = line.rstrip() + ' ' + continuation
        next_line = None

        # Rematch with the longer line, at the original position.
        match = self.copyright_re.match (line, match.start())
        assert match

    holder = match.group (4)

    # Use the filter to test cases where markup is getting in the way.
    if filter.by_package_author (dir, filename):
        assert holder not in self.holders

    elif not holder:
        self.errors.report (pathname, 'missing copyright holder')
        return (False, orig_line, next_line)

    elif holder not in self.holders:
        self.errors.report (pathname,
                            'unrecognised copyright holder: ' + holder)
        return (False, orig_line, next_line)

    else:
        # See whether the copyright is associated with the package
        # author.
        canon_form = self.holders[holder]
        if not canon_form:
            return (False, orig_line, next_line)

        # Make sure the author is given in a consistent way.
        line = (line[:match.start (4)]
                + canon_form
                + line[match.end (4):])

        # Remove any 'by'
        line = line[:match.start (3)] + line[match.end (3):]

# Update the copyright years.
years = match.group (2).strip()
try:
    canon_form = self.canonicalise_years (dir, filename, filter, years)
```

```
        except self.BadYear as e:
            self.errors.report (pathname, str (e))
            return (False, orig_line, next_line)

        line = (line[:match.start (2)]
                + (" if intro.startswith ('copyright = ') else ' ')
                + canon_form + self.separator
                + line[match.end (2):])

        # Use the standard (C) form.
        if intro.endswith ('right'):
            intro += ' (C)'
        elif intro.endswith ('(c)'):
            intro = intro[:-3] + '(C)'
        line = line[:match.start (1)] + intro + line[match.end (1):]

        # Strip trailing whitespace
        line = line.rstrip() + '\n'

        return (line != orig_line, line, next_line)

    def process_file (self, dir, filename, filter):
        pathname = os.path.join (dir, filename)
        if filename.endswith ('.tmp'):
            # Looks like something we tried to create before.
            try:
                os.remove (pathname)
            except OSError:
                pass
            return

        lines = []
        changed = False
        line_filter = filter.get_line_filter (dir, filename)
        mode = None
        with open (pathname, 'r') as file:
            prev = None
            mode = os.fstat (file.fileno()).st_mode
            for line in file:
                while line:
                    next_line = None
                    # Leave filtered-out lines alone.
                    if not (line_filter and line_filter.match (line)):
                        match = self.copyright_re.search (line)
                        if match:
                            res = self.update_copyright (dir, filename, filter,
                                                         file, line, match)
                            (this_changed, line, next_line) = res
```

```
                    changed = changed or this_changed

                # Check for copyright lines that might have slipped by.
                elif self.other_copyright_re.search (line):
                    self.errors.report (pathname,
                                        'unrecognised copyright: %s'
                                        % line.strip())
            lines.append (line)
            line = next_line

        # If something changed, write the new file out.
        if changed and self.errors.ok():
            tmp_pathname = pathname + '.tmp'
            with open (tmp_pathname, 'w') as file:
                for line in lines:
                    file.write (line)
                os.fchmod (file.fileno(), mode)
            if self.use_quilt:
                subprocess.call (['quilt', 'add', pathname])
            os.rename (tmp_pathname, pathname)

    def process_tree (self, tree, filter):
        for (dir, subdirs, filenames) in os.walk (tree):
            # Don't recurse through directories that should be skipped.
            for i in xrange (len (subdirs) - 1, -1, -1):
                if filter.skip_dir (dir, subdirs[i]):
                    del subdirs[i]

            # Handle the files in this directory.
            for filename in filenames:
                if filter.skip_file (dir, filename):
                    sys.stdout.write ('Skipping %s\n'
                                      % os.path.join (dir, filename))
                else:
                    self.process_file (dir, filename, filter)

class CmdLine:
    def __init__ (self, copyright = Copyright):
        self.errors = Errors()
        self.copyright = copyright (self.errors)
        self.dirs = []
        self.default_dirs = []
        self.chosen_dirs = []
        self.option_handlers = dict()
        self.option_help = []

        self.add_option ('--help', 'Print this help', self.o_help)
        self.add_option ('--quilt', '"quilt add" files before changing them',
```

```
                self.o_quilt)
    self.add_option ('--this-year', 'Add the current year to every notice',
                self.o_this_year)

def add_option (self, name, help, handler):
    self.option_help.append ((name, help))
    self.option_handlers[name] = handler

def add_dir (self, dir, filter = GenericFilter()):
    self.dirs.append ((dir, filter))

def o_help (self, option = None):
    sys.stdout.write ('Usage: %s [options] dir1 dir2...\n\n'
                 'Options:\n' % sys.argv[0])
    format = '%-15s %s\n'
    for (what, help) in self.option_help:
        sys.stdout.write (format % (what, help))
    sys.stdout.write ('\nDirectories:\n')

    format = '%-25s'
    i = 0
    for (dir, filter) in self.dirs:
        i += 1
        if i % 3 == 0 or i == len (self.dirs):
            sys.stdout.write (dir + '\n')
        else:
            sys.stdout.write (format % dir)
    sys.exit (0)

def o_quilt (self, option):
    self.copyright.set_use_quilt (True)

def o_this_year (self, option):
    self.copyright.include_year (time.localtime().tm_year)

def main (self):
    for arg in sys.argv[1:]:
        if arg[:1] != '-':
            self.chosen_dirs.append (arg)
        elif arg in self.option_handlers:
            self.option_handlers[arg] (arg)
        else:
            self.errors.report (None, 'unrecognised option: ' + arg)
    if self.errors.ok():
        if len (self.chosen_dirs) == 0:
            self.chosen_dirs = self.default_dirs
        if len (self.chosen_dirs) == 0:
            self.o_help()
```

```
        else:
            for chosen_dir in self.chosen_dirs:
                canon_dir = os.path.join (chosen_dir, '')
                count = 0
                for (dir, filter) in self.dirs:
                    if (dir + os.sep).startswith (canon_dir):
                        count += 1
                        self.copyright.process_tree (dir, filter)
                if count == 0:
                    self.errors.report (None, 'unrecognised directory: '
                                        + chosen_dir)
    sys.exit (0 if self.errors.ok() else 1)

#-----------------------------------------------------------------------------

class TopLevelFilter (GenericFilter):
  def skip_dir (self, dir, subdir):
    return True

class ConfigFilter (GenericFilter):
  def __init__ (self):
    GenericFilter.__init__ (self)

  def skip_file (self, dir, filename):
    if filename.endswith ('.m4'):
      pathname = os.path.join (dir, filename)
      with open (pathname) as file:
        # Skip files imported from gettext.
        if file.readline().find ('gettext-') >= 0:
          return True
    return GenericFilter.skip_file (self, dir, filename)

class GCCFilter (GenericFilter):
  def __init__ (self):
    GenericFilter.__init__ (self)

    self.skip_files |= set ([
        # Not part of GCC
        'math-68881.h',
        ])

    self.skip_dirs |= set ([
        # Better not create a merge nightmare for the GNAT folks.
        'ada',

        # Handled separately.
        'testsuite',
        ])
```

```
        self.skip_extensions |= set ([
                # Maintained by the translation project.
                '.po',

                # Automatically-generated.
                '.pot',
                ])

        self.fossilised_files |= set ([
                # Old news won't be updated.
                'ONEWS',
                ])

class TestsuiteFilter (GenericFilter):
    def __init__ (self):
        GenericFilter.__init__ (self)

        self.skip_extensions |= set ([
                # Don't change the tests, which could be woend by anyone.
                '.c',
                '.C',
                '.cc',
                '.h',
                '.hs',
                '.f',
                '.f90',
                '.go',
                '.inc',
                '.java',
                ])

    def skip_file (self, dir, filename):
        # g++.niklas/README contains historical copyright information
        # and isn't updated.
        if filename == 'README' and os.path.basename (dir) == 'g++.niklas':
            return True
        # Similarly params/README.
        if filename == 'README' and os.path.basename (dir) == 'params':
            return True
        if filename == 'pdt_5.f03' and os.path.basename (dir) == 'gfortran.dg':
      return True
        return GenericFilter.skip_file (self, dir, filename)

class LibCppFilter (GenericFilter):
    def __init__ (self):
        GenericFilter.__init__ (self)
```

```
        self.skip_extensions |= set ([
                # Maintained by the translation project.
                '.po',

                # Automatically-generated.
                '.pot',
                ])

class LibGCCFilter (GenericFilter):
    def __init__ (self):
        GenericFilter.__init__ (self)

        self.skip_dirs |= set ([
                # Imported from GLIBC.
                'soft-fp',
                ])

class LibStdCxxFilter (GenericFilter):
    def __init__ (self):
        GenericFilter.__init__ (self)

        self.skip_files |= set ([
                # Contains no copyright of its own, but quotes the GPL.
                'intro.xml',
                ])

        self.skip_dirs |= set ([
                # Contains automatically-generated sources.
                'html',

                # The testsuite data files shouldn't be changed.
                'data',

                # Contains imported images
                'images',
                ])

        self.own_files |= set ([
                # Contains markup around the copyright owner.
                'spine.xml',
                ])

    def get_line_filter (self, dir, filename):
        if filename == 'boost_concept_check.h':
            return re.compile ('// \(C\) Copyright Jeremy Siek')
        return GenericFilter.get_line_filter (self, dir, filename)

class GCCCopyright (Copyright):
```

```
  def __init__ (self, errors):
    Copyright.__init__ (self, errors)

    canon_fsf = 'Free Software Foundation, Inc.'
    self.add_package_author ('Free Software Foundation', canon_fsf)
    self.add_package_author ('Free Software Foundation.', canon_fsf)
    self.add_package_author ('Free Software Foundation Inc.', canon_fsf)
    self.add_package_author ('Free Software Foundation, Inc', canon_fsf)
    self.add_package_author ('Free Software Foundation, Inc.', canon_fsf)
    self.add_package_author ('The Free Software Foundation', canon_fsf)
    self.add_package_author ('The Free Software Foundation, Inc.', canon_fsf)
    self.add_package_author ('Software Foundation, Inc.', canon_fsf)

    self.add_external_author ('ARM')
    self.add_external_author ('AdaCore')
    self.add_external_author ('Ami Tavory and Vladimir Dreizin, IBM-HRL.')
    self.add_external_author ('Cavium Networks.')
    self.add_external_author ('Faraday Technology Corp.')
    self.add_external_author ('Florida State University')
    self.add_external_author ('Greg Colvin and Beman Dawes.')
    self.add_external_author ('Hewlett-Packard Company')
    self.add_external_author ('Intel Corporation')
    self.add_external_author ('Information Technology Industry Council.')
    self.add_external_author ('James Theiler, Brian Gough')
    self.add_external_author ('Makoto Matsumoto and Takuji Nishimura,')
    self.add_external_author ('National Research Council of Canada.')
    self.add_external_author ('NVIDIA Corporation')
    self.add_external_author ('Peter Dimov and Multi Media Ltd.')
    self.add_external_author ('Peter Dimov')
    self.add_external_author ('Pipeline Associates, Inc.')
    self.add_external_author ('Regents of the University of California.')
    self.add_external_author ('Silicon Graphics Computer Systems, Inc.')
    self.add_external_author ('Silicon Graphics')
    self.add_external_author ('Stephen L. Moshier')
    self.add_external_author ('Sun Microsystems, Inc. All rights reserved.')
    self.add_external_author ('The Go Authors.  All rights reserved.')
    self.add_external_author ('The Go Authors. All rights reserved.')
    self.add_external_author ('The Go Authors.')
    self.add_external_author ('The Regents of the University of California.')
    self.add_external_author ('Unicode, Inc.')
    self.add_external_author ('University of Toronto.')

class GCCCmdLine (CmdLine):
  def __init__ (self):
    CmdLine.__init__ (self, GCCCopyright)

    self.add_dir ('.', TopLevelFilter())
    # boehm-gc is imported from upstream.
```

```
self.add_dir ('config', ConfigFilter())
# contrib isn't really part of GCC.
self.add_dir ('fixincludes')
self.add_dir ('gcc', GCCFilter())
self.add_dir (os.path.join ('gcc', 'testsuite'), TestsuiteFilter())
self.add_dir ('gnattools')
self.add_dir ('gotools')
self.add_dir ('include')
# intl is imported from upstream.
self.add_dir ('libada')
self.add_dir ('libatomic')
self.add_dir ('libbacktrace')
self.add_dir ('libcc1')
self.add_dir ('libcpp', LibCppFilter())
self.add_dir ('libdecnumber')
# libffi is imported from upstream.
self.add_dir ('libgcc', LibGCCFilter())
self.add_dir ('libgfortran')
# libgo is imported from upstream.
self.add_dir ('libgomp')
self.add_dir ('libhsail-rt')
self.add_dir ('libiberty')
self.add_dir ('libitm')
self.add_dir ('libobjc')
# liboffloadmic is imported from upstream.
self.add_dir ('libquadmath')
# libsanitizer is imported from upstream.
self.add_dir ('libssp')
self.add_dir ('libstdc++-v3', LibStdCxxFilter())
self.add_dir ('libvtv')
self.add_dir ('lto-plugin')
# maintainer-scripts maintainer-scripts
# zlib is imported from upstream.

self.default_dirs = [
    'gcc',
    'include',
    'libada',
    'libatomic',
    'libbacktrace',
    'libcc1',
    'libcpp',
    'libdecnumber',
    'libgcc',
    'libgfortran',
    'libgomp',
    'libhsail-rt',
    'libiberty',
```

'libitm',
'libobjc',
'libssp',
'libstdc++-v3',
'libvtv',
'lto-plugin',
]

GCCCmdLine().main()

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If the disclaimer of warranty and limitation of liability provided above cannot be given local legal effect according to their terms, reviewing courts shall apply local law that most closely approximates an absolute waiver of all civil liability in connection with the Program, unless a warranty or assumption of liability accompanies a copy of the Program in return for a fee.

@end enumerate

@heading END OF TERMS AND CONDITIONS

@heading How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively

state the exclusion of warranty; and each file should have at least
the ``copyright'' line and a pointer to where the full notice is found.

@smallexample
@var{one line to give the program's name and a brief idea of what it does.}
Copyright (C) @var{year} @var{name of author}

This program is free software: you can redistribute it and/or modify
it under the terms of the GNU General Public License as published by
the Free Software Foundation, either version 3 of the License, or (at
your option) any later version.

This program is distributed in the hope that it will be useful, but
WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU
General Public License for more details.

You should have received a copy of the GNU General Public License
along with this program. If not, see @url{http://www.gnu.org/licenses/}.
@end smallexample

Also add information on how to contact you by electronic and paper mail.

If the program does terminal interaction, make it output a short
notice like this when it starts in an interactive mode:

@smallexample
@var{program} Copyright (C) @var{year} @var{name of author}
This program comes with ABSOLUTELY NO WARRANTY; for details type @samp{show w}.
This is free software, and you are welcome to redistribute it
under certain conditions; type @samp{show c} for details.
@end smallexample

The hypothetical commands @samp{show w} and @samp{show c} should show
the appropriate parts of the General Public License. Of course, your
program's commands might be different; for a GUI interface, you would
use an ``about box''.

You should also get your employer (if you work as a programmer) or school,
if any, to sign a ``copyright disclaimer'' for the program, if necessary.
For more information on this, and how to apply and follow the GNU GPL, see
@url{http://www.gnu.org/licenses/}.

The GNU General Public License does not permit incorporating your
program into proprietary programs. If your program is a subroutine
library, you may consider it more useful to permit linking proprietary
applications with the library. If this is what you want to do, use
the GNU Lesser General Public License instead of this License. But

```
first, please read @url{http://www.gnu.org/philosophy/why-not-lgpl.html}.
@c man end
.\" Automatically generated by Pod::Man 4.09 (Pod::Simple 3.35)
.\"
.\" Standard preamble:
.\" ========================================================================
.de Sp \" Vertical space (when we can't use .PP)
.if t .sp .5v
.if n .sp
..
.de Vb \" Begin verbatim text
.ft CW
.nf
.ne \\$1
..
.de Ve \" End verbatim text
.ft R
.fi
..
.\" Set up some character translations and predefined strings.  \*(-- will
.\" give an unbreakable dash, \*(PI will give pi, \*(L" will give a left
.\" double quote, and \*(R" will give a right double quote.  \*(C+ will
.\" give a nicer C++.  Capital omega is used to do unbreakable dashes and
.\" therefore won't be available.  \*(C` and \*(C' expand to `' in nroff,
.\" nothing in troff, for use with C<>.
.tr \(*W-
.ds C+ C\v'-.1v'\h'-1p'\s-2+\h'-1p'+\s0\v'.1v'\h'-1p'
.ie n \{\
.    ds -- \(*W-
.    ds PI pi
.    if (\n(.H=4u)&(1m=24u) .ds -- \(*W\h'-12u'\(*W\h'-12u'-\" diablo 10 pitch
.    if (\n(.H=4u)&(1m=20u) .ds -- \(*W\h'-12u'\(*W\h'-8u'-\"  diablo 12 pitch
.    ds L" ""
.    ds R" ""
.    ds C` ""
.    ds C' ""
'br\}
.el\{\
.    ds -- \|\(em\|
.    ds PI \(*p
.    ds L" ``
.    ds R" ''
.    ds C`
.    ds C'
'br\}
.\"
.\" Escape single quotes in literal strings from groff's Unicode transform.
.ie \n(.g .ds Aq \(aq
```

```
.el       .ds Aq '
.\"
.\" If the F register is >0, we'll generate index entries on stderr for
.\" titles (.TH), headers (.SH), subsections (.SS), items (.Ip), and index
.\" entries marked with X<> in POD.  Of course, you'll have to process the
.\" output yourself in some meaningful fashion.
.\"
.\" Avoid warning from groff about undefined register 'F'.
.de IX
..
.if !\nF .nr F 0
.if \nF>0 \{\
.    de IX
.    tm Index:\\$1\t\\n%\t"\\$2"
..
.    if !\nF==2 \{\
.        nr % 0
.        nr F 2
.    \}
.\}
.\"
.\" Accent mark definitions (@(#)ms.acc 1.5 88/02/08 SMI; from UCB 4.2).
.\" Fear.  Run.  Save yourself.  No user-serviceable parts.
.    \" fudge factors for nroff and troff
.if n \{\
.    ds #H 0
.    ds #V .8m
.    ds #F .3m
.    ds #[ \f1
.    ds #] \fP
.\}
.if t \{\
.    ds #H ((1u-(\\\\n(.fu%2u))*.13m)
.    ds #V .6m
.    ds #F 0
.    ds #[ \&
.    ds #] \&
.\}
.    \" simple accents for nroff and troff
.if n \{\
.    ds ' \&
.    ds ` \&
.    ds ^ \&
.    ds , \&
.    ds ~ ~
.    ds /
.\}
.if t \{\
```

```
.    ds ' \\k:\h'-(\\n(.wu*8/10-\*(#H)'\'\h'|\\n:u'
.    ds ` \\k:\h'-(\\n(.wu*8/10-\*(#H)'\`\h'|\\n:u'
.    ds ^ \\k:\h'-(\\n(.wu*10/11-\*(#H)'^\h'|\\n:u'
.    ds , \\k:\h'-(\\n(.wu*8/10)',\h'|\\n:u'
.    ds ~ \\k:\h'-(\\n(.wu-\*(#H-.1m)'~\h'|\\n:u'
.    ds / \\k:\h'-(\\n(.wu*8/10-\*(#H)'\z\(sl\h'|\\n:u'
.\}
.    \" troff and (daisy-wheel) nroff accents
.ds : \\k:\h'-(\\n(.wu*8/10-\*(#H+.1m+\*(#F)'\v'-\*(#V'\z.\h'.2m+\*(#F'.\h'|\\n:u'\v'\*(#V'
.ds 8 \h'\*(#H'\(*b\h'-\*(#H'
.ds o \\k:\h'-(\\n(.wu+\w'\(de'u-\*(#H)/2u'\v'-.3n'\*(#[\z\(de\v'.3n'\h'|\\n:u'\*(#]
.ds d- \h'\*(#H'\(pd\h'-\w'~'u'\v'-.25m'\f2\(hy\fP\v'.25m'\h'-\*(#H'
.ds D- D\\k:\h'-\w'D'u'\v'-.11m'\z\(hy\v'.11m'\h'|\\n:u'
.ds th \*(#[\v'.3m'\s+1I\s-1\v'-.3m'\h'-(\w'I'u*2/3)'\s-1o\s+1\*(#]
.ds Th \*(#[\s+2I\s-2\h'-\w'I'u*3/5'\v'-.3m'o\v'.3m'\*(#]
.ds ae a\h'-(\w'a'u*4/10)'e
.ds Ae A\h'-(\w'A'u*4/10)'E
.    \" corrections for vroff
.if v .ds ~ \\k:\h'-(\\n(.wu*9/10-\*(#H)'\s-2\u~\d\s+2\h'|\\n:u'
.if v .ds ^ \\k:\h'-(\\n(.wu*10/11-\*(#H)'\v'-.4m'^\v'.4m'\h'|\\n:u'
.    \" for low resolution devices (crt and lpr)
.if \n(.H>23 .if \n(.V>19 \
\{\
.    ds : e
.    ds 8 ss
.    ds o a
.    ds d- d\h'-1'\(ga
.    ds D- D\h'-1'\(hy
.    ds th \o'bp'
.    ds Th \o'LP'
.    ds ae ae
.    ds Ae AE
.\}
.rm #[ #] #H #V #F C
.\" ==========================================================================
.\"
.IX Title "GPL 7"
.TH GPL 7 "2018-07-26" "gcc-8.2.0" "GNU"
.\" For nroff, turn off justification.  Always turn off hyphenation; it makes
.\" way too many mistakes in technical documents.
.if n .ad l
.nh
.SH "NAME"
gpl \- GNU General Public License
.SH "DESCRIPTION"
.IX Header "DESCRIPTION"
.SS "\s-1GNU\s0 General Public License"
.IX Subsection "GNU General Public License"
```

.SS "Version 3, 29 June 2007"
.IX Subsection "Version 3, 29 June 2007"
.Vb 1
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\&
\&	Everyone is permitted to copy and distribute verbatim copies of this
\&	license document, but changing it is not allowed.
.Ve
.SS "Preamble"
.IX Subsection "Preamble"
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software and other kinds of works.
.PP
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to take away your freedom to share and change the works. By contrast,
the \s-1GNU\s0 General Public License is intended to guarantee your freedom
to share and change all versions of a program*(--to make sure it remains
free software for all its users. We, the Free Software Foundation,
use the \s-1GNU\s0 General Public License for most of our software; it
applies also to any other work released this way by its authors. You
can apply it to your programs, too.
.PP
When we speak of free software, we are referring to freedom, not
price. Our General Public Licenses are designed to make sure that you
have the freedom to distribute copies of free software (and charge for
them if you wish), that you receive source code or can get it if you
want it, that you can change the software or use pieces of it in new
free programs, and that you know you can do these things.
.PP
To protect your rights, we need to prevent others from denying you
these rights or asking you to surrender the rights. Therefore, you
have certain responsibilities if you distribute copies of the
software, or if you modify it: responsibilities to respect the freedom
of others.
.PP
For example, if you distribute copies of such a program, whether
gratis or for a fee, you must pass on to the recipients the same
freedoms that you received. You must make sure that they, too,
receive or can get the source code. And you must show them these
terms so they know their rights.
.PP
Developers that use the \s-1GNU GPL\s0 protect your rights with two steps:
(1) assert copyright on the software, and (2) offer you this License
giving you legal permission to copy, distribute and/or modify it.
.PP
For the developers' and authors' protection, the \s-1GPL\s0 clearly explains
that there is no warranty for this free software. For both users' and
authors' sake, the \s-1GPL\s0 requires that modified versions be marked as

changed, so that their problems will not be attributed erroneously to
authors of previous versions.
.PP
Some devices are designed to deny users access to install or run
modified versions of the software inside them, although the
manufacturer can do so. This is fundamentally incompatible with the
aim of protecting users' freedom to change the software. The
systematic pattern of such abuse occurs in the area of products for
individuals to use, which is precisely where it is most unacceptable.
Therefore, we have designed this version of the \s-1GPL\s0 to prohibit the
practice for those products. If such problems arise substantially in
other domains, we stand ready to extend this provision to those
domains in future versions of the \s-1GPL,\s0 as needed to protect the
freedom of users.
.PP
Finally, every program is threatened constantly by software patents.
States should not allow patents to restrict development and use of
software on general-purpose computers, but in those that do, we wish
to avoid the special danger that patents applied to a free program
could make it effectively proprietary. To prevent this, the \s-1GPL\s0
assures that patents cannot be used to render the program non-free.
.PP
The precise terms and conditions for copying, distribution and
modification follow.
.SS "\s-1TERMS AND CONDITIONS\s0"
.IX Subsection "TERMS AND CONDITIONS"
.IP "0. Definitions." 4
.IX Item "0. Definitions."
\&*(L"This License*(R" refers to version 3 of the \s-1GNU\s0 General Public License.
.Sp
\&*(L"Copyright*(R" also means copyright-like laws that apply to other kinds
of works, such as semiconductor masks.
.Sp
\&*(L"The Program*(R" refers to any copyrightable work licensed under this
License. Each licensee is addressed as *(L"you*(R". *(L"Licensees*(R" and
\&*(L"recipients*(R" may be individuals or organizations.
.Sp
To *(L"modify*(R" a work means to copy from or adapt all or part of the work
in a fashion requiring copyright permission, other than the making of
an exact copy. The resulting work is called a *(L"modified version*(R" of
the earlier work or a work *(L"based on*(R" the earlier work.
.Sp
A *(L"covered work*(R" means either the unmodified Program or a work based
on the Program.
.Sp
To *(L"propagate*(R" a work means to do anything with it that, without
permission, would make you directly or secondarily liable for
infringement under applicable copyright law, except executing it on a

computer or modifying a private copy. Propagation includes copying,
distribution (with or without modification), making available to the
public, and in some countries other activities as well.
.Sp
To *(L"convey*(R" a work means any kind of propagation that enables other
parties to make or receive copies. Mere interaction with a user
through a computer network, with no transfer of a copy, is not
conveying.
.Sp
An interactive user interface displays *(L"Appropriate Legal Notices*(R" to
the extent that it includes a convenient and prominently visible
feature that (1) displays an appropriate copyright notice, and (2)
tells the user that there is no warranty for the work (except to the
extent that warranties are provided), that licensees may convey the
work under this License, and how to view a copy of this License. If
the interface presents a list of user commands or options, such as a
menu, a prominent item in the list meets this criterion.
.IP "1. Source Code." 4
.IX Item "1. Source Code."
The *(L"source code*(R" for a work means the preferred form of the work for
making modifications to it. *(L"Object code*(R" means any non-source form
of a work.
.Sp
A *(L"Standard Interface*(R" means an interface that either is an official
standard defined by a recognized standards body, or, in the case of
interfaces specified for a particular programming language, one that
is widely used among developers working in that language.
.Sp
The *(L"System Libraries*(R" of an executable work include anything, other
than the work as a whole, that (a) is included in the normal form of
packaging a Major Component, but which is not part of that Major
Component, and (b) serves only to enable use of the work with that
Major Component, or to implement a Standard Interface for which an
implementation is available to the public in source code form. A
\&*(L"Major Component*(R", in this context, means a major essential component
(kernel, window system, and so on) of the specific operating system
(if any) on which the executable work runs, or a compiler used to
produce the work, or an object code interpreter used to run it.
.Sp
The *(L"Corresponding Source*(R" for a work in object code form means all
the source code needed to generate, install, and (for an executable
work) run the object code and to modify the work, including scripts to
control those activities. However, it does not include the work's
System Libraries, or general-purpose tools or generally available free
programs which are used unmodified in performing those activities but
which are not part of the work. For example, Corresponding Source
includes interface definition files associated with source files for
the work, and the source code for shared libraries and dynamically

linked subprograms that the work is specifically designed to require,
such as by intimate data communication or control flow between those
subprograms and other parts of the work.
.Sp
The Corresponding Source need not include anything that users can
regenerate automatically from other parts of the Corresponding Source.
.Sp
The Corresponding Source for a work in source code form is that same
work.
.IP "2. Basic Permissions." 4
.IX Item "2. Basic Permissions."
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content, constitutes a covered work. This License acknowledges your
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.Sp
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without conditions so long as your license otherwise remains in force.
You may convey covered works to others for the sole purpose of having
them make modifications exclusively for you, or provide you with
facilities for running those works, provided that you comply with the
terms of this License in conveying all material for which you do not
control copyright. Those thus making or running the covered works for
you must do so exclusively on your behalf, under your direction and
control, on terms that prohibit them from making any copies of your
copyrighted material outside their relationship with you.
.Sp
Conveying under any other circumstances is permitted solely under the
conditions stated below. Sublicensing is not allowed; section 10
makes it unnecessary.
.IP "3. Protecting Users' Legal Rights From Anti-Circumvention Law." 4
.IX Item "3. Protecting Users' Legal Rights From Anti-Circumvention Law."
No covered work shall be deemed part of an effective technological
measure under any applicable law fulfilling obligations under article
11 of the \s-1WIPO\s0 copyright treaty adopted on 20 December 1996, or
similar laws prohibiting or restricting circumvention of such
measures.
.Sp
When you convey a covered work, you waive any legal power to forbid
circumvention of technological measures to the extent such
circumvention is effected by exercising rights under this License with
respect to the covered work, and you disclaim any intention to limit
operation or modification of the work as a means of enforcing, against
the work's users, your or third parties' legal rights to forbid
circumvention of technological measures.

.IP "4. Conveying Verbatim Copies." 4
.IX Item "4. Conveying Verbatim Copies."
You may convey verbatim copies of the Program's source code as you
receive it, in any medium, provided that you conspicuously and
appropriately publish on each copy an appropriate copyright notice;
keep intact all notices stating that this License and any
non-permissive terms added in accord with section 7 apply to the code;
keep intact all notices of the absence of any warranty; and give all
recipients a copy of this License along with the Program.
.Sp
You may charge any price or no price for each copy that you convey,
and you may offer support or warranty protection for a fee.
.IP "5. Conveying Modified Source Versions." 4
.IX Item "5. Conveying Modified Source Versions."
You may convey a work based on the Program, or the modifications to
produce it from the Program, in the form of source code under the
terms of section 4, provided that you also meet all of these
conditions:
.RS 4
.IP "a." 4
.IX Item "a."
The work must carry prominent notices stating that you modified it,
and giving a relevant date.
.IP "b." 4
.IX Item "b."
The work must carry prominent notices stating that it is released
under this License and any conditions added under section 7. This
requirement modifies the requirement in section 4 to *(L"keep intact all
notices*(R".
.IP "c." 4
.IX Item "c."
You must license the entire work, as a whole, under this License to
anyone who comes into possession of a copy. This License will
therefore apply, along with any applicable section 7 additional terms,
to the whole of the work, and all its parts, regardless of how they
are packaged. This License gives no permission to license the work in
any other way, but it does not invalidate such permission if you have
separately received it.
.IP "d." 4
.IX Item "d."
If the work has interactive user interfaces, each must display
Appropriate Legal Notices; however, if the Program has interactive
interfaces that do not display Appropriate Legal Notices, your work
need not make them do so.
.RE
.RS 4
.Sp
A compilation of a covered work with other separate and independent

works, which are not by their nature extensions of the covered work,
and which are not combined with it such as to form a larger program,
in or on a volume of a storage or distribution medium, is called an
\&*(L"aggregate*(R" if the compilation and its resulting copyright are not
used to limit the access or legal rights of the compilation's users
beyond what the individual works permit. Inclusion of a covered work
in an aggregate does not cause this License to apply to the other
parts of the aggregate.
.RE
.IP "6. Conveying Non-Source Forms." 4
.IX Item "6. Conveying Non-Source Forms."
You may convey a covered work in object code form under the terms of
sections 4 and 5, provided that you also convey the machine-readable
Corresponding Source under the terms of this License, in one of these
ways:
.RS 4
.IP "a." 4
.IX Item "a."
Convey the object code in, or embodied in, a physical product
(including a physical distribution medium), accompanied by the
Corresponding Source fixed on a durable physical medium customarily
used for software interchange.
.IP "b." 4
.IX Item "b."
Convey the object code in, or embodied in, a physical product
(including a physical distribution medium), accompanied by a written
offer, valid for at least three years and valid for as long as you
offer spare parts or customer support for that product model, to give
anyone who possesses the object code either (1) a copy of the
Corresponding Source for all the software in the product that is
covered by this License, on a durable physical medium customarily used
for software interchange, for a price no more than your reasonable
cost of physically performing this conveying of source, or (2) access
to copy the Corresponding Source from a network server at no charge.
.IP "c." 4
.IX Item "c."
Convey individual copies of the object code with a copy of the written
offer to provide the Corresponding Source. This alternative is
allowed only occasionally and noncommercially, and only if you
received the object code with such an offer, in accord with subsection
6b.
.IP "d." 4
.IX Item "d."
Convey the object code by offering access from a designated place
(gratis or for a charge), and offer equivalent access to the
Corresponding Source in the same way through the same place at no
further charge. You need not require recipients to copy the
Corresponding Source along with the object code. If the place to copy

the object code is a network server, the Corresponding Source may be
on a different server (operated by you or a third party) that supports
equivalent copying facilities, provided you maintain clear directions
next to the object code saying where to find the Corresponding Source.
Regardless of what server hosts the Corresponding Source, you remain
obligated to ensure that it is available for as long as needed to
satisfy these requirements.
.IP "e." 4
.IX Item "e."
Convey the object code using peer-to-peer transmission, provided you
inform other peers where the object code and Corresponding Source of
the work are being offered to the general public at no charge under
subsection 6d.
.RE
.RS 4
.Sp
A separable portion of the object code, whose source code is excluded
from the Corresponding Source as a System Library, need not be
included in conveying the object code work.
.Sp
A *(L"User Product*(R" is either (1) a *(L"consumer product*(R", which means any
tangible personal property which is normally used for personal,
family, or household purposes, or (2) anything designed or sold for
incorporation into a dwelling. In determining whether a product is a
consumer product, doubtful cases shall be resolved in favor of
coverage. For a particular product received by a particular user,
\&*(L"normally used*(R" refers to a typical or common use of that class of
product, regardless of the status of the particular user or of the way
in which the particular user actually uses, or expects or is expected
to use, the product. A product is a consumer product regardless of
whether the product has substantial commercial, industrial or
non-consumer uses, unless such uses represent the only significant
mode of use of the product.
.Sp
\&*(L"Installation Information*(R" for a User Product means any methods,
procedures, authorization keys, or other information required to
install and execute modified versions of a covered work in that User
Product from a modified version of its Corresponding Source. The
information must suffice to ensure that the continued functioning of
the modified object code is in no case prevented or interfered with
solely because modification has been made.
.Sp
If you convey an object code work under this section in, or with, or
specifically for use in, a User Product, and the conveying occurs as
part of a transaction in which the right of possession and use of the
User Product is transferred to the recipient in perpetuity or for a
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```
/* Use the Sequent Symmetry assembler syntax.  */

/* Define the syntax of pseudo-ops, labels and comments.  */

/* Prefix for internally generated assembler labels.  If we aren't using
  underscores, we are using prefix `.'s to identify labels that should
  be ignored, as in `i386/gas.h' --karl@cs.umb.edu  */

#define LPREFIX "L"

/* Assembler pseudos to introduce constants of various size.  */

#define ASM_BYTE "\t.byte\t"
#define ASM_SHORT "\t.word\t"
#define ASM_LONG "\t.long\t"
#define ASM_QUAD "\t.quad\t"  /* Should not be used for 32bit compilation.  */

/* This was suggested, but it shouldn't be right for DBX output. -- RMS
  #define ASM_OUTPUT_SOURCE_FILENAME(FILE, NAME) */


/* Define the syntax of labels and symbol definitions/declarations.  */

/* This is how to output an assembler line
  that says to advance the location counter by SIZE bytes.  */

#define ASM_OUTPUT_SKIP(FILE,SIZE)  \
 fprintf (FILE, "\t.space " HOST_WIDE_INT_PRINT_UNSIGNED"\n", (SIZE))

/* Define the syntax of labels and symbol definitions/declarations.  */

/* This says how to output an assembler line
  to define a global common symbol.  */

#define ASM_OUTPUT_COMMON(FILE, NAME, SIZE, ROUNDED)  \
( fputs (".comm ", (FILE)),   \
 assemble_name ((FILE), (NAME)),  \
 fprintf ((FILE), ",%u\n", (int)(ROUNDED)))

/* This says how to output an assembler line
  to define a local common symbol.  */

#define ASM_OUTPUT_LOCAL(FILE, NAME, SIZE, ROUNDED)  \
( fputs (".lcomm ", (FILE)),   \
 assemble_name ((FILE), (NAME)),  \
 fprintf ((FILE), ",%u\n", (int)(ROUNDED)))
```

```
#ifdef HAVE_GAS_LCOMM_WITH_ALIGNMENT
#define ASM_OUTPUT_ALIGNED_LOCAL(FILE, NAME, SIZE, ALIGNMENT)  \
( fputs (".lcomm ", (FILE)),   \
 assemble_name ((FILE), (NAME)),  \
 fprintf ((FILE), ",%u,%u\n", (int)(SIZE), (int)(ALIGNMENT) / BITS_PER_UNIT))
#endif

/* This is how to output an assembler line
  that says to advance the location counter
  to a multiple of 2**LOG bytes.  */

#define ASM_OUTPUT_ALIGN(FILE,LOG) \
 if ((LOG)!=0) fprintf ((FILE), "\t.align %d\n", (LOG))

/* This is how to store into the string BUF
  the symbol_ref name of an internal numbered label where
  PREFIX is the class of label and NUM is the number within the class.
  This is suitable for output with `assemble_name'.  */

#define ASM_GENERATE_INTERNAL_LABEL(BUF,PREFIX,NUMBER) \
   sprintf ((BUF), "*%s%ld", (PREFIX), (long)(NUMBER))

/* The prefix to add to user-visible assembler symbols.  */

#define USER_LABEL_PREFIX "_"

/* Sequent has some changes in the format of DBX symbols.  */
#define DBX_NO_XREFS 1

/* Don't split DBX symbols into continuations.  */
#define DBX_CONTIN_LENGTH 0
```

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Julian Seward, jseward@bzip.org
bzip2/libbzip2 version 1.0.6 of 6 September 2010

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  </simpara>
</listitem>
<listitem>
  <simpara>
    Delete any section Entitled Endorsements. Such a section
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  </simpara>
</listitem>
<listitem>
  <simpara>
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    Endorsements or to conflict in title with any Invariant
    Section.
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</listitem>
<listitem>
  <simpara>
    Preserve any Warranty Disclaimers.
  </simpara>
</listitem>
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<simpara>
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<bridgehead xml:id="fdl-1-section6" renderas="sect2">
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<bridgehead xml:id="fdl-1-section7" renderas="sect2">
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</simpara>
<bridgehead xml:id="fdl-1-section8" renderas="sect2">
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<simpara>
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<bridgehead xml:id="fdl-1-section9" renderas="sect2">
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<bridgehead xml:id="fdl-1-section11" renderas="sect2">
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</simpara>

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</appendix>
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  <acronym>GNU</acronym> General Public License version 3
 </title></info>
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 </para>
 <para>
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<para>
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<para>
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</para>
<para>
The precise terms and conditions for copying, distribution and modification
follow.
</para>
<bridgehead>
TERMS AND CONDITIONS
</bridgehead>

<bridgehead xml:id="gpl-3-definitions" renderas="sect1">
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<para>
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</para>
<para>
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<para>
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</para>
<para>
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</para>
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1. Source Code.
</bridgehead>
<para>
The source code for a work means the preferred form of the
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non-source form of a work.
</para>
<para>
A Standard Interface means an interface that either is an
official standard defined by a recognized standards body, or, in the case of
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</para>
<para>
The System Libraries of an executable work include anything,
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and (b) serves only to enable use of the work with that Major Component, or
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to the public in source code form. A Major Component, in this
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on) of the specific operating system (if any) on which the executable work
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used to run it.
</para>
<para>
The Corresponding Source for a work in object code form means
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work) run the object code and to modify the work, including scripts to
control those activities. However, it does not include the works
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the work is specifically designed to require, such as by intimate data
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the work.
</para>
<para>
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</para>
<para>

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</para>
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<para>
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<para>
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</para>
<bridgehead xml:id="ConveyingModified" renderas="sect1">
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</bridgehead>
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</para>
<orderedlist numeration="loweralpha" inheritnum="ignore" continuation="restarts">
<listitem>
<para>
The work must carry prominent notices stating that you modified it, and
giving a relevant date.
</para>
</listitem>
<listitem>
<para>
The work must carry prominent notices stating that it is released under
this License and any conditions added under section 7. This requirement
modifies the requirement in section 4 to keep intact all
notices.
</para>
</listitem>
<listitem>
<para>
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</listitem>
<listitem>
<para>
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</listitem>
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<para>
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this License to apply to the other parts of the aggregate.
</para>
<bridgehead xml:id="ConveyingNonSource" renderas="sect1">
6. Conveying Non-Source Forms.
</bridgehead>
<para>
You may convey a covered work in object code form under the terms of
sections 4 and 5, provided that you also convey the machine-readable
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</para>
<orderedlist numeration="loweralpha" inheritnum="ignore" continuation="restarts">
<listitem>
<para>
Convey the object code in, or embodied in, a physical product (including
a physical distribution medium), accompanied by the Corresponding Source
fixed on a durable physical medium customarily used for software
interchange.
</para>
</listitem>
<listitem>
<para>
Convey the object code in, or embodied in, a physical product (including
a physical distribution medium), accompanied by a written offer, valid
for at least three years and valid for as long as you offer spare parts
or customer support for that product model, to give anyone who possesses
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durable physical medium customarily used for software interchange, for a

price no more than your reasonable cost of physically performing this
conveying of source, or (2) access to copy the Corresponding Source from
a network server at no charge.
</para>
</listitem>
<listitem>
<para>
Convey individual copies of the object code with a copy of the written
offer to provide the Corresponding Source. This alternative is allowed
only occasionally and noncommercially, and only if you received the
object code with such an offer, in accord with subsection 6b.
</para>
</listitem>
<listitem>
<para>
Convey the object code by offering access from a designated place
(gratis or for a charge), and offer equivalent access to the
Corresponding Source in the same way through the same place at no
further charge. You need not require recipients to copy the
Corresponding Source along with the object code. If the place to copy
the object code is a network server, the Corresponding Source may be on
a different server (operated by you or a third party) that supports
equivalent copying facilities, provided you maintain clear directions
next to the object code saying where to find the Corresponding Source.
Regardless of what server hosts the Corresponding Source, you remain
obligated to ensure that it is available for as long as needed to
satisfy these requirements.
</para>
</listitem>
<listitem>
<para>
Convey the object code using peer-to-peer transmission, provided you
inform other peers where the object code and Corresponding Source of the
work are being offered to the general public at no charge under
subsection 6d.
</para>
</listitem>
</orderedlist>
<para>
A separable portion of the object code, whose source code is excluded from
the Corresponding Source as a System Library, need not be included in
conveying the object code work.
</para>
<para>
A User Product is either (1) a consumer product,
which means any tangible personal property which is normally used for
personal, family, or household purposes, or (2) anything designed or sold
for incorporation into a dwelling. In determining whether a product is a

consumer product, doubtful cases shall be resolved in favor of coverage.
For a particular product received by a particular user, normally
used refers to a typical or common use of that class of product,
regardless of the status of the particular user or of the way in which the
particular user actually uses, or expects or is expected to use, the
product. A product is a consumer product regardless of whether the product
has substantial commercial, industrial or non-consumer uses, unless such
uses represent the only significant mode of use of the product.
</para>
<para>
Installation Information for a User Product means any methods,
procedures, authorization keys, or other information required to install and
execute modified versions of a covered work in that User Product from a
modified version of its Corresponding Source. The information must suffice
to ensure that the continued functioning of the modified object code is in
no case prevented or interfered with solely because modification has been
made.
</para>
<para>
If you convey an object code work under this section in, or with, or
specifically for use in, a User Product, and the conveying occurs as part of
a transaction in which the right of possession and use of the User Product
is transferred to the recipient in perpetuity or for a fixed term
(regardless of how the transaction is characterized), the Corresponding
Source conveyed under this section must be accompanied by the Installation
Information. But this requirement does not apply if neither you nor any
third party retains the ability to install modified object code on the User
Product (for example, the work has been installed in
<acronym>ROM</acronym>).
</para>
<para>
The requirement to provide Installation Information does not include a
requirement to continue to provide support service, warranty, or updates for
a work that has been modified or installed by the recipient, or for the User
Product in which it has been modified or installed. Access to a network may
be denied when the modification itself materially and adversely affects the
operation of the network or violates the rules and protocols for
communication across the network.
</para>
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</appendix>

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Version 3.1, 31 March 2009

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Because of this blurred distinction, using the ordinary General Public License for libraries did not effectively promote software sharing, because most developers did not use the libraries. We concluded that weaker conditions might promote sharing better.

However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free libraries that are incorporated in them. (We have not seen how to achieve this as regards changes in header files, but we have achieved it as regards changes in the actual functions of the Library.) The hope is that this will lead to faster development of free libraries.

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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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b) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

c) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

d) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

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[This is the first released version of the library GPL. It is
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These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

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<signature of Ty Coon>, 1 April 1989
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#! /usr/bin/env python

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#
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#

```
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"""copyright.py

This script updates the list of years in the copyright notices in
most files maintained by the GDB project.

Usage: cd src/gdb && python copyright.py

Always review the output of this script before committing it!
A useful command to review the output is:
  % filterdiff -x \*.c -x \*.cc -x \*.h -x \*.exp updates.diff
This removes the bulk of the changes which are most likely to be correct.
"""

import datetime
import os
import os.path
import subprocess


def get_update_list():
  """Return the list of files to update.

  Assumes that the current working directory when called is the root
  of the GDB source tree (NOT the gdb/ subdirectory!).  The names of
  the files are relative to that root directory.
  """
  result = []
  for gdb_dir in ('gdb', 'sim', 'include/gdb'):
    for root, dirs, files in os.walk(gdb_dir, topdown=True):
      for dirname in dirs:
        reldirname = "%s/%s" % (root, dirname)
        if (dirname in EXCLUDE_ALL_LIST
          or reldirname in EXCLUDE_LIST
          or reldirname in NOT_FSF_LIST
          or reldirname in BY_HAND):
          # Prune this directory from our search list.
          dirs.remove(dirname)
      for filename in files:
        relpath = "%s/%s" % (root, filename)
        if (filename in EXCLUDE_ALL_LIST
```

```
            or relpath in EXCLUDE_LIST
            or relpath in NOT_FSF_LIST
            or relpath in BY_HAND):
            # Ignore this file.
            pass
        else:
            result.append(relpath)
    return result


def update_files(update_list):
    """Update the copyright header of the files in the given list.

    We use gnulib's update-copyright script for that.
    """
    # We want to use year intervals in the copyright notices, and
    # all years should be collapsed to one single year interval,
    # even if there are "holes" in the list of years found in the
    # original copyright notice (OK'ed by the FSF, case [gnu.org #719834]).
    os.environ['UPDATE_COPYRIGHT_USE_INTERVALS'] = '2'

    # Perform the update, and save the output in a string.
    update_cmd = ['bash', 'gdb/gnulib/import/extra/update-copyright']
    update_cmd += update_list

    p = subprocess.Popen(update_cmd, stdout=subprocess.PIPE,
                         stderr=subprocess.STDOUT)
    update_out = p.communicate()[0]

    # Process the output.  Typically, a lot of files do not have
    # a copyright notice :-(.  The update-copyright script prints
    # a well defined warning when it did not find the copyright notice.
    # For each of those, do a sanity check and see if they may in fact
    # have one.  For the files that are found not to have one, we filter
    # the line out from the output, since there is nothing more to do,
    # short of looking at each file and seeing which notice is appropriate.
    # Too much work! (~4,000 files listed as of 2012-01-03).
    update_out = update_out.splitlines()
    warning_string = ': warning: copyright statement not found'
    warning_len = len(warning_string)

    for line in update_out:
        if line.endswith('\n'):
            line = line[:-1]
        if line.endswith(warning_string):
            filename = line[:-warning_len]
            if may_have_copyright_notice(filename):
                print line
```

```
    else:
        # Unrecognized file format. !?!
        print "*** " + line


def may_have_copyright_notice(filename):
  """Check that the given file does not seem to have a copyright notice.

  The filename is relative to the root directory.
  This function assumes that the current working directory is that root
  directory.

  The algorigthm is fairly crude, meaning that it might return
  some false positives.  I do not think it will return any false
  negatives...  We might improve this function to handle more
  complex cases later...
  """
  # For now, it may have a copyright notice if we find the word
  # "Copyright" at the (reasonable) start of the given file, say
  # 50 lines...
  MAX_LINES = 50

  fd = open(filename)

  lineno = 1
  for line in fd:
    if 'Copyright' in line:
      return True
    lineno += 1
    if lineno > 50:
      return False
  return False


def main ():
  """The main subprogram."""
  if not os.path.isfile("gnulib/import/extra/update-copyright"):
    print "Error: This script must be called from the gdb directory."
  root_dir = os.path.dirname(os.getcwd())
  os.chdir(root_dir)

  update_list = get_update_list()
  update_files (update_list)

  # Remind the user that some files need to be updated by HAND...
  if BY_HAND:
    print
    print "\033[31mREMINDER: The following files must be updated by hand." \
```

```
            "\033[0m"
        for filename in BY_HAND + MULTIPLE_COPYRIGHT_HEADERS:
            print "  ", filename

################################################################################
#
# Some constants, placed at the end because they take up a lot of room.
# The actual value of these constants is not significant to the understanding
# of the script.
#
################################################################################

# Files which should not be modified, either because they are
# generated, non-FSF, or otherwise special (e.g. license text,
# or test cases which must be sensitive to line numbering).
#
# Filenames are relative to the root directory.
EXCLUDE_LIST = (
   'gdb/nat/glibc_thread_db.h',
   'gdb/CONTRIBUTE',
   'gdb/gnulib/import'
)

# Files which should not be modified, either because they are
# generated, non-FSF, or otherwise special (e.g. license text,
# or test cases which must be sensitive to line numbering).
#
# Matches any file or directory name anywhere.  Use with caution.
# This is mostly for files that can be found in multiple directories.
# Eg: We want all files named COPYING to be left untouched.

EXCLUDE_ALL_LIST = (
   "COPYING", "COPYING.LIB", "CVS", "configure", "copying.c",
   "fdl.texi", "gpl.texi", "aclocal.m4",
)

# The list of files to update by hand.
BY_HAND = (
   # These files are sensitive to line numbering.
   "gdb/testsuite/gdb.base/step-line.inp",
   "gdb/testsuite/gdb.base/step-line.c",
)

# Files containing multiple copyright headers.  This script is only
# fixing the first one it finds, so we need to finish the update
# by hand.
MULTIPLE_COPYRIGHT_HEADERS = (
   "gdb/doc/gdb.texinfo",
```

```
  "gdb/doc/refcard.tex",
  "gdb/gdbarch.sh",
)

# The list of file which have a copyright, but not head by the FSF.
# Filenames are relative to the root directory.
NOT_FSF_LIST = (
  "gdb/exc_request.defs",
  "gdb/gdbtk",
  "gdb/testsuite/gdb.gdbtk/",
  "sim/arm/armemu.h", "sim/arm/armos.c", "sim/arm/gdbhost.c",
  "sim/arm/dbg_hif.h", "sim/arm/dbg_conf.h", "sim/arm/communicate.h",
  "sim/arm/armos.h", "sim/arm/armcopro.c", "sim/arm/armemu.c",
  "sim/arm/kid.c", "sim/arm/thumbemu.c", "sim/arm/armdefs.h",
  "sim/arm/armopts.h", "sim/arm/dbg_cp.h", "sim/arm/dbg_rdi.h",
  "sim/arm/parent.c", "sim/arm/armsupp.c", "sim/arm/armrdi.c",
  "sim/arm/bag.c", "sim/arm/armvirt.c", "sim/arm/main.c", "sim/arm/bag.h",
  "sim/arm/communicate.c", "sim/arm/gdbhost.h", "sim/arm/armfpe.h",
  "sim/arm/arminit.c",
  "sim/common/cgen-fpu.c", "sim/common/cgen-fpu.h",
  "sim/common/cgen-accfp.c",
  "sim/mips/m16run.c", "sim/mips/sim-main.c",
  "sim/moxie/moxie-gdb.dts",
  # Not a single file in sim/ppc/ appears to be copyright FSF :-(.
  "sim/ppc/filter.h", "sim/ppc/gen-support.h", "sim/ppc/ld-insn.h",
  "sim/ppc/hw_sem.c", "sim/ppc/hw_disk.c", "sim/ppc/idecode_branch.h",
  "sim/ppc/sim-endian.h", "sim/ppc/table.c", "sim/ppc/hw_core.c",
  "sim/ppc/gen-support.c", "sim/ppc/gen-semantics.h", "sim/ppc/cpu.h",
  "sim/ppc/sim_callbacks.h", "sim/ppc/RUN", "sim/ppc/Makefile.in",
  "sim/ppc/emul_chirp.c", "sim/ppc/hw_nvram.c", "sim/ppc/dc-test.01",
  "sim/ppc/hw_phb.c", "sim/ppc/hw_eeprom.c", "sim/ppc/bits.h",
  "sim/ppc/hw_vm.c", "sim/ppc/cap.h", "sim/ppc/os_emul.h",
  "sim/ppc/options.h", "sim/ppc/gen-idecode.c", "sim/ppc/filter.c",
  "sim/ppc/corefile-n.h", "sim/ppc/std-config.h", "sim/ppc/ld-decode.h",
  "sim/ppc/filter_filename.h", "sim/ppc/hw_shm.c",
  "sim/ppc/pk_disklabel.c", "sim/ppc/dc-simple", "sim/ppc/misc.h",
  "sim/ppc/device_table.h", "sim/ppc/ld-insn.c", "sim/ppc/inline.c",
  "sim/ppc/emul_bugapi.h", "sim/ppc/hw_cpu.h", "sim/ppc/debug.h",
  "sim/ppc/hw_ide.c", "sim/ppc/debug.c", "sim/ppc/gen-itable.h",
  "sim/ppc/interrupts.c", "sim/ppc/hw_glue.c", "sim/ppc/emul_unix.c",
  "sim/ppc/sim_calls.c", "sim/ppc/dc-complex", "sim/ppc/ld-cache.c",
  "sim/ppc/registers.h", "sim/ppc/dc-test.02", "sim/ppc/options.c",
  "sim/ppc/igen.h", "sim/ppc/registers.c", "sim/ppc/device.h",
  "sim/ppc/emul_chirp.h", "sim/ppc/hw_register.c", "sim/ppc/hw_init.c",
  "sim/ppc/sim-endian-n.h", "sim/ppc/filter_filename.c",
  "sim/ppc/bits.c", "sim/ppc/idecode_fields.h", "sim/ppc/hw_memory.c",
  "sim/ppc/misc.c", "sim/ppc/double.c", "sim/ppc/psim.h",
  "sim/ppc/hw_trace.c", "sim/ppc/emul_netbsd.h", "sim/ppc/psim.c",
```

```
  "sim/ppc/ppc-instructions", "sim/ppc/tree.h", "sim/ppc/README",
  "sim/ppc/gen-icache.h", "sim/ppc/gen-model.h", "sim/ppc/ld-cache.h",
  "sim/ppc/mon.c", "sim/ppc/corefile.h", "sim/ppc/vm.c",
  "sim/ppc/INSTALL", "sim/ppc/gen-model.c", "sim/ppc/hw_cpu.c",
  "sim/ppc/corefile.c", "sim/ppc/hw_opic.c", "sim/ppc/gen-icache.c",
  "sim/ppc/events.h", "sim/ppc/os_emul.c", "sim/ppc/emul_generic.c",
  "sim/ppc/main.c", "sim/ppc/hw_com.c", "sim/ppc/gen-semantics.c",
  "sim/ppc/emul_bugapi.c", "sim/ppc/device.c", "sim/ppc/emul_generic.h",
  "sim/ppc/tree.c", "sim/ppc/mon.h", "sim/ppc/interrupts.h",
  "sim/ppc/cap.c", "sim/ppc/cpu.c", "sim/ppc/hw_phb.h",
  "sim/ppc/device_table.c", "sim/ppc/lf.c", "sim/ppc/lf.c",
  "sim/ppc/dc-stupid", "sim/ppc/hw_pal.c", "sim/ppc/ppc-spr-table",
  "sim/ppc/emul_unix.h", "sim/ppc/words.h", "sim/ppc/basics.h",
  "sim/ppc/hw_htab.c", "sim/ppc/lf.h", "sim/ppc/ld-decode.c",
  "sim/ppc/sim-endian.c", "sim/ppc/gen-itable.c",
  "sim/ppc/idecode_expression.h", "sim/ppc/table.h", "sim/ppc/dgen.c",
  "sim/ppc/events.c", "sim/ppc/gen-idecode.h", "sim/ppc/emul_netbsd.c",
  "sim/ppc/igen.c", "sim/ppc/vm_n.h", "sim/ppc/vm.h",
  "sim/ppc/hw_iobus.c", "sim/ppc/inline.h",
  "sim/testsuite/sim/bfin/s21.s", "sim/testsuite/sim/mips/mips32-dsp2.s",
)

if __name__ == "__main__":
  main()
BEGIN {
  FS="\"";
  print "/* ==> Do not modify this file!!  " \
 "-*- buffer-read-only: t -*- vi" \
 ":set ro:";
  print "   It is created automatically by copying.awk.";
  print "   Modify copying.awk instead.  <== */";
  print ""
  print "#include \"defs.h\""
  print "#include \"command.h\""
  print "#include \"gdbcmd.h\""
  print ""
  print "static void show_copying_command (char *, int);"
  print ""
  print "static void show_warranty_command (char *, int);"
  print ""
  print "void _initialize_copying (void);"
  print ""
  print "static void";
  print "show_copying_command (char *ignore, int from_tty)";
  print "{";
 }
NR == 1,/^[  ]*15\. Disclaimer of Warranty\.[  ]*$/ {
  if ($0 ~ //)
```

```
    {
      printf "  printf_filtered (\"\\n\");\n";
    }
  else if ($0 !~ /^[  ]*15\. Disclaimer of Warranty\.[  ]*$/)
    {
      printf "  printf_filtered (\"";
      for (i = 1; i < NF; i++)
  printf "%s\\\"", $i;
      printf "%s\\n\");\n", $NF;
    }
 }
/^[  ]*15\. Disclaimer of Warranty\.[  ]*$/ {
  print "}";
  print "";
  print "static void";
  print "show_warranty_command (char *ignore, int from_tty)";
  print "{";
 }
/^[  ]*15\. Disclaimer of Warranty\.[  ]*$/, /^[  ]*END OF TERMS AND CONDITIONS[  ]*$/{
  if (! ($0 ~ /^[  ]*END OF TERMS AND CONDITIONS[  ]*$/))
    {
      printf "  printf_filtered (\"";
      for (i = 1; i < NF; i++)
  printf "%s\\\"", $i;
      printf "%s\\n\");\n", $NF;
    }
 }
END {
  print "}";
  print "";
  print "void"
  print "_initialize_copying (void)";
  print "{";
  print "  add_cmd (\"copying\", no_set_class, show_copying_command,";
  print "    _(\"Conditions for redistributing copies of GDB.\"),";
  print "    &showlist);";
  print "  add_cmd (\"warranty\", no_set_class, show_warranty_command,";
  print "    _(\"Various kinds of warranty you do not have.\"),";
  print "    &showlist);";
  print "";
  print "  /* For old-timers, allow \"info copying\", etc.  */";
  print "  add_info (\"copying\", show_copying_command,";
  print "     _(\"Conditions for redistributing copies of GDB.\"));";
  print "  add_info (\"warranty\", show_warranty_command,";
  print "     _(\"Various kinds of warranty you do not have.\"));";
  print "}";
 }
```

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@c Set file name and title for man page.
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@settitle GNU General Public License
@c man begin SEEALSO
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"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

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When a "work that uses the Library" uses material from a header file

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system,

rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

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1.41 gdbm 1.14.1 :1.0

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TERMS AND CONDITIONS

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The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

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d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.

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b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.

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1.42 glib-2.0 2.54.3 :0

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General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the @dfn{Lesser} General Public License because it does @emph{Less} to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a ``work based on the library'' and a ``work that uses the library''. The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

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This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called ``this License''). Each licensee is addressed as ``you''.

A ``library'' means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The ``Library'', below, refers to any such software library or work which has been distributed under these terms. A ``work based on the Library'' means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term ``modification''.)

``Source code'' for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

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You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

@enumerate a
@item

The modified work must itself be a software library.

@item
You must cause the files modified to carry prominent notices
stating that you changed the files and the date of any change.

@item
You must cause the whole of the work to be licensed at no
charge to all third parties under the terms of this License.

@item
If a facility in the modified Library refers to a function or a
table of data to be supplied by an application program that uses
the facility, other than as an argument passed when the facility
is invoked, then you must make a good faith effort to ensure that,
in the event an application does not supply such function or
table, the facility still operates, and performs whatever part of
its purpose remains meaningful.

(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.)
@end enumerate

These requirements apply to the modified work as a whole. If
identifiable sections of that work are not derived from the Library,
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on the Library, the distribution of the whole must be on the terms of
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entire whole, and thus to each and every part regardless of who wrote
it.

Thus, it is not the intent of this section to claim rights or contest
your rights to work written entirely by you; rather, the intent is to
exercise the right to control the distribution of derivative or
collective works based on the Library.

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You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

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You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

@item
A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a ``work that uses the Library''. Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a ``work that uses the Library'' with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a ``work that uses the library''. The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a ``work that uses the Library'' uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be

linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

@item
As an exception to the Sections above, you may also combine or link a ``work that uses the Library'' with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

@enumerate a
@item
Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable ``work that uses the Library'', as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

@item
Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the

library already present on the user's computer system, rather than
copying library functions into the executable, and (2) will operate
properly with a modified version of the library, if the user installs
one, as long as the modified version is interface-compatible with the
version that the work was made with.

@item
Accompany the work with a written offer, valid for at
least three years, to give the same user the materials
specified in Subsection 6a, above, for a charge no more
than the cost of performing this distribution.

@item
If distribution of the work is made by offering access to copy
from a designated place, offer equivalent access to copy the above
specified materials from the same place.

@item
Verify that the user has already received a copy of these
materials or that you have already sent this user a copy.
@end enumerate

For an executable, the required form of the ``work that uses the
Library" must include any data and utility programs needed for
reproducing the executable from it. However, as a special exception,
the materials to be distributed need not include anything that is
normally distributed (in either source or binary form) with the major
components (compiler, kernel, and so on) of the operating system on
which the executable runs, unless that component itself accompanies the
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It may happen that this requirement contradicts the license
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facilities not covered by this License, and distribute such a combined
library, provided that the separate distribution of the work based on
the Library and of the other library facilities is otherwise
permitted, and provided that you do these two things:

@enumerate a
@item
Accompany the combined library with a copy of the same work

based on the Library, uncombined with any other library
facilities. This must be distributed under the terms of the
Sections above.

@item
Give prominent notice with the combined library of the fact
that part of it is a work based on the Library, and explaining
where to find the accompanying uncombined form of the same work.
@end enumerate

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@end enumerate

@subheading END OF TERMS AND CONDITIONS

@page
@subheading How to Apply These Terms to Your New Libraries

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redistribution under these terms (or, alternatively, under the terms of the
ordinary General Public License).

To apply these terms, attach the following notices to the library. It is
safest to attach them to the start of each source file to most effectively
convey the exclusion of warranty; and each file should have at least the
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@end smallexample

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You should also get your employer (if you work as a programmer) or your
school, if any, to sign a ``copyright disclaimer'' for the library, if
necessary. Here is a sample; alter the names:

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Yoyodyne, Inc., hereby disclaims all copyright interest in the library
`Frob' (a library for tweaking knobs) written by James Random Hacker.

@var{signature of Ty Coon}, 1 April 1990
Ty Coon, President of Vice
@end smallexample

That's all there is to it!
/* setjmp is implemented in setjmp.S */
/* _setjmp is implemented in setjmp.S */
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Preamble

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This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

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We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain

special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

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"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

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2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) The modified work must itself be a software library.

b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(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.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

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must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

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1.52 i40evf 3.1.4

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1.53 init-ifupdown 1.0

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Mark Gates
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1.56 iperf3 3.5

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```
 * stdio.c
 * by Mark Gates <mgates@nlanr.net>
 * and Ajay Tirumalla <tirumala@ncsa.uiuc.edu>
 * ----------------------------------------------------------------
 * input and output numbers, converting with kilo, mega, giga
 * ---------------------------------------------------------------- */
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1.58 iptables 1.6.2 :2.0

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1.59 iputils s20161105

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1.60 isc-dhcp 4.4.1

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```
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<!-- Generate ISC copyright comments from Docbook copyright metadata. -->

<xsl:stylesheet version="1.0"
 xmlns:xsl="http://www.w3.org/1999/XSL/Transform"
 xmlns:xi="http://www.w3.org/2001/XInclude"
 xmlns:db="http://docbook.org/ns/docbook">

 <xsl:template name="isc.copyright.format">
   <xsl:param name="text"/>
   <xsl:value-of select="$isc.copyright.leader"/>
   <xsl:value-of select="normalize-space(substring-before($text, '&#10;'))"/>
   <xsl:text>&#10;</xsl:text>
   <xsl:variable name="rest" select="substring-after($text, '&#10;')"/>
   <xsl:if test="translate($rest, '&#9;&#32;', '')">
     <xsl:call-template name="isc.copyright.format">
       <xsl:with-param name="text" select="$rest"/>
     </xsl:call-template>
   </xsl:if>
 </xsl:template>

 <xsl:variable name="isc.copyright.text">
   <xsl:text>
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 <xsl:variable name="isc.copyright">
   <xsl:call-template name="isc.copyright.format">
     <xsl:with-param name="text">
       <xsl:for-each select="book/info/copyright | refentry/docinfo/copyright">
   <xsl:text>Copyright (C) </xsl:text>
   <xsl:call-template name="copyright.years">
     <xsl:with-param name="years" select="year"/>
   </xsl:call-template>
   <xsl:text> </xsl:text>
   <xsl:value-of select="holder"/>
         <xsl:value-of select="$isc.copyright.breakline"/>
   <xsl:text>&#10;</xsl:text>
 </xsl:for-each>
 <xsl:value-of select="$isc.copyright.text"/>
     </xsl:with-param>
   </xsl:call-template>
 </xsl:variable>
```

</xsl:stylesheet>

<!--
 - Local variables:
 - mode: sgml
 - End:
-->
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* configure.ac, Makefile.am: The original versions were derived from the ones in the XML Catalog Manager project, version 2.2.

Author: Julio Merino <jmmv@users.sourceforge.net>

* atf-c/ui.c: The format_paragraph and format_text functions were derived form the ones in the Monotone project, revision 3a0982da308228d796df35f98d787c5cff2bb5b6.

Author: Julio Merino <jmmv@NetBSD.org>

* atf-c++/detail/io.hpp, atf-c++/detail/io.cpp, atf-c++/detail/io_test.cpp: These files were derived from the file_handle, systembuf, pipe and pistream classes and tests found in the Boost.Process library.

Author: Julio Merino <jmmv84@gmail.com>

* admin/check-style.sh, admin/check-style-common.awk, admin/check-style-cpp.awk, admin/check-style-shell.awk: These files, except the first one, were first implemented in the Buildtool project. They were later adapted to be part of Boost.Process and, during that process, the shell script was created.

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1.62 ixgbevf 3.1.2

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1.63 jansson 2.9

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1.64 jemalloc 5.1.0

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1.65 kbd 2.0.4 :1.0

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ffffff||~~f<ZZ~~Zl8T|T6ffffffff6ffff~~l88lDH0x|v|x|xl8l800x0>3333~``|ffffvn|b``fffvn|b`b``|ffff8D@xLLp|<||<|flxxl
df`flxxlfx|x|flx|ffff8lx|ff8l8fjxxhbfH0|||~||~|(|~|(|~|$ZZ~~Z(T|T(|<|(|<|~||x||(((||(||||||(||(||(|&>&|(|>||~||~|(~|(~|(~|(~|(~(~(~(8
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`v666666~~`0p00x8ll8|l6l``f0f?``f0np0v0f?8l<<8l8lfbhxh`bf<ff<f<6<ff<f`|``f8lf`|``ffbhxh`bf`0<<<<<f<<f<<l8|`8|
v`0||||8l||v||l||f<<f|||l|ffff<<l80`xx|v8<8lx|vvx|vlx|v8l8x|v||||l8l8||0||8l||||`08<08<<f8<l8<l8|`8|vfffff`0||0||8l||v||l||~v`0v0
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f8<fffff||fff|``v|vf``|p|000006vl8ll88l~x0fpppv8l6fb`|ffffff|fffffb`````<llllllIfbhxhbfT||T|<|l8fllxllf6ffffff||ffff|``||~~Z<~
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8l|ll|fff<<`|fff|`|`0x|v0`x|v0xx|vvx|vllx|v8l8x|v~~||l80||0||8l||ll||`08<08<<f8<ll8<x0x~|vfffff`0||0||8l||v||ll||~~`0v0v0xvv
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`0p00x0p00x pp00xp00xxp|xv`0xx0xx0xxxvxxxx0000|`0v0vxvv0|`xllx`|
#
PC Screen (console) Fonts - psf1 header
#
0 leshort 0x0436 psf screen font data
>2 byte 0 256 characters, no index
>2 byte 1 512 characters, no index
>2 byte 2 256 characters, Unicode index
>2 byte 3 512 characters, Unicode index
>2 byte 4 256 characters, Unicode level 2 index
>2 byte 5 512 characters, Unicode level 2 index
>3 byte x 8x%d
#
~~~~

```
# PC Screen (console) Fonts - psf2 header
#
0       lelong  0x864ab572 psf2 screen font data
>12 lelong&1 1  with Unicode index
>16 lelong  x  \b, %d glyphs
>28 lelong  x  \b, %dx
>24 lelong  x  \b%d
```

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 kbdrate.c
is Copyright (C) 1992 Rickard E. Faith.

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 dumpkeys.c loadkeys.y loadkeys.analyze.l ksyms.c ksyms.h
 showkey.c keymaps.5 loadkeys.1 dumpkeys.1 showkey.1
are Copyright (C) 1993 Risto Kankkunen.

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(and changes to loadkeys.y)
are Copyright (C) 1993 Eugene G. Crosser.

The files
 psfaddtable.1 psfgettable.1 psfstriptable.1
are Copyright (C) 1994 H. Peter Anvin.

The files
 chvt.c clrunimap.c deallocvt.c fgconsole.c findfile.c
 getfd.c getkeycodes.c getunimap.c kbd_mode.c loadunimap.c
 psffontop.c psfxtable.c resizecons.c screendump.c setkeycodes.c
 setleds.c setmetamode.c setvesablank.c showconsolefont.c
 spawn_console.c spawn_login.c
 chvt.1 deallocvt.1 kbd_mode.1 setleds.1 setmetamode.1
 getkeycodes.8 loadunimap.8 resizecons.8 setkeycodes.8
 kbd.FAQ.*
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Alexey Gladkov <gladkov.alexey@gmail.com>

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Authors: Seth Forshee <seth.forshee@canonical.com>
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mentioned in the directory consolefonts.

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l6l8DD8||l008<666<D((DA""A|`8|ffxD((DA""AD((DA""Al~|6f<lllllll||<f<|>vfffff||x|~xx<llll|~||88((8>vff||~~6||~~~|
T88T||||~0<66<8l<lllllll||l|8|l>vfffff||~~6f||~~~|||<f<||~|~
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fflfbhxhbffbhxh``<ff:<<xfllxllf` ` ` ` `bf8ll8fff|```||fff|lff|`8|~~Z<|l8|ll888lffff<<0`<0000000<p8<<8l00x|v``xlfff|||<lv||8
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8x|vl8x|vl8x|v0008lx|v:lx|vv8lx|v8lx|v8lx|v00`0||8||v|||||08l||:l||v8l||8l||8l||`08<88<v8<8<8<`0||>``>8||v|||||08l||:l||v8l||8l
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ff|ffff<ff<lfffffflfbhxh`bffbhxh```<ff:<<xfflxxlff` ` ` ` `bf||fff|` ` ` ` ||fff|lfff|`8|~~Z<|l8ll|88|lffff<<0`<00000000<p8<<8l0
x|v``xlffff|||<lv||620x0000xv|x``lvffff8<ff<``flxxlf8<fffff||fffff|``v|vf```|`8|0000006vl8ll888l~0`pppv8lUUUUUUU~
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fffl xxlf`````<<<fff$lllllll|||0`8ll8vv000`00000000f<<f~00`||8x~|0`|<|<l|8`|0000||||~x00`0~~`00`|||8lfff|ffff<ff<lfffffflfb
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8<l8~|l8~|8ll8l<||~~~~~~~|`8ll8|fllxxllflxxlffb````bb``l|88|ll888lTT||TT|T||||<~Z<Bf$<<Bf$<<Bf$<~<Bf$<~<ffffff
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1.66 kexec-tools 2.0.16

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Gnomovision version 69, Copyright (C) year name of author
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
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```

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be called something other than `show w' and `show c'; they could even be
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necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice
```

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1.68 kmod 25

1.68.1 Available under license :

```
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```

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1.69 libcap2 2.25

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1.71 libdnet 1.12

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1.72 libevent 2.1.8-stable

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==========

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1.73 libffi 3.2.1

1.73.1 Available under license :

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#!/bin/sh

***** BEGIN LICENSE BLOCK *****
Version: MPL 1.1/GPL 2.0/LGPL 2.1
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# the terms of any one of the MPL, the GPL or the LGPL.
#
# ***** END LICENSE BLOCK *****

#
# GCC-compatible wrapper for cl.exe and ml.exe. Arguments are given in GCC
# format and translated into something sensible for cl or ml.
#

args_orig=$@
args="-nologo -W3"
static_crt=
debug_crt=
cl="cl"
ml="ml"
safeseh="-safeseh"
output=

while [ $# -gt 0 ]
do
 case $1
 in
   -fexceptions)
     # Don't enable exceptions for now.
     #args="$args -EHac"
     shift 1
   ;;
   -m32)
     shift 1
   ;;
   -m64)
     ml="ml64" # "$MSVC/x86_amd64/ml64"
     safeseh=
     shift 1
   ;;
   -clang-cl)
     cl="clang-cl"
     safeseh=
     shift 1
   ;;
   -O0)
     args="$args -Od"
     shift 1
   ;;
   -O*)
     # Runtime error checks (enabled by setting -RTC1 in the -DFFI_DEBUG
     # case below) are not compatible with optimization flags and will
     # cause the build to fail. Therefore, drop the optimization flag if
```

```
  # -DFFI_DEBUG is also set.
  case $args_orig in
    *-DFFI_DEBUG*)
      args="$args"
    ;;
    *)
      # The ax_cc_maxopt.m4 macro from the upstream autoconf-archive
      # project doesn't support MSVC and therefore ends up trying to
      # use -O3. Use the equivalent "max optimization" flag for MSVC
      # instead of erroring out.
      case $1 in
        -O3)
          args="$args -O2"
        ;;
        *)
          args="$args $1"
        ;;
      esac
      opt="true"
    ;;
  esac
  shift 1
;;
-g)
  # Enable debug symbol generation.
  args="$args -Zi"
  shift 1
;;
-DFFI_DEBUG)
  # Enable runtime error checks.
  args="$args -RTC1"
  defines="$defines $1"
  shift 1
;;
-DUSE_STATIC_RTL)
  # Link against static CRT.
  static_crt=1
  shift 1
;;
-DUSE_DEBUG_RTL)
  # Link against debug CRT.
  debug_crt=1
  shift 1
;;
-c)
  args="$args -c"
  args="$(echo $args | sed 's%/Fe%/Fo%g')"
  single="-c"
```

```
  shift 1
;;
-D*=*)
  name="$(echo $1|sed 's/-D\([^=][^=]*\)=.*/\1/g')"
  value="$(echo $1|sed 's/-D[^=][^=]*=//g')"
  args="$args -D${name}='$value'"
  defines="$defines -D${name}='$value'"
  shift 1
;;
-D*)
  args="$args $1"
  defines="$defines $1"
  shift 1
;;
-I)
  args="$args -I$2"
  includes="$includes -I$2"
  shift 2
;;
-I*)
  args="$args $1"
  includes="$includes $1"
  shift 1
;;
-W|-Wextra)
  # TODO map extra warnings
  shift 1
;;
-Wall)
  # -Wall on MSVC is overzealous, and we already build with -W3. Nothing
  # to do here.
  shift 1
;;
-pedantic)
  # libffi tests -pedantic with -Wall, so drop it also.
  shift 1
;;
-Werror)
  args="$args -WX"
  shift 1
;;
-W*)
  # TODO map specific warnings
  shift 1
;;
-S)
  args="$args -FAs"
  shift 1
```

```
  ;;
  -o)
    outdir="$(dirname $2)"
    base="$(basename $2|sed 's/\.[^.]*//g')"
    if [ -n "$single" ]; then
      output="-Fo$2"
    else
      output="-Fe$2"
    fi
    if [ -n "$assembly" ]; then
      args="$args $output"
    else
      args="$args $output -Fd$outdir/$base -Fp$outdir/$base -Fa$outdir/$base"
    fi
    shift 2
  ;;
  *.S)
    src=$1
    assembly="true"
    shift 1
  ;;
  *.c)
    args="$args $1"
    shift 1
  ;;
  *)
    # Assume it's an MSVC argument, and pass it through.
    args="$args $1"
    shift 1
  ;;
 esac
done

# If -Zi is specified, certain optimizations are implicitly disabled
# by MSVC. Add back those optimizations if this is an optimized build.
# NOTE: These arguments must come after all others.
if [ -n "$opt" ]; then
  args="$args -link -OPT:REF -OPT:ICF -INCREMENTAL:NO"
fi

if [ -n "$static_crt" ]; then
  md=-MT
else
  md=-MD
fi

if [ -n "$debug_crt" ]; then
  md="${md}d"
```

```
fi

if [ -n "$assembly" ]; then
  if [ -z "$outdir" ]; then
    outdir="."
  fi
  ppsrc="$outdir/$(basename $src|sed 's/.S$/.asm/g')"
  echo "$cl -nologo -EP $includes $defines $src > $ppsrc"
  "$cl" -nologo -EP $includes $defines $src > $ppsrc || exit $?
  output="$(echo $output | sed 's%/F[dpa][^ ]*%%g')"
  args="-nologo $safeseh $single $output $ppsrc"

  echo "$ml $args"
  eval "\"$ml\" $args"
  result=$?

  # required to fix ml64 broken output?
  #mv *.obj $outdir
else
  args="$md $args"
  echo "$cl $args"
  # Return an error code of 1 if an invalid command line parameter is passed
  # instead of just ignoring it.
  eval "(\"$cl\" $args 2>&1 1>&3 | \
       awk '{print \$0} /D9002/ {error=1} END{exit error}' >&2) 3>&1"
  result=$?
fi

exit $result

% texinfo.tex -- TeX macros to handle Texinfo files.
%
% Load plain if necessary, i.e., if running under initex.
\expandafter\ifx\csname fmtname\endcsname\relax\input plain\fi
%
\def\texinfoversion{2013-02-01.11}
%
% Copyright 1985, 1986, 1988, 1990, 1991, 1992, 1993, 1994, 1995,
% 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006,
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% a Texinfo source document, you may use the result without
% restriction. This Exception is an additional permission under section 7
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%
% Please try the latest version of texinfo.tex before submitting bug
% reports; you can get the latest version from:
%   http://ftp.gnu.org/gnu/texinfo/ (the Texinfo release area), or
%   http://ftpmirror.gnu.org/texinfo/ (same, via a mirror), or
%   http://www.gnu.org/software/texinfo/ (the Texinfo home page)
% The texinfo.tex in any given distribution could well be out
% of date, so if that's what you're using, please check.
%
% Send bug reports to bug-texinfo@gnu.org.  Please include including a
% complete document in each bug report with which we can reproduce the
% problem.  Patches are, of course, greatly appreciated.
%
% To process a Texinfo manual with TeX, it's most reliable to use the
% texi2dvi shell script that comes with the distribution.  For a simple
% manual foo.texi, however, you can get away with this:
%   tex foo.texi
%   texindex foo.??
%   tex foo.texi
%   tex foo.texi
%   dvips foo.dvi -o  # or whatever; this makes foo.ps.
% The extra TeX runs get the cross-reference information correct.
% Sometimes one run after texindex suffices, and sometimes you need more
% than two; texi2dvi does it as many times as necessary.
%
% It is possible to adapt texinfo.tex for other languages, to some
% extent.  You can get the existing language-specific files from the
% full Texinfo distribution.
%
% The GNU Texinfo home page is http://www.gnu.org/software/texinfo.


\message{Loading texinfo [version \texinfoversion]:}

% If in a .fmt file, print the version number
% and turn on active characters that we couldn't do earlier because
% they might have appeared in the input file name.
\everyjob{\message{[Texinfo version \texinfoversion]}%
```

```
 \catcode`+=\active \catcode`\_=\active}

\chardef\other=12

% We never want plain's \outer definition of \+ in Texinfo.
% For @tex, we can use \tabalign.
\let\+ = \relax

% Save some plain tex macros whose names we will redefine.
\let\ptexb=\b
\let\ptexbullet=\bullet
\let\ptexc=\c
\let\ptexcomma=\,
\let\ptexdot=\.
\let\ptexdots=\dots
\let\ptexend=\end
\let\ptexequiv=\equiv
\let\ptexexclam=\!
\let\ptexfootnote=\footnote
\let\ptexgtr=>
\let\ptexhat=^
\let\ptexi=\i
\let\ptexindent=\indent
\let\ptexinsert=\insert
\let\ptexlbrace=\{
\let\ptexless=<
\let\ptexnewwrite\newwrite
\let\ptexnoindent=\noindent
\let\ptexplus=+
\let\ptexraggedright=\raggedright
\let\ptexrbrace=\}
\let\ptexslash=\/
\let\ptexstar=\*
\let\ptext=\t
\let\ptextop=\top
{\catcode`\'=\active \global\let\ptexquoteright'}% active in plain's math mode

% If this character appears in an error message or help string, it
% starts a new line in the output.
\newlinechar = `^^J

% Use TeX 3.0's \inputlineno to get the line number, for better error
% messages, but if we're using an old version of TeX, don't do anything.
%
\ifx\inputlineno\thisisundefined
 \let\linenumber = \empty % Pre-3.0.
\else
 \def\linenumber{l.\the\inputlineno:\space}
```

```
\fi

% Set up fixed words for English if not already set.
\ifx\putwordAppendix\undefined  \gdef\putwordAppendix{Appendix}\fi
\ifx\putwordChapter\undefined   \gdef\putwordChapter{Chapter}\fi
\ifx\putworderror\undefined     \gdef\putworderror{error}\fi
\ifx\putwordfile\undefined      \gdef\putwordfile{file}\fi
\ifx\putwordin\undefined        \gdef\putwordin{in}\fi
\ifx\putwordIndexIsEmpty\undefined       \gdef\putwordIndexIsEmpty{(Index is empty)}\fi
\ifx\putwordIndexNonexistent\undefined   \gdef\putwordIndexNonexistent{(Index is nonexistent)}\fi
\ifx\putwordInfo\undefined      \gdef\putwordInfo{Info}\fi
\ifx\putwordInstanceVariableof\undefined \gdef\putwordInstanceVariableof{Instance Variable of}\fi
\ifx\putwordMethodon\undefined  \gdef\putwordMethodon{Method on}\fi
\ifx\putwordNoTitle\undefined   \gdef\putwordNoTitle{No Title}\fi
\ifx\putwordof\undefined        \gdef\putwordof{of}\fi
\ifx\putwordon\undefined        \gdef\putwordon{on}\fi
\ifx\putwordpage\undefined      \gdef\putwordpage{page}\fi
\ifx\putwordsection\undefined   \gdef\putwordsection{section}\fi
\ifx\putwordSection\undefined   \gdef\putwordSection{Section}\fi
\ifx\putwordsee\undefined       \gdef\putwordsee{see}\fi
\ifx\putwordSee\undefined       \gdef\putwordSee{See}\fi
\ifx\putwordShortTOC\undefined  \gdef\putwordShortTOC{Short Contents}\fi
\ifx\putwordTOC\undefined       \gdef\putwordTOC{Table of Contents}\fi
%
\ifx\putwordMJan\undefined \gdef\putwordMJan{January}\fi
\ifx\putwordMFeb\undefined \gdef\putwordMFeb{February}\fi
\ifx\putwordMMar\undefined \gdef\putwordMMar{March}\fi
\ifx\putwordMApr\undefined \gdef\putwordMApr{April}\fi
\ifx\putwordMMay\undefined \gdef\putwordMMay{May}\fi
\ifx\putwordMJun\undefined \gdef\putwordMJun{June}\fi
\ifx\putwordMJul\undefined \gdef\putwordMJul{July}\fi
\ifx\putwordMAug\undefined \gdef\putwordMAug{August}\fi
\ifx\putwordMSep\undefined \gdef\putwordMSep{September}\fi
\ifx\putwordMOct\undefined \gdef\putwordMOct{October}\fi
\ifx\putwordMNov\undefined \gdef\putwordMNov{November}\fi
\ifx\putwordMDec\undefined \gdef\putwordMDec{December}\fi
%
\ifx\putwordDefmac\undefined    \gdef\putwordDefmac{Macro}\fi
\ifx\putwordDefspec\undefined   \gdef\putwordDefspec{Special Form}\fi
\ifx\putwordDefvar\undefined    \gdef\putwordDefvar{Variable}\fi
\ifx\putwordDefopt\undefined    \gdef\putwordDefopt{User Option}\fi
\ifx\putwordDeffunc\undefined   \gdef\putwordDeffunc{Function}\fi

% Since the category of space is not known, we have to be careful.
\chardef\spacecat = 10
\def\spaceisspace{\catcode`\ =\spacecat}

% sometimes characters are active, so we need control sequences.
```

```
\chardef\ampChar   = `\&
\chardef\colonChar = `\:
\chardef\commaChar = `\,
\chardef\dashChar  = `\-
\chardef\dotChar   = `\.
\chardef\exclamChar= `\!
\chardef\hashChar  = `\#
\chardef\lquoteChar= `\`
\chardef\questChar = `\?
\chardef\rquoteChar= `\'
\chardef\semiChar  = `\;
\chardef\slashChar = `\/
\chardef\underChar = `\_

% Ignore a token.
%
\def\gobble#1{}

% The following is used inside several \edef's.
\def\makecsname#1{\expandafter\noexpand\csname#1\endcsname}

% Hyphenation fixes.
\hyphenation{
 Flor-i-da Ghost-script Ghost-view Mac-OS Post-Script
 ap-pen-dix bit-map bit-maps
 data-base data-bases eshell fall-ing half-way long-est man-u-script
 man-u-scripts mini-buf-fer mini-buf-fers over-view par-a-digm
 par-a-digms rath-er rec-tan-gu-lar ro-bot-ics se-vere-ly set-up spa-ces
 spell-ing spell-ings
 stand-alone strong-est time-stamp time-stamps which-ever white-space
 wide-spread wrap-around
}

% Margin to add to right of even pages, to left of odd pages.
\newdimen\bindingoffset
\newdimen\normaloffset
\newdimen\pagewidth \newdimen\pageheight

% For a final copy, take out the rectangles
% that mark overfull boxes (in case you have decided
% that the text looks ok even though it passes the margin).
%
\def\finalout{\overfullrule=0pt }

% Sometimes it is convenient to have everything in the transcript file
% and nothing on the terminal.  We don't just call \tracingall here,
% since that produces some useless output on the terminal.  We also make
% some effort to order the tracing commands to reduce output in the log
```

```
% file; cf. trace.sty in LaTeX.
%
\def\gloggingall{\begingroup \globaldefs = 1 \loggingall \endgroup}%
\def\loggingall{%
 \tracingstats2
 \tracingpages1
 \tracinglostchars2  % 2 gives us more in etex
 \tracingparagraphs1
 \tracingoutput1
 \tracingmacros2
 \tracingrestores1
 \showboxbreadth\maxdimen \showboxdepth\maxdimen
 \ifx\eTeXversion\thisisundefined\else % etex gives us more logging
   \tracingscantokens1
   \tracingifs1
   \tracinggroups1
   \tracingnesting2
   \tracingassigns1
 \fi
 \tracingcommands3  % 3 gives us more in etex
 \errorcontextlines16
}%

% @errormsg{MSG}.  Do the index-like expansions on MSG, but if things
% aren't perfect, it's not the end of the world, being an error message,
% after all.
%
\def\errormsg{\begingroup \indexnofonts \doerrormsg}
\def\doerrormsg#1{\errmessage{#1}}

% add check for \lastpenalty to plain's definitions.  If the last thing
% we did was a \nobreak, we don't want to insert more space.
%
\def\smallbreak{\ifnum\lastpenalty<10000\par\ifdim\lastskip<\smallskipamount
 \removelastskip\penalty-50\smallskip\fi\fi}
\def\medbreak{\ifnum\lastpenalty<10000\par\ifdim\lastskip<\medskipamount
 \removelastskip\penalty-100\medskip\fi\fi}
\def\bigbreak{\ifnum\lastpenalty<10000\par\ifdim\lastskip<\bigskipamount
 \removelastskip\penalty-200\bigskip\fi\fi}

% Do @cropmarks to get crop marks.
%
\newif\ifcropmarks
\let\cropmarks = \cropmarkstrue
%
% Dimensions to add cropmarks at corners.
% Added by P. A. MacKay, 12 Nov. 1986
%
```

```
\newdimen\outerhsize \newdimen\outervsize % set by the paper size routines
\newdimen\cornerlong  \cornerlong=1pc
\newdimen\cornerthick \cornerthick=.3pt
\newdimen\topandbottommargin \topandbottommargin=.75in

% Output a mark which sets \thischapter, \thissection and \thiscolor.
% We dump everything together because we only have one kind of mark.
% This works because we only use \botmark / \topmark, not \firstmark.
%
% A mark contains a subexpression of the \ifcase ... \fi construct.
% \get*marks macros below extract the needed part using \ifcase.
%
% Another complication is to let the user choose whether \thischapter
% (\thissection) refers to the chapter (section) in effect at the top
% of a page, or that at the bottom of a page.  The solution is
% described on page 260 of The TeXbook.  It involves outputting two
% marks for the sectioning macros, one before the section break, and
% one after.  I won't pretend I can describe this better than DEK...
\def\domark{%
 \toks0=\expandafter{\lastchapterdefs}%
 \toks2=\expandafter{\lastsectiondefs}%
 \toks4=\expandafter{\prevchapterdefs}%
 \toks6=\expandafter{\prevsectiondefs}%
 \toks8=\expandafter{\lastcolordefs}%
 \mark{%
                \the\toks0 \the\toks2
    \noexpand\or \the\toks4 \the\toks6
   \noexpand\else \the\toks8
 }%
}
% \topmark doesn't work for the very first chapter (after the title
% page or the contents), so we use \firstmark there -- this gets us
% the mark with the chapter defs, unless the user sneaks in, e.g.,
% @setcolor (or @url, or @link, etc.) between @contents and the very
% first @chapter.
\def\gettopheadingmarks{%
 \ifcase0\topmark\fi
 \ifx\thischapter\empty \ifcase0\firstmark\fi \fi
}
\def\getbottomheadingmarks{\ifcase1\botmark\fi}
\def\getcolormarks{\ifcase2\topmark\fi}

% Avoid "undefined control sequence" errors.
\def\lastchapterdefs{}
\def\lastsectiondefs{}
\def\prevchapterdefs{}
\def\prevsectiondefs{}
\def\lastcolordefs{}
```

```
% Main output routine.
\chardef\PAGE = 255
\output = {\onepageout{\pagecontents\PAGE}}

\newbox\headlinebox
\newbox\footlinebox

% \onepageout takes a vbox as an argument.  Note that \pagecontents
% does insertions, but you have to call it yourself.
\def\onepageout#1{%
 \ifcropmarks \hoffset=0pt \else \hoffset=\normaloffset \fi
 %
 \ifodd\pageno  \advance\hoffset by \bindingoffset
 \else \advance\hoffset by -\bindingoffset\fi
 %
 % Do this outside of the \shipout so @code etc. will be expanded in
 % the headline as they should be, not taken literally (outputting "code).
 \ifodd\pageno \getoddheadingmarks \else \getevenheadingmarks \fi
 \setbox\headlinebox = \vbox{\let\hsize=\pagewidth \makeheadline}%
 \ifodd\pageno \getoddfootingmarks \else \getevenfootingmarks \fi
 \setbox\footlinebox = \vbox{\let\hsize=\pagewidth \makefootline}%
 %
 {%
  % Have to do this stuff outside the \shipout because we want it to
  % take effect in \write's, yet the group defined by the \vbox ends
  % before the \shipout runs.
  %
  \indexdummies         % don't expand commands in the output.
  \normalturnoffactive  % \ in index entries must not stay \, e.g., if
           % the page break happens to be in the middle of an example.
           % We don't want .vr (or whatever) entries like this:
           % \entry{{\tt \indexbackslash }acronym}{32}{\code {\acronym}}
           % "\acronym" won't work when it's read back in;
           % it needs to be
           % {\code {{\tt \backslashcurfont }acronym}
  \shipout\vbox{%
    % Do this early so pdf references go to the beginning of the page.
    \ifpdfmakepagedest \pdfdest name{\the\pageno} xyz\fi
    %
    \ifcropmarks \vbox to \outervsize\bgroup
      \hsize = \outerhsize
      \vskip-\topandbottommargin
      \vtop to0pt{%
        \line{\ewtop\hfil\ewtop}%
        \nointerlineskip
        \line{%
          \vbox{\moveleft\cornerthick\nstop}%
```

```
          \hfill
          \vbox{\moveright\cornerthick\nstop}%
        }%
        \vss}%
      \vskip\topandbottommargin
      \line\bgroup
        \hfil % center the page within the outer (page) hsize.
        \ifodd\pageno\hskip\bindingoffset\fi
        \vbox\bgroup
    \fi
    %
    \unvbox\headlinebox
    \pagebody{#1}%
    \ifdim\ht\footlinebox > 0pt
      % Only leave this space if the footline is nonempty.
      % (We lessened \vsize for it in \oddfootingyyy.)
      % The \baselineskip=24pt in plain's \makefootline has no effect.
      \vskip 24pt
      \unvbox\footlinebox
    \fi
    %
    \ifcropmarks
        \egroup % end of \vbox\bgroup
      \hfil\egroup % end of (centering) \line\bgroup
      \vskip\topandbottommargin plus1fill minus1fill
      \boxmaxdepth = \cornerthick
      \vbox to0pt{\vss
        \line{%
          \vbox{\moveleft\cornerthick\nsbot}%
          \hfill
          \vbox{\moveright\cornerthick\nsbot}%
        }%
        \nointerlineskip
        \line{\ewbot\hfil\ewbot}%
      }%
    \egroup % \vbox from first cropmarks clause
    \fi
  }% end of \shipout\vbox
 }% end of group with \indexdummies
 \advancepageno
 \ifnum\outputpenalty>-20000 \else\dosupereject\fi
}

\newinsert\margin \dimen\margin=\maxdimen

\def\pagebody#1{\vbox to\pageheight{\boxmaxdepth=\maxdepth #1}}
{\catcode`\@ =11
\gdef\pagecontents#1{\ifvoid\topins\else\unvbox\topins\fi
```

```
% marginal hacks, juha@viisa.uucp (Juha Takala)
\ifvoid\margin\else % marginal info is present
 \rlap{\kern\hsize\vbox to\z@{\kern1pt\box\margin \vss}}\fi
\dimen@=\dp#1\relax \unvbox#1\relax
\ifvoid\footins\else\vskip\skip\footins\footnoterule \unvbox\footins\fi
\ifr@ggedbottom \kern-\dimen@ \vfil \fi}
}

% Here are the rules for the cropmarks.  Note that they are
% offset so that the space between them is truly \outerhsize or \outervsize
% (P. A. MacKay, 12 November, 1986)
%
\def\ewtop{\vrule height\cornerthick depth0pt width\cornerlong}
\def\nstop{\vbox
 {\hrule height\cornerthick depth\cornerlong width\cornerthick}}
\def\ewbot{\vrule height0pt depth\cornerthick width\cornerlong}
\def\nsbot{\vbox
 {\hrule height\cornerlong depth\cornerthick width\cornerthick}}

% Parse an argument, then pass it to #1.  The argument is the rest of
% the input line (except we remove a trailing comment).  #1 should be a
% macro which expects an ordinary undelimited TeX argument.
%
\def\parsearg{\parseargusing{}}
\def\parseargusing#1#2{%
 \def\argtorun{#2}%
 \begingroup
   \obeylines
   \spaceisspace
   #1%
   \parseargline\empty% Insert the \empty token, see \finishparsearg below.
}

{\obeylines %
 \gdef\parseargline#1^^M{%
   \endgroup % End of the group started in \parsearg.
   \argremovecomment #1\comment\ArgTerm%
 }%
}

% First remove any @comment, then any @c comment.
\def\argremovecomment#1\comment#2\ArgTerm{\argremovec #1\c\ArgTerm}
\def\argremovec#1\c#2\ArgTerm{\argcheckspaces#1\^^M\ArgTerm}

% Each occurrence of `\^^M' or `<space>\^^M' is replaced by a single space.
%
% \argremovec might leave us with trailing space, e.g.,
%    @end itemize  @c foo
```

```
% This space token undergoes the same procedure and is eventually removed
% by \finishparsearg.
%
\def\argcheckspaces#1\^^M{\argcheckspacesX#1\^^M \^^M}
\def\argcheckspacesX#1 \^^M{\argcheckspacesY#1\^^M}
\def\argcheckspacesY#1\^^M#2\^^M#3\ArgTerm{%
 \def\temp{#3}%
 \ifx\temp\empty
   % Do not use \next, perhaps the caller of \parsearg uses it; reuse \temp:
   \let\temp\finishparsearg
 \else
   \let\temp\argcheckspaces
 \fi
 % Put the space token in:
 \temp#1 #3\ArgTerm
}

% If a _delimited_ argument is enclosed in braces, they get stripped; so
% to get _exactly_ the rest of the line, we had to prevent such situation.
% We prepended an \empty token at the very beginning and we expand it now,
% just before passing the control to \argtorun.
% (Similarly, we have to think about #3 of \argcheckspacesY above: it is
% either the null string, or it ends with \^^M---thus there is no danger
% that a pair of braces would be stripped.
%
% But first, we have to remove the trailing space token.
%
\def\finishparsearg#1 \ArgTerm{\expandafter\argtorun\expandafter{#1}}

% \parseargdef\foo{...}
% is roughly equivalent to
% \def\foo{\parsearg\Xfoo}
% \def\Xfoo#1{...}
%
% Actually, I use \csname\string\foo\endcsname, ie. \\foo, as it is my
% favourite TeX trick.  --kasal, 16nov03

\def\parseargdef#1{%
 \expandafter \doparseargdef \csname\string#1\endcsname #1%
}
\def\doparseargdef#1#2{%
 \def#2{\parsearg#1}%
 \def#1##1%
}

% Several utility definitions with active space:
{
 \obeyspaces
```

```
 \gdef\obeyedspace{ }

 % Make each space character in the input produce a normal interword
 % space in the output.  Don't allow a line break at this space, as this
 % is used only in environments like @example, where each line of input
 % should produce a line of output anyway.
 %
 \gdef\sepspaces{\obeyspaces\let =\tie}

 % If an index command is used in an @example environment, any spaces
 % therein should become regular spaces in the raw index file, not the
 % expansion of \tie (\leavevmode \penalty \@M \ ).
 \gdef\unsepspaces{\let =\space}
}


\def\flushcr{\ifx\par\lisppar \def\next##1{}\else \let\next=\relax \fi \next}

% Define the framework for environments in texinfo.tex.  It's used like this:
%
%   \envdef\foo{...}
%   \def\Efoo{...}
%
% It's the responsibility of \envdef to insert \begingroup before the
% actual body; @end closes the group after calling \Efoo.  \envdef also
% defines \thisenv, so the current environment is known; @end checks
% whether the environment name matches.  The \checkenv macro can also be
% used to check whether the current environment is the one expected.
%
% Non-false conditionals (@iftex, @ifset) don't fit into this, so they
% are not treated as environments; they don't open a group.  (The
% implementation of @end takes care not to call \endgroup in this
% special case.)


% At run-time, environments start with this:
\def\startenvironment#1{\begingroup\def\thisenv{#1}}
% initialize
\let\thisenv\empty

% ... but they get defined via ``\envdef\foo{...}'':
\long\def\envdef#1#2{\def#1{\startenvironment#1#2}}
\def\envparseargdef#1#2{\parseargdef#1{\startenvironment#1#2}}

% Check whether we're in the right environment:
\def\checkenv#1{%
 \def\temp{#1}%
 \ifx\thisenv\temp
```

```
 \else
   \badenverr
 \fi
}

% Environment mismatch, #1 expected:
\def\badenverr{%
 \errhelp = \EMsimple
 \errmessage{This command can appear only \inenvironment\temp,
   not \inenvironment\thisenv}%
}
\def\inenvironment#1{%
 \ifx#1\empty
   outside of any environment%
 \else
   in environment \expandafter\string#1%
 \fi
}

% @end foo executes the definition of \Efoo.
% But first, it executes a specialized version of \checkenv
%
\parseargdef\end{%
 \if 1\csname iscond.#1\endcsname
 \else
   % The general wording of \badenverr may not be ideal.
   \expandafter\checkenv\csname#1\endcsname
   \csname E#1\endcsname
   \endgroup
 \fi
}

\newhelp\EMsimple{Press RETURN to continue.}


% Be sure we're in horizontal mode when doing a tie, since we make space
% equivalent to this in @example-like environments. Otherwise, a space
% at the beginning of a line will start with \penalty -- and
% since \penalty is valid in vertical mode, we'd end up putting the
% penalty on the vertical list instead of in the new paragraph.
{\catcode`@ = 11
% Avoid using \@M directly, because that causes trouble
% if the definition is written into an index file.
\global\let\tiepenalty = \@M
\gdef\tie{\leavevmode\penalty\tiepenalty\ }
}

% @: forces normal size whitespace following.
```

```
\def\:{\spacefactor=1000 }

% @* forces a line break.
\def\*{\unskip\hfil\break\hbox{}\ignorespaces}

% @/ allows a line break.
\let\/=\allowbreak

% @. is an end-of-sentence period.
\def\.{.\spacefactor=\endofsentencespacefactor\space}

% @! is an end-of-sentence bang.
\def\!{!\spacefactor=\endofsentencespacefactor\space}

% @? is an end-of-sentence query.
\def\?{?\spacefactor=\endofsentencespacefactor\space}

% @frenchspacing on|off  says whether to put extra space after punctuation.
%
\def\onword{on}
\def\offword{off}
%
\parseargdef\frenchspacing{%
 \def\temp{#1}%
 \ifx\temp\onword \plainfrenchspacing
 \else\ifx\temp\offword \plainnonfrenchspacing
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @frenchspacing option `\temp', must be on|off}%
 \fi\fi
}

% @w prevents a word break.  Without the \leavevmode, @w at the
% beginning of a paragraph, when TeX is still in vertical mode, would
% produce a whole line of output instead of starting the paragraph.
\def\w#1{\leavevmode\hbox{#1}}

% @group ... @end group forces ... to be all on one page, by enclosing
% it in a TeX vbox.  We use \vtop instead of \vbox to construct the box
% to keep its height that of a normal line.  According to the rules for
% \topskip (p.114 of the TeXbook), the glue inserted is
% max (\topskip - \ht (first item), 0).  If that height is large,
% therefore, no glue is inserted, and the space between the headline and
% the text is small, which looks bad.
%
% Another complication is that the group might be very large.  This can
% cause the glue on the previous page to be unduly stretched, because it
% does not have much material.  In this case, it's better to add an
```

```
% explicit \vfill so that the extra space is at the bottom.  The
% threshold for doing this is if the group is more than \vfilllimit
% percent of a page (\vfilllimit can be changed inside of @tex).
%
\newbox\groupbox
\def\vfilllimit{0.7}
%
\envdef\group{%
 \ifnum\catcode`\^^M=\active \else
   \errhelp = \groupinvalidhelp
   \errmessage{@group invalid in context where filling is enabled}%
 \fi
 \startsavinginserts
 %
 \setbox\groupbox = \vtop\bgroup
   % Do @comment since we are called inside an environment such as
   % @example, where each end-of-line in the input causes an
   % end-of-line in the output.  We don't want the end-of-line after
   % the `@group' to put extra space in the output.  Since @group
   % should appear on a line by itself (according to the Texinfo
   % manual), we don't worry about eating any user text.
   \comment
}
%
% The \vtop produces a box with normal height and large depth; thus, TeX puts
% \baselineskip glue before it, and (when the next line of text is done)
% \lineskip glue after it.  Thus, space below is not quite equal to space
% above.  But it's pretty close.
\def\Egroup{%
   % To get correct interline space between the last line of the group
   % and the first line afterwards, we have to propagate \prevdepth.
   \endgraf % Not \par, as it may have been set to \lisppar.
   \global\dimen1 = \prevdepth
 \egroup           % End the \vtop.
 % \dimen0 is the vertical size of the group's box.
 \dimen0 = \ht\groupbox  \advance\dimen0 by \dp\groupbox
 % \dimen2 is how much space is left on the page (more or less).
 \dimen2 = \pageheight   \advance\dimen2 by -\pagetotal
 % if the group doesn't fit on the current page, and it's a big big
 % group, force a page break.
 \ifdim \dimen0 > \dimen2
   \ifdim \pagetotal < \vfilllimit\pageheight
     \page
   \fi
 \fi
 \box\groupbox
 \prevdepth = \dimen1
 \checkinserts
```

```
}
%
% TeX puts in an \escapechar (i.e., `@') at the beginning of the help
% message, so this ends up printing `@group can only ...'.
%
\newhelp\groupinvalidhelp{%
group can only be used in environments such as @example,^^J%
where each line of input produces a line of output.}

% @need space-in-mils
% forces a page break if there is not space-in-mils remaining.

\newdimen\mil  \mil=0.001in

\parseargdef\need{%
 % Ensure vertical mode, so we don't make a big box in the middle of a
 % paragraph.
 \par
 %
 % If the @need value is less than one line space, it's useless.
 \dimen0 = #1\mil
 \dimen2 = \ht\strutbox
 \advance\dimen2 by \dp\strutbox
 \ifdim\dimen0 > \dimen2
   %
   % Do a \strut just to make the height of this box be normal, so the
   % normal leading is inserted relative to the preceding line.
   % And a page break here is fine.
   \vtop to #1\mil{\strut\vfil}%
   %
   % TeX does not even consider page breaks if a penalty added to the
   % main vertical list is 10000 or more.  But in order to see if the
   % empty box we just added fits on the page, we must make it consider
   % page breaks.  On the other hand, we don't want to actually break the
   % page after the empty box.  So we use a penalty of 9999.
   %
   % There is an extremely small chance that TeX will actually break the
   % page at this \penalty, if there are no other feasible breakpoints in
   % sight.  (If the user is using lots of big @group commands, which
   % almost-but-not-quite fill up a page, TeX will have a hard time doing
   % good page breaking, for example.)  However, I could not construct an
   % example where a page broke at this \penalty; if it happens in a real
   % document, then we can reconsider our strategy.
   \penalty9999
   %
   % Back up by the size of the box, whether we did a page break or not.
   \kern -#1\mil
   %
```

```
  % Do not allow a page break right after this kern.
  \nobreak
 \fi
}

% @br   forces paragraph break (and is undocumented).

\let\br = \par

% @page forces the start of a new page.
%
\def\page{\par\vfill\supereject}

% @exdent text....
% outputs text on separate line in roman font, starting at standard page margin

% This records the amount of indent in the innermost environment.
% That's how much \exdent should take out.
\newskip\exdentamount

% This defn is used inside fill environments such as @defun.
\parseargdef\exdent{\hfil\break\hbox{\kern -\exdentamount{\rm#1}}\hfil\break}

% This defn is used inside nofill environments such as @example.
\parseargdef\nofillexdent{{\advance \leftskip by -\exdentamount
 \leftline{\hskip\leftskip{\rm#1}}}}

% @inmargin{WHICH}{TEXT} puts TEXT in the WHICH margin next to the current
% paragraph.  For more general purposes, use the \margin insertion
% class.  WHICH is `l' or `r'.  Not documented, written for gawk manual.
%
\newskip\inmarginspacing \inmarginspacing=1cm
\def\strutdepth{\dp\strutbox}
%
\def\doinmargin#1#2{\strut\vadjust{%
 \nobreak
 \kern-\strutdepth
 \vtop to \strutdepth{%
  \baselineskip=\strutdepth
  \vss
  % if you have multiple lines of stuff to put here, you'll need to
  % make the vbox yourself of the appropriate size.
  \ifx#1l%
   \llap{\ignorespaces #2\hskip\inmarginspacing}%
  \else
   \rlap{\hskip\hsize \hskip\inmarginspacing \ignorespaces #2}%
  \fi
  \null
```

```
 }%
}}
\def\inleftmargin{\doinmargin l}
\def\inrightmargin{\doinmargin r}
%
% @inmargin{TEXT [, RIGHT-TEXT]}
% (if RIGHT-TEXT is given, use TEXT for left page, RIGHT-TEXT for right;
% else use TEXT for both).
%
\def\inmargin#1{\parseinmargin #1,,\finish}
\def\parseinmargin#1,#2,#3\finish{% not perfect, but better than nothing.
 \setbox0 = \hbox{\ignorespaces #2}%
 \ifdim\wd0 > 0pt
   \def\lefttext{#1}%  have both texts
   \def\righttext{#2}%
 \else
   \def\lefttext{#1}%  have only one text
   \def\righttext{#1}%
 \fi
 %
 \ifodd\pageno
   \def\temp{\inrightmargin\righttext}% odd page -> outside is right margin
 \else
   \def\temp{\inleftmargin\lefttext}%
 \fi
 \temp
}

% @| inserts a changebar to the left of the current line.  It should
% surround any changed text.  This approach does *not* work if the
% change spans more than two lines of output.  To handle that, we would
% have adopt a much more difficult approach (putting marks into the main
% vertical list for the beginning and end of each change).  This command
% is not documented, not supported, and doesn't work.
%
\def\|{%
 % \vadjust can only be used in horizontal mode.
 \leavevmode
 %
 % Append this vertical mode material after the current line in the output.
 \vadjust{%
   % We want to insert a rule with the height and depth of the current
   % leading; that is exactly what \strutbox is supposed to record.
   \vskip-\baselineskip
   %
   % \vadjust-items are inserted at the left edge of the type.  So
   % the \llap here moves out into the left-hand margin.
   \llap{%
```

```
    %
    % For a thicker or thinner bar, change the `1pt'.
    \vrule height\baselineskip width1pt
    %
    % This is the space between the bar and the text.
    \hskip 12pt
  }%
 }%
}

% @include FILE -- \input text of FILE.
%
\def\include{\parseargusing\filenamecatcodes\includezzz}
\def\includezzz#1{%
 \pushthisfilestack
 \def\thisfile{#1}%
 {%
  \makevalueexpandable  % we want to expand any @value in FILE.
  \turnoffactive        % and allow special characters in the expansion
  \indexnofonts         % Allow `@@' and other weird things in file names.
  \wlog{texinfo.tex: doing @include of #1^^J}%
  \edef\temp{\noexpand\input #1 }%
  %
  % This trickery is to read FILE outside of a group, in case it makes
  % definitions, etc.
  \expandafter
 }\temp
 \popthisfilestack
}
\def\filenamecatcodes{%
 \catcode`\\=\other
 \catcode`~=\other
 \catcode`^=\other
 \catcode`_=\other
 \catcode`|=\other
 \catcode`<=\other
 \catcode`>=\other
 \catcode`+=\other
 \catcode`-=\other
 \catcode`\`=\other
 \catcode`\'=\other
}

\def\pushthisfilestack{%
 \expandafter\pushthisfilestackX\popthisfilestack\StackTerm
}
\def\pushthisfilestackX{%
 \expandafter\pushthisfilestackY\thisfile\StackTerm
```

```
}
\def\pushthisfilestackY #1\StackTerm #2\StackTerm {%
 \gdef\popthisfilestack{\gdef\thisfile{#1}\gdef\popthisfilestack{#2}}%
}

\def\popthisfilestack{\errthisfilestackempty}
\def\errthisfilestackempty{\errmessage{Internal error:
 the stack of filenames is empty.}}
%
\def\thisfile{}

% @center line
% outputs that line, centered.
%
\parseargdef\center{%
 \ifhmode
   \let\centersub\centerH
 \else
   \let\centersub\centerV
 \fi
 \centersub{\hfil \ignorespaces#1\unskip \hfil}%
 \let\centersub\relax % don't let the definition persist, just in case
}
\def\centerH#1{{%
 \hfil\break
 \advance\hsize by -\leftskip
 \advance\hsize by -\rightskip
 \line{#1}%
 \break
}}
%
\newcount\centerpenalty
\def\centerV#1{%
 % The idea here is the same as in \startdefun, \cartouche, etc.: if
 % @center is the first thing after a section heading, we need to wipe
 % out the negative parskip inserted by \sectionheading, but still
 % prevent a page break here.
 \centerpenalty = \lastpenalty
 \ifnum\centerpenalty>10000 \vskip\parskip \fi
 \ifnum\centerpenalty>9999 \penalty\centerpenalty \fi
 \line{\kern\leftskip #1\kern\rightskip}%
}

% @sp n   outputs n lines of vertical space
%
\parseargdef\sp{\vskip #1\baselineskip}

% @comment ...line which is ignored...
```

```
% @c is the same as @comment
% @ignore ... @end ignore  is another way to write a comment
%
\def\comment{\begingroup \catcode`\^^M=\other%
\catcode`\@=\other \catcode`\{=\other \catcode`\}=\other%
\commentxxx}
{\catcode`\^^M=\other \gdef\commentxxx#1^^M{\endgroup}}
%
\let\c=\comment

% @paragraphindent NCHARS
% We'll use ems for NCHARS, close enough.
% NCHARS can also be the word `asis' or `none'.
% We cannot feasibly implement @paragraphindent asis, though.
%
\def\asisword{asis} % no translation, these are keywords
\def\noneword{none}
%
\parseargdef\paragraphindent{%
 \def\temp{#1}%
 \ifx\temp\asisword
 \else
   \ifx\temp\noneword
     \defaultparindent = 0pt
   \else
     \defaultparindent = #1em
   \fi
 \fi
 \parindent = \defaultparindent
}

% @exampleindent NCHARS
% We'll use ems for NCHARS like @paragraphindent.
% It seems @exampleindent asis isn't necessary, but
% I preserve it to make it similar to @paragraphindent.
\parseargdef\exampleindent{%
 \def\temp{#1}%
 \ifx\temp\asisword
 \else
   \ifx\temp\noneword
     \lispnarrowing = 0pt
   \else
     \lispnarrowing = #1em
   \fi
 \fi
}

% @firstparagraphindent WORD
```

```
% If WORD is `none', then suppress indentation of the first paragraph
% after a section heading.  If WORD is `insert', then do indent at such
% paragraphs.
%
% The paragraph indentation is suppressed or not by calling
% \suppressfirstparagraphindent, which the sectioning commands do.
% We switch the definition of this back and forth according to WORD.
% By default, we suppress indentation.
%
\def\suppressfirstparagraphindent{\dosuppressfirstparagraphindent}
\def\insertword{insert}
%
\parseargdef\firstparagraphindent{%
 \def\temp{#1}%
 \ifx\temp\noneword
   \let\suppressfirstparagraphindent = \dosuppressfirstparagraphindent
 \else\ifx\temp\insertword
   \let\suppressfirstparagraphindent = \relax
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @firstparagraphindent option `\temp'}%
 \fi\fi
}

% Here is how we actually suppress indentation.  Redefine \everypar to
% \kern backwards by \parindent, and then reset itself to empty.
%
% We also make \indent itself not actually do anything until the next
% paragraph.
%
\gdef\dosuppressfirstparagraphindent{%
 \gdef\indent{%
   \restorefirstparagraphindent
   \indent
 }%
 \gdef\noindent{%
   \restorefirstparagraphindent
   \noindent
 }%
 \global\everypar = {%
   \kern -\parindent
   \restorefirstparagraphindent
 }%
}

\gdef\restorefirstparagraphindent{%
 \global \let \indent = \ptexindent
 \global \let \noindent = \ptexnoindent
```

```
 \global \everypar = {}%
}


% @refill is a no-op.
\let\refill=\relax

% If working on a large document in chapters, it is convenient to
% be able to disable indexing, cross-referencing, and contents, for test runs.
% This is done with @novalidate (before @setfilename).
%
\newif\iflinks \linkstrue % by default we want the aux files.
\let\novalidate = \linksfalse

% @setfilename is done at the beginning of every texinfo file.
% So open here the files we need to have open while reading the input.
% This makes it possible to make a .fmt file for texinfo.
\def\setfilename{%
  \fixbackslash  % Turn off hack to swallow `\input texinfo'.
  \iflinks
    \tryauxfile
    % Open the new aux file.  TeX will close it automatically at exit.
    \immediate\openout\auxfile=\jobname.aux
  \fi % \openindices needs to do some work in any case.
  \openindices
  \let\setfilename=\comment % Ignore extra @setfilename cmds.
  %
  % If texinfo.cnf is present on the system, read it.
  % Useful for site-wide @afourpaper, etc.
  \openin 1 texinfo.cnf
  \ifeof 1 \else \input texinfo.cnf \fi
  \closein 1
  %
  \comment % Ignore the actual filename.
}

% Called from \setfilename.
%
\def\openindices{%
 \newindex{cp}%
 \newcodeindex{fn}%
 \newcodeindex{vr}%
 \newcodeindex{tp}%
 \newcodeindex{ky}%
 \newcodeindex{pg}%
}

% @bye.
```

```
\outer\def\bye{\pagealignmacro\tracingstats=1\ptexend}


\message{pdf,}
% adobe `portable' document format
\newcount\tempnum
\newcount\lnkcount
\newtoks\filename
\newcount\filenamelength
\newcount\pgn
\newtoks\toksA
\newtoks\toksB
\newtoks\toksC
\newtoks\toksD
\newbox\boxA
\newcount\countA
\newif\ifpdf
\newif\ifpdfmakepagedest

% when pdftex is run in dvi mode, \pdfoutput is defined (so \pdfoutput=1
% can be set).  So we test for \relax and 0 as well as being undefined.
\ifx\pdfoutput\thisisundefined
\else
 \ifx\pdfoutput\relax
 \else
   \ifcase\pdfoutput
   \else
     \pdftrue
   \fi
 \fi
\fi

% PDF uses PostScript string constants for the names of xref targets,
% for display in the outlines, and in other places.  Thus, we have to
% double any backslashes.  Otherwise, a name like "\node" will be
% interpreted as a newline (\n), followed by o, d, e.  Not good.
%
% See http://www.ntg.nl/pipermail/ntg-pdftex/2004-July/000654.html and
% related messages.  The final outcome is that it is up to the TeX user
% to double the backslashes and otherwise make the string valid, so
% that's what we do.  pdftex 1.30.0 (ca.2005) introduced a primitive to
% do this reliably, so we use it.

% #1 is a control sequence in which to do the replacements,
% which we \xdef.
\def\txiescapepdf#1{%
 \ifx\pdfescapestring\thisisundefined
   % No primitive available; should we give a warning or log?
```

```
  % Many times it won't matter.
 \else
  % The expandable \pdfescapestring primitive escapes parentheses,
  % backslashes, and other special chars.
  \xdef#1{\pdfescapestring{#1}}%
 \fi
}

\newhelp\nopdfimagehelp{Texinfo supports .png, .jpg, .jpeg, and .pdf images
with PDF output, and none of those formats could be found.  (.eps cannot
be supported due to the design of the PDF format; use regular TeX (DVI
output) for that.)}

\ifpdf
 %
 % Color manipulation macros based on pdfcolor.tex,
 % except using rgb instead of cmyk; the latter is said to render as a
 % very dark gray on-screen and a very dark halftone in print, instead
 % of actual black.
 \def\rgbDarkRed{0.50 0.09 0.12}
 \def\rgbBlack{0 0 0}
 %
 % k sets the color for filling (usual text, etc.);
 % K sets the color for stroking (thin rules, e.g., normal _'s).
 \def\pdfsetcolor#1{\pdfliteral{#1 rg  #1 RG}}
 %
 % Set color, and create a mark which defines \thiscolor accordingly,
 % so that \makeheadline knows which color to restore.
 \def\setcolor#1{%
  \xdef\lastcolordefs{\gdef\noexpand\thiscolor{#1}}%
  \domark
  \pdfsetcolor{#1}%
 }
 %
 \def\maincolor{\rgbBlack}
 \pdfsetcolor{\maincolor}
 \edef\thiscolor{\maincolor}
 \def\lastcolordefs{}
 %
 \def\makefootline{%
  \baselineskip24pt
  \line{\pdfsetcolor{\maincolor}\the\footline}%
 }
 %
 \def\makeheadline{%
  \vbox to 0pt{%
   \vskip-22.5pt
   \line{%
```

```
      \vbox to8.5pt{}%
      % Extract \thiscolor definition from the marks.
      \getcolormarks
      % Typeset the headline with \maincolor, then restore the color.
      \pdfsetcolor{\maincolor}\the\headline\pdfsetcolor{\thiscolor}%
    }%
    \vss
  }%
  \nointerlineskip
}
%
%
\pdfcatalog{/PageMode /UseOutlines}
%
% #1 is image name, #2 width (might be empty/whitespace), #3 height (ditto).
\def\dopdfimage#1#2#3{%
  \def\pdfimagewidth{#2}\setbox0 = \hbox{\ignorespaces #2}%
  \def\pdfimageheight{#3}\setbox2 = \hbox{\ignorespaces #3}%
  %
  % pdftex (and the PDF format) support .pdf, .png, .jpg (among
  % others).  Let's try in that order, PDF first since if
  % someone has a scalable image, presumably better to use that than a
  % bitmap.
  \let\pdfimgext=\empty
  \begingroup
    \openin 1 #1.pdf \ifeof 1
      \openin 1 #1.PDF \ifeof 1
        \openin 1 #1.png \ifeof 1
          \openin 1 #1.jpg \ifeof 1
            \openin 1 #1.jpeg \ifeof 1
              \openin 1 #1.JPG \ifeof 1
                \errhelp = \nopdfimagehelp
                \errmessage{Could not find image file #1 for pdf}%
              \else \gdef\pdfimgext{JPG}%
              \fi
            \else \gdef\pdfimgext{jpeg}%
            \fi
          \else \gdef\pdfimgext{jpg}%
          \fi
        \else \gdef\pdfimgext{png}%
        \fi
      \else \gdef\pdfimgext{PDF}%
      \fi
    \else \gdef\pdfimgext{pdf}%
    \fi
    \closein 1
  \endgroup
  %
```

```
  % without \immediate, ancient pdftex seg faults when the same image is
  % included twice.  (Version 3.14159-pre-1.0-unofficial-20010704.)
  \ifnum\pdftexversion < 14
    \immediate\pdfimage
  \else
    \immediate\pdfximage
  \fi
    \ifdim \wd0 >0pt width \pdfimagewidth \fi
    \ifdim \wd2 >0pt height \pdfimageheight \fi
    \ifnum\pdftexversion<13
      #1.\pdfimgext
     \else
      {#1.\pdfimgext}%
     \fi
  \ifnum\pdftexversion < 14 \else
    \pdfrefximage \pdflastximage
  \fi}
%
\def\pdfmkdest#1{{%
  % We have to set dummies so commands such as @code, and characters
  % such as \, aren't expanded when present in a section title.
  \indexnofonts
  \turnoffactive
  \makevalueexpandable
  \def\pdfdestname{#1}%
  \txiescapepdf\pdfdestname
  \safewhatsit{\pdfdest name{\pdfdestname} xyz}%
}}
%
% used to mark target names; must be expandable.
\def\pdfmkpgn#1{#1}
%
% by default, use a color that is dark enough to print on paper as
% nearly black, but still distinguishable for online viewing.
\def\urlcolor{\rgbDarkRed}
\def\linkcolor{\rgbDarkRed}
\def\endlink{\setcolor{\maincolor}\pdfendlink}
%
% Adding outlines to PDF; macros for calculating structure of outlines
% come from Petr Olsak
\def\expnumber#1{\expandafter\ifx\csname#1\endcsname\relax 0%
  \else \csname#1\endcsname \fi}
\def\advancenumber#1{\tempnum=\expnumber{#1}\relax
  \advance\tempnum by 1
  \expandafter\xdef\csname#1\endcsname{\the\tempnum}}
%
% #1 is the section text, which is what will be displayed in the
% outline by the pdf viewer.  #2 is the pdf expression for the number
```

```
% of subentries (or empty, for subsubsections).  #3 is the node text,
% which might be empty if this toc entry had no corresponding node.
% #4 is the page number
%
\def\dopdfoutline#1#2#3#4{%
  % Generate a link to the node text if that exists; else, use the
  % page number.  We could generate a destination for the section
  % text in the case where a section has no node, but it doesn't
  % seem worth the trouble, since most documents are normally structured.
  \edef\pdfoutlinedest{#3}%
  \ifx\pdfoutlinedest\empty
    \def\pdfoutlinedest{#4}%
  \else
    \txiescapepdf\pdfoutlinedest
  \fi
  %
  % Also escape PDF chars in the display string.
  \edef\pdfoutlinetext{#1}%
  \txiescapepdf\pdfoutlinetext
  %
  \pdfoutline goto name{\pdfmkpgn{\pdfoutlinedest}}#2{\pdfoutlinetext}%
}
%
\def\pdfmakeoutlines{%
  \begingroup
    % Read toc silently, to get counts of subentries for \pdfoutline.
    \def\partentry##1##2##3##4{}% ignore parts in the outlines
    \def\numchapentry##1##2##3##4{%
\def\thischapnum{##2}%
\def\thissecnum{0}%
\def\thissubsecnum{0}%
    }%
    \def\numsecentry##1##2##3##4{%
\advancenumber{chap\thischapnum}%
\def\thissecnum{##2}%
\def\thissubsecnum{0}%
    }%
    \def\numsubsecentry##1##2##3##4{%
\advancenumber{sec\thissecnum}%
\def\thissubsecnum{##2}%
    }%
    \def\numsubsubsecentry##1##2##3##4{%
\advancenumber{subsec\thissubsecnum}%
    }%
    \def\thischapnum{0}%
    \def\thissecnum{0}%
    \def\thissubsecnum{0}%
    %
```

```
    % use \def rather than \let here because we redefine \chapentry et
    % al. a second time, below.
    \def\appentry{\numchapentry}%
    \def\appsecentry{\numsecentry}%
    \def\appsubsecentry{\numsubsecentry}%
    \def\appsubsubsecentry{\numsubsubsecentry}%
    \def\unnchapentry{\numchapentry}%
    \def\unnsecentry{\numsecentry}%
    \def\unnsubsecentry{\numsubsecentry}%
    \def\unnsubsubsecentry{\numsubsubsecentry}%
    \readdatafile{toc}%
    %
    % Read toc second time, this time actually producing the outlines.
    % The `-' means take the \expnumber as the absolute number of
    % subentries, which we calculated on our first read of the .toc above.
    %
    % We use the node names as the destinations.
    \def\numchapentry##1##2##3##4{%
      \dopdfoutline{##1}{count-\expnumber{chap##2}}{##3}{##4}}%
    \def\numsecentry##1##2##3##4{%
      \dopdfoutline{##1}{count-\expnumber{sec##2}}{##3}{##4}}%
    \def\numsubsecentry##1##2##3##4{%
      \dopdfoutline{##1}{count-\expnumber{subsec##2}}{##3}{##4}}%
    \def\numsubsubsecentry##1##2##3##4{% count is always zero
      \dopdfoutline{##1}{}{##3}{##4}}%
    %
    % PDF outlines are displayed using system fonts, instead of
    % document fonts.  Therefore we cannot use special characters,
    % since the encoding is unknown.  For example, the eogonek from
    % Latin 2 (0xea) gets translated to a | character.  Info from
    % Staszek Wawrykiewicz, 19 Jan 2004 04:09:24 +0100.
    %
    % TODO this right, we have to translate 8-bit characters to
    % their "best" equivalent, based on the @documentencoding.  Too
    % much work for too little return.  Just use the ASCII equivalents
    % we use for the index sort strings.
    %
    \indexnofonts
    \setupdatafile
    % We can have normal brace characters in the PDF outlines, unlike
    % Texinfo index files.  So set that up.
    \def\{{\lbracecharliteral}%
    \def\}{\rbracecharliteral}%
    \catcode`\\=\active \otherbackslash
    \input \tocreadfilename
  \endgroup
}
{\catcode`[=1 \catcode`]=2
```

```
 \catcode`{=\other \catcode`}=\other
 \gdef\lbracecharliteral[{]%
 \gdef\rbracecharliteral[}]%
]
%
\def\skipspaces#1{\def\PP{#1}\def\D{|}%
  \ifx\PP\D\let\nextsp\relax
  \else\let\nextsp\skipspaces
    \addtokens{\filename}{\PP}%
    \advance\filenamelength by 1
  \fi
  \nextsp}
\def\getfilename#1{%
  \filenamelength=0
  % If we don't expand the argument now, \skipspaces will get
  % snagged on things like "@value{foo}".
  \edef\temp{#1}%
  \expandafter\skipspaces\temp|\relax
}
\ifnum\pdftexversion < 14
  \let \startlink \pdfannotlink
\else
  \let \startlink \pdfstartlink
\fi
% make a live url in pdf output.
\def\pdfurl#1{%
  \begingroup
    % it seems we really need yet another set of dummies; have not
    % tried to figure out what each command should do in the context
    % of @url.  for now, just make @/ a no-op, that's the only one
    % people have actually reported a problem with.
    %
    \normalturnoffactive
    \def\@{@}%
    \let\/=\empty
    \makevalueexpandable
    % do we want to go so far as to use \indexnofonts instead of just
    % special-casing \var here?
    \def\var##1{##1}%
    %
    \leavevmode\setcolor{\urlcolor}%
    \startlink attr{/Border [0 0 0]}%
      user{/Subtype /Link /A << /S /URI /URI (#1) >>}%
  \endgroup}
\def\pdfgettoks#1.{\setbox\boxA=\hbox{\toksA={#1.}\toksB={}\maketoks}}
\def\addtokens#1#2{\edef\addtoks{\noexpand#1={\the#1#2}}\addtoks}
\def\adn#1{\addtokens{\toksC}{#1}\global\countA=1\let\next=\maketoks}
\def\poptoks#1#2|ENDTOKS|{\let\first=#1\toksD={#1}\toksA={#2}}
```

```
 \def\maketoks{%
   \expandafter\poptoks\the\toksA|ENDTOKS|\relax
   \ifx\first0\adn0
   \else\ifx\first1\adn1 \else\ifx\first2\adn2 \else\ifx\first3\adn3
   \else\ifx\first4\adn4 \else\ifx\first5\adn5 \else\ifx\first6\adn6
   \else\ifx\first7\adn7 \else\ifx\first8\adn8 \else\ifx\first9\adn9
   \else
     \ifnum0=\countA\else\makelink\fi
     \ifx\first.\let\next=\done\else
       \let\next=\maketoks
       \addtokens{\toksB}{\the\toksD}
       \ifx\first,\addtokens{\toksB}{\space}\fi
     \fi
   \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi
   \next}
 \def\makelink{\addtokens{\toksB}%
   {\noexpand\pdflink{\the\toksC}}\toksC={}\global\countA=0}
 \def\pdflink#1{%
   \startlink attr{/Border [0 0 0]} goto name{\pdfmkpgn{#1}}
   \setcolor{\linkcolor}#1\endlink}
 \def\done{\edef\st{\global\noexpand\toksA={\the\toksB}}\st}
\else
 % non-pdf mode
 \let\pdfmkdest = \gobble
 \let\pdfurl = \gobble
 \let\endlink = \relax
 \let\setcolor = \gobble
 \let\pdfsetcolor = \gobble
 \let\pdfmakeoutlines = \relax
\fi  % \ifx\pdfoutput


\message{fonts,}

% Change the current font style to #1, remembering it in \curfontstyle.
% For now, we do not accumulate font styles: @b{@i{foo}} prints foo in
% italics, not bold italics.
%
\def\setfontstyle#1{%
 \def\curfontstyle{#1}% not as a control sequence, because we are \edef'd.
 \csname ten#1\endcsname  % change the current font
}

% Select #1 fonts with the current style.
%
\def\selectfonts#1{\csname #1fonts\endcsname \csname\curfontstyle\endcsname}

\def\rm{\fam=0 \setfontstyle{rm}}
```

```
\def\it{\fam=\itfam \setfontstyle{it}}
\def\sl{\fam=\slfam \setfontstyle{sl}}
\def\bf{\fam=\bffam \setfontstyle{bf}}\def\bfstylename{bf}
\def\tt{\fam=\ttfam \setfontstyle{tt}}

% Unfortunately, we have to override this for titles and the like, since
% in those cases "rm" is bold.  Sigh.
\def\rmisbold{\rm\def\curfontstyle{bf}}

% Texinfo sort of supports the sans serif font style, which plain TeX does not.
% So we set up a \sf.
\newfam\sffam
\def\sf{\fam=\sffam \setfontstyle{sf}}
\let\li = \sf % Sometimes we call it \li, not \sf.

% We don't need math for this font style.
\def\ttsl{\setfontstyle{ttsl}}


% Set the baselineskip to #1, and the lineskip and strut size
% correspondingly.  There is no deep meaning behind these magic numbers
% used as factors; they just match (closely enough) what Knuth defined.
%
\def\lineskipfactor{.08333}
\def\strutheightpercent{.70833}
\def\strutdepthpercent {.29167}
%
% can get a sort of poor man's double spacing by redefining this.
\def\baselinefactor{1}
%
\newdimen\textleading
\def\setleading#1{%
 \dimen0 = #1\relax
 \normalbaselineskip = \baselinefactor\dimen0
 \normallineskip = \lineskipfactor\normalbaselineskip
 \normalbaselines
 \setbox\strutbox =\hbox{%
   \vrule width0pt height\strutheightpercent\baselineskip
                depth \strutdepthpercent \baselineskip
 }%
}

% PDF CMaps.  See also LaTeX's t1.cmap.
%
% do nothing with this by default.
\expandafter\let\csname cmapOT1\endcsname\gobble
\expandafter\let\csname cmapOT1IT\endcsname\gobble
\expandafter\let\csname cmapOT1TT\endcsname\gobble
```

```
% if we are producing pdf, and we have \pdffontattr, then define cmaps.
% (\pdffontattr was introduced many years ago, but people still run
% older pdftex's; it's easy to conditionalize, so we do.)
\ifpdf \ifx\pdffontattr\thisisundefined \else
 \begingroup
   \catcode`\^^M=\active \def^^M{^^J}% Output line endings as the ^^J char.
   \catcode`\%=12 \immediate\pdfobj stream {%!PS-Adobe-3.0 Resource-CMap
%%DocumentNeededResources: ProcSet (CIDInit)
%%IncludeResource: ProcSet (CIDInit)
%%BeginResource: CMap (TeX-OT1-0)
%%Title: (TeX-OT1-0 TeX OT1 0)
%%Version: 1.000
%%EndComments
/CIDInit /ProcSet findresource begin
12 dict begin
begincmap
/CIDSystemInfo
<< /Registry (TeX)
/Ordering (OT1)
/Supplement 0
>> def
/CMapName /TeX-OT1-0 def
/CMapType 2 def
1 begincodespacerange
<00> <7F>
endcodespacerange
8 beginbfrange
<00> <01> <0393>
<09> <0A> <03A8>
<23> <26> <0023>
<28> <3B> <0028>
<3F> <5B> <003F>
<5D> <5E> <005D>
<61> <7A> <0061>
<7B> <7C> <2013>
endbfrange
40 beginbfchar
<02> <0398>
<03> <039B>
<04> <039E>
<05> <03A0>
<06> <03A3>
<07> <03D2>
<08> <03A6>
<0B> <00660066>
<0C> <00660069>
<0D> <0066006C>
```

```
<0E> <006600660069>
<0F> <00660066006C>
<10> <0131>
<11> <0237>
<12> <0060>
<13> <00B4>
<14> <02C7>
<15> <02D8>
<16> <00AF>
<17> <02DA>
<18> <00B8>
<19> <00DF>
<1A> <00E6>
<1B> <0153>
<1C> <00F8>
<1D> <00C6>
<1E> <0152>
<1F> <00D8>
<21> <0021>
<22> <201D>
<27> <2019>
<3C> <00A1>
<3D> <003D>
<3E> <00BF>
<5C> <201C>
<5F> <02D9>
<60> <2018>
<7D> <02DD>
<7E> <007E>
<7F> <00A8>
endbfchar
endcmap
CMapName currentdict /CMap defineresource pop
end
end
%%EndResource
%%EOF
   }\endgroup
 \expandafter\edef\csname cmapOT1\endcsname#1{%
   \pdffontattr#1{/ToUnicode \the\pdflastobj\space 0 R}%
 }%
%
% \cmapOT1IT
 \begingroup
   \catcode`\^^M=\active \def^^M{^^J}% Output line endings as the ^^J char.
   \catcode`\%=12 \immediate\pdfobj stream {%!PS-Adobe-3.0 Resource-CMap
%%DocumentNeededResources: ProcSet (CIDInit)
%%IncludeResource: ProcSet (CIDInit)
```

```
%%BeginResource: CMap (TeX-OT1IT-0)
%%Title: (TeX-OT1IT-0 TeX OT1IT 0)
%%Version: 1.000
%%EndComments
/CIDInit /ProcSet findresource begin
12 dict begin
begincmap
/CIDSystemInfo
<< /Registry (TeX)
/Ordering (OT1IT)
/Supplement 0
>> def
/CMapName /TeX-OT1IT-0 def
/CMapType 2 def
1 begincodespacerange
<00> <7F>
endcodespacerange
8 beginbfrange
<00> <01> <0393>
<09> <0A> <03A8>
<25> <26> <0025>
<28> <3B> <0028>
<3F> <5B> <003F>
<5D> <5E> <005D>
<61> <7A> <0061>
<7B> <7C> <2013>
endbfrange
42 beginbfchar
<02> <0398>
<03> <039B>
<04> <039E>
<05> <03A0>
<06> <03A3>
<07> <03D2>
<08> <03A6>
<0B> <00660066>
<0C> <00660069>
<0D> <0066006C>
<0E> <006600660069>
<0F> <00660066006C>
<10> <0131>
<11> <0237>
<12> <0060>
<13> <00B4>
<14> <02C7>
<15> <02D8>
<16> <00AF>
<17> <02DA>
```

```
<18> <00B8>
<19> <00DF>
<1A> <00E6>
<1B> <0153>
<1C> <00F8>
<1D> <00C6>
<1E> <0152>
<1F> <00D8>
<21> <0021>
<22> <201D>
<23> <0023>
<24> <00A3>
<27> <2019>
<3C> <00A1>
<3D> <003D>
<3E> <00BF>
<5C> <201C>
<5F> <02D9>
<60> <2018>
<7D> <02DD>
<7E> <007E>
<7F> <00A8>
endbfchar
endcmap
CMapName currentdict /CMap defineresource pop
end
end
%%EndResource
%%EOF
  }\endgroup
 \expandafter\edef\csname cmapOT1IT\endcsname#1{%
  \pdffontattr#1{/ToUnicode \the\pdflastobj\space 0 R}%
 }%
%
% \cmapOT1TT
 \begingroup
  \catcode`\^^M=\active \def^^M{^^J}% Output line endings as the ^^J char.
  \catcode`\%=12 \immediate\pdfobj stream {%!PS-Adobe-3.0 Resource-CMap
%%DocumentNeededResources: ProcSet (CIDInit)
%%IncludeResource: ProcSet (CIDInit)
%%BeginResource: CMap (TeX-OT1TT-0)
%%Title: (TeX-OT1TT-0 TeX OT1TT 0)
%%Version: 1.000
%%EndComments
/CIDInit /ProcSet findresource begin
12 dict begin
begincmap
/CIDSystemInfo
```

```
<< /Registry (TeX)
/Ordering (OT1TT)
/Supplement 0
>> def
/CMapName /TeX-OT1TT-0 def
/CMapType 2 def
1 begincodespacerange
<00> <7F>
endcodespacerange
5 beginbfrange
<00> <01> <0393>
<09> <0A> <03A8>
<21> <26> <0021>
<28> <5F> <0028>
<61> <7E> <0061>
endbfrange
32 beginbfchar
<02> <0398>
<03> <039B>
<04> <039E>
<05> <03A0>
<06> <03A3>
<07> <03D2>
<08> <03A6>
<0B> <2191>
<0C> <2193>
<0D> <0027>
<0E> <00A1>
<0F> <00BF>
<10> <0131>
<11> <0237>
<12> <0060>
<13> <00B4>
<14> <02C7>
<15> <02D8>
<16> <00AF>
<17> <02DA>
<18> <00B8>
<19> <00DF>
<1A> <00E6>
<1B> <0153>
<1C> <00F8>
<1D> <00C6>
<1E> <0152>
<1F> <00D8>
<20> <2423>
<27> <2019>
<60> <2018>
```

```
<7F> <00A8>
endbfchar
endcmap
CMapName currentdict /CMap defineresource pop
end
end
%%EndResource
%%EOF
   }\endgroup
 \expandafter\edef\csname cmapOT1TT\endcsname#1{%
   \pdffontattr#1{/ToUnicode \the\pdflastobj\space 0 R}%
 }%
\fi\fi


% Set the font macro #1 to the font named \fontprefix#2.
% #3 is the font's design size, #4 is a scale factor, #5 is the CMap
% encoding (only OT1, OT1IT and OT1TT are allowed, or empty to omit).
% Example:
% #1 = \textrm
% #2 = \rmshape
% #3 = 10
% #4 = \mainmagstep
% #5 = OT1
%
\def\setfont#1#2#3#4#5{%
 \font#1=\fontprefix#2#3 scaled #4
 \csname cmap#5\endcsname#1%
}
% This is what gets called when #5 of \setfont is empty.
\let\cmap\gobble
%
% (end of cmaps)

% Use cm as the default font prefix.
% To specify the font prefix, you must define \fontprefix
% before you read in texinfo.tex.
\ifx\fontprefix\thisisundefined
\def\fontprefix{cm}
\fi
% Support font families that don't use the same naming scheme as CM.
\def\rmshape{r}
\def\rmbshape{bx}              % where the normal face is bold
\def\bfshape{b}
\def\bxshape{bx}
\def\ttshape{tt}
\def\ttbshape{tt}
\def\ttslshape{sltt}
```

```
\def\itshape{ti}
\def\itbshape{bxti}
\def\slshape{sl}
\def\slbshape{bxsl}
\def\sfshape{ss}
\def\sfbshape{ss}
\def\scshape{csc}
\def\scbshape{csc}

% Definitions for a main text size of 11pt.  (The default in Texinfo.)
%
\def\definetextfontsizexi{%
% Text fonts (11.2pt, magstep1).
\def\textnominalsize{11pt}
\edef\mainmagstep{\magstephalf}
\setfont\textrm\rmshape{10}{\mainmagstep}{OT1}
\setfont\texttt\ttshape{10}{\mainmagstep}{OT1TT}
\setfont\textbf\bfshape{10}{\mainmagstep}{OT1}
\setfont\textit\itshape{10}{\mainmagstep}{OT1IT}
\setfont\textsl\slshape{10}{\mainmagstep}{OT1}
\setfont\textsf\sfshape{10}{\mainmagstep}{OT1}
\setfont\textsc\scshape{10}{\mainmagstep}{OT1}
\setfont\texttsl\ttslshape{10}{\mainmagstep}{OT1TT}
\font\texti=cmmi10 scaled \mainmagstep
\font\textsy=cmsy10 scaled \mainmagstep
\def\textecsize{1095}

% A few fonts for @defun names and args.
\setfont\defbf\bfshape{10}{\magstep1}{OT1}
\setfont\deftt\ttshape{10}{\magstep1}{OT1TT}
\setfont\defttsl\ttslshape{10}{\magstep1}{OT1TT}
\def\df{\let\tentt=\deftt \let\tenbf = \defbf \let\tenttsl=\defttsl \bf}

% Fonts for indices, footnotes, small examples (9pt).
\def\smallnominalsize{9pt}
\setfont\smallrm\rmshape{9}{1000}{OT1}
\setfont\smalltt\ttshape{9}{1000}{OT1TT}
\setfont\smallbf\bfshape{10}{900}{OT1}
\setfont\smallit\itshape{9}{1000}{OT1IT}
\setfont\smallsl\slshape{9}{1000}{OT1}
\setfont\smallsf\sfshape{9}{1000}{OT1}
\setfont\smallsc\scshape{10}{900}{OT1}
\setfont\smallttsl\ttslshape{10}{900}{OT1TT}
\font\smalli=cmmi9
\font\smallsy=cmsy9
\def\smallecsize{0900}

% Fonts for small examples (8pt).
```

```
\def\smallernominalsize{8pt}
\setfont\smallerrm\rmshape{8}{1000}{OT1}
\setfont\smallertt\ttshape{8}{1000}{OT1TT}
\setfont\smallerbf\bfshape{10}{800}{OT1}
\setfont\smallerit\itshape{8}{1000}{OT1IT}
\setfont\smallersl\slshape{8}{1000}{OT1}
\setfont\smallersf\sfshape{8}{1000}{OT1}
\setfont\smallersc\scshape{10}{800}{OT1}
\setfont\smallerttsl\ttslshape{10}{800}{OT1TT}
\font\smalleri=cmmi8
\font\smallersy=cmsy8
\def\smallerecsize{0800}

% Fonts for title page (20.4pt):
\def\titlenominalsize{20pt}
\setfont\titlerm\rmbshape{12}{\magstep3}{OT1}
\setfont\titleit\itbshape{10}{\magstep4}{OT1IT}
\setfont\titlesl\slbshape{10}{\magstep4}{OT1}
\setfont\titlett\ttbshape{12}{\magstep3}{OT1TT}
\setfont\titlettsl\ttslshape{10}{\magstep4}{OT1TT}
\setfont\titlesf\sfbshape{17}{\magstep1}{OT1}
\let\titlebf=\titlerm
\setfont\titlesc\scbshape{10}{\magstep4}{OT1}
\font\titlei=cmmi12 scaled \magstep3
\font\titlesy=cmsy10 scaled \magstep4
\def\titleecsize{2074}

% Chapter (and unnumbered) fonts (17.28pt).
\def\chapnominalsize{17pt}
\setfont\chaprm\rmbshape{12}{\magstep2}{OT1}
\setfont\chapit\itbshape{10}{\magstep3}{OT1IT}
\setfont\chapsl\slbshape{10}{\magstep3}{OT1}
\setfont\chaptt\ttbshape{12}{\magstep2}{OT1TT}
\setfont\chapttsl\ttslshape{10}{\magstep3}{OT1TT}
\setfont\chapsf\sfbshape{17}{1000}{OT1}
\let\chapbf=\chaprm
\setfont\chapsc\scbshape{10}{\magstep3}{OT1}
\font\chapi=cmmi12 scaled \magstep2
\font\chapsy=cmsy10 scaled \magstep3
\def\chapecsize{1728}

% Section fonts (14.4pt).
\def\secnominalsize{14pt}
\setfont\secrm\rmbshape{12}{\magstep1}{OT1}
\setfont\secit\itbshape{10}{\magstep2}{OT1IT}
\setfont\secsl\slbshape{10}{\magstep2}{OT1}
\setfont\sectt\ttbshape{12}{\magstep1}{OT1TT}
\setfont\secttsl\ttslshape{10}{\magstep2}{OT1TT}
```

```
\setfont\secsf\sfbshape{12}{\magstep1}{OT1}
\let\secbf\secrm
\setfont\secsc\scbshape{10}{\magstep2}{OT1}
\font\seci=cmmi12 scaled \magstep1
\font\secsy=cmsy10 scaled \magstep2
\def\sececsize{1440}

% Subsection fonts (13.15pt).
\def\ssecnominalsize{13pt}
\setfont\ssecrm\rmbshape{12}{\magstephalf}{OT1}
\setfont\ssecit\itbshape{10}{1315}{OT1IT}
\setfont\ssecsl\slbshape{10}{1315}{OT1}
\setfont\ssectt\ttbshape{12}{\magstephalf}{OT1TT}
\setfont\ssecttsl\ttslshape{10}{1315}{OT1TT}
\setfont\ssecsf\sfbshape{12}{\magstephalf}{OT1}
\let\ssecbf\ssecrm
\setfont\ssecsc\scbshape{10}{1315}{OT1}
\font\sseci=cmmi12 scaled \magstephalf
\font\ssecsy=cmsy10 scaled 1315
\def\ssececsize{1200}

% Reduced fonts for @acro in text (10pt).
\def\reducednominalsize{10pt}
\setfont\reducedrm\rmshape{10}{1000}{OT1}
\setfont\reducedtt\ttshape{10}{1000}{OT1TT}
\setfont\reducedbf\bfshape{10}{1000}{OT1}
\setfont\reducedit\itshape{10}{1000}{OT1IT}
\setfont\reducedsl\slshape{10}{1000}{OT1}
\setfont\reducedsf\sfshape{10}{1000}{OT1}
\setfont\reducedsc\scshape{10}{1000}{OT1}
\setfont\reducedttsl\ttslshape{10}{1000}{OT1TT}
\font\reducedi=cmmi10
\font\reducedsy=cmsy10
\def\reducedecsize{1000}

\textleading = 13.2pt % line spacing for 11pt CM
\textfonts          % reset the current fonts
\rm
} % end of 11pt text font size definitions, \definetextfontsizexi


% Definitions to make the main text be 10pt Computer Modern, with
% section, chapter, etc., sizes following suit.  This is for the GNU
% Press printing of the Emacs 22 manual.  Maybe other manuals in the
% future.  Used with @smallbook, which sets the leading to 12pt.
%
\def\definetextfontsizex{%
% Text fonts (10pt).
```

```
\def\textnominalsize{10pt}
\edef\mainmagstep{1000}
\setfont\textrm\rmshape{10}{\mainmagstep}{OT1}
\setfont\texttt\ttshape{10}{\mainmagstep}{OT1TT}
\setfont\textbf\bfshape{10}{\mainmagstep}{OT1}
\setfont\textit\itshape{10}{\mainmagstep}{OT1IT}
\setfont\textsl\slshape{10}{\mainmagstep}{OT1}
\setfont\textsf\sfshape{10}{\mainmagstep}{OT1}
\setfont\textsc\scshape{10}{\mainmagstep}{OT1}
\setfont\texttsl\ttslshape{10}{\mainmagstep}{OT1TT}
\font\texti=cmmi10 scaled \mainmagstep
\font\textsy=cmsy10 scaled \mainmagstep
\def\textecsize{1000}

% A few fonts for @defun names and args.
\setfont\defbf\bfshape{10}{\magstephalf}{OT1}
\setfont\deftt\ttshape{10}{\magstephalf}{OT1TT}
\setfont\defttsl\ttslshape{10}{\magstephalf}{OT1TT}
\def\df{\let\tentt=\deftt \let\tenbf = \defbf \let\tenttsl=\defttsl \bf}

% Fonts for indices, footnotes, small examples (9pt).
\def\smallnominalsize{9pt}
\setfont\smallrm\rmshape{9}{1000}{OT1}
\setfont\smalltt\ttshape{9}{1000}{OT1TT}
\setfont\smallbf\bfshape{10}{900}{OT1}
\setfont\smallit\itshape{9}{1000}{OT1IT}
\setfont\smallsl\slshape{9}{1000}{OT1}
\setfont\smallsf\sfshape{9}{1000}{OT1}
\setfont\smallsc\scshape{10}{900}{OT1}
\setfont\smallttsl\ttslshape{10}{900}{OT1TT}
\font\smalli=cmmi9
\font\smallsy=cmsy9
\def\smallecsize{0900}

% Fonts for small examples (8pt).
\def\smallernominalsize{8pt}
\setfont\smallerrm\rmshape{8}{1000}{OT1}
\setfont\smallertt\ttshape{8}{1000}{OT1TT}
\setfont\smallerbf\bfshape{10}{800}{OT1}
\setfont\smallerit\itshape{8}{1000}{OT1IT}
\setfont\smallersl\slshape{8}{1000}{OT1}
\setfont\smallersf\sfshape{8}{1000}{OT1}
\setfont\smallersc\scshape{10}{800}{OT1}
\setfont\smallerttsl\ttslshape{10}{800}{OT1TT}
\font\smalleri=cmmi8
\font\smallersy=cmsy8
\def\smallerecsize{0800}
```

```
% Fonts for title page (20.4pt):
\def\titlenominalsize{20pt}
\setfont\titlerm\rmbshape{12}{\magstep3}{OT1}
\setfont\titleit\itbshape{10}{\magstep4}{OT1IT}
\setfont\titlesl\slbshape{10}{\magstep4}{OT1}
\setfont\titlett\ttbshape{12}{\magstep3}{OT1TT}
\setfont\titlettsl\ttslshape{10}{\magstep4}{OT1TT}
\setfont\titlesf\sfbshape{17}{\magstep1}{OT1}
\let\titlebf=\titlerm
\setfont\titlesc\scbshape{10}{\magstep4}{OT1}
\font\titlei=cmmi12 scaled \magstep3
\font\titlesy=cmsy10 scaled \magstep4
\def\titleecsize{2074}

% Chapter fonts (14.4pt).
\def\chapnominalsize{14pt}
\setfont\chaprm\rmbshape{12}{\magstep1}{OT1}
\setfont\chapit\itbshape{10}{\magstep2}{OT1IT}
\setfont\chapsl\slbshape{10}{\magstep2}{OT1}
\setfont\chaptt\ttbshape{12}{\magstep1}{OT1TT}
\setfont\chapttsl\ttslshape{10}{\magstep2}{OT1TT}
\setfont\chapsf\sfbshape{12}{\magstep1}{OT1}
\let\chapbf\chaprm
\setfont\chapsc\scbshape{10}{\magstep2}{OT1}
\font\chapi=cmmi12 scaled \magstep1
\font\chapsy=cmsy10 scaled \magstep2
\def\chapecsize{1440}

% Section fonts (12pt).
\def\secnominalsize{12pt}
\setfont\secrm\rmbshape{12}{1000}{OT1}
\setfont\secit\itbshape{10}{\magstep1}{OT1IT}
\setfont\secsl\slbshape{10}{\magstep1}{OT1}
\setfont\sectt\ttbshape{12}{1000}{OT1TT}
\setfont\secttsl\ttslshape{10}{\magstep1}{OT1TT}
\setfont\secsf\sfbshape{12}{1000}{OT1}
\let\secbf\secrm
\setfont\secsc\scbshape{10}{\magstep1}{OT1}
\font\seci=cmmi12
\font\secsy=cmsy10 scaled \magstep1
\def\sececsize{1200}

% Subsection fonts (10pt).
\def\ssecnominalsize{10pt}
\setfont\ssecrm\rmbshape{10}{1000}{OT1}
\setfont\ssecit\itbshape{10}{1000}{OT1IT}
\setfont\ssecsl\slbshape{10}{1000}{OT1}
\setfont\ssectt\ttbshape{10}{1000}{OT1TT}
```

```
\setfont\ssecttsl\ttslshape{10}{1000}{OT1TT}
\setfont\ssecsf\sfbshape{10}{1000}{OT1}
\let\ssecbf\ssecrm
\setfont\ssecsc\scbshape{10}{1000}{OT1}
\font\sseci=cmmi10
\font\ssecsy=cmsy10
\def\ssececsize{1000}

% Reduced fonts for @acro in text (9pt).
\def\reducednominalsize{9pt}
\setfont\reducedrm\rmshape{9}{1000}{OT1}
\setfont\reducedtt\ttshape{9}{1000}{OT1TT}
\setfont\reducedbf\bfshape{10}{900}{OT1}
\setfont\reducedit\itshape{9}{1000}{OT1IT}
\setfont\reducedsl\slshape{9}{1000}{OT1}
\setfont\reducedsf\sfshape{9}{1000}{OT1}
\setfont\reducedsc\scshape{10}{900}{OT1}
\setfont\reducedttsl\ttslshape{10}{900}{OT1TT}
\font\reducedi=cmmi9
\font\reducedsy=cmsy9
\def\reducedecsize{0900}

\divide\parskip by 2  % reduce space between paragraphs
\textleading = 12pt   % line spacing for 10pt CM
\textfonts            % reset the current fonts
\rm
} % end of 10pt text font size definitions, \definetextfontsizex


% We provide the user-level command
%   @fonttextsize 10
% (or 11) to redefine the text font size.  pt is assumed.
%
\def\xiword{11}
\def\xword{10}
\def\xwordpt{10pt}
%
\parseargdef\fonttextsize{%
 \def\textsizearg{#1}%
 %\wlog{doing @fonttextsize \textsizearg}%
 %
 % Set \globaldefs so that documents can use this inside @tex, since
 % makeinfo 4.8 does not support it, but we need it nonetheless.
 %
\begingroup \globaldefs=1
 \ifx\textsizearg\xword \definetextfontsizex
 \else \ifx\textsizearg\xiword \definetextfontsizexi
 \else
```

```
   \errhelp=\EMsimple
   \errmessage{@fonttextsize only supports `10' or `11', not `\textsizearg'}
 \fi\fi
\endgroup
}


% In order for the font changes to affect most math symbols and letters,
% we have to define the \textfont of the standard families.  Since
% texinfo doesn't allow for producing subscripts and superscripts except
% in the main text, we don't bother to reset \scriptfont and
% \scriptscriptfont (which would also require loading a lot more fonts).
%
\def\resetmathfonts{%
 \textfont0=\tenrm \textfont1=\teni \textfont2=\tensy
 \textfont\itfam=\tenit \textfont\slfam=\tensl \textfont\bffam=\tenbf
 \textfont\ttfam=\tentt \textfont\sffam=\tensf
}

% The font-changing commands redefine the meanings of \tenSTYLE, instead
% of just \STYLE.  We do this because \STYLE needs to also set the
% current \fam for math mode.  Our \STYLE (e.g., \rm) commands hardwire
% \tenSTYLE to set the current font.
%
% Each font-changing command also sets the names \lsize (one size lower)
% and \lllsize (three sizes lower).  These relative commands are used in
% the LaTeX logo and acronyms.
%
% This all needs generalizing, badly.
%
\def\textfonts{%
 \let\tenrm=\textrm \let\tenit=\textit \let\tensl=\textsl
 \let\tenbf=\textbf \let\tentt=\texttt \let\smallcaps=\textsc
 \let\tensf=\textsf \let\teni=\texti \let\tensy=\textsy
 \let\tenttsl=\texttttsl
 \def\curfontsize{text}%
 \def\lsize{reduced}\def\lllsize{smaller}%
 \resetmathfonts \setleading{\textleading}}
\def\titlefonts{%
 \let\tenrm=\titlerm \let\tenit=\titleit \let\tensl=\titlesl
 \let\tenbf=\titlebf \let\tentt=\titlett \let\smallcaps=\titlesc
 \let\tensf=\titlesf \let\teni=\titlei \let\tensy=\titlesy
 \let\tenttsl=\titlettsl
 \def\curfontsize{title}%
 \def\lsize{chap}\def\lllsize{subsec}%
 \resetmathfonts \setleading{27pt}}
\def\titlefont#1{{\titlefonts\rmisbold #1}}
\def\chapfonts{%
```

```
 \let\tenrm=\chaprm \let\tenit=\chapit \let\tensl=\chapsl
 \let\tenbf=\chapbf \let\tentt=\chaptt \let\smallcaps=\chapsc
 \let\tensf=\chapsf \let\teni=\chapi \let\tensy=\chapsy
 \let\tenttsl=\chapttsl
 \def\curfontsize{chap}%
 \def\lsize{sec}\def\lllsize{text}%
 \resetmathfonts \setleading{19pt}}
\def\secfonts{%
 \let\tenrm=\secrm \let\tenit=\secit \let\tensl=\secsl
 \let\tenbf=\secbf \let\tentt=\sectt \let\smallcaps=\secsc
 \let\tensf=\secsf \let\teni=\seci \let\tensy=\secsy
 \let\tenttsl=\secttsl
 \def\curfontsize{sec}%
 \def\lsize{subsec}\def\lllsize{reduced}%
 \resetmathfonts \setleading{16pt}}
\def\subsecfonts{%
 \let\tenrm=\ssecrm \let\tenit=\ssecit \let\tensl=\ssecsl
 \let\tenbf=\ssecbf \let\tentt=\ssectt \let\smallcaps=\ssecsc
 \let\tensf=\ssecsf \let\teni=\sseci \let\tensy=\ssecsy
 \let\tenttsl=\ssecttsl
 \def\curfontsize{ssec}%
 \def\lsize{text}\def\lllsize{small}%
 \resetmathfonts \setleading{15pt}}
\let\subsubsecfonts = \subsecfonts
\def\reducedfonts{%
 \let\tenrm=\reducedrm \let\tenit=\reducedit \let\tensl=\reducedsl
 \let\tenbf=\reducedbf \let\tentt=\reducedtt \let\reducedcaps=\reducedsc
 \let\tensf=\reducedsf \let\teni=\reducedi \let\tensy=\reducedsy
 \let\tenttsl=\reducedttsl
 \def\curfontsize{reduced}%
 \def\lsize{small}\def\lllsize{smaller}%
 \resetmathfonts \setleading{10.5pt}}
\def\smallfonts{%
 \let\tenrm=\smallrm \let\tenit=\smallit \let\tensl=\smallsl
 \let\tenbf=\smallbf \let\tentt=\smalltt \let\smallcaps=\smallsc
 \let\tensf=\smallsf \let\teni=\smalli \let\tensy=\smallsy
 \let\tenttsl=\smallttsl
 \def\curfontsize{small}%
 \def\lsize{smaller}\def\lllsize{smaller}%
 \resetmathfonts \setleading{10.5pt}}
\def\smallerfonts{%
 \let\tenrm=\smallerrm \let\tenit=\smallerit \let\tensl=\smallersl
 \let\tenbf=\smallerbf \let\tentt=\smallertt \let\smallcaps=\smallersc
 \let\tensf=\smallersf \let\teni=\smalleri \let\tensy=\smallersy
 \let\tenttsl=\smallerttsl
 \def\curfontsize{smaller}%
 \def\lsize{smaller}\def\lllsize{smaller}%
 \resetmathfonts \setleading{9.5pt}}
```

```
% Fonts for short table of contents.
\setfont\shortcontrm\rmshape{12}{1000}{OT1}
\setfont\shortcontbf\bfshape{10}{\magstep1}{OT1}  % no cmb12
\setfont\shortcontsl\slshape{12}{1000}{OT1}
\setfont\shortconttt\ttshape{12}{1000}{OT1TT}

% Define these just so they can be easily changed for other fonts.
\def\angleleft{$\langle$}
\def\angleright{$\rangle$}

% Set the fonts to use with the @small... environments.
\let\smallexamplefonts = \smallfonts

% About \smallexamplefonts.  If we use \smallfonts (9pt), @smallexample
% can fit this many characters:
%   8.5x11=86   smallbook=72  a4=90  a5=69
% If we use \scriptfonts (8pt), then we can fit this many characters:
%   8.5x11=90+  smallbook=80  a4=90+  a5=77
% For me, subjectively, the few extra characters that fit aren't worth
% the additional smallness of 8pt.  So I'm making the default 9pt.
%
% By the way, for comparison, here's what fits with @example (10pt):
%   8.5x11=71  smallbook=60  a4=75  a5=58
% --karl, 24jan03.

% Set up the default fonts, so we can use them for creating boxes.
%
\definetextfontsizexi


\message{markup,}

% Check if we are currently using a typewriter font.  Since all the
% Computer Modern typewriter fonts have zero interword stretch (and
% shrink), and it is reasonable to expect all typewriter fonts to have
% this property, we can check that font parameter.
%
\def\ifmonospace{\ifdim\fontdimen3\font=0pt }

% Markup style infrastructure.  \defmarkupstylesetup\INITMACRO will
% define and register \INITMACRO to be called on markup style changes.
% \INITMACRO can check \currentmarkupstyle for the innermost
% style and the set of \ifmarkupSTYLE switches for all styles
% currently in effect.
\newif\ifmarkupvar
\newif\ifmarkupsamp
\newif\ifmarkupkey
```

```
%\newif\ifmarkupfile % @file == @samp.
%\newif\ifmarkupoption % @option == @samp.
\newif\ifmarkupcode
\newif\ifmarkupkbd
%\newif\ifmarkupenv % @env == @code.
%\newif\ifmarkupcommand % @command == @code.
\newif\ifmarkuptex % @tex (and part of @math, for now).
\newif\ifmarkupexample
\newif\ifmarkupverb
\newif\ifmarkupverbatim

\let\currentmarkupstyle\empty

\def\setupmarkupstyle#1{%
 \csname markup#1true\endcsname
 \def\currentmarkupstyle{#1}%
 \markupstylesetup
}

\let\markupstylesetup\empty

\def\defmarkupstylesetup#1{%
 \expandafter\def\expandafter\markupstylesetup
   \expandafter{\markupstylesetup #1}%
 \def#1%
}

% Markup style setup for left and right quotes.
\defmarkupstylesetup\markupsetuplq{%
 \expandafter\let\expandafter \temp
   \csname markupsetuplq\currentmarkupstyle\endcsname
 \ifx\temp\relax \markupsetuplqdefault \else \temp \fi
}

\defmarkupstylesetup\markupsetuprq{%
 \expandafter\let\expandafter \temp
   \csname markupsetuprq\currentmarkupstyle\endcsname
 \ifx\temp\relax \markupsetuprqdefault \else \temp \fi
}

{
\catcode`\'=\active
\catcode`\`=\active

\gdef\markupsetuplqdefault{\let`\lq}
\gdef\markupsetuprqdefault{\let'\rq}

\gdef\markupsetcodequoteleft{\let`\codequoteleft}
```

```
\gdef\markupsetcodequoteright{\let'\codequoteright}
}

\let\markupsetuplqcode \markupsetcodequoteleft
\let\markupsetuprqcode \markupsetcodequoteright
%
\let\markupsetuplqexample \markupsetcodequoteleft
\let\markupsetuprqexample \markupsetcodequoteright
%
\let\markupsetuplqkbd     \markupsetcodequoteleft
\let\markupsetuprqkbd     \markupsetcodequoteright
%
\let\markupsetuplqsamp \markupsetcodequoteleft
\let\markupsetuprqsamp \markupsetcodequoteright
%
\let\markupsetuplqverb \markupsetcodequoteleft
\let\markupsetuprqverb \markupsetcodequoteright
%
\let\markupsetuplqverbatim \markupsetcodequoteleft
\let\markupsetuprqverbatim \markupsetcodequoteright

% Allow an option to not use regular directed right quote/apostrophe
% (char 0x27), but instead the undirected quote from cmtt (char 0x0d).
% The undirected quote is ugly, so don't make it the default, but it
% works for pasting with more pdf viewers (at least evince), the
% lilypond developers report.  xpdf does work with the regular 0x27.
%
\def\codequoteright{%
 \expandafter\ifx\csname SETtxicodequoteundirected\endcsname\relax
   \expandafter\ifx\csname SETcodequoteundirected\endcsname\relax
     '%
   \else \char'15 \fi
 \else \char'15 \fi
}
%
% and a similar option for the left quote char vs. a grave accent.
% Modern fonts display ASCII 0x60 as a grave accent, so some people like
% the code environments to do likewise.
%
\def\codequoteleft{%
 \expandafter\ifx\csname SETtxicodequotebacktick\endcsname\relax
   \expandafter\ifx\csname SETcodequotebacktick\endcsname\relax
     % [Knuth] pp. 380,381,391
     % \relax disables Spanish ligatures ?` and !` of \tt font.
     \relax`%
   \else \char'22 \fi
 \else \char'22 \fi
}
```

```
% Commands to set the quote options.
%
\parseargdef\codequoteundirected{%
 \def\temp{#1}%
 \ifx\temp\onword
   \expandafter\let\csname SETtxicodequoteundirected\endcsname
     = t%
 \else\ifx\temp\offword
   \expandafter\let\csname SETtxicodequoteundirected\endcsname
     = \relax
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @codequoteundirected value `\temp', must be on|off}%
 \fi\fi
}
%
\parseargdef\codequotebacktick{%
 \def\temp{#1}%
 \ifx\temp\onword
   \expandafter\let\csname SETtxicodequotebacktick\endcsname
     = t%
 \else\ifx\temp\offword
   \expandafter\let\csname SETtxicodequotebacktick\endcsname
     = \relax
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @codequotebacktick value `\temp', must be on|off}%
 \fi\fi
}

% [Knuth] pp. 380,381,391, disable Spanish ligatures ?` and !` of \tt font.
\def\noligaturesquoteleft{\relax\lq}

% Count depth in font-changes, for error checks
\newcount\fontdepth \fontdepth=0

% Font commands.

% #1 is the font command (\sl or \it), #2 is the text to slant.
% If we are in a monospaced environment, however, 1) always use \ttsl,
% and 2) do not add an italic correction.
\def\dosmartslant#1#2{%
 \ifusingtt
   {{\ttsl #2}\let\next=\relax}%
   {\def\next{{#1#2}\futurelet\next\smartitaliccorrection}}%
 \next
}
```

```
\def\smartslanted{\dosmartslant\sl}
\def\smartitalic{\dosmartslant\it}

% Output an italic correction unless \next (presumed to be the following
% character) is such as not to need one.
\def\smartitaliccorrection{%
 \ifx\next,%
 \else\ifx\next-%
 \else\ifx\next.%
 \else\ptexslash
 \fi\fi\fi
 \aftersmartic
}

% Unconditional use \ttsl, and no ic.  @var is set to this for defuns.
\def\ttslanted#1{{\ttsl #1}}

% @cite is like \smartslanted except unconditionally use \sl.  We never want
% ttsl for book titles, do we?
\def\cite#1{{\sl #1}\futurelet\next\smartitaliccorrection}

\def\aftersmartic{}
\def\var#1{%
 \let\saveaftersmartic = \aftersmartic
 \def\aftersmartic{\null\let\aftersmartic=\saveaftersmartic}%
 \smartslanted{#1}%
}

\let\i=\smartitalic
\let\slanted=\smartslanted
\let\dfn=\smartslanted
\let\emph=\smartitalic

% Explicit font changes: @r, @sc, undocumented @ii.
\def\r#1{{\rm #1}}              % roman font
\def\sc#1{{\smallcaps#1}}       % smallcaps font
\def\ii#1{{\it #1}}             % italic font

% @b, explicit bold.  Also @strong.
\def\b#1{{\bf #1}}
\let\strong=\b

% @sansserif, explicit sans.
\def\sansserif#1{{\sf #1}}

% We can't just use \exhyphenpenalty, because that only has effect at
% the end of a paragraph.  Restore normal hyphenation at the end of the
% group within which \nohyphenation is presumably called.
```

```
%
\def\nohyphenation{\hyphenchar\font = -1  \aftergroup\restorehyphenation}
\def\restorehyphenation{\hyphenchar\font = `- }

% Set sfcode to normal for the chars that usually have another value.
% Can't use plain's \frenchspacing because it uses the `\x notation, and
% sometimes \x has an active definition that messes things up.
%
\catcode`@=11
 \def\plainfrenchspacing{%
   \sfcode\dotChar  =\@m \sfcode\questChar=\@m \sfcode\exclamChar=\@m
   \sfcode\colonChar=\@m \sfcode\semiChar =\@m \sfcode\commaChar =\@m
   \def\endofsentencespacefactor{1000}% for @. and friends
 }
 \def\plainnonfrenchspacing{%
   \sfcode`\.3000\sfcode`\?3000\sfcode`\!3000
   \sfcode`\:2000\sfcode`\;1500\sfcode`\,1250
   \def\endofsentencespacefactor{3000}% for @. and friends
 }
\catcode`@=\other
\def\endofsentencespacefactor{3000}% default

% @t, explicit typewriter.
\def\t#1{%
 {\tt \rawbackslash \plainfrenchspacing #1}%
 \null
}

% @samp.
\def\samp#1{{\setupmarkupstyle{samp}\lq\tclose{#1}\rq\null}}

% @indicateurl is \samp, that is, with quotes.
\let\indicateurl=\samp

% @code (and similar) prints in typewriter, but with spaces the same
% size as normal in the surrounding text, without hyphenation, etc.
% This is a subroutine for that.
\def\tclose#1{%
 {%
   % Change normal interword space to be same as for the current font.
   \spaceskip = \fontdimen2\font
   %
   % Switch to typewriter.
   \tt
   %
   % But `\ ' produces the large typewriter interword space.
   \def\ {{\spaceskip = 0pt{} }}%
   %
```

```
  % Turn off hyphenation.
  \nohyphenation
  %
  \rawbackslash
  \plainfrenchspacing
  #1%
 }%
 \null % reset spacefactor to 1000
}

% We *must* turn on hyphenation at `-' and `_' in @code.
% Otherwise, it is too hard to avoid overfull hboxes
% in the Emacs manual, the Library manual, etc.
%
% Unfortunately, TeX uses one parameter (\hyphenchar) to control
% both hyphenation at - and hyphenation within words.
% We must therefore turn them both off (\tclose does that)
% and arrange explicitly to hyphenate at a dash.
%  -- rms.
{
 \catcode`\-=\active \catcode`\_=\active
 \catcode`\'=\active \catcode`\`=\active
 \global\let'=\rq \global\let`=\lq  % default definitions
 %
 \global\def\code{\begingroup
  \setupmarkupstyle{code}%
  % The following should really be moved into \setupmarkupstyle handlers.
  \catcode\dashChar=\active  \catcode\underChar=\active
  \ifallowcodebreaks
   \let-\codedash
   \let_\codeunder
  \else
   \let-\normaldash
   \let_\realunder
  \fi
  \codex
 }
}

\def\codex #1{\tclose{#1}\endgroup}

\def\normaldash{-}
\def\codedash{-\discretionary{}{}{}}
\def\codeunder{%
 % this is all so @math{@code{var_name}+1} can work.  In math mode, _
 % is "active" (mathcode"8000) and \normalunderscore (or \char95, etc.)
 % will therefore expand the active definition of _, which is us
 % (inside @code that is), therefore an endless loop.
```

```
 \ifusingtt{\ifmmode
            \mathchar"075F % class 0=ordinary, family 7=ttfam, pos 0x5F=_.
          \else\normalunderscore \fi
          \discretionary{}{}{}}%
         {\_}%
}

% An additional complication: the above will allow breaks after, e.g.,
% each of the four underscores in __typeof__.  This is bad.
% @allowcodebreaks provides a document-level way to turn breaking at -
% and _ on and off.
%
\newif\ifallowcodebreaks  \allowcodebreakstrue

\def\keywordtrue{true}
\def\keywordfalse{false}

\parseargdef\allowcodebreaks{%
 \def\txiarg{#1}%
 \ifx\txiarg\keywordtrue
   \allowcodebreakstrue
 \else\ifx\txiarg\keywordfalse
   \allowcodebreaksfalse
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @allowcodebreaks option `\txiarg', must be true|false}%
 \fi\fi
}

% For @command, @env, @file, @option quotes seem unnecessary,
% so use \code rather than \samp.
\let\command=\code
\let\env=\code
\let\file=\code
\let\option=\code

% @uref (abbreviation for `urlref') takes an optional (comma-separated)
% second argument specifying the text to display and an optional third
% arg as text to display instead of (rather than in addition to) the url
% itself.  First (mandatory) arg is the url.
% (This \urefnobreak definition isn't used now, leaving it for a while
% for comparison.)
\def\urefnobreak#1{\dourefnobreak #1,,,\finish}
\def\dourefnobreak#1,#2,#3,#4\finish{\begingroup
 \unsepspaces
 \pdfurl{#1}%
 \setbox0 = \hbox{\ignorespaces #3}%
 \ifdim\wd0 > 0pt
```

```
  \unhbox0 % third arg given, show only that
 \else
  \setbox0 = \hbox{\ignorespaces #2}%
  \ifdim\wd0 > 0pt
   \ifpdf
    \unhbox0            % PDF: 2nd arg given, show only it
   \else
    \unhbox0\ (\code{#1})% DVI: 2nd arg given, show both it and url
   \fi
  \else
   \code{#1}% only url given, so show it
  \fi
 \fi
 \endlink
\endgroup}

% This \urefbreak definition is the active one.
\def\urefbreak{\begingroup \urefcatcodes \dourefbreak}
\let\uref=\urefbreak
\def\dourefbreak#1{\urefbreakfinish #1,,,\finish}
\def\urefbreakfinish#1,#2,#3,#4\finish{% doesn't work in @example
 \unsepspaces
 \pdfurl{#1}%
 \setbox0 = \hbox{\ignorespaces #3}%
 \ifdim\wd0 > 0pt
  \unhbox0 % third arg given, show only that
 \else
  \setbox0 = \hbox{\ignorespaces #2}%
  \ifdim\wd0 > 0pt
   \ifpdf
    \unhbox0            % PDF: 2nd arg given, show only it
   \else
    \unhbox0\ (\urefcode{#1})% DVI: 2nd arg given, show both it and url
   \fi
  \else
   \urefcode{#1}% only url given, so show it
  \fi
 \fi
 \endlink
\endgroup}

% Allow line breaks around only a few characters (only).
\def\urefcatcodes{%
 \catcode\ampChar=\active   \catcode\dotChar=\active
 \catcode\hashChar=\active  \catcode\questChar=\active
 \catcode\slashChar=\active
}
{
```

```
 \urefcatcodes
 %
 \global\def\urefcode{\begingroup
   \setupmarkupstyle{code}%
   \urefcatcodes
   \let&\urefcodeamp
   \let.\urefcodedot
   \let#\urefcodehash
   \let?\urefcodequest
   \let/\urefcodeslash
   \codex
 }
 %
 % By default, they are just regular characters.
 \global\def&{\normalamp}
 \global\def.{\normaldot}
 \global\def#{\normalhash}
 \global\def?{\normalquest}
 \global\def/{\normalslash}
}

% we put a little stretch before and after the breakable chars, to help
% line breaking of long url's.  The unequal skips make look better in
% cmtt at least, especially for dots.
\def\urefprestretch{\urefprebreak \hskip0pt plus.13em }
\def\urefpoststretch{\urefpostbreak \hskip0pt plus.1em }
%
\def\urefcodeamp{\urefprestretch \&\urefpoststretch}
\def\urefcodedot{\urefprestretch .\urefpoststretch}
\def\urefcodehash{\urefprestretch \#\urefpoststretch}
\def\urefcodequest{\urefprestretch ?\urefpoststretch}
\def\urefcodeslash{\futurelet\next\urefcodeslashfinish}
{
 \catcode`\/=\active
 \global\def\urefcodeslashfinish{%
   \urefprestretch \slashChar
   % Allow line break only after the final / in a sequence of
   % slashes, to avoid line break between the slashes in http://.
   \ifx\next/\else \urefpoststretch \fi
 }
}

% One more complication: by default we'll break after the special
% characters, but some people like to break before the special chars, so
% allow that.  Also allow no breaking at all, for manual control.
%
\parseargdef\urefbreakstyle{%
 \def\txiarg{#1}%
```

```
 \ifx\txiarg\wordnone
   \def\urefprebreak{\nobreak}\def\urefpostbreak{\nobreak}
 \else\ifx\txiarg\wordbefore
   \def\urefprebreak{\allowbreak}\def\urefpostbreak{\nobreak}
 \else\ifx\txiarg\wordafter
   \def\urefprebreak{\nobreak}\def\urefpostbreak{\allowbreak}
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @urefbreakstyle setting `\txiarg'}%
 \fi\fi\fi
}
\def\wordafter{after}
\def\wordbefore{before}
\def\wordnone{none}

\urefbreakstyle after

% @url synonym for @uref, since that's how everyone uses it.
%
\let\url=\uref

% rms does not like angle brackets --karl, 17may97.
% So now @email is just like @uref, unless we are pdf.
%
%\def\email#1{\angleleft{\tt #1}\angleright}
\ifpdf
 \def\email#1{\doemail#1,,\finish}
 \def\doemail#1,#2,#3\finish{\begingroup
   \unsepspaces
   \pdfurl{mailto:#1}%
   \setbox0 = \hbox{\ignorespaces #2}%
   \ifdim\wd0>0pt\unhbox0\else\code{#1}\fi
   \endlink
 \endgroup}
\else
 \let\email=\uref
\fi

% @kbdinputstyle -- arg is `distinct' (@kbd uses slanted tty font always),
%   `example' (@kbd uses ttsl only inside of @example and friends),
%   or `code' (@kbd uses normal tty font always).
\parseargdef\kbdinputstyle{%
 \def\txiarg{#1}%
 \ifx\txiarg\worddistinct
   \gdef\kbdexamplefont{\ttsl}\gdef\kbdfont{\ttsl}%
 \else\ifx\txiarg\wordexample
   \gdef\kbdexamplefont{\ttsl}\gdef\kbdfont{\tt}%
 \else\ifx\txiarg\wordcode
```

```
   \gdef\kbdexamplefont{\tt}\gdef\kbdfont{\tt}%
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @kbdinputstyle setting `\txiarg'}%
 \fi\fi\fi
}
\def\worddistinct{distinct}
\def\wordexample{example}
\def\wordcode{code}

% Default is `distinct'.
\kbdinputstyle distinct

% @kbd is like @code, except that if the argument is just one @key command,
% then @kbd has no effect.
\def\kbd#1{{\def\look{#1}\expandafter\kbdsub\look??\par}}

\def\xkey{\key}
\def\kbdsub#1#2#3\par{%
 \def\one{#1}\def\three{#3}\def\threex{??}%
 \ifx\one\xkey\ifx\threex\three \key{#2}%
 \else{\tclose{\kbdfont\setupmarkupstyle{kbd}\look}}\fi
 \else{\tclose{\kbdfont\setupmarkupstyle{kbd}\look}}\fi
}

% definition of @key that produces a lozenge.  Doesn't adjust to text size.
%\setfont\keyrm\rmshape{8}{1000}{OT1}
%\font\keysy=cmsy9
%\def\key#1{{\keyrm\textfont2=\keysy \leavevmode\hbox{%
%  \raise0.4pt\hbox{\angleleft}\kern-.08em\vtop{%
%    \vbox{\hrule\kern-0.4pt
%     \hbox{\raise0.4pt\hbox{\vphantom{\angleleft}}#1}}%
%    \kern-0.4pt\hrule}%
%  \kern-.06em\raise0.4pt\hbox{\angleright}}}}

% definition of @key with no lozenge.  If the current font is already
% monospace, don't change it; that way, we respect @kbdinputstyle.  But
% if it isn't monospace, then use \tt.
%
\def\key#1{{\setupmarkupstyle{key}%
 \nohyphenation
 \ifmonospace\else\tt\fi
 #1}\null}

% @clicksequence{File @click{} Open ...}
\def\clicksequence#1{\begingroup #1\endgroup}

% @clickstyle @arrow   (by default)
```

```
\parseargdef\clickstyle{\def\click{#1}}
\def\click{\arrow}

% Typeset a dimension, e.g., `in' or `pt'.  The only reason for the
% argument is to make the input look right: @dmn{pt} instead of @dmn{}pt.
%
\def\dmn#1{\thinspace #1}

% @l was never documented to mean ``switch to the Lisp font",
% and it is not used as such in any manual I can find.  We need it for
% Polish suppressed-l.  --karl, 22sep96.
%\def\l#1{{\li #1}\null}

% @acronym for "FBI", "NATO", and the like.
% We print this one point size smaller, since it's intended for
% all-uppercase.
%
\def\acronym#1{\doacronym #1,,\finish}
\def\doacronym#1,#2,#3\finish{%
 {\selectfonts\lsize #1}%
 \def\temp{#2}%
 \ifx\temp\empty \else
   \space ({\unsepspaces \ignorespaces \temp \unskip})%
 \fi
 \null % reset \spacefactor=1000
}

% @abbr for "Comput. J." and the like.
% No font change, but don't do end-of-sentence spacing.
%
\def\abbr#1{\doabbr #1,,\finish}
\def\doabbr#1,#2,#3\finish{%
 {\plainfrenchspacing #1}%
 \def\temp{#2}%
 \ifx\temp\empty \else
   \space ({\unsepspaces \ignorespaces \temp \unskip})%
 \fi
 \null % reset \spacefactor=1000
}

% @asis just yields its argument.  Used with @table, for example.
%
\def\asis#1{#1}

% @math outputs its argument in math mode.
%
% One complication: _ usually means subscripts, but it could also mean
% an actual _ character, as in @math{@var{some_variable} + 1}.  So make
```

```
% _ active, and distinguish by seeing if the current family is \slfam,
% which is what @var uses.
{
 \catcode`\_ = \active
 \gdef\mathunderscore{%
   \catcode`\_=\active
   \def_{\ifnum\fam=\slfam \_\else\sb\fi}%
 }
}
% Another complication: we want \\ (and @\) to output a math (or tt) \.
% FYI, plain.tex uses \\ as a temporary control sequence (for no
% particular reason), but this is not advertised and we don't care.
%
% The \mathchar is class=0=ordinary, family=7=ttfam, position=5C=\.
\def\mathbackslash{\ifnum\fam=\ttfam \mathchar"075C \else\backslash \fi}
%
\def\math{%
 \tex
 \mathunderscore
 \let\\ = \mathbackslash
 \mathactive
 % make the texinfo accent commands work in math mode
 \let\"=\ddot
 \let\'=\acute
 \let\==\bar
 \let\^=\hat
 \let\`=\grave
 \let\u=\breve
 \let\v=\check
 \let\~=\tilde
 \let\dotaccent=\dot
 $\finishmath
}
\def\finishmath#1{#1$\endgroup}  % Close the group opened by \tex.

% Some active characters (such as <) are spaced differently in math.
% We have to reset their definitions in case the @math was an argument
% to a command which sets the catcodes (such as @item or @section).
%
{
 \catcode`^ = \active
 \catcode`< = \active
 \catcode`> = \active
 \catcode`+ = \active
 \catcode`' = \active
 \gdef\mathactive{%
   \let^ = \ptexhat
   \let< = \ptexless
```

```
   \let> = \ptexgtr
   \let+ = \ptexplus
   \let' = \ptexquoteright
 }
}

% ctrl is no longer a Texinfo command, but leave this definition for fun.
\def\ctrl #1{{\tt \rawbackslash \hat}#1}

% @inlinefmt{FMTNAME,PROCESSED-TEXT} and @inlineraw{FMTNAME,RAW-TEXT}.
% Ignore unless FMTNAME == tex; then it is like @iftex and @tex,
% except specified as a normal braced arg, so no newlines to worry about.
%
\def\outfmtnametex{tex}
%
\long\def\inlinefmt#1{\doinlinefmt #1,\finish}
\long\def\doinlinefmt#1,#2,\finish{%
 \def\inlinefmtname{#1}%
 \ifx\inlinefmtname\outfmtnametex \ignorespaces #2\fi
}
% For raw, must switch into @tex before parsing the argument, to avoid
% setting catcodes prematurely.  Doing it this way means that, for
% example, @inlineraw{html, foo{bar} gets a parse error instead of being
% ignored.  But this isn't important because if people want a literal
% *right* brace they would have to use a command anyway, so they may as
% well use a command to get a left brace too.  We could re-use the
% delimiter character idea from \verb, but it seems like overkill.
%
\long\def\inlineraw{\tex \doinlineraw}
\long\def\doinlineraw#1{\doinlinerawtwo #1,\finish}
\def\doinlinerawtwo#1,#2,\finish{%
 \def\inlinerawname{#1}%
 \ifx\inlinerawname\outfmtnametex \ignorespaces #2\fi
 \endgroup % close group opened by \tex.
}


\message{glyphs,}
% and logos.

% @@ prints an @, as does @atchar{}.
\def\@{\char64 }
\let\atchar=\@

% @{ @} @lbracechar{} @rbracechar{} all generate brace characters.
% Unless we're in typewriter, use \ecfont because the CM text fonts do
% not have braces, and we don't want to switch into math.
\def\mylbrace{{\ifmonospace\else\ecfont\fi \char123}}
```

```
\def\myrbrace{{\ifmonospace\else\ecfont\fi \char125}}
\let\{=\mylbrace \let\lbracechar=\{
\let\}=\myrbrace \let\rbracechar=\}
\begingroup
 % Definitions to produce \{ and \} commands for indices,
 % and @{ and @} for the aux/toc files.
 \catcode`\{ = \other \catcode`\} = \other
 \catcode`\[ = 1 \catcode`\] = 2
 \catcode`\! = 0 \catcode`\\ = \other
 !gdef!lbracecmd[\{]%
 !gdef!rbracecmd[\}]%
 !gdef!lbraceatcmd[@{]%
 !gdef!rbraceatcmd[@}]%
!endgroup

% @comma{} to avoid , parsing problems.
\let\comma = ,

% Accents: @, @dotaccent @ringaccent @ubaraccent @udotaccent
% Others are defined by plain TeX: @` @' @" @^ @~ @= @u @v @H.
\let\, = \ptexc
\let\dotaccent = \ptexdot
\def\ringaccent#1{{\accent23 #1}}
\let\tieaccent = \ptext
\let\ubaraccent = \ptexb
\let\udotaccent = \d

% Other special characters: @questiondown @exclamdown @ordf @ordm
% Plain TeX defines: @AA @AE @O @OE @L (plus lowercase versions) @ss.
\def\questiondown{?`}
\def\exclamdown{!`}
\def\ordf{\leavevmode\raise1ex\hbox{\selectfonts\lllsize \underbar{a}}}
\def\ordm{\leavevmode\raise1ex\hbox{\selectfonts\lllsize \underbar{o}}}

% Dotless i and dotless j, used for accents.
\def\imacro{i}
\def\jmacro{j}
\def\dotless#1{%
 \def\temp{#1}%
 \ifx\temp\imacro \ifmmode\imath \else\ptexi \fi
 \else\ifx\temp\jmacro \ifmmode\jmath \else\j \fi
 \else \errmessage{@dotless can be used only with i or j}%
 \fi\fi
}

% The \TeX{} logo, as in plain, but resetting the spacing so that a
% period following counts as ending a sentence.  (Idea found in latex.)
%
```

```
\edef\TeX{\TeX \spacefactor=1000 }

% @LaTeX{} logo.  Not quite the same results as the definition in
% latex.ltx, since we use a different font for the raised A; it's most
% convenient for us to use an explicitly smaller font, rather than using
% the \scriptstyle font (since we don't reset \scriptstyle and
% \scriptscriptstyle).
%
\def\LaTeX{%
 L\kern-.36em
 {\setbox0=\hbox{T}%
  \vbox to \ht0{\hbox{%
    \ifx\textnominalsize\xwordpt
      % for 10pt running text, \lllsize (8pt) is too small for the A in LaTeX.
      % Revert to plain's \scriptsize, which is 7pt.
      \count255=\the\fam $\fam\count255 \scriptstyle A$%
    \else
      % For 11pt, we can use our lllsize.
      \selectfonts\lllsize A%
    \fi
    }%
    \vss
 }}%
 \kern-.15em
 \TeX
}

% Some math mode symbols.
\def\bullet{$\ptexbullet$}
\def\geq{\ifmmode \ge\else $\ge$\fi}
\def\leq{\ifmmode \le\else $\le$\fi}
\def\minus{\ifmmode -\else $-$\fi}

% @dots{} outputs an ellipsis using the current font.
% We do .5em per period so that it has the same spacing in the cm
% typewriter fonts as three actual period characters; on the other hand,
% in other typewriter fonts three periods are wider than 1.5em.  So do
% whichever is larger.
%
\def\dots{%
 \leavevmode
 \setbox0=\hbox{...}% get width of three periods
 \ifdim\wd0 > 1.5em
   \dimen0 = \wd0
 \else
   \dimen0 = 1.5em
 \fi
 \hbox to \dimen0{%
```

```
   \hskip 0pt plus.25fil
   .\hskip 0pt plus1fil
   .\hskip 0pt plus1fil
   .\hskip 0pt plus.5fil
 }%
}

% @enddots{} is an end-of-sentence ellipsis.
%
\def\enddots{%
 \dots
 \spacefactor=\endofsentencespacefactor
}

% @point{}, @result{}, @expansion{}, @print{}, @equiv{}.
%
% Since these characters are used in examples, they should be an even number of
% \tt widths. Each \tt character is 1en, so two makes it 1em.
%
\def\point{$\star$}
\def\arrow{\leavevmode\raise.05ex\hbox to 1em{\hfil$\rightarrow$\hfil}}
\def\result{\leavevmode\raise.05ex\hbox to 1em{\hfil$\Rightarrow$\hfil}}
\def\expansion{\leavevmode\hbox to 1em{\hfil$\mapsto$\hfil}}
\def\print{\leavevmode\lower.1ex\hbox to 1em{\hfil$\dashv$\hfil}}
\def\equiv{\leavevmode\hbox to 1em{\hfil$\ptexequiv$\hfil}}

% The @error{} command.
% Adapted from the TeXbook's \boxit.
%
\newbox\errorbox
%
{\tentt \global\dimen0 = 3em}% Width of the box.
\dimen2 = .55pt % Thickness of rules
% The text. (`r' is open on the right, `e' somewhat less so on the left.)
\setbox0 = \hbox{\kern-.75pt \reducedsf \putworderror\kern-1.5pt}
%
\setbox\errorbox=\hbox to \dimen0{\hfil
  \hsize = \dimen0 \advance\hsize by -5.8pt % Space to left+right.
  \advance\hsize by -2\dimen2 % Rules.
  \vbox{%
    \hrule height\dimen2
    \hbox{\vrule width\dimen2 \kern3pt          % Space to left of text.
      \vtop{\kern2.4pt \box0 \kern2.4pt}% Space above/below.
      \kern3pt\vrule width\dimen2}% Space to right.
    \hrule height\dimen2}
  \hfil}
%
\def\error{\leavevmode\lower.7ex\copy\errorbox}
```

```
% @pounds{} is a sterling sign, which Knuth put in the CM italic font.
%
\def\pounds{{\it\$}}

% @euro{} comes from a separate font, depending on the current style.
% We use the free feym* fonts from the eurosym package by Henrik
% Theiling, which support regular, slanted, bold and bold slanted (and
% "outlined" (blackboard board, sort of) versions, which we don't need).
% It is available from http://www.ctan.org/tex-archive/fonts/eurosym.
%
% Although only regular is the truly official Euro symbol, we ignore
% that.  The Euro is designed to be slightly taller than the regular
% font height.
%
% feymr - regular
% feymo - slanted
% feybr - bold
% feybo - bold slanted
%
% There is no good (free) typewriter version, to my knowledge.
% A feymr10 euro is ~7.3pt wide, while a normal cmtt10 char is ~5.25pt wide.
% Hmm.
%
% Also doesn't work in math.  Do we need to do math with euro symbols?
% Hope not.
%
%
\def\euro{{\eurofont e}}
\def\eurofont{%
 % We set the font at each command, rather than predefining it in
 % \textfonts and the other font-switching commands, so that
 % installations which never need the symbol don't have to have the
 % font installed.
 %
 % There is only one designed size (nominal 10pt), so we always scale
 % that to the current nominal size.
 %
 % By the way, simply using "at 1em" works for cmr10 and the like, but
 % does not work for cmbx10 and other extended/shrunken fonts.
 %
 \def\eurosize{\csname\curfontsize nominalsize\endcsname}%
 %
 \ifx\curfontstyle\bfstylename
   % bold:
   \font\thiseurofont = \ifusingit{feybo10}{feybr10} at \eurosize
 \else
   % regular:
```

```
  \font\thiseurofont = \ifusingit{feymo10}{feymr10} at \eurosize
 \fi
 \thiseurofont
}

% Glyphs from the EC fonts.  We don't use \let for the aliases, because
% sometimes we redefine the original macro, and the alias should reflect
% the redefinition.
%
% Use LaTeX names for the Icelandic letters.
\def\DH{{\ecfont \char"D0}} % Eth
\def\dh{{\ecfont \char"F0}} % eth
\def\TH{{\ecfont \char"DE}} % Thorn
\def\th{{\ecfont \char"FE}} % thorn
%
\def\guillemetleft{{\ecfont \char"13}}
\def\guillemotleft{\guillemetleft}
\def\guillemetright{{\ecfont \char"14}}
\def\guillemotright{\guillemetright}
\def\guilsinglleft{{\ecfont \char"0E}}
\def\guilsinglright{{\ecfont \char"0F}}
\def\quotedblbase{{\ecfont \char"12}}
\def\quotesinglbase{{\ecfont \char"0D}}
%
% This positioning is not perfect (see the ogonek LaTeX package), but
% we have the precomposed glyphs for the most common cases.  We put the
% tests to use those glyphs in the single \ogonek macro so we have fewer
% dummy definitions to worry about for index entries, etc.
%
% ogonek is also used with other letters in Lithuanian (IOU), but using
% the precomposed glyphs for those is not so easy since they aren't in
% the same EC font.
\def\ogonek#1{{%
 \def\temp{#1}%
 \ifx\temp\macrocharA\Aogonek
 \else\ifx\temp\macrochara\aogonek
 \else\ifx\temp\macrocharE\Eogonek
 \else\ifx\temp\macrochare\eogonek
 \else
  \ecfont \setbox0=\hbox{#1}%
  \ifdim\ht0=1ex\accent"0C #1%
  \else\ooalign{\unhbox0\crcr\hidewidth\char"0C \hidewidth}%
  \fi
 \fi\fi\fi\fi
 }%
}
\def\Aogonek{{\ecfont \char"81}}\def\macrocharA{A}
\def\aogonek{{\ecfont \char"A1}}\def\macrochara{a}
```

```
\def\Eogonek{{\ecfont \char"86}}\def\macrocharE{E}
\def\eogonek{{\ecfont \char"A6}}\def\macrochare{e}
%
% Use the ec* fonts (cm-super in outline format) for non-CM glyphs.
\def\ecfont{%
 % We can't distinguish serif/sans and italic/slanted, but this
 % is used for crude hacks anyway (like adding French and German
 % quotes to documents typeset with CM, where we lose kerning), so
 % hopefully nobody will notice/care.
 \edef\ecsize{\csname\curfontsize ecsize\endcsname}%
 \edef\nominalsize{\csname\curfontsize nominalsize\endcsname}%
 \ifmonospace
   % typewriter:
   \font\thisecfont = ectt\ecsize \space at \nominalsize
 \else
   \ifx\curfontstyle\bfstylename
     % bold:
     \font\thisecfont = ecb\ifusingit{i}{x}\ecsize \space at \nominalsize
   \else
     % regular:
     \font\thisecfont = ec\ifusingit{ti}{rm}\ecsize \space at \nominalsize
   \fi
 \fi
 \thisecfont
}

% @registeredsymbol - R in a circle.  The font for the R should really
% be smaller yet, but lllsize is the best we can do for now.
% Adapted from the plain.tex definition of \copyright.
%
\def\registeredsymbol{%
 $^{{\ooalign{\hfil\raise.07ex\hbox{\selectfonts\lllsize R}%
            \hfil\crcr\Orb}}%
   }$%
}

% @textdegree - the normal degrees sign.
%
\def\textdegree{$^\circ$}

% Laurent Siebenmann reports \Orb undefined with:
%  Textures 1.7.7 (preloaded format=plain 93.10.14)  (68K)  16 APR 2004 02:38
% so we'll define it if necessary.
%
\ifx\Orb\thisisundefined
\def\Orb{\mathhexbox20D}
\fi
```

```
% Quotes.
\chardef\quotedblleft="5C
\chardef\quotedblright=`\"
\chardef\quoteleft=`\`
\chardef\quoteright=`\'


\message{page headings,}

\newskip\titlepagetopglue \titlepagetopglue = 1.5in
\newskip\titlepagebottomglue \titlepagebottomglue = 2pc

% First the title page.  Must do @settitle before @titlepage.
\newif\ifseenauthor
\newif\iffinishedtitlepage

% Do an implicit @contents or @shortcontents after @end titlepage if the
% user says @setcontentsaftertitlepage or @setshortcontentsaftertitlepage.
%
\newif\ifsetcontentsaftertitlepage
\let\setcontentsaftertitlepage = \setcontentsaftertitlepagetrue
\newif\ifsetshortcontentsaftertitlepage
\let\setshortcontentsaftertitlepage = \setshortcontentsaftertitlepagetrue

\parseargdef\shorttitlepage{%
 \begingroup \hbox{}\vskip 1.5in \chaprm \centerline{#1}%
 \endgroup\page\hbox{}\page}

\envdef\titlepage{%
 % Open one extra group, as we want to close it in the middle of \Etitlepage.
 \begingroup
   \parindent=0pt \textfonts
   % Leave some space at the very top of the page.
   \vglue\titlepagetopglue
   % No rule at page bottom unless we print one at the top with @title.
   \finishedtitlepagetrue
   %
   % Most title ``pages'' are actually two pages long, with space
   % at the top of the second.  We don't want the ragged left on the second.
   \let\oldpage = \page
   \def\page{%
     \iffinishedtitlepage\else
  \finishtitlepage
     \fi
     \let\page = \oldpage
     \page
     \null
   }%
```

```
}

\def\Etitlepage{%
  \iffinishedtitlepage\else
 \finishtitlepage
  \fi
  % It is important to do the page break before ending the group,
  % because the headline and footline are only empty inside the group.
  % If we use the new definition of \page, we always get a blank page
  % after the title page, which we certainly don't want.
  \oldpage
 \endgroup
 %
 % Need this before the \...aftertitlepage checks so that if they are
 % in effect the toc pages will come out with page numbers.
 \HEADINGSon
 %
 % If they want short, they certainly want long too.
 \ifsetshortcontentsaftertitlepage
  \shortcontents
  \contents
  \global\let\shortcontents = \relax
  \global\let\contents = \relax
 \fi
 %
 \ifsetcontentsaftertitlepage
  \contents
  \global\let\contents = \relax
  \global\let\shortcontents = \relax
 \fi
}

\def\finishtitlepage{%
 \vskip4pt \hrule height 2pt width \hsize
 \vskip\titlepagebottomglue
 \finishedtitlepagetrue
}

% Settings used for typesetting titles: no hyphenation, no indentation,
% don't worry much about spacing, ragged right.  This should be used
% inside a \vbox, and fonts need to be set appropriately first.  Because
% it is always used for titles, nothing else, we call \rmisbold.  \par
% should be specified before the end of the \vbox, since a vbox is a group.
%
\def\raggedtitlesettings{%
 \rmisbold
 \hyphenpenalty=10000
 \parindent=0pt
```

```
 \tolerance=5000
 \ptexraggedright
}

% Macros to be used within @titlepage:

\let\subtitlerm=\tenrm
\def\subtitlefont{\subtitlerm \normalbaselineskip = 13pt \normalbaselines}

\parseargdef\title{%
 \checkenv\titlepage
 \vbox{\titlefonts \raggedtitlesettings #1\par}%
 % print a rule at the page bottom also.
 \finishedtitlepagefalse
 \vskip4pt \hrule height 4pt width \hsize \vskip4pt
}

\parseargdef\subtitle{%
 \checkenv\titlepage
 {\subtitlefont \rightline{#1}}%
}

% @author should come last, but may come many times.
% It can also be used inside @quotation.
%
\parseargdef\author{%
 \def\temp{\quotation}%
 \ifx\thisenv\temp
   \def\quotationauthor{#1}% printed in \Equotation.
 \else
   \checkenv\titlepage
   \ifseenauthor\else \vskip 0pt plus 1filll \seenauthortrue \fi
   {\secfonts\rmisbold \leftline{#1}}%
 \fi
}


% Set up page headings and footings.

\let\thispage=\folio

\newtoks\evenheadline    % headline on even pages
\newtoks\oddheadline     % headline on odd pages
\newtoks\evenfootline    % footline on even pages
\newtoks\oddfootline     % footline on odd pages

% Now make TeX use those variables
\headline={{\textfonts\rm \ifodd\pageno \the\oddheadline
```

```
                    \else \the\evenheadline \fi}}
\footline={{\textfonts\rm \ifodd\pageno \the\oddfootline
                    \else \the\evenfootline \fi}\HEADINGShook}
\let\HEADINGShook=\relax

% Commands to set those variables.
% For example, this is what  @headings on  does
% @evenheading @thistitle|@thispage|@thischapter
% @oddheading @thischapter|@thispage|@thistitle
% @evenfooting @thisfile||
% @oddfooting ||@thisfile


\def\evenheading{\parsearg\evenheadingxxx}
\def\evenheadingxxx #1{\evenheadingyyy #1\|\|\|\|\finish}
\def\evenheadingyyy #1\|#2\|#3\|#4\finish{%
\global\evenheadline={\rlap{\centerline{#2}}\line{#1\hfil#3}}}

\def\oddheading{\parsearg\oddheadingxxx}
\def\oddheadingxxx #1{\oddheadingyyy #1\|\|\|\|\finish}
\def\oddheadingyyy #1\|#2\|#3\|#4\finish{%
\global\oddheadline={\rlap{\centerline{#2}}\line{#1\hfil#3}}}

\parseargdef\everyheading{\oddheadingxxx{#1}\evenheadingxxx{#1}}%

\def\evenfooting{\parsearg\evenfootingxxx}
\def\evenfootingxxx #1{\evenfootingyyy #1\|\|\|\|\finish}
\def\evenfootingyyy #1\|#2\|#3\|#4\finish{%
\global\evenfootline={\rlap{\centerline{#2}}\line{#1\hfil#3}}}

\def\oddfooting{\parsearg\oddfootingxxx}
\def\oddfootingxxx #1{\oddfootingyyy #1\|\|\|\|\finish}
\def\oddfootingyyy #1\|#2\|#3\|#4\finish{%
 \global\oddfootline = {\rlap{\centerline{#2}}\line{#1\hfil#3}}%
 %
 % Leave some space for the footline.  Hopefully ok to assume
 % @evenfooting will not be used by itself.
 \global\advance\pageheight by -12pt
 \global\advance\vsize by -12pt
}

\parseargdef\everyfooting{\oddfootingxxx{#1}\evenfootingxxx{#1}}

% @evenheadingmarks top     \thischapter <- chapter at the top of a page
% @evenheadingmarks bottom  \thischapter <- chapter at the bottom of a page
%
% The same set of arguments for:
%
```

```
% @oddheadingmarks
% @evenfootingmarks
% @oddfootingmarks
% @everyheadingmarks
% @everyfootingmarks

\def\evenheadingmarks{\headingmarks{even}{heading}}
\def\oddheadingmarks{\headingmarks{odd}{heading}}
\def\evenfootingmarks{\headingmarks{even}{footing}}
\def\oddfootingmarks{\headingmarks{odd}{footing}}
\def\everyheadingmarks#1 {\headingmarks{even}{heading}{#1}
                    \headingmarks{odd}{heading}{#1} }
\def\everyfootingmarks#1 {\headingmarks{even}{footing}{#1}
                    \headingmarks{odd}{footing}{#1} }
% #1 = even/odd, #2 = heading/footing, #3 = top/bottom.
\def\headingmarks#1#2#3 {%
 \expandafter\let\expandafter\temp \csname get#3headingmarks\endcsname
 \global\expandafter\let\csname get#1#2marks\endcsname \temp
}

\everyheadingmarks bottom
\everyfootingmarks bottom

% @headings double      turns headings on for double-sided printing.
% @headings single      turns headings on for single-sided printing.
% @headings off         turns them off.
% @headings on          same as @headings double, retained for compatibility.
% @headings after       turns on double-sided headings after this page.
% @headings doubleafter turns on double-sided headings after this page.
% @headings singleafter turns on single-sided headings after this page.
% By default, they are off at the start of a document,
% and turned `on' after @end titlepage.

\def\headings #1 {\csname HEADINGS#1\endcsname}

\def\headingsoff{% non-global headings elimination
 \evenheadline={\hfil}\evenfootline={\hfil}%
  \oddheadline={\hfil}\oddfootline={\hfil}%
}

\def\HEADINGSoff{{\globaldefs=1 \headingsoff}} % global setting
\HEADINGSoff  % it's the default

% When we turn headings on, set the page number to 1.
% For double-sided printing, put current file name in lower left corner,
% chapter name on inside top of right hand pages, document
% title on inside top of left hand pages, and page numbers on outside top
% edge of all pages.
```

```
\def\HEADINGSdouble{%
\global\pageno=1
\global\evenfootline={\hfil}
\global\oddfootline={\hfil}
\global\evenheadline={\line{\folio\hfil\thistitle}}
\global\oddheadline={\line{\thischapter\hfil\folio}}
\global\let\contentsalignmacro = \chapoddpage
}
\let\contentsalignmacro = \chappager

% For single-sided printing, chapter title goes across top left of page,
% page number on top right.
\def\HEADINGSsingle{%
\global\pageno=1
\global\evenfootline={\hfil}
\global\oddfootline={\hfil}
\global\evenheadline={\line{\thischapter\hfil\folio}}
\global\oddheadline={\line{\thischapter\hfil\folio}}
\global\let\contentsalignmacro = \chappager
}
\def\HEADINGSon{\HEADINGSdouble}

\def\HEADINGSafter{\let\HEADINGShook=\HEADINGSdoublex}
\let\HEADINGSdoubleafter=\HEADINGSafter
\def\HEADINGSdoublex{%
\global\evenfootline={\hfil}
\global\oddfootline={\hfil}
\global\evenheadline={\line{\folio\hfil\thistitle}}
\global\oddheadline={\line{\thischapter\hfil\folio}}
\global\let\contentsalignmacro = \chapoddpage
}

\def\HEADINGSsingleafter{\let\HEADINGShook=\HEADINGSsinglex}
\def\HEADINGSsinglex{%
\global\evenfootline={\hfil}
\global\oddfootline={\hfil}
\global\evenheadline={\line{\thischapter\hfil\folio}}
\global\oddheadline={\line{\thischapter\hfil\folio}}
\global\let\contentsalignmacro = \chappager
}

% Subroutines used in generating headings
% This produces Day Month Year style of output.
% Only define if not already defined, in case a txi-??.tex file has set
% up a different format (e.g., txi-cs.tex does this).
\ifx\today\thisisundefined
\def\today{%
 \number\day\space
```

```
 \ifcase\month
 \or\putwordMJan\or\putwordMFeb\or\putwordMMar\or\putwordMApr
 \or\putwordMMay\or\putwordMJun\or\putwordMJul\or\putwordMAug
 \or\putwordMSep\or\putwordMOct\or\putwordMNov\or\putwordMDec
 \fi
 \space\number\year}
\fi

% @settitle line...  specifies the title of the document, for headings.
% It generates no output of its own.
\def\thistitle{\putwordNoTitle}
\def\settitle{\parsearg{\gdef\thistitle}}


\message{tables,}
% Tables -- @table, @ftable, @vtable, @item(x).

% default indentation of table text
\newdimen\tableindent \tableindent=.8in
% default indentation of @itemize and @enumerate text
\newdimen\itemindent  \itemindent=.3in
% margin between end of table item and start of table text.
\newdimen\itemmargin  \itemmargin=.1in

% used internally for \itemindent minus \itemmargin
\newdimen\itemmax

% Note @table, @ftable, and @vtable define @item, @itemx, etc., with
% these defs.
% They also define \itemindex
% to index the item name in whatever manner is desired (perhaps none).

\newif\ifitemxneedsnegativevskip

\def\itemxpar{\par\ifitemxneedsnegativevskip\nobreak\vskip-\parskip\nobreak\fi}

\def\internalBitem{\smallbreak \parsearg\itemzzz}
\def\internalBitemx{\itemxpar \parsearg\itemzzz}

\def\itemzzz #1{\begingroup %
 \advance\hsize by -\rightskip
 \advance\hsize by -\tableindent
 \setbox0=\hbox{\itemindicate{#1}}%
 \itemindex{#1}%
 \nobreak % This prevents a break before @itemx.
 %
 % If the item text does not fit in the space we have, put it on a line
 % by itself, and do not allow a page break either before or after that
```

```
% line.  We do not start a paragraph here because then if the next
% command is, e.g., @kindex, the whatsit would get put into the
% horizontal list on a line by itself, resulting in extra blank space.
\ifdim \wd0>\itemmax
  %
  % Make this a paragraph so we get the \parskip glue and wrapping,
  % but leave it ragged-right.
  \begingroup
    \advance\leftskip by-\tableindent
    \advance\hsize by\tableindent
    \advance\rightskip by0pt plus1fil\relax
    \leavevmode\unhbox0\par
  \endgroup
  %
  % We're going to be starting a paragraph, but we don't want the
  % \parskip glue -- logically it's part of the @item we just started.
  \nobreak \vskip-\parskip
  %
  % Stop a page break at the \parskip glue coming up.  However, if
  % what follows is an environment such as @example, there will be no
  % \parskip glue; then the negative vskip we just inserted would
  % cause the example and the item to crash together.  So we use this
  % bizarre value of 10001 as a signal to \aboveenvbreak to insert
  % \parskip glue after all.  Section titles are handled this way also.
  %
  \penalty 10001
  \endgroup
  \itemxneedsnegativevskipfalse
\else
  % The item text fits into the space.  Start a paragraph, so that the
  % following text (if any) will end up on the same line.
  \noindent
  % Do this with kerns and \unhbox so that if there is a footnote in
  % the item text, it can migrate to the main vertical list and
  % eventually be printed.
  \nobreak\kern-\tableindent
  \dimen0 = \itemmax  \advance\dimen0 by \itemmargin \advance\dimen0 by -\wd0
  \unhbox0
  \nobreak\kern\dimen0
  \endgroup
  \itemxneedsnegativevskiptrue
\fi
}

\def\item{\errmessage{@item while not in a list environment}}
\def\itemx{\errmessage{@itemx while not in a list environment}}

% @table, @ftable, @vtable.
```

```
\envdef\table{%
 \let\itemindex\gobble
 \tablecheck{table}%
}
\envdef\ftable{%
 \def\itemindex ##1{\doind {fn}{\code{##1}}}%
 \tablecheck{ftable}%
}
\envdef\vtable{%
 \def\itemindex ##1{\doind {vr}{\code{##1}}}%
 \tablecheck{vtable}%
}
\def\tablecheck#1{%
 \ifnum \the\catcode`\^^M=\active
   \endgroup
   \errmessage{This command won't work in this context; perhaps the problem is
     that we are \inenvironment\thisenv}%
   \def\next{\doignore{#1}}%
 \else
   \let\next\tablex
 \fi
 \next
}
\def\tablex#1{%
 \def\itemindicate{#1}%
 \parsearg\tabley
}
\def\tabley#1{%
 {%
   \makevalueexpandable
   \edef\temp{\noexpand\tablez #1\space\space\space}%
   \expandafter
 }\temp \endtablez
}
\def\tablez #1 #2 #3 #4\endtablez{%
 \aboveenvbreak
 \ifnum 0#1>0 \advance \leftskip by #1\mil \fi
 \ifnum 0#2>0 \tableindent=#2\mil \fi
 \ifnum 0#3>0 \advance \rightskip by #3\mil \fi
 \itemmax=\tableindent
 \advance \itemmax by -\itemmargin
 \advance \leftskip by \tableindent
 \exdentamount=\tableindent
 \parindent = 0pt
 \parskip = \smallskipamount
 \ifdim \parskip=0pt \parskip=2pt \fi
 \let\item = \internalBitem
 \let\itemx = \internalBitemx
```

```
}
\def\Etable{\endgraf\afterenvbreak}
\let\Eftable\Etable
\let\Evtable\Etable
\let\Eitemize\Etable
\let\Eenumerate\Etable

% This is the counter used by @enumerate, which is really @itemize

\newcount \itemno

\envdef\itemize{\parsearg\doitemize}

\def\doitemize#1{%
 \aboveenvbreak
 \itemmax=\itemindent
 \advance\itemmax by -\itemmargin
 \advance\leftskip by \itemindent
 \exdentamount=\itemindent
 \parindent=0pt
 \parskip=\smallskipamount
 \ifdim\parskip=0pt \parskip=2pt \fi
 %
 % Try typesetting the item mark that if the document erroneously says
 % something like @itemize @samp (intending @table), there's an error
 % right away at the @itemize.  It's not the best error message in the
 % world, but it's better than leaving it to the @item.  This means if
 % the user wants an empty mark, they have to say @w{} not just @w.
 \def\itemcontents{#1}%
 \setbox0 = \hbox{\itemcontents}%
 %
 % @itemize with no arg is equivalent to @itemize @bullet.
 \ifx\itemcontents\empty\def\itemcontents{\bullet}\fi
 %
 \let\item=\itemizeitem
}

% Definition of @item while inside @itemize and @enumerate.
%
\def\itemizeitem{%
 \advance\itemno by 1  % for enumerations
 {\let\par=\endgraf \smallbreak}% reasonable place to break
 {%
  % If the document has an @itemize directly after a section title, a
  % \nobreak will be last on the list, and \sectionheading will have
  % done a \vskip-\parskip.  In that case, we don't want to zero
  % parskip, or the item text will crash with the heading.  On the
  % other hand, when there is normal text preceding the item (as there
```

```
  % usually is), we do want to zero parskip, or there would be too much
  % space.  In that case, we won't have a \nobreak before.  At least
  % that's the theory.
  \ifnum\lastpenalty<10000 \parskip=0in \fi
  \noindent
  \hbox to 0pt{\hss \itemcontents \kern\itemmargin}%
  %
  \vadjust{\penalty 1200}}% not good to break after first line of item.
 \flushcr
}

% \splitoff TOKENS\endmark defines \first to be the first token in
% TOKENS, and \rest to be the remainder.
%
\def\splitoff#1#2\endmark{\def\first{#1}\def\rest{#2}}%

% Allow an optional argument of an uppercase letter, lowercase letter,
% or number, to specify the first label in the enumerated list.  No
% argument is the same as `1'.
%
\envparseargdef\enumerate{\enumeratey #1  \endenumeratey}
\def\enumeratey #1 #2\endenumeratey{%
 % If we were given no argument, pretend we were given `1'.
 \def\thearg{#1}%
 \ifx\thearg\empty \def\thearg{1}\fi
 %
 % Detect if the argument is a single token.  If so, it might be a
 % letter.  Otherwise, the only valid thing it can be is a number.
 % (We will always have one token, because of the test we just made.
 % This is a good thing, since \splitoff doesn't work given nothing at
 % all -- the first parameter is undelimited.)
 \expandafter\splitoff\thearg\endmark
 \ifx\rest\empty
   % Only one token in the argument.  It could still be anything.
   % A ``lowercase letter" is one whose \lccode is nonzero.
   % An ``uppercase letter" is one whose \lccode is both nonzero, and
   %   not equal to itself.
   % Otherwise, we assume it's a number.
   %
   % We need the \relax at the end of the \ifnum lines to stop TeX from
   % continuing to look for a <number>.
   %
   \ifnum\lccode\expandafter`\thearg=0\relax
     \numericenumerate % a number (we hope)
   \else
     % It's a letter.
     \ifnum\lccode\expandafter`\thearg=\expandafter`\thearg\relax
       \lowercaseenumerate % lowercase letter
```

```
    \else
      \uppercaseenumerate % uppercase letter
    \fi
  \fi
 \else
  % Multiple tokens in the argument.  We hope it's a number.
  \numericenumerate
 \fi
}

% An @enumerate whose labels are integers.  The starting integer is
% given in \thearg.
%
\def\numericenumerate{%
 \itemno = \thearg
 \startenumeration{\the\itemno}%
}

% The starting (lowercase) letter is in \thearg.
\def\lowercaseenumerate{%
 \itemno = \expandafter`\thearg
 \startenumeration{%
  % Be sure we're not beyond the end of the alphabet.
  \ifnum\itemno=0
    \errmessage{No more lowercase letters in @enumerate; get a bigger
              alphabet}%
  \fi
  \char\lccode\itemno
 }%
}

% The starting (uppercase) letter is in \thearg.
\def\uppercaseenumerate{%
 \itemno = \expandafter`\thearg
 \startenumeration{%
  % Be sure we're not beyond the end of the alphabet.
  \ifnum\itemno=0
    \errmessage{No more uppercase letters in @enumerate; get a bigger
              alphabet}
  \fi
  \char\uccode\itemno
 }%
}

% Call \doitemize, adding a period to the first argument and supplying the
% common last two arguments.  Also subtract one from the initial value in
% \itemno, since @item increments \itemno.
%
```

```
\def\startenumeration#1{%
 \advance\itemno by -1
 \doitemize{#1.}\flushcr
}

% @alphaenumerate and @capsenumerate are abbreviations for giving an arg
% to @enumerate.
%
\def\alphaenumerate{\enumerate{a}}
\def\capsenumerate{\enumerate{A}}
\def\Ealphaenumerate{\Eenumerate}
\def\Ecapsenumerate{\Eenumerate}


% @multitable macros
% Amy Hendrickson, 8/18/94, 3/6/96
%
% @multitable ... @end multitable will make as many columns as desired.
% Contents of each column will wrap at width given in preamble.  Width
% can be specified either with sample text given in a template line,
% or in percent of \hsize, the current width of text on page.

% Table can continue over pages but will only break between lines.

% To make preamble:
%
% Either define widths of columns in terms of percent of \hsize:
%   @multitable @columnfractions .25 .3 .45
%   @item ...
%
%   Numbers following @columnfractions are the percent of the total
%   current hsize to be used for each column. You may use as many
%   columns as desired.


% Or use a template:
%   @multitable {Column 1 template} {Column 2 template} {Column 3 template}
%   @item ...
%   using the widest term desired in each column.

% Each new table line starts with @item, each subsequent new column
% starts with @tab. Empty columns may be produced by supplying @tab's
% with nothing between them for as many times as empty columns are needed,
% ie, @tab@tab@tab will produce two empty columns.

% @item, @tab do not need to be on their own lines, but it will not hurt
% if they are.
```

```
% Sample multitable:

%   @multitable {Column 1 template} {Column 2 template} {Column 3 template}
%   @item first col stuff @tab second col stuff @tab third col
%   @item
%   first col stuff
%   @tab
%   second col stuff
%   @tab
%   third col
%   @item first col stuff @tab second col stuff
%   @tab Many paragraphs of text may be used in any column.
%
%        They will wrap at the width determined by the template.
%   @item@tab@tab This will be in third column.
%   @end multitable

% Default dimensions may be reset by user.
% @multitableparskip is vertical space between paragraphs in table.
% @multitableparindent is paragraph indent in table.
% @multitablecolmargin is horizontal space to be left between columns.
% @multitablelinespace is space to leave between table items, baseline
%                                                 to baseline.
%   0pt means it depends on current normal line spacing.
%
\newskip\multitableparskip
\newskip\multitableparindent
\newdimen\multitablecolspace
\newskip\multitablelinespace
\multitableparskip=0pt
\multitableparindent=6pt
\multitablecolspace=12pt
\multitablelinespace=0pt

% Macros used to set up halign preamble:
%
\let\endsetuptable\relax
\def\xendsetuptable{\endsetuptable}
\let\columnfractions\relax
\def\xcolumnfractions{\columnfractions}
\newif\ifsetpercent

% #1 is the @columnfraction, usually a decimal number like .5, but might
% be just 1.  We just use it, whatever it is.
%
\def\pickupwholefraction#1 {%
 \global\advance\colcount by 1
 \expandafter\xdef\csname col\the\colcount\endcsname{#1\hsize}%
```

```
 \setuptable
}

\newcount\colcount
\def\setuptable#1{%
 \def\firstarg{#1}%
 \ifx\firstarg\xendsetuptable
   \let\go = \relax
 \else
   \ifx\firstarg\xcolumnfractions
     \global\setpercenttrue
   \else
     \ifsetpercent
       \let\go\pickupwholefraction
     \else
       \global\advance\colcount by 1
       \setbox0=\hbox{#1\unskip\space}% Add a normal word space as a
               % separator; typically that is always in the input, anyway.
       \expandafter\xdef\csname col\the\colcount\endcsname{\the\wd0}%
     \fi
   \fi
   \ifx\go\pickupwholefraction
     % Put the argument back for the \pickupwholefraction call, so
     % we'll always have a period there to be parsed.
     \def\go{\pickupwholefraction#1}%
   \else
     \let\go = \setuptable
   \fi%
 \fi
 \go
}

% multitable-only commands.
%
% @headitem starts a heading row, which we typeset in bold.
% Assignments have to be global since we are inside the implicit group
% of an alignment entry.  \everycr resets \everytab so we don't have to
% undo it ourselves.
\def\headitemfont{\b}% for people to use in the template row; not changeable
\def\headitem{%
 \checkenv\multitable
 \crcr
 \global\everytab={\bf}% can't use \headitemfont since the parsing differs
 \the\everytab % for the first item
}%
%
% A \tab used to include \hskip1sp.  But then the space in a template
% line is not enough.  That is bad.  So let's go back to just `&' until
```

```
% we again encounter the problem the 1sp was intended to solve.
%     --karl, nathan@acm.org, 20apr99.
\def\tab{\checkenv\multitable &\the\everytab}%

% @multitable ... @end multitable definitions:
%
\newtoks\everytab  % insert after every tab.
%
\envdef\multitable{%
 \vskip\parskip
 \startsavinginserts
 %
 % @item within a multitable starts a normal row.
 % We use \def instead of \let so that if one of the multitable entries
 % contains an @itemize, we don't choke on the \item (seen as \crcr aka
 % \endtemplate) expanding \doitemize.
 \def\item{\crcr}%
 %
 \tolerance=9500
 \hbadness=9500
 \setmultitablespacing
 \parskip=\multitableparskip
 \parindent=\multitableparindent
 \overfullrule=0pt
 \global\colcount=0
 %
 \everycr = {%
   \noalign{%
     \global\everytab={}%
     \global\colcount=0 % Reset the column counter.
     % Check for saved footnotes, etc.
     \checkinserts
     % Keeps underfull box messages off when table breaks over pages.
     %\filbreak
 % Maybe so, but it also creates really weird page breaks when the
 % table breaks over pages. Wouldn't \vfil be better?  Wait until the
 % problem manifests itself, so it can be fixed for real --karl.
   }%
 }%
 %
 \parsearg\domultitable
}
\def\domultitable#1{%
 % To parse everything between @multitable and @item:
 \setuptable#1 \endsetuptable
 %
 % This preamble sets up a generic column definition, which will
 % be used as many times as user calls for columns.
```

```
% \vtop will set a single line and will also let text wrap and
% continue for many paragraphs if desired.
\halign\bgroup &%
  \global\advance\colcount by 1
  \multistrut
  \vtop{%
    % Use the current \colcount to find the correct column width:
    \hsize=\expandafter\csname col\the\colcount\endcsname
    %
    % In order to keep entries from bumping into each other
    % we will add a \leftskip of \multitablecolspace to all columns after
    % the first one.
    %
    % If a template has been used, we will add \multitablecolspace
    % to the width of each template entry.
    %
    % If the user has set preamble in terms of percent of \hsize we will
    % use that dimension as the width of the column, and the \leftskip
    % will keep entries from bumping into each other.  Table will start at
    % left margin and final column will justify at right margin.
    %
    % Make sure we don't inherit \rightskip from the outer environment.
    \rightskip=0pt
    \ifnum\colcount=1
% The first column will be indented with the surrounding text.
\advance\hsize by\leftskip
    \else
\ifsetpercent \else
  % If user has not set preamble in terms of percent of \hsize
  % we will advance \hsize by \multitablecolspace.
  \advance\hsize by \multitablecolspace
\fi
     % In either case we will make \leftskip=\multitablecolspace:
    \leftskip=\multitablecolspace
    \fi
    % Ignoring space at the beginning and end avoids an occasional spurious
    % blank line, when TeX decides to break the line at the space before the
    % box from the multistrut, so the strut ends up on a line by itself.
    % For example:
    % @multitable @columnfractions .11 .89
    % @item @code{#}
    % @tab Legal holiday which is valid in major parts of the whole country.
    % Is automatically provided with highlighting sequences respectively
    % marking characters.
    \noindent\ignorespaces##\unskip\multistrut
   }\cr
}
\def\Emultitable{%
```

```
 \crcr
 \egroup % end the \halign
 \global\setpercentfalse
}

\def\setmultitablespacing{%
 \def\multistrut{\strut}% just use the standard line spacing
 %
 % Compute \multitablelinespace (if not defined by user) for use in
 % \multitableparskip calculation.  We used define \multistrut based on
 % this, but (ironically) that caused the spacing to be off.
 % See bug-texinfo report from Werner Lemberg, 31 Oct 2004 12:52:20 +0100.
\ifdim\multitablelinespace=0pt
\setbox0=\vbox{X}\global\multitablelinespace=\the\baselineskip
\global\advance\multitablelinespace by-\ht0
\fi
% Test to see if parskip is larger than space between lines of
% table. If not, do nothing.
%       If so, set to same dimension as multitablelinespace.
\ifdim\multitableparskip>\multitablelinespace
\global\multitableparskip=\multitablelinespace
\global\advance\multitableparskip-7pt % to keep parskip somewhat smaller
                              % than skip between lines in the table.
\fi%
\ifdim\multitableparskip=0pt
\global\multitableparskip=\multitablelinespace
\global\advance\multitableparskip-7pt % to keep parskip somewhat smaller
                              % than skip between lines in the table.
\fi}


\message{conditionals,}

% @iftex, @ifnotdocbook, @ifnothtml, @ifnotinfo, @ifnotplaintext,
% @ifnotxml always succeed.  They currently do nothing; we don't
% attempt to check whether the conditionals are properly nested.  But we
% have to remember that they are conditionals, so that @end doesn't
% attempt to close an environment group.
%
\def\makecond#1{%
 \expandafter\let\csname #1\endcsname = \relax
 \expandafter\let\csname iscond.#1\endcsname = 1
}
\makecond{iftex}
\makecond{ifnotdocbook}
\makecond{ifnothtml}
\makecond{ifnotinfo}
\makecond{ifnotplaintext}
```

```
\makecond{ifnotxml}

% Ignore @ignore, @ifhtml, @ifinfo, and the like.
%
\def\direntry{\doignore{direntry}}
\def\documentdescription{\doignore{documentdescription}}
\def\docbook{\doignore{docbook}}
\def\html{\doignore{html}}
\def\ifdocbook{\doignore{ifdocbook}}
\def\ifhtml{\doignore{ifhtml}}
\def\ifinfo{\doignore{ifinfo}}
\def\ifnottex{\doignore{ifnottex}}
\def\ifplaintext{\doignore{ifplaintext}}
\def\ifxml{\doignore{ifxml}}
\def\ignore{\doignore{ignore}}
\def\menu{\doignore{menu}}
\def\xml{\doignore{xml}}

% Ignore text until a line `@end #1', keeping track of nested conditionals.
%
% A count to remember the depth of nesting.
\newcount\doignorecount

\def\doignore#1{\begingroup
 % Scan in ``verbatim" mode:
 \obeylines
 \catcode`\@ = \other
 \catcode`\{ = \other
 \catcode`\} = \other
 %
 % Make sure that spaces turn into tokens that match what \doignoretext wants.
 \spaceisspace
 %
 % Count number of #1's that we've seen.
 \doignorecount = 0
 %
 % Swallow text until we reach the matching `@end #1'.
 \dodoignore{#1}%
}

{ \catcode`_=11 % We want to use \_STOP_ which cannot appear in texinfo source.
 \obeylines %
 %
 \gdef\dodoignore#1{%
   % #1 contains the command name as a string, e.g., `ifinfo'.
   %
   % Define a command to find the next `@end #1'.
   \long\def\doignoretext##1^^M@end #1{%
```

```
    \doignoretextyyy##1^^M@#1\_STOP_}%
   %
   % And this command to find another #1 command, at the beginning of a
   % line.  (Otherwise, we would consider a line `@c @ifset', for
   % example, to count as an @ifset for nesting.)
   \long\def\doignoretextyyy##1^^M@#1##2\_STOP_{\doignoreyyy{##2}\_STOP_}%
   %
   % And now expand that command.
   \doignoretext ^^M%
 }%
}

\def\doignoreyyy#1{%
 \def\temp{#1}%
 \ifx\temp\empty   % Nothing found.
   \let\next\doignoretextzzz
 \else     % Found a nested condition, ...
   \advance\doignorecount by 1
   \let\next\doignoretextyyy  % ..., look for another.
   % If we're here, #1 ends with ^^M\ifinfo (for example).
 \fi
 \next #1% the token \_STOP_ is present just after this macro.
}

% We have to swallow the remaining "\_STOP_".
%
\def\doignoretextzzz#1{%
 \ifnum\doignorecount = 0 % We have just found the outermost @end.
   \let\next\enddoignore
 \else    % Still inside a nested condition.
   \advance\doignorecount by -1
   \let\next\doignoretext      % Look for the next @end.
 \fi
 \next
}

% Finish off ignored text.
{ \obeylines%
 % Ignore anything after the last `@end #1'; this matters in verbatim
 % environments, where otherwise the newline after an ignored conditional
 % would result in a blank line in the output.
 \gdef\enddoignore#1^^M{\endgroup\ignorespaces}%
}


% @set VAR sets the variable VAR to an empty value.
% @set VAR REST-OF-LINE sets VAR to the value REST-OF-LINE.
%
```

```
% Since we want to separate VAR from REST-OF-LINE (which might be
% empty), we can't just use \parsearg; we have to insert a space of our
% own to delimit the rest of the line, and then take it out again if we
% didn't need it.
% We rely on the fact that \parsearg sets \catcode`\ =10.
%
\parseargdef\set{\setyyy#1 \endsetyyy}
\def\setyyy#1 #2\endsetyyy{%
 {%
   \makevalueexpandable
   \def\temp{#2}%
   \edef\next{\gdef\makecsname{SET#1}}%
   \ifx\temp\empty
     \next{}%
   \else
     \setzzz#2\endsetzzz
   \fi
 }%
}
% Remove the trailing space \setxxx inserted.
\def\setzzz#1 \endsetzzz{\next{#1}}

% @clear VAR clears (i.e., unsets) the variable VAR.
%
\parseargdef\clear{%
 {%
   \makevalueexpandable
   \global\expandafter\let\csname SET#1\endcsname=\relax
 }%
}

% @value{foo} gets the text saved in variable foo.
\def\value{\begingroup\makevalueexpandable\valuexxx}
\def\valuexxx#1{\expandablevalue{#1}\endgroup}
{
 \catcode`\- = \active \catcode`\_ = \active
 %
 \gdef\makevalueexpandable{%
   \let\value = \expandablevalue
   % We don't want these characters active, ...
   \catcode`\-=\other \catcode`\_=\other
   % ..., but we might end up with active ones in the argument if
   % we're called from @code, as @code{@value{foo-bar_}}, though.
   % So \let them to their normal equivalents.
   \let-\normaldash \let_\normalunderscore
 }
}
```

```
% We have this subroutine so that we can handle at least some @value's
% properly in indexes (we call \makevalueexpandable in \indexdummies).
% The command has to be fully expandable (if the variable is set), since
% the result winds up in the index file.  This means that if the
% variable's value contains other Texinfo commands, it's almost certain
% it will fail (although perhaps we could fix that with sufficient work
% to do a one-level expansion on the result, instead of complete).
%
\def\expandablevalue#1{%
 \expandafter\ifx\csname SET#1\endcsname\relax
   {[No value for ``#1'']}%
   \message{Variable `#1', used in @value, is not set.}%
 \else
   \csname SET#1\endcsname
 \fi
}

% @ifset VAR ... @end ifset reads the `...' iff VAR has been defined
% with @set.
%
% To get special treatment of `@end ifset,' call \makeond and the redefine.
%
\makecond{ifset}
\def\ifset{\parsearg{\doifset{\let\next=\ifsetfail}}}
\def\doifset#1#2{%
 {%
   \makevalueexpandable
   \let\next=\empty
   \expandafter\ifx\csname SET#2\endcsname\relax
     #1% If not set, redefine \next.
   \fi
   \expandafter
 }\next
}
\def\ifsetfail{\doignore{ifset}}

% @ifclear VAR ... @end executes the `...' iff VAR has never been
% defined with @set, or has been undefined with @clear.
%
% The `\else' inside the `\doifset' parameter is a trick to reuse the
% above code: if the variable is not set, do nothing, if it is set,
% then redefine \next to \ifclearfail.
%
\makecond{ifclear}
\def\ifclear{\parsearg{\doifset{\else \let\next=\ifclearfail}}}
\def\ifclearfail{\doignore{ifclear}}

% @ifcommandisdefined CMD ... @end executes the `...' if CMD (written
```

```
% without the @) is in fact defined.  We can only feasibly check at the
% TeX level, so something like `mathcode' is going to considered
% defined even though it is not a Texinfo command.
%
\makecond{ifcommanddefined}
\def\ifcommanddefined{\parsearg{\doifcmddefined{\let\next=\ifcmddefinedfail}}}
%
\def\doifcmddefined#1#2{{%
   \makevalueexpandable
   \let\next=\empty
   \expandafter\ifx\csname #2\endcsname\relax
     #1% If not defined, \let\next as above.
   \fi
   \expandafter
 }\next
}
\def\ifcmddefinedfail{\doignore{ifcommanddefined}}

% @ifcommandnotdefined CMD ... handled similar to @ifclear above.
\makecond{ifcommandnotdefined}
\def\ifcommandnotdefined{%
 \parsearg{\doifcmddefined{\else \let\next=\ifcmdnotdefinedfail}}}
\def\ifcmdnotdefinedfail{\doignore{ifcommandnotdefined}}

% Set the `txicommandconditionals' variable, so documents have a way to
% test if the @ifcommand...defined conditionals are available.
\set txicommandconditionals

% @dircategory CATEGORY  -- specify a category of the dir file
% which this file should belong to.  Ignore this in TeX.
\let\dircategory=\comment

% @defininfoenclose.
\let\definfoenclose=\comment


\message{indexing,}
% Index generation facilities

% Define \newwrite to be identical to plain tex's \newwrite
% except not \outer, so it can be used within macros and \if's.
\edef\newwrite{\makecsname{ptexnewwrite}}

% \newindex {foo} defines an index named foo.
% It automatically defines \fooindex such that
% \fooindex ...rest of line... puts an entry in the index foo.
% It also defines \fooindfile to be the number of the output channel for
% the file that accumulates this index.  The file's extension is foo.
```

```
% The name of an index should be no more than 2 characters long
% for the sake of vms.
%
\def\newindex#1{%
 \iflinks
   \expandafter\newwrite \csname#1indfile\endcsname
   \openout \csname#1indfile\endcsname \jobname.#1 % Open the file
 \fi
 \expandafter\xdef\csname#1index\endcsname{%     % Define @#1index
   \noexpand\doindex{#1}}
}

% @defindex foo  ==  \newindex{foo}
%
\def\defindex{\parsearg\newindex}

% Define @defcodeindex, like @defindex except put all entries in @code.
%
\def\defcodeindex{\parsearg\newcodeindex}
%
\def\newcodeindex#1{%
 \iflinks
   \expandafter\newwrite \csname#1indfile\endcsname
   \openout \csname#1indfile\endcsname \jobname.#1
 \fi
 \expandafter\xdef\csname#1index\endcsname{%
   \noexpand\docodeindex{#1}}%
}


% @synindex foo bar    makes index foo feed into index bar.
% Do this instead of @defindex foo if you don't want it as a separate index.
%
% @syncodeindex foo bar   similar, but put all entries made for index foo
% inside @code.
%
\def\synindex#1 #2 {\dosynindex\doindex{#1}{#2}}
\def\syncodeindex#1 #2 {\dosynindex\docodeindex{#1}{#2}}

% #1 is \doindex or \docodeindex, #2 the index getting redefined (foo),
% #3 the target index (bar).
\def\dosynindex#1#2#3{%
 % Only do \closeout if we haven't already done it, else we'll end up
 % closing the target index.
 \expandafter \ifx\csname donesynindex#2\endcsname \relax
   % The \closeout helps reduce unnecessary open files; the limit on the
   % Acorn RISC OS is a mere 16 files.
   \expandafter\closeout\csname#2indfile\endcsname
```

```
  \expandafter\let\csname donesynindex#2\endcsname = 1
 \fi
 % redefine \fooindfile:
 \expandafter\let\expandafter\temp\expandafter=\csname#3indfile\endcsname
 \expandafter\let\csname#2indfile\endcsname=\temp
 % redefine \fooindex:
 \expandafter\xdef\csname#2index\endcsname{\noexpand#1{#3}}%
}

% Define \doindex, the driver for all \fooindex macros.
% Argument #1 is generated by the calling \fooindex macro,
%  and it is "foo", the name of the index.

% \doindex just uses \parsearg; it calls \doind for the actual work.
% This is because \doind is more useful to call from other macros.

% There is also \dosubind {index}{topic}{subtopic}
% which makes an entry in a two-level index such as the operation index.

\def\doindex#1{\edef\indexname{#1}\parsearg\singleindexer}
\def\singleindexer #1{\doind{\indexname}{#1}}

% like the previous two, but they put @code around the argument.
\def\docodeindex#1{\edef\indexname{#1}\parsearg\singlecodeindexer}
\def\singlecodeindexer #1{\doind{\indexname}{\code{#1}}}

% Take care of Texinfo commands that can appear in an index entry.
% Since there are some commands we want to expand, and others we don't,
% we have to laboriously prevent expansion for those that we don't.
%
\def\indexdummies{%
 \escapechar = `\\     % use backslash in output files.
 \def\@{@}% change to @@ when we switch to @ as escape char in index files.
 \def\ {\realbackslash\space }%
 %
 % Need these unexpandable (because we define \tt as a dummy)
 % definitions when @{ or @} appear in index entry text.  Also, more
 % complicated, when \tex is in effect and \{ is a \delimiter again.
 % We can't use \lbracecmd and \rbracecmd because texindex assumes
 % braces and backslashes are used only as delimiters.  Perhaps we
 % should define @lbrace and @rbrace commands a la @comma.
 \def\{{{\tt\char123}}%
 \def\}{{\tt\char125}}%
 %
 % I don't entirely understand this, but when an index entry is
 % generated from a macro call, the \endinput which \scanmacro inserts
 % causes processing to be prematurely terminated.  This is,
 % apparently, because \indexsorttmp is fully expanded, and \endinput
```

```
 % is an expandable command.  The redefinition below makes \endinput
 % disappear altogether for that purpose -- although logging shows that
 % processing continues to some further point.  On the other hand, it
 % seems \endinput does not hurt in the printed index arg, since that
 % is still getting written without apparent harm.
 %
 % Sample source (mac-idx3.tex, reported by Graham Percival to
 % help-texinfo, 22may06):
 % @macro funindex {WORD}
 % @findex xyz
 % @end macro
 % ...
 % @funindex commtest
 %
 % The above is not enough to reproduce the bug, but it gives the flavor.
 %
 % Sample whatsit resulting:
 % .@write3{\entry{xyz}{@folio }{@code {xyz@endinput }}}
 %
 % So:
 \let\endinput = \empty
 %
 % Do the redefinitions.
 \commondummies
}

% For the aux and toc files, @ is the escape character.  So we want to
% redefine everything using @ as the escape character (instead of
% \realbackslash, still used for index files).  When everything uses @,
% this will be simpler.
%
\def\atdummies{%
 \def\@{@@}%
 \def\ {@ }%
 \let\{ = \lbraceatcmd
 \let\} = \rbraceatcmd
 %
 % Do the redefinitions.
 \commondummies
 \otherbackslash
}

% Called from \indexdummies and \atdummies.
%
\def\commondummies{%
 %
 % \definedummyword defines \#1 as \string\#1\space, thus effectively
 % preventing its expansion.  This is used only for control words,
```

```
% not control letters, because the \space would be incorrect for
% control characters, but is needed to separate the control word
% from whatever follows.
%
% For control letters, we have \definedummyletter, which omits the
% space.
%
% These can be used both for control words that take an argument and
% those that do not.  If it is followed by {arg} in the input, then
% that will dutifully get written to the index (or wherever).
%
\def\definedummyword  ##1{\def##1{\string##1\space}}%
\def\definedummyletter##1{\def##1{\string##1}}%
\let\definedummyaccent\definedummyletter
%
\commondummiesnofonts
%
\definedummyletter\_%
\definedummyletter\-%
%
% Non-English letters.
\definedummyword\AA
\definedummyword\AE
\definedummyword\DH
\definedummyword\L
\definedummyword\O
\definedummyword\OE
\definedummyword\TH
\definedummyword\aa
\definedummyword\ae
\definedummyword\dh
\definedummyword\exclamdown
\definedummyword\l
\definedummyword\o
\definedummyword\oe
\definedummyword\ordf
\definedummyword\ordm
\definedummyword\questiondown
\definedummyword\ss
\definedummyword\th
%
% Although these internal commands shouldn't show up, sometimes they do.
\definedummyword\bf
\definedummyword\gtr
\definedummyword\hat
\definedummyword\less
\definedummyword\sf
\definedummyword\sl
```

```
\definedummyword\tclose
\definedummyword\tt
%
\definedummyword\LaTeX
\definedummyword\TeX
%
% Assorted special characters.
\definedummyword\arrow
\definedummyword\bullet
\definedummyword\comma
\definedummyword\copyright
\definedummyword\registeredsymbol
\definedummyword\dots
\definedummyword\enddots
\definedummyword\entrybreak
\definedummyword\equiv
\definedummyword\error
\definedummyword\euro
\definedummyword\expansion
\definedummyword\geq
\definedummyword\guillemetleft
\definedummyword\guillemetright
\definedummyword\guilsinglleft
\definedummyword\guilsinglright
\definedummyword\lbracechar
\definedummyword\leq
\definedummyword\minus
\definedummyword\ogonek
\definedummyword\pounds
\definedummyword\point
\definedummyword\print
\definedummyword\quotedblbase
\definedummyword\quotedblleft
\definedummyword\quotedblright
\definedummyword\quoteleft
\definedummyword\quoteright
\definedummyword\quotesinglbase
\definedummyword\rbracechar
\definedummyword\result
\definedummyword\textdegree
%
% We want to disable all macros so that they are not expanded by \write.
\macrolist
%
\normalturnoffactive
%
% Handle some cases of @value -- where it does not contain any
% (non-fully-expandable) commands.
```

```
 \makevalueexpandable
}

% \commondummiesnofonts: common to \commondummies and \indexnofonts.
%
\def\commondummiesnofonts{%
 % Control letters and accents.
 \definedummyletter\!%
 \definedummyaccent\"%
 \definedummyaccent\'%
 \definedummyletter\*%
 \definedummyaccent\,%
 \definedummyletter\.%
 \definedummyletter\/%
 \definedummyletter\:%
 \definedummyaccent\=%
 \definedummyletter\?%
 \definedummyaccent\^%
 \definedummyaccent\`%
 \definedummyaccent\~%
 \definedummyword\u
 \definedummyword\v
 \definedummyword\H
 \definedummyword\dotaccent
 \definedummyword\ogonek
 \definedummyword\ringaccent
 \definedummyword\tieaccent
 \definedummyword\ubaraccent
 \definedummyword\udotaccent
 \definedummyword\dotless
 %
 % Texinfo font commands.
 \definedummyword\b
 \definedummyword\i
 \definedummyword\r
 \definedummyword\sansserif
 \definedummyword\sc
 \definedummyword\slanted
 \definedummyword\t
 %
 % Commands that take arguments.
 \definedummyword\abbr
 \definedummyword\acronym
 \definedummyword\anchor
 \definedummyword\cite
 \definedummyword\code
 \definedummyword\command
 \definedummyword\dfn
```

```
 \definedummyword\dmn
 \definedummyword\email
 \definedummyword\emph
 \definedummyword\env
 \definedummyword\file
 \definedummyword\image
 \definedummyword\indicateurl
 \definedummyword\inforef
 \definedummyword\kbd
 \definedummyword\key
 \definedummyword\math
 \definedummyword\option
 \definedummyword\pxref
 \definedummyword\ref
 \definedummyword\samp
 \definedummyword\strong
 \definedummyword\tie
 \definedummyword\uref
 \definedummyword\url
 \definedummyword\var
 \definedummyword\verb
 \definedummyword\w
 \definedummyword\xref
}

% \indexnofonts is used when outputting the strings to sort the index
% by, and when constructing control sequence names.  It eliminates all
% control sequences and just writes whatever the best ASCII sort string
% would be for a given command (usually its argument).
%
\def\indexnofonts{%
 % Accent commands should become @asis.
 \def\definedummyaccent##1{\let##1\asis}%
 % We can just ignore other control letters.
 \def\definedummyletter##1{\let##1\empty}%
 % All control words become @asis by default; overrides below.
 \let\definedummyword\definedummyaccent
 %
 \commondummiesnofonts
 %
 % Don't no-op \tt, since it isn't a user-level command
 % and is used in the definitions of the active chars like <, >, |, etc.
 % Likewise with the other plain tex font commands.
 %\let\tt=\asis
 %
 \def\ { }%
 \def\@{@}%
 \def\_{\normalunderscore}%
```

```
\def\-{}% @- shouldn't affect sorting
%
% Unfortunately, texindex is not prepared to handle braces in the
% content at all.  So for index sorting, we map @{ and @} to strings
% starting with |, since that ASCII character is between ASCII { and }.
\def\{{|a}%
\def\lbracechar{|a}%
%
\def\}{|b}%
\def\rbracechar{|b}%
%
% Non-English letters.
\def\AA{AA}%
\def\AE{AE}%
\def\DH{DZZ}%
\def\L{L}%
\def\OE{OE}%
\def\O{O}%
\def\TH{ZZZ}%
\def\aa{aa}%
\def\ae{ae}%
\def\dh{dzz}%
\def\exclamdown{!}%
\def\l{l}%
\def\oe{oe}%
\def\ordf{a}%
\def\ordm{o}%
\def\o{o}%
\def\questiondown{?}%
\def\ss{ss}%
\def\th{zzz}%
%
\def\LaTeX{LaTeX}%
\def\TeX{TeX}%
%
% Assorted special characters.
% (The following {} will end up in the sort string, but that's ok.)
\def\arrow{->}%
\def\bullet{bullet}%
\def\comma{,}%
\def\copyright{copyright}%
\def\dots{...}%
\def\enddots{...}%
\def\equiv{==}%
\def\error{error}%
\def\euro{euro}%
\def\expansion{==>}%
\def\geq{>=}%
```

```
 \def\guillemetleft{<<}%
 \def\guillemetright{>>}%
 \def\guilsinglleft{<}%
 \def\guilsinglright{>}%
 \def\leq{<=}%
 \def\minus{-}%
 \def\point{.}%
 \def\pounds{pounds}%
 \def\print{-|}%
 \def\quotedblbase{"}%
 \def\quotedblleft{"}%
 \def\quotedblright{"}%
 \def\quoteleft{`}%
 \def\quoteright{'}%
 \def\quotesinglbase{,}%
 \def\registeredsymbol{R}%
 \def\result{=>}%
 \def\textdegree{o}%
 %
 \expandafter\ifx\csname SETtxiindexlquoteignore\endcsname\relax
 \else \indexlquoteignore \fi
 %
 % We need to get rid of all macros, leaving only the arguments (if present).
 % Of course this is not nearly correct, but it is the best we can do for now.
 % makeinfo does not expand macros in the argument to @deffn, which ends up
 % writing an index entry, and texindex isn't prepared for an index sort entry
 % that starts with \.
 %
 % Since macro invocations are followed by braces, we can just redefine them
 % to take a single TeX argument.  The case of a macro invocation that
 % goes to end-of-line is not handled.
 %
 \macrolist
}

% Undocumented (for FSFS 2nd ed.): @set txiindexlquoteignore makes us
% ignore left quotes in the sort term.
{\catcode`\`=\active
\gdef\indexlquoteignore{\let`=\empty}}

\let\indexbackslash=0  %overridden during \printindex.
\let\SETmarginindex=\relax % put index entries in margin (undocumented)?

% Most index entries go through here, but \dosubind is the general case.
% #1 is the index name, #2 is the entry text.
\def\doind#1#2{\dosubind{#1}{#2}{}}

% Workhorse for all \fooindexes.
```

```
% #1 is name of index, #2 is stuff to put there, #3 is subentry --
% empty if called from \doind, as we usually are (the main exception
% is with most defuns, which call us directly).
%
\def\dosubind#1#2#3{%
 \iflinks
 {%
   % Store the main index entry text (including the third arg).
   \toks0 = {#2}%
   % If third arg is present, precede it with a space.
   \def\thirdarg{#3}%
   \ifx\thirdarg\empty \else
     \toks0 = \expandafter{\the\toks0 \space #3}%
   \fi
   %
   \edef\writeto{\csname#1indfile\endcsname}%
   %
   \safewhatsit\dosubindwrite
 }%
 \fi
}

% Write the entry in \toks0 to the index file:
%
\def\dosubindwrite{%
 % Put the index entry in the margin if desired.
 \ifx\SETmarginindex\relax\else
   \insert\margin{\hbox{\vrule height8pt depth3pt width0pt \the\toks0}}%
 \fi
 %
 % Remember, we are within a group.
 \indexdummies % Must do this here, since \bf, etc expand at this stage
 \def\backslashcurfont{\indexbackslash}% \indexbackslash isn't defined now
     % so it will be output as is; and it will print as backslash.
 %
 % Process the index entry with all font commands turned off, to
 % get the string to sort by.
 {\indexnofonts
  \edef\temp{\the\toks0}% need full expansion
  \xdef\indexsorttmp{\temp}%
 }%
 %
 % Set up the complete index entry, with both the sort key and
 % the original text, including any font commands.  We write
 % three arguments to \entry to the .?? file (four in the
 % subentry case), texindex reduces to two when writing the .??s
 % sorted result.
 \edef\temp{%
```

```
  \write\writeto{%
    \string\entry{\indexsorttmp}{\noexpand\folio}{\the\toks0}}%
 }%
 \temp
}

% Take care of unwanted page breaks/skips around a whatsit:
%
% If a skip is the last thing on the list now, preserve it
% by backing up by \lastskip, doing the \write, then inserting
% the skip again.  Otherwise, the whatsit generated by the
% \write or \pdfdest will make \lastskip zero.  The result is that
% sequences like this:
% @end defun
% @tindex whatever
% @defun ...
% will have extra space inserted, because the \medbreak in the
% start of the @defun won't see the skip inserted by the @end of
% the previous defun.
%
% But don't do any of this if we're not in vertical mode.  We
% don't want to do a \vskip and prematurely end a paragraph.
%
% Avoid page breaks due to these extra skips, too.
%
% But wait, there is a catch there:
% We'll have to check whether \lastskip is zero skip.  \ifdim is not
% sufficient for this purpose, as it ignores stretch and shrink parts
% of the skip.  The only way seems to be to check the textual
% representation of the skip.
%
% The following is almost like \def\zeroskipmacro{0.0pt} except that
% the ``p'' and ``t'' characters have catcode \other, not 11 (letter).
%
\edef\zeroskipmacro{\expandafter\the\csname z@skip\endcsname}
%
\newskip\whatsitskip
\newcount\whatsitpenalty
%
% ..., ready, GO:
%
\def\safewhatsit#1{\ifhmode
 #1%
\else
 % \lastskip and \lastpenalty cannot both be nonzero simultaneously.
 \whatsitskip = \lastskip
 \edef\lastskipmacro{\the\lastskip}%
 \whatsitpenalty = \lastpenalty
```

```
 %
 % If \lastskip is nonzero, that means the last item was a
 % skip.  And since a skip is discardable, that means this
 % -\whatsitskip glue we're inserting is preceded by a
 % non-discardable item, therefore it is not a potential
 % breakpoint, therefore no \nobreak needed.
 \ifx\lastskipmacro\zeroskipmacro
 \else
   \vskip-\whatsitskip
 \fi
 %
 #1%
 %
 \ifx\lastskipmacro\zeroskipmacro
   % If \lastskip was zero, perhaps the last item was a penalty, and
   % perhaps it was >=10000, e.g., a \nobreak.  In that case, we want
   % to re-insert the same penalty (values >10000 are used for various
   % signals); since we just inserted a non-discardable item, any
   % following glue (such as a \parskip) would be a breakpoint.  For example:
   %   @deffn deffn-whatever
   %   @vindex index-whatever
   %   Description.
   % would allow a break between the index-whatever whatsit
   % and the "Description." paragraph.
   \ifnum\whatsitpenalty>9999 \penalty\whatsitpenalty \fi
 \else
   % On the other hand, if we had a nonzero \lastskip,
   % this make-up glue would be preceded by a non-discardable item
   % (the whatsit from the \write), so we must insert a \nobreak.
   \nobreak\vskip\whatsitskip
 \fi
\fi}

% The index entry written in the file actually looks like
%  \entry {sortstring}{page}{topic}
% or
%  \entry {sortstring}{page}{topic}{subtopic}
% The texindex program reads in these files and writes files
% containing these kinds of lines:
%  \initial {c}
%     before the first topic whose initial is c
%  \entry {topic}{pagelist}
%     for a topic that is used without subtopics
%  \primary {topic}
%     for the beginning of a topic that is used with subtopics
%  \secondary {subtopic}{pagelist}
%     for each subtopic.
```

```
% Define the user-accessible indexing commands
% @findex, @vindex, @kindex, @cindex.

\def\findex {\fnindex}
\def\kindex {\kyindex}
\def\cindex {\cpindex}
\def\vindex {\vrindex}
\def\tindex {\tpindex}
\def\pindex {\pgindex}

\def\cindexsub {\begingroup\obeylines\cindexsub}
{\obeylines %
\gdef\cindexsub "#1" #2^^M{\endgroup %
\dosubind{cp}{#2}{#1}}}

% Define the macros used in formatting output of the sorted index material.

% @printindex causes a particular index (the ??s file) to get printed.
% It does not print any chapter heading (usually an @unnumbered).
%
\parseargdef\printindex{\begingroup
 \dobreak \chapheadingskip{10000}%
 %
 \smallfonts \rm
 \tolerance = 9500
 \plainfrenchspacing
 \everypar = {}% don't want the \kern\-parindent from indentation suppression.
 %
 % See if the index file exists and is nonempty.
 % Change catcode of @ here so that if the index file contains
 % \initial {@}
 % as its first line, TeX doesn't complain about mismatched braces
 % (because it thinks @} is a control sequence).
 \catcode`\@ = 11
 \openin 1 \jobname.#1s
 \ifeof 1
   % \enddoublecolumns gets confused if there is no text in the index,
   % and it loses the chapter title and the aux file entries for the
   % index.  The easiest way to prevent this problem is to make sure
   % there is some text.
   \putwordIndexNonexistent
 \else
   %
   % If the index file exists but is empty, then \openin leaves \ifeof
   % false.  We have to make TeX try to read something from the file, so
   % it can discover if there is anything in it.
   \read 1 to \temp
   \ifeof 1
```

```
    \putwordIndexIsEmpty
  \else
    % Index files are almost Texinfo source, but we use \ as the escape
    % character.  It would be better to use @, but that's too big a change
    % to make right now.
    \def\indexbackslash{\backslashcurfont}%
    \catcode`\\ = 0
    \escapechar = `\\
    \begindoublecolumns
    \input \jobname.#1s
    \enddoublecolumns
  \fi
 \fi
 \closein 1
\endgroup}

% These macros are used by the sorted index file itself.
% Change them to control the appearance of the index.

\def\initial#1{{%
 % Some minor font changes for the special characters.
 \let\tentt=\sectt \let\tt=\sectt \let\sf=\sectt
 %
 % Remove any glue we may have, we'll be inserting our own.
 \removelastskip
 %
 % We like breaks before the index initials, so insert a bonus.
 \nobreak
 \vskip 0pt plus 3\baselineskip
 \penalty 0
 \vskip 0pt plus -3\baselineskip
 %
 % Typeset the initial.  Making this add up to a whole number of
 % baselineskips increases the chance of the dots lining up from column
 % to column.  It still won't often be perfect, because of the stretch
 % we need before each entry, but it's better.
 %
 % No shrink because it confuses \balancecolumns.
 \vskip 1.67\baselineskip plus .5\baselineskip
 \leftline{\secbf #1}%
 % Do our best not to break after the initial.
 \nobreak
 \vskip .33\baselineskip plus .1\baselineskip
}}

% \entry typesets a paragraph consisting of the text (#1), dot leaders, and
% then page number (#2) flushed to the right margin.  It is used for index
% and table of contents entries.  The paragraph is indented by \leftskip.
```

```
%
% A straightforward implementation would start like this:
% \def\entry#1#2{...
% But this freezes the catcodes in the argument, and can cause problems to
% @code, which sets - active.  This problem was fixed by a kludge---
% ``-'' was active throughout whole index, but this isn't really right.
% The right solution is to prevent \entry from swallowing the whole text.
%                                --kasal, 21nov03
\def\entry{%
 \begingroup
  %
  % Start a new paragraph if necessary, so our assignments below can't
  % affect previous text.
  \par
  %
  % Do not fill out the last line with white space.
  \parfillskip = 0in
  %
  % No extra space above this paragraph.
  \parskip = 0in
  %
  % Do not prefer a separate line ending with a hyphen to fewer lines.
  \finalhyphendemerits = 0
  %
  % \hangindent is only relevant when the entry text and page number
  % don't both fit on one line.  In that case, bob suggests starting the
  % dots pretty far over on the line.  Unfortunately, a large
  % indentation looks wrong when the entry text itself is broken across
  % lines.  So we use a small indentation and put up with long leaders.
  %
  % \hangafter is reset to 1 (which is the value we want) at the start
  % of each paragraph, so we need not do anything with that.
  \hangindent = 2em
  %
  % When the entry text needs to be broken, just fill out the first line
  % with blank space.
  \rightskip = 0pt plus1fil
  %
  % A bit of stretch before each entry for the benefit of balancing
  % columns.
  \vskip 0pt plus1pt
  %
  % When reading the text of entry, convert explicit line breaks
  % from @* into spaces.  The user might give these in long section
  % titles, for instance.
  \def\*{\unskip\space\ignorespaces}%
  \def\entrybreak{\hfil\break}%
  %
```

```
  % Swallow the left brace of the text (first parameter):
  \afterassignment\doentry
  \let\temp =
}
\def\entrybreak{\unskip\space\ignorespaces}%
\def\doentry{%
  \bgroup % Instead of the swallowed brace.
    \noindent
    \aftergroup\finishentry
    % And now comes the text of the entry.
}
\def\finishentry#1{%
  % #1 is the page number.
  %
  % The following is kludged to not output a line of dots in the index if
  % there are no page numbers.  The next person who breaks this will be
  % cursed by a Unix daemon.
  \setbox\boxA = \hbox{#1}%
  \ifdim\wd\boxA = 0pt
    \ %
  \else
    %
    % If we must, put the page number on a line of its own, and fill out
    % this line with blank space.  (The \hfil is overwhelmed with the
    % fill leaders glue in \indexdotfill if the page number does fit.)
    \hfil\penalty50
    \null\nobreak\indexdotfill % Have leaders before the page number.
    %
    % The `\ ' here is removed by the implicit \unskip that TeX does as
    % part of (the primitive) \par.  Without it, a spurious underfull
    % \hbox ensues.
    \ifpdf
 \pdfgettoks#1.%
 \ \the\toksA
    \else
 \ #1%
    \fi
  \fi
  \par
 \endgroup
}

% Like plain.tex's \dotfill, except uses up at least 1 em.
\def\indexdotfill{\cleaders
 \hbox{$\mathsurround=0pt \mkern1.5mu.\mkern1.5mu$}\hskip 1em plus 1fill}

\def\primary #1{\line{#1\hfil}}
```

```
\newskip\secondaryindent \secondaryindent=0.5cm
\def\secondary#1#2{{%
 \parfillskip=0in
 \parskip=0in
 \hangindent=1in
 \hangafter=1
 \noindent\hskip\secondaryindent\hbox{#1}\indexdotfill
 \ifpdf
   \pdfgettoks#2.\ \the\toksA % The page number ends the paragraph.
 \else
   #2
 \fi
 \par
}}

% Define two-column mode, which we use to typeset indexes.
% Adapted from the TeXbook, page 416, which is to say,
% the manmac.tex format used to print the TeXbook itself.
\catcode`\@=11

\newbox\partialpage
\newdimen\doublecolumnhsize

\def\begindoublecolumns{\begingroup % ended by \enddoublecolumns
 % Grab any single-column material above us.
 \output = {%
   %
   % Here is a possibility not foreseen in manmac: if we accumulate a
   % whole lot of material, we might end up calling this \output
   % routine twice in a row (see the doublecol-lose test, which is
   % essentially a couple of indexes with @setchapternewpage off).  In
   % that case we just ship out what is in \partialpage with the normal
   % output routine.  Generally, \partialpage will be empty when this
   % runs and this will be a no-op.  See the indexspread.tex test case.
   \ifvoid\partialpage \else
     \onepageout{\pagecontents\partialpage}%
   \fi
   %
   \global\setbox\partialpage = \vbox{%
     % Unvbox the main output page.
     \unvbox\PAGE
     \kern-\topskip \kern\baselineskip
   }%
 }%
 \eject % run that output routine to set \partialpage
 %
 % Use the double-column output routine for subsequent pages.
 \output = {\doublecolumnout}%
```

```
 %
 % Change the page size parameters.  We could do this once outside this
 % routine, in each of @smallbook, @afourpaper, and the default 8.5x11
 % format, but then we repeat the same computation.  Repeating a couple
 % of assignments once per index is clearly meaningless for the
 % execution time, so we may as well do it in one place.
 %
 % First we halve the line length, less a little for the gutter between
 % the columns.  We compute the gutter based on the line length, so it
 % changes automatically with the paper format.  The magic constant
 % below is chosen so that the gutter has the same value (well, +-<1pt)
 % as it did when we hard-coded it.
 %
 % We put the result in a separate register, \doublecolumhsize, so we
 % can restore it in \pagesofar, after \hsize itself has (potentially)
 % been clobbered.
 %
 \doublecolumnhsize = \hsize
   \advance\doublecolumnhsize by -.04154\hsize
   \divide\doublecolumnhsize by 2
 \hsize = \doublecolumnhsize
 %
 % Double the \vsize as well.  (We don't need a separate register here,
 % since nobody clobbers \vsize.)
 \vsize = 2\vsize
}

% The double-column output routine for all double-column pages except
% the last.
%
\def\doublecolumnout{%
 \splittopskip=\topskip \splitmaxdepth=\maxdepth
 % Get the available space for the double columns -- the normal
 % (undoubled) page height minus any material left over from the
 % previous page.
 \dimen@ = \vsize
 \divide\dimen@ by 2
 \advance\dimen@ by -\ht\partialpage
 %
 % box0 will be the left-hand column, box2 the right.
 \setbox0=\vsplit255 to\dimen@ \setbox2=\vsplit255 to\dimen@
 \onepageout\pagesofar
 \unvbox255
 \penalty\outputpenalty
}
%
% Re-output the contents of the output page -- any previous material,
% followed by the two boxes we just split, in box0 and box2.
```

```
\def\pagesofar{%
 \unvbox\partialpage
 %
 \hsize = \doublecolumnhsize
 \wd0=\hsize \wd2=\hsize
 \hbox to\pagewidth{\box0\hfil\box2}%
}
%
% All done with double columns.
\def\enddoublecolumns{%
 % The following penalty ensures that the page builder is exercised
 % _before_ we change the output routine.  This is necessary in the
 % following situation:
 %
 % The last section of the index consists only of a single entry.
 % Before this section, \pagetotal is less than \pagegoal, so no
 % break occurs before the last section starts.  However, the last
 % section, consisting of \initial and the single \entry, does not
 % fit on the page and has to be broken off.  Without the following
 % penalty the page builder will not be exercised until \eject
 % below, and by that time we'll already have changed the output
 % routine to the \balancecolumns version, so the next-to-last
 % double-column page will be processed with \balancecolumns, which
 % is wrong:  The two columns will go to the main vertical list, with
 % the broken-off section in the recent contributions.  As soon as
 % the output routine finishes, TeX starts reconsidering the page
 % break.  The two columns and the broken-off section both fit on the
 % page, because the two columns now take up only half of the page
 % goal.  When TeX sees \eject from below which follows the final
 % section, it invokes the new output routine that we've set after
 % \balancecolumns below; \onepageout will try to fit the two columns
 % and the final section into the vbox of \pageheight (see
 % \pagebody), causing an overfull box.
 %
 % Note that glue won't work here, because glue does not exercise the
 % page builder, unlike penalties (see The TeXbook, pp. 280-281).
 \penalty0
 %
 \output = {%
  % Split the last of the double-column material.  Leave it on the
  % current page, no automatic page break.
  \balancecolumns
  %
  % If we end up splitting too much material for the current page,
  % though, there will be another page break right after this \output
  % invocation ends.  Having called \balancecolumns once, we do not
  % want to call it again.  Therefore, reset \output to its normal
  % definition right away.  (We hope \balancecolumns will never be
```

```
  % called on to balance too much material, but if it is, this makes
  % the output somewhat more palatable.)
  \global\output = {\onepageout{\pagecontents\PAGE}}%
 }%
 \eject
 \endgroup % started in \begindoublecolumns
 %
 % \pagegoal was set to the doubled \vsize above, since we restarted
 % the current page.  We're now back to normal single-column
 % typesetting, so reset \pagegoal to the normal \vsize (after the
 % \endgroup where \vsize got restored).
 \pagegoal = \vsize
}
%
% Called at the end of the double column material.
\def\balancecolumns{%
 \setbox0 = \vbox{\unvbox255}% like \box255 but more efficient, see p.120.
 \dimen@ = \ht0
 \advance\dimen@ by \topskip
 \advance\dimen@ by-\baselineskip
 \divide\dimen@ by 2 % target to split to
 %debug\message{final 2-column material height=\the\ht0, target=\the\dimen@.}%
 \splittopskip = \topskip
 % Loop until we get a decent breakpoint.
 {%
  \vbadness = 10000
  \loop
    \global\setbox3 = \copy0
    \global\setbox1 = \vsplit3 to \dimen@
  \ifdim\ht3>\dimen@
    \global\advance\dimen@ by 1pt
  \repeat
 }%
 %debug\message{split to \the\dimen@, column heights: \the\ht1, \the\ht3.}%
 \setbox0=\vbox to\dimen@{\unvbox1}%
 \setbox2=\vbox to\dimen@{\unvbox3}%
 %
 \pagesofar
}
\catcode`\@ = \other


\message{sectioning,}
% Chapters, sections, etc.

% Let's start with @part.
\outer\parseargdef\part{\partzzz{#1}}
\def\partzzz#1{%
```

```
 \chapoddpage
 \null
 \vskip.3\vsize  % move it down on the page a bit
 \begingroup
   \noindent \titlefonts\rmisbold #1\par % the text
   \let\lastnode=\empty      % no node to associate with
   \writetocentry{part}{#1}{}% but put it in the toc
   \headingsoff              % no headline or footline on the part page
   \chapoddpage
 \endgroup
}

% \unnumberedno is an oxymoron.  But we count the unnumbered
% sections so that we can refer to them unambiguously in the pdf
% outlines by their "section number".  We avoid collisions with chapter
% numbers by starting them at 10000.  (If a document ever has 10000
% chapters, we're in trouble anyway, I'm sure.)
\newcount\unnumberedno \unnumberedno = 10000
\newcount\chapno
\newcount\secno        \secno=0
\newcount\subsecno     \subsecno=0
\newcount\subsubsecno  \subsubsecno=0

% This counter is funny since it counts through charcodes of letters A, B, ...
\newcount\appendixno  \appendixno = `\@
%
% \def\appendixletter{\char\the\appendixno}
% We do the following ugly conditional instead of the above simple
% construct for the sake of pdftex, which needs the actual
% letter in the expansion, not just typeset.
%
\def\appendixletter{%
 \ifnum\appendixno=`A A%
 \else\ifnum\appendixno=`B B%
 \else\ifnum\appendixno=`C C%
 \else\ifnum\appendixno=`D D%
 \else\ifnum\appendixno=`E E%
 \else\ifnum\appendixno=`F F%
 \else\ifnum\appendixno=`G G%
 \else\ifnum\appendixno=`H H%
 \else\ifnum\appendixno=`I I%
 \else\ifnum\appendixno=`J J%
 \else\ifnum\appendixno=`K K%
 \else\ifnum\appendixno=`L L%
 \else\ifnum\appendixno=`M M%
 \else\ifnum\appendixno=`N N%
 \else\ifnum\appendixno=`O O%
 \else\ifnum\appendixno=`P P%
```

```
 \else\ifnum\appendixno=`Q Q%
 \else\ifnum\appendixno=`R R%
 \else\ifnum\appendixno=`S S%
 \else\ifnum\appendixno=`T T%
 \else\ifnum\appendixno=`U U%
 \else\ifnum\appendixno=`V V%
 \else\ifnum\appendixno=`W W%
 \else\ifnum\appendixno=`X X%
 \else\ifnum\appendixno=`Y Y%
 \else\ifnum\appendixno=`Z Z%
 % The \the is necessary, despite appearances, because \appendixletter is
 % expanded while writing the .toc file.  \char\appendixno is not
 % expandable, thus it is written literally, thus all appendixes come out
 % with the same letter (or @) in the toc without it.
 \else\char\the\appendixno
 \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi
 \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi}

% Each @chapter defines these (using marks) as the number+name, number
% and name of the chapter.  Page headings and footings can use
% these.  @section does likewise.
\def\thischapter{}
\def\thischapternum{}
\def\thischaptername{}
\def\thissection{}
\def\thissectionnum{}
\def\thissectionname{}

\newcount\absseclevel % used to calculate proper heading level
\newcount\secbase\secbase=0 % @raisesections/@lowersections modify this count

% @raisesections: treat @section as chapter, @subsection as section, etc.
\def\raisesections{\global\advance\secbase by -1}
\let\up=\raisesections % original BFox name

% @lowersections: treat @chapter as section, @section as subsection, etc.
\def\lowersections{\global\advance\secbase by 1}
\let\down=\lowersections % original BFox name

% we only have subsub.
\chardef\maxseclevel = 3
%
% A numbered section within an unnumbered changes to unnumbered too.
% To achieve this, remember the "biggest" unnum. sec. we are currently in:
\chardef\unnlevel = \maxseclevel
%
% Trace whether the current chapter is an appendix or not:
% \chapheadtype is "N" or "A", unnumbered chapters are ignored.
```

```
\def\chapheadtype{N}

% Choose a heading macro
% #1 is heading type
% #2 is heading level
% #3 is text for heading
\def\genhead#1#2#3{%
 % Compute the abs. sec. level:
 \absseclevel=#2
 \advance\absseclevel by \secbase
 % Make sure \absseclevel doesn't fall outside the range:
 \ifnum \absseclevel < 0
   \absseclevel = 0
 \else
   \ifnum \absseclevel > 3
     \absseclevel = 3
   \fi
 \fi
 % The heading type:
 \def\headtype{#1}%
 \if \headtype U%
   \ifnum \absseclevel < \unnlevel
     \chardef\unnlevel = \absseclevel
   \fi
 \else
   % Check for appendix sections:
   \ifnum \absseclevel = 0
     \edef\chapheadtype{\headtype}%
   \else
     \if \headtype A\if \chapheadtype N%
 \errmessage{@appendix... within a non-appendix chapter}%
     \fi\fi
   \fi
   % Check for numbered within unnumbered:
   \ifnum \absseclevel > \unnlevel
     \def\headtype{U}%
   \else
     \chardef\unnlevel = 3
   \fi
 \fi
 % Now print the heading:
 \if \headtype U%
   \ifcase\absseclevel
 \unnumberedzzz{#3}%
   \or \unnumberedseczzz{#3}%
   \or \unnumberedsubseczzz{#3}%
   \or \unnumberedsubsubseczzz{#3}%
   \fi
```

```
 \else
   \if \headtype A%
     \ifcase\absseclevel
   \appendixzzz{#3}%
     \or \appendixsectionzzz{#3}%
     \or \appendixsubseczzz{#3}%
     \or \appendixsubsubseczzz{#3}%
     \fi
   \else
     \ifcase\absseclevel
   \chapterzzz{#3}%
     \or \seczzz{#3}%
     \or \numberedsubseczzz{#3}%
     \or \numberedsubsubseczzz{#3}%
     \fi
   \fi
 \fi
 \suppressfirstparagraphindent
}

% an interface:
\def\numhead{\genhead N}
\def\apphead{\genhead A}
\def\unnmhead{\genhead U}

% @chapter, @appendix, @unnumbered.  Increment top-level counter, reset
% all lower-level sectioning counters to zero.
%
% Also set \chaplevelprefix, which we prepend to @float sequence numbers
% (e.g., figures), q.v.  By default (before any chapter), that is empty.
\let\chaplevelprefix = \empty
%
\outer\parseargdef\chapter{\numhead0{#1}} % normally numhead0 calls chapterzzz
\def\chapterzzz#1{%
 % section resetting is \global in case the chapter is in a group, such
 % as an @include file.
 \global\secno=0 \global\subsecno=0 \global\subsubsecno=0
   \global\advance\chapno by 1
 %
 % Used for \float.
 \gdef\chaplevelprefix{\the\chapno.}%
 \resetallfloatnos
 %
 % \putwordChapter can contain complex things in translations.
 \toks0=\expandafter{\putwordChapter}%
 \message{\the\toks0 \space \the\chapno}%
 %
 % Write the actual heading.
```

```
 \chapmacro{#1}{Ynumbered}{\the\chapno}%
 %
 % So @section and the like are numbered underneath this chapter.
 \global\let\section = \numberedsec
 \global\let\subsection = \numberedsubsec
 \global\let\subsubsection = \numberedsubsubsec
}

\outer\parseargdef\appendix{\apphead0{#1}} % normally calls appendixzzz
%
\def\appendixzzz#1{%
 \global\secno=0 \global\subsecno=0 \global\subsubsecno=0
   \global\advance\appendixno by 1
 \gdef\chaplevelprefix{\appendixletter.}%
 \resetallfloatnos
 %
 % \putwordAppendix can contain complex things in translations.
 \toks0=\expandafter{\putwordAppendix}%
 \message{\the\toks0 \space \appendixletter}%
 %
 \chapmacro{#1}{Yappendix}{\appendixletter}%
 %
 \global\let\section = \appendixsec
 \global\let\subsection = \appendixsubsec
 \global\let\subsubsection = \appendixsubsubsec
}

% normally unnmhead0 calls unnumberedzzz:
\outer\parseargdef\unnumbered{\unnmhead0{#1}}
\def\unnumberedzzz#1{%
 \global\secno=0 \global\subsecno=0 \global\subsubsecno=0
   \global\advance\unnumberedno by 1
 %
 % Since an unnumbered has no number, no prefix for figures.
 \global\let\chaplevelprefix = \empty
 \resetallfloatnos
 %
 % This used to be simply \message{#1}, but TeX fully expands the
 % argument to \message.  Therefore, if #1 contained @-commands, TeX
 % expanded them.  For example, in `@unnumbered The @cite{Book}', TeX
 % expanded @cite (which turns out to cause errors because \cite is meant
 % to be executed, not expanded).
 %
 % Anyway, we don't want the fully-expanded definition of @cite to appear
 % as a result of the \message, we just want `@cite' itself.  We use
 % \the<toks register> to achieve this: TeX expands \the<toks> only once,
 % simply yielding the contents of <toks register>.  (We also do this for
 % the toc entries.)
```

```
 \toks0 = {#1}%
 \message{(\the\toks0)}%
 %
 \chapmacro{#1}{Ynothing}{\the\unnumberedno}%
 %
 \global\let\section = \unnumberedsec
 \global\let\subsection = \unnumberedsubsec
 \global\let\subsubsection = \unnumberedsubsubsec
}

% @centerchap is like @unnumbered, but the heading is centered.
\outer\parseargdef\centerchap{%
 % Well, we could do the following in a group, but that would break
 % an assumption that \chapmacro is called at the outermost level.
 % Thus we are safer this way:  --kasal, 24feb04
 \let\centerparametersmaybe = \centerparameters
 \unnmhead0{#1}%
 \let\centerparametersmaybe = \relax
}

% @top is like @unnumbered.
\let\top\unnumbered

% Sections.
%
\outer\parseargdef\numberedsec{\numhead1{#1}} % normally calls seczzz
\def\seczzz#1{%
 \global\subsecno=0 \global\subsubsecno=0  \global\advance\secno by 1
 \sectionheading{#1}{sec}{Ynumbered}{\the\chapno.\the\secno}%
}

% normally calls appendixsectionzzz:
\outer\parseargdef\appendixsection{\apphead1{#1}}
\def\appendixsectionzzz#1{%
 \global\subsecno=0 \global\subsubsecno=0  \global\advance\secno by 1
 \sectionheading{#1}{sec}{Yappendix}{\appendixletter.\the\secno}%
}
\let\appendixsec\appendixsection

% normally calls unnumberedseczzz:
\outer\parseargdef\unnumberedsec{\unnmhead1{#1}}
\def\unnumberedseczzz#1{%
 \global\subsecno=0 \global\subsubsecno=0  \global\advance\secno by 1
 \sectionheading{#1}{sec}{Ynothing}{\the\unnumberedno.\the\secno}%
}

% Subsections.
%
```

```
% normally calls numberedsubseczzz:
\outer\parseargdef\numberedsubsec{\numhead2{#1}}
\def\numberedsubseczzz#1{%
 \global\subsubsecno=0  \global\advance\subsecno by 1
 \sectionheading{#1}{subsec}{Ynumbered}{\the\chapno.\the\secno.\the\subsecno}%
}

% normally calls appendixsubseczzz:
\outer\parseargdef\appendixsubsec{\apphead2{#1}}
\def\appendixsubseczzz#1{%
 \global\subsubsecno=0  \global\advance\subsecno by 1
 \sectionheading{#1}{subsec}{Yappendix}%
        {\appendixletter.\the\secno.\the\subsecno}%
}

% normally calls unnumberedsubseczzz:
\outer\parseargdef\unnumberedsubsec{\unnmhead2{#1}}
\def\unnumberedsubseczzz#1{%
 \global\subsubsecno=0  \global\advance\subsecno by 1
 \sectionheading{#1}{subsec}{Ynothing}%
        {\the\unnumberedno.\the\secno.\the\subsecno}%
}

% Subsubsections.
%
% normally numberedsubsubseczzz:
\outer\parseargdef\numberedsubsubsec{\numhead3{#1}}
\def\numberedsubsubseczzz#1{%
 \global\advance\subsubsecno by 1
 \sectionheading{#1}{subsubsec}{Ynumbered}%
        {\the\chapno.\the\secno.\the\subsecno.\the\subsubsecno}%
}

% normally appendixsubsubseczzz:
\outer\parseargdef\appendixsubsubsec{\apphead3{#1}}
\def\appendixsubsubseczzz#1{%
 \global\advance\subsubsecno by 1
 \sectionheading{#1}{subsubsec}{Yappendix}%
        {\appendixletter.\the\secno.\the\subsecno.\the\subsubsecno}%
}

% normally unnumberedsubsubseczzz:
\outer\parseargdef\unnumberedsubsubsec{\unnmhead3{#1}}
\def\unnumberedsubsubseczzz#1{%
 \global\advance\subsubsecno by 1
 \sectionheading{#1}{subsubsec}{Ynothing}%
        {\the\unnumberedno.\the\secno.\the\subsecno.\the\subsubsecno}%
}
```

```
% These macros control what the section commands do, according
% to what kind of chapter we are in (ordinary, appendix, or unnumbered).
% Define them by default for a numbered chapter.
\let\section = \numberedsec
\let\subsection = \numberedsubsec
\let\subsubsection = \numberedsubsubsec

% Define @majorheading, @heading and @subheading

\def\majorheading{%
 {\advance\chapheadingskip by 10pt \chapbreak }%
 \parsearg\chapheadingzzz
}

\def\chapheading{\chapbreak \parsearg\chapheadingzzz}
\def\chapheadingzzz#1{%
 \vbox{\chapfonts \raggedtitlesettings #1\par}%
 \nobreak\bigskip \nobreak
 \suppressfirstparagraphindent
}

% @heading, @subheading, @subsubheading.
\parseargdef\heading{\sectionheading{#1}{sec}{Yomitfromtoc}{}
 \suppressfirstparagraphindent}
\parseargdef\subheading{\sectionheading{#1}{subsec}{Yomitfromtoc}{}
 \suppressfirstparagraphindent}
\parseargdef\subsubheading{\sectionheading{#1}{subsubsec}{Yomitfromtoc}{}
 \suppressfirstparagraphindent}

% These macros generate a chapter, section, etc. heading only
% (including whitespace, linebreaking, etc. around it),
% given all the information in convenient, parsed form.

% Args are the skip and penalty (usually negative)
\def\dobreak#1#2{\par\ifdim\lastskip<#1\removelastskip\penalty#2\vskip#1\fi}

% Parameter controlling skip before chapter headings (if needed)
\newskip\chapheadingskip

% Define plain chapter starts, and page on/off switching for it.
\def\chapbreak{\dobreak \chapheadingskip {-4000}}
\def\chappager{\par\vfill\supereject}
% Because \domark is called before \chapoddpage, the filler page will
% get the headings for the next chapter, which is wrong.  But we don't
% care -- we just disable all headings on the filler page.
\def\chapoddpage{%
 \chappager
```

```
 \ifodd\pageno \else
   \begingroup
     \headingsoff
     \null
     \chappager
   \endgroup
 \fi
}

\def\setchapternewpage #1 {\csname CHAPPAG#1\endcsname}

\def\CHAPPAGoff{%
\global\let\contentsalignmacro = \chappager
\global\let\pchapsepmacro=\chapbreak
\global\let\pagealignmacro=\chappager}

\def\CHAPPAGon{%
\global\let\contentsalignmacro = \chappager
\global\let\pchapsepmacro=\chappager
\global\let\pagealignmacro=\chappager
\global\def\HEADINGSon{\HEADINGSsingle}}

\def\CHAPPAGodd{%
\global\let\contentsalignmacro = \chapoddpage
\global\let\pchapsepmacro=\chapoddpage
\global\let\pagealignmacro=\chapoddpage
\global\def\HEADINGSon{\HEADINGSdouble}}

\CHAPPAGon

% Chapter opening.
%
% #1 is the text, #2 is the section type (Ynumbered, Ynothing,
% Yappendix, Yomitfromtoc), #3 the chapter number.
%
% To test against our argument.
\def\Ynothingkeyword{Ynothing}
\def\Yomitfromtockeyword{Yomitfromtoc}
\def\Yappendixkeyword{Yappendix}
%
\def\chapmacro#1#2#3{%
 % Insert the first mark before the heading break (see notes for \domark).
 \let\prevchapterdefs=\lastchapterdefs
 \let\prevsectiondefs=\lastsectiondefs
 \gdef\lastsectiondefs{\gdef\thissectionname{}\gdef\thissectionnum{}%
                    \gdef\thissection{}}%
 %
 \def\temptype{#2}%
```

```
\ifx\temptype\Ynothingkeyword
  \gdef\lastchapterdefs{\gdef\thischaptername{#1}\gdef\thischapternum{}%
                \gdef\thischapter{\thischaptername}}%
\else\ifx\temptype\Yomitfromtockeyword
  \gdef\lastchapterdefs{\gdef\thischaptername{#1}\gdef\thischapternum{}%
                \gdef\thischapter{}}%
\else\ifx\temptype\Yappendixkeyword
  \toks0={#1}%
  \xdef\lastchapterdefs{%
    \gdef\noexpand\thischaptername{\the\toks0}%
    \gdef\noexpand\thischapternum{\appendixletter}%
    % \noexpand\putwordAppendix avoids expanding indigestible
    % commands in some of the translations.
    \gdef\noexpand\thischapter{\noexpand\putwordAppendix{}
                    \noexpand\thischapternum:
                    \noexpand\thischaptername}%
  }%
\else
  \toks0={#1}%
  \xdef\lastchapterdefs{%
    \gdef\noexpand\thischaptername{\the\toks0}%
    \gdef\noexpand\thischapternum{\the\chapno}%
    % \noexpand\putwordChapter avoids expanding indigestible
    % commands in some of the translations.
    \gdef\noexpand\thischapter{\noexpand\putwordChapter{}
                    \noexpand\thischapternum:
                    \noexpand\thischaptername}%
  }%
\fi\fi\fi
%
% Output the mark.  Pass it through \safewhatsit, to take care of
% the preceding space.
\safewhatsit\domark
%
% Insert the chapter heading break.
\pchapsepmacro
%
% Now the second mark, after the heading break.  No break points
% between here and the heading.
\let\prevchapterdefs=\lastchapterdefs
\let\prevsectiondefs=\lastsectiondefs
\domark
%
{%
  \chapfonts \rmisbold
  %
  % Have to define \lastsection before calling \donoderef, because the
  % xref code eventually uses it.  On the other hand, it has to be called
```

```
  % after \pchapsepmacro, or the headline will change too soon.
  \gdef\lastsection{#1}%
  %
  % Only insert the separating space if we have a chapter/appendix
  % number, and don't print the unnumbered ``number''.
  \ifx\temptype\Ynothingkeyword
    \setbox0 = \hbox{}%
    \def\toctype{unnchap}%
  \else\ifx\temptype\Yomitfromtockeyword
    \setbox0 = \hbox{}% contents like unnumbered, but no toc entry
    \def\toctype{omit}%
  \else\ifx\temptype\Yappendixkeyword
    \setbox0 = \hbox{\putwordAppendix{} #3\enspace}%
    \def\toctype{app}%
  \else
    \setbox0 = \hbox{#3\enspace}%
    \def\toctype{numchap}%
  \fi\fi\fi
  %
  % Write the toc entry for this chapter.  Must come before the
  % \donoderef, because we include the current node name in the toc
  % entry, and \donoderef resets it to empty.
  \writetocentry{\toctype}{#1}{#3}%
  %
  % For pdftex, we have to write out the node definition (aka, make
  % the pdfdest) after any page break, but before the actual text has
  % been typeset.  If the destination for the pdf outline is after the
  % text, then jumping from the outline may wind up with the text not
  % being visible, for instance under high magnification.
  \donoderef{#2}%
  %
  % Typeset the actual heading.
  \nobreak % Avoid page breaks at the interline glue.
  \vbox{\raggedtitlesettings \hangindent=\wd0 \centerparametersmaybe
        \unhbox0 #1\par}%
 }%
 \nobreak\bigskip % no page break after a chapter title
 \nobreak
}

% @centerchap -- centered and unnumbered.
\let\centerparametersmaybe = \relax
\def\centerparameters{%
 \advance\rightskip by 3\rightskip
 \leftskip = \rightskip
 \parfillskip = 0pt
}
```

```
% I don't think this chapter style is supported any more, so I'm not
% updating it with the new noderef stuff.  We'll see.  --karl, 11aug03.
%
\def\setchapterstyle #1 {\csname CHAPF#1\endcsname}
%
\def\unnchfopen #1{%
 \chapoddpage
 \vbox{\chapfonts \raggedtitlesettings #1\par}%
 \nobreak\bigskip\nobreak
}
\def\chfopen #1#2{\chapoddpage {\chapfonts
\vbox to 3in{\vfil \hbox to\hsize{\hfil #2} \hbox to\hsize{\hfil #1} \vfil}}%
\par\penalty 5000 %
}
\def\centerchfopen #1{%
 \chapoddpage
 \vbox{\chapfonts \raggedtitlesettings \hfill #1\hfill}%
 \nobreak\bigskip \nobreak
}
\def\CHAPFopen{%
 \global\let\chapmacro=\chfopen
 \global\let\centerchapmacro=\centerchfopen}


% Section titles.  These macros combine the section number parts and
% call the generic \sectionheading to do the printing.
%
\newskip\secheadingskip
\def\secheadingbreak{\dobreak \secheadingskip{-1000}}

% Subsection titles.
\newskip\subsecheadingskip
\def\subsecheadingbreak{\dobreak \subsecheadingskip{-500}}

% Subsubsection titles.
\def\subsubsecheadingskip{\subsecheadingskip}
\def\subsubsecheadingbreak{\subsecheadingbreak}


% Print any size, any type, section title.
%
% #1 is the text, #2 is the section level (sec/subsec/subsubsec), #3 is
% the section type for xrefs (Ynumbered, Ynothing, Yappendix), #4 is the
% section number.
%
\def\seckeyword{sec}
%
```

```
\def\sectionheading#1#2#3#4{%
 {%
  \checkenv{}% should not be in an environment.
  %
  % Switch to the right set of fonts.
  \csname #2fonts\endcsname \rmisbold
  %
  \def\sectionlevel{#2}%
  \def\temptype{#3}%
  %
  % Insert first mark before the heading break (see notes for \domark).
  \let\prevsectiondefs=\lastsectiondefs
  \ifx\temptype\Ynothingkeyword
    \ifx\sectionlevel\seckeyword
      \gdef\lastsectiondefs{\gdef\thissectionname{#1}\gdef\thissectionnum{}%
                            \gdef\thissection{\thissectionname}}%
    \fi
  \else\ifx\temptype\Yomitfromtockeyword
    % Don't redefine \thissection.
  \else\ifx\temptype\Yappendixkeyword
    \ifx\sectionlevel\seckeyword
      \toks0={#1}%
      \xdef\lastsectiondefs{%
        \gdef\noexpand\thissectionname{\the\toks0}%
        \gdef\noexpand\thissectionnum{#4}%
        % \noexpand\putwordSection avoids expanding indigestible
        % commands in some of the translations.
        \gdef\noexpand\thissection{\noexpand\putwordSection{}
                                   \noexpand\thissectionnum:
                                   \noexpand\thissectionname}%
      }%
    \fi
  \else
    \ifx\sectionlevel\seckeyword
      \toks0={#1}%
      \xdef\lastsectiondefs{%
        \gdef\noexpand\thissectionname{\the\toks0}%
        \gdef\noexpand\thissectionnum{#4}%
        % \noexpand\putwordSection avoids expanding indigestible
        % commands in some of the translations.
        \gdef\noexpand\thissection{\noexpand\putwordSection{}
                                   \noexpand\thissectionnum:
                                   \noexpand\thissectionname}%
      }%
    \fi
  \fi\fi\fi
  %
  % Go into vertical mode.  Usually we'll already be there, but we
```

```
% don't want the following whatsit to end up in a preceding paragraph
% if the document didn't happen to have a blank line.
\par
%
% Output the mark.  Pass it through \safewhatsit, to take care of
% the preceding space.
\safewhatsit\domark
%
% Insert space above the heading.
\csname #2headingbreak\endcsname
%
% Now the second mark, after the heading break.  No break points
% between here and the heading.
\let\prevsectiondefs=\lastsectiondefs
\domark
%
% Only insert the space after the number if we have a section number.
\ifx\temptype\Ynothingkeyword
  \setbox0 = \hbox{}%
  \def\toctype{unn}%
  \gdef\lastsection{#1}%
\else\ifx\temptype\Yomitfromtockeyword
  % for @headings -- no section number, don't include in toc,
  % and don't redefine \lastsection.
  \setbox0 = \hbox{}%
  \def\toctype{omit}%
  \let\sectionlevel=\empty
\else\ifx\temptype\Yappendixkeyword
  \setbox0 = \hbox{#4\enspace}%
  \def\toctype{app}%
  \gdef\lastsection{#1}%
\else
  \setbox0 = \hbox{#4\enspace}%
  \def\toctype{num}%
  \gdef\lastsection{#1}%
\fi\fi\fi
%
% Write the toc entry (before \donoderef).  See comments in \chapmacro.
\writetocentry{\toctype\sectionlevel}{#1}{#4}%
%
% Write the node reference (= pdf destination for pdftex).
% Again, see comments in \chapmacro.
\donoderef{#3}%
%
% Interline glue will be inserted when the vbox is completed.
% That glue will be a valid breakpoint for the page, since it'll be
% preceded by a whatsit (usually from the \donoderef, or from the
% \writetocentry if there was no node).  We don't want to allow that
```

```
  % break, since then the whatsits could end up on page n while the
  % section is on page n+1, thus toc/etc. are wrong.  Debian bug 276000.
  \nobreak
  %
  % Output the actual section heading.
  \vbox{\hyphenpenalty=10000 \tolerance=5000 \parindent=0pt \ptexraggedright
        \hangindent=\wd0  % zero if no section number
        \unhbox0 #1}%
 }%
 % Add extra space after the heading -- half of whatever came above it.
 % Don't allow stretch, though.
 \kern .5 \csname #2headingskip\endcsname
 %
 % Do not let the kern be a potential breakpoint, as it would be if it
 % was followed by glue.
 \nobreak
 %
 % We'll almost certainly start a paragraph next, so don't let that
 % glue accumulate.  (Not a breakpoint because it's preceded by a
 % discardable item.)  However, when a paragraph is not started next
 % (\startdefun, \cartouche, \center, etc.), this needs to be wiped out
 % or the negative glue will cause weirdly wrong output, typically
 % obscuring the section heading with something else.
 \vskip-\parskip
 %
 % This is so the last item on the main vertical list is a known
 % \penalty > 10000, so \startdefun, etc., can recognize the situation
 % and do the needful.
 \penalty 10001
}


\message{toc,}
% Table of contents.
\newwrite\tocfile

% Write an entry to the toc file, opening it if necessary.
% Called from @chapter, etc.
%
% Example usage: \writetocentry{sec}{Section Name}{\the\chapno.\the\secno}
% We append the current node name (if any) and page number as additional
% arguments for the \{chap,sec,...}entry macros which will eventually
% read this.  The node name is used in the pdf outlines as the
% destination to jump to.
%
% We open the .toc file for writing here instead of at @setfilename (or
% any other fixed time) so that @contents can be anywhere in the document.
% But if #1 is `omit', then we don't do anything.  This is used for the
```

```
% table of contents chapter openings themselves.
%
\newif\iftocfileopened
\def\omitkeyword{omit}%
%
\def\writetocentry#1#2#3{%
 \edef\writetoctype{#1}%
 \ifx\writetoctype\omitkeyword \else
   \iftocfileopened\else
     \immediate\openout\tocfile = \jobname.toc
     \global\tocfileopenedtrue
   \fi
   %
   \iflinks
     {\atdummies
      \edef\temp{%
        \write\tocfile{@#1entry{#2}{#3}{\lastnode}{\noexpand\folio}}}%
      \temp
     }%
   \fi
 \fi
 %
 % Tell \shipout to create a pdf destination on each page, if we're
 % writing pdf.  These are used in the table of contents.  We can't
 % just write one on every page because the title pages are numbered
 % 1 and 2 (the page numbers aren't printed), and so are the first
 % two pages of the document.  Thus, we'd have two destinations named
 % `1', and two named `2'.
 \ifpdf \global\pdfmakepagedesttrue \fi
}


% These characters do not print properly in the Computer Modern roman
% fonts, so we must take special care.  This is more or less redundant
% with the Texinfo input format setup at the end of this file.
%
\def\activecatcodes{%
 \catcode`\"=\active
 \catcode`\$=\active
 \catcode`\<=\active
 \catcode`\>=\active
 \catcode`\\=\active
 \catcode`\^=\active
 \catcode`\_=\active
 \catcode`\|=\active
 \catcode`\~=\active
}
```

```
% Read the toc file, which is essentially Texinfo input.
\def\readtocfile{%
 \setupdatafile
 \activecatcodes
 \input \tocreadfilename
}

\newskip\contentsrightmargin \contentsrightmargin=1in
\newcount\savepageno
\newcount\lastnegativepageno \lastnegativepageno = -1

% Prepare to read what we've written to \tocfile.
%
\def\startcontents#1{%
 % If @setchapternewpage on, and @headings double, the contents should
 % start on an odd page, unlike chapters.  Thus, we maintain
 % \contentsalignmacro in parallel with \pagealignmacro.
 % From: Torbjorn Granlund <tege@matematik.su.se>
 \contentsalignmacro
 \immediate\closeout\tocfile
 %
 % Don't need to put `Contents' or `Short Contents' in the headline.
 % It is abundantly clear what they are.
 \chapmacro{#1}{Yomitfromtoc}{}%
 %
 \savepageno = \pageno
 \begingroup                % Set up to handle contents files properly.
   \raggedbottom             % Worry more about breakpoints than the bottom.
   \advance\hsize by -\contentsrightmargin % Don't use the full line length.
   %
   % Roman numerals for page numbers.
   \ifnum \pageno>0 \global\pageno = \lastnegativepageno \fi
}

% redefined for the two-volume lispref.  We always output on
% \jobname.toc even if this is redefined.
%
\def\tocreadfilename{\jobname.toc}

% Normal (long) toc.
%
\def\contents{%
 \startcontents{\putwordTOC}%
   \openin 1 \tocreadfilename\space
   \ifeof 1 \else
     \readtocfile
   \fi
```

```
  \vfill \eject
  \contentsalignmacro % in case @setchapternewpage odd is in effect
  \ifeof 1 \else
    \pdfmakeoutlines
  \fi
  \closein 1
 \endgroup
 \lastnegativepageno = \pageno
 \global\pageno = \savepageno
}

% And just the chapters.
\def\summarycontents{%
 \startcontents{\putwordShortTOC}%
  %
  \let\partentry = \shortpartentry
  \let\numchapentry = \shortchapentry
  \let\appentry = \shortchapentry
  \let\unnchapentry = \shortunnchapentry
  % We want a true roman here for the page numbers.
  \secfonts
  \let\rm=\shortcontrm \let\bf=\shortcontbf
  \let\sl=\shortcontsl \let\tt=\shortconttt
  \rm
  \hyphenpenalty = 10000
  \advance\baselineskip by 1pt % Open it up a little.
  \def\numsecentry##1##2##3##4{}
  \let\appsecentry = \numsecentry
  \let\unnsecentry = \numsecentry
  \let\numsubsecentry = \numsecentry
  \let\appsubsecentry = \numsecentry
  \let\unnsubsecentry = \numsecentry
  \let\numsubsubsecentry = \numsecentry
  \let\appsubsubsecentry = \numsecentry
  \let\unnsubsubsecentry = \numsecentry
  \openin 1 \tocreadfilename\space
  \ifeof 1 \else
    \readtocfile
  \fi
  \closein 1
  \vfill \eject
  \contentsalignmacro % in case @setchapternewpage odd is in effect
 \endgroup
 \lastnegativepageno = \pageno
 \global\pageno = \savepageno
}
\let\shortcontents = \summarycontents
```

```
% Typeset the label for a chapter or appendix for the short contents.
% The arg is, e.g., `A' for an appendix, or `3' for a chapter.
%
\def\shortchaplabel#1{%
 % This space should be enough, since a single number is .5em, and the
 % widest letter (M) is 1em, at least in the Computer Modern fonts.
 % But use \hss just in case.
 % (This space doesn't include the extra space that gets added after
 % the label; that gets put in by \shortchapentry above.)
 %
 % We'd like to right-justify chapter numbers, but that looks strange
 % with appendix letters.  And right-justifying numbers and
 % left-justifying letters looks strange when there is less than 10
 % chapters.  Have to read the whole toc once to know how many chapters
 % there are before deciding ...
 \hbox to 1em{#1\hss}%
}

% These macros generate individual entries in the table of contents.
% The first argument is the chapter or section name.
% The last argument is the page number.
% The arguments in between are the chapter number, section number, ...

% Parts, in the main contents.  Replace the part number, which doesn't
% exist, with an empty box.  Let's hope all the numbers have the same width.
% Also ignore the page number, which is conventionally not printed.
\def\numeralbox{\setbox0=\hbox{8}\hbox to \wd0{\hfil}}
\def\partentry#1#2#3#4{\dochapentry{\numeralbox\labelspace#1}{}}
%
% Parts, in the short toc.
\def\shortpartentry#1#2#3#4{%
 \penalty-300
 \vskip.5\baselineskip plus.15\baselineskip minus.1\baselineskip
 \shortchapentry{{\bf #1}}{\numeralbox}{}{}%
}

% Chapters, in the main contents.
\def\numchapentry#1#2#3#4{\dochapentry{#2\labelspace#1}{#4}}
%
% Chapters, in the short toc.
% See comments in \dochapentry re vbox and related settings.
\def\shortchapentry#1#2#3#4{%
 \tocentry{\shortchaplabel{#2}\labelspace #1}{\doshortpageno\bgroup#4\egroup}%
}

% Appendices, in the main contents.
% Need the word Appendix, and a fixed-size box.
%
```

```
\def\appendixbox#1{%
 % We use M since it's probably the widest letter.
 \setbox0 = \hbox{\putwordAppendix{} M}%
 \hbox to \wd0{\putwordAppendix{} #1\hss}}
%
\def\appentry#1#2#3#4{\dochapentry{\appendixbox{#2}\labelspace#1}{#4}}

% Unnumbered chapters.
\def\unnchapentry#1#2#3#4{\dochapentry{#1}{#4}}
\def\shortunnchapentry#1#2#3#4{\tocentry{#1}{\doshortpageno\bgroup#4\egroup}}

% Sections.
\def\numsecentry#1#2#3#4{\dosecentry{#2\labelspace#1}{#4}}
\let\appsecentry=\numsecentry
\def\unnsecentry#1#2#3#4{\dosecentry{#1}{#4}}

% Subsections.
\def\numsubsecentry#1#2#3#4{\dosubsecentry{#2\labelspace#1}{#4}}
\let\appsubsecentry=\numsubsecentry
\def\unnsubsecentry#1#2#3#4{\dosubsecentry{#1}{#4}}

% And subsubsections.
\def\numsubsubsecentry#1#2#3#4{\dosubsubsecentry{#2\labelspace#1}{#4}}
\let\appsubsubsecentry=\numsubsubsecentry
\def\unnsubsubsecentry#1#2#3#4{\dosubsubsecentry{#1}{#4}}

% This parameter controls the indentation of the various levels.
% Same as \defaultparindent.
\newdimen\tocindent \tocindent = 15pt

% Now for the actual typesetting. In all these, #1 is the text and #2 is the
% page number.
%
% If the toc has to be broken over pages, we want it to be at chapters
% if at all possible; hence the \penalty.
\def\dochapentry#1#2{%
  \penalty-300 \vskip1\baselineskip plus.33\baselineskip minus.25\baselineskip
  \begingroup
    \chapentryfonts
    \tocentry{#1}{\dopageno\bgroup#2\egroup}%
  \endgroup
  \nobreak\vskip .25\baselineskip plus.1\baselineskip
}

\def\dosecentry#1#2{\begingroup
 \secentryfonts \leftskip=\tocindent
 \tocentry{#1}{\dopageno\bgroup#2\egroup}%
\endgroup}
```

```
\def\dosubsecentry#1#2{\begingroup
 \subsecentryfonts \leftskip=2\tocindent
 \tocentry{#1}{\dopageno\bgroup#2\egroup}%
\endgroup}

\def\dosubsubsecentry#1#2{\begingroup
 \subsubsecentryfonts \leftskip=3\tocindent
 \tocentry{#1}{\dopageno\bgroup#2\egroup}%
\endgroup}

% We use the same \entry macro as for the index entries.
\let\tocentry = \entry

% Space between chapter (or whatever) number and the title.
\def\labelspace{\hskip1em \relax}

\def\dopageno#1{{\rm #1}}
\def\doshortpageno#1{{\rm #1}}

\def\chapentryfonts{\secfonts \rm}
\def\secentryfonts{\textfonts}
\def\subsecentryfonts{\textfonts}
\def\subsubsecentryfonts{\textfonts}


\message{environments,}
% @foo ... @end foo.

% @tex ... @end tex    escapes into raw TeX temporarily.
% One exception: @ is still an escape character, so that @end tex works.
% But \@ or @@ will get a plain @ character.

\envdef\tex{%
 \setupmarkupstyle{tex}%
 \catcode `\\=0 \catcode `\{=1 \catcode `\}=2
 \catcode `\$=3 \catcode `\&=4 \catcode `\#=6
 \catcode `\^=7 \catcode `\_=8 \catcode `\~=\active \let~=\tie
 \catcode `\%=14
 \catcode `\+=\other
 \catcode `\"=\other
 \catcode `\|=\other
 \catcode `\<=\other
 \catcode `\>=\other
 \catcode`\`=\other
 \catcode`\'=\other
 \escapechar=`\\
 %
```

```
 % ' is active in math mode (mathcode"8000).  So reset it, and all our
 % other math active characters (just in case), to plain's definitions.
 \mathactive
 %
 \let\b=\ptexb
 \let\bullet=\ptexbullet
 \let\c=\ptexc
 \let\,=\ptexcomma
 \let\.=\ptexdot
 \let\dots=\ptexdots
 \let\equiv=\ptexequiv
 \let\!=\ptexexclam
 \let\i=\ptexi
 \let\indent=\ptexindent
 \let\noindent=\ptexnoindent
 \let\{=\ptexlbrace
 \let\+=\tabalign
 \let\}=\ptexrbrace
 \let\/=\ptexslash
 \let\*=\ptexstar
 \let\t=\ptext
 \expandafter \let\csname top\endcsname=\ptextop  % outer
 \let\frenchspacing=\plainfrenchspacing
 %
 \def\endldots{\mathinner{\ldots\ldots\ldots\ldots}}%
 \def\enddots{\relax\ifmmode\endldots\else$\mathsurround=0pt \endldots\,$\fi}%
 \def\@{@}%
}
% There is no need to define \Etex.

% Define @lisp ... @end lisp.
% @lisp environment forms a group so it can rebind things,
% including the definition of @end lisp (which normally is erroneous).

% Amount to narrow the margins by for @lisp.
\newskip\lispnarrowing \lispnarrowing=0.4in

% This is the definition that ^^M gets inside @lisp, @example, and other
% such environments.  \null is better than a space, since it doesn't
% have any width.
\def\lisppar{\null\endgraf}

% This space is always present above and below environments.
\newskip\envskipamount \envskipamount = 0pt

% Make spacing and below environment symmetrical.  We use \parskip here
% to help in doing that, since in @example-like environments \parskip
% is reset to zero; thus the \afterenvbreak inserts no space -- but the
```

```
% start of the next paragraph will insert \parskip.
%
\def\aboveenvbreak{{%
 % =10000 instead of <10000 because of a special case in \itemzzz and
 % \sectionheading, q.v.
 \ifnum \lastpenalty=10000 \else
   \advance\envskipamount by \parskip
   \endgraf
   \ifdim\lastskip<\envskipamount
     \removelastskip
     % it's not a good place to break if the last penalty was \nobreak
     % or better ...
     \ifnum\lastpenalty<10000 \penalty-50 \fi
     \vskip\envskipamount
   \fi
 \fi
}}

\let\afterenvbreak = \aboveenvbreak

% \nonarrowing is a flag.  If "set", @lisp etc don't narrow margins; it will
% also clear it, so that its embedded environments do the narrowing again.
\let\nonarrowing=\relax

% @cartouche ... @end cartouche: draw rectangle w/rounded corners around
% environment contents.
\font\circle=lcircle10
\newdimen\circthick
\newdimen\cartouter\newdimen\cartinner
\newskip\normbskip\newskip\normpskip\newskip\normlskip
\circthick=\fontdimen8\circle
%
\def\ctl{{\circle\char'013\hskip -6pt}}% 6pt from pl file: 1/2charwidth
\def\ctr{{\hskip 6pt\circle\char'010}}
\def\cbl{{\circle\char'012\hskip -6pt}}
\def\cbr{{\hskip 6pt\circle\char'011}}
\def\carttop{\hbox to \cartouter{\hskip\lskip
      \ctl\leaders\hrule height\circthick\hfil\ctr
      \hskip\rskip}}
\def\cartbot{\hbox to \cartouter{\hskip\lskip
      \cbl\leaders\hrule height\circthick\hfil\cbr
      \hskip\rskip}}
%
\newskip\lskip\newskip\rskip

\envdef\cartouche{%
 \ifhmode\par\fi  % can't be in the midst of a paragraph.
 \startsavinginserts
```

```
\lskip=\leftskip \rskip=\rightskip
\leftskip=0pt\rightskip=0pt % we want these *outside*.
\cartinner=\hsize \advance\cartinner by-\lskip
\advance\cartinner by-\rskip
\cartouter=\hsize
\advance\cartouter by 18.4pt % allow for 3pt kerns on either
   % side, and for 6pt waste from
   % each corner char, and rule thickness
\normbskip=\baselineskip \normpskip=\parskip \normlskip=\lineskip
% Flag to tell @lisp, etc., not to narrow margin.
\let\nonarrowing = t%
%
% If this cartouche directly follows a sectioning command, we need the
% \parskip glue (backspaced over by default) or the cartouche can
% collide with the section heading.
\ifnum\lastpenalty>10000 \vskip\parskip \penalty\lastpenalty \fi
%
\vbox\bgroup
    \baselineskip=0pt\parskip=0pt\lineskip=0pt
    \carttop
    \hbox\bgroup
  \hskip\lskip
  \vrule\kern3pt
  \vbox\bgroup
      \kern3pt
      \hsize=\cartinner
      \baselineskip=\normbskip
      \lineskip=\normlskip
      \parskip=\normpskip
      \vskip -\parskip
      \comment % For explanation, see the end of def\group.
}
\def\Ecartouche{%
            \ifhmode\par\fi
      \kern3pt
  \egroup
  \kern3pt\vrule
  \hskip\rskip
    \egroup
    \cartbot
 \egroup
 \checkinserts
}


% This macro is called at the beginning of all the @example variants,
% inside a group.
\newdimen\nonfillparindent
```

```
\def\nonfillstart{%
 \aboveenvbreak
 \hfuzz = 12pt % Don't be fussy
 \sepspaces % Make spaces be word-separators rather than space tokens.
 \let\par = \lisppar % don't ignore blank lines
 \obeylines % each line of input is a line of output
 \parskip = 0pt
 % Turn off paragraph indentation but redefine \indent to emulate
 % the normal \indent.
 \nonfillparindent=\parindent
 \parindent = 0pt
 \let\indent\nonfillindent
 %
 \emergencystretch = 0pt % don't try to avoid overfull boxes
 \ifx\nonarrowing\relax
   \advance \leftskip by \lispnarrowing
   \exdentamount=\lispnarrowing
 \else
   \let\nonarrowing = \relax
 \fi
 \let\exdent=\nofillexdent
}

\begingroup
\obeyspaces
% We want to swallow spaces (but not other tokens) after the fake
% @indent in our nonfill-environments, where spaces are normally
% active and set to @tie, resulting in them not being ignored after
% @indent.
\gdef\nonfillindent{\futurelet\temp\nonfillindentcheck}%
\gdef\nonfillindentcheck{%
\ifx\temp %
\expandafter\nonfillindentgobble%
\else%
\leavevmode\nonfillindentbox%
\fi%
}%
\endgroup
\def\nonfillindentgobble#1{\nonfillindent}
\def\nonfillindentbox{\hbox to \nonfillparindent{\hss}}

% If you want all examples etc. small: @set dispenvsize small.
% If you want even small examples the full size: @set dispenvsize nosmall.
% This affects the following displayed environments:
%    @example, @display, @format, @lisp
%
\def\smallword{small}
\def\nosmallword{nosmall}
```

```
\let\SETdispenvsize\relax
\def\setnormaldispenv{%
 \ifx\SETdispenvsize\smallword
   % end paragraph for sake of leading, in case document has no blank
   % line.  This is redundant with what happens in \aboveenvbreak, but
   % we need to do it before changing the fonts, and it's inconvenient
   % to change the fonts afterward.
   \ifnum \lastpenalty=10000 \else \endgraf \fi
   \smallexamplefonts \rm
 \fi
}
\def\setsmalldispenv{%
 \ifx\SETdispenvsize\nosmallword
 \else
   \ifnum \lastpenalty=10000 \else \endgraf \fi
   \smallexamplefonts \rm
 \fi
}

% We often define two environments, @foo and @smallfoo.
% Let's do it in one command.  #1 is the env name, #2 the definition.
\def\makedispenvdef#1#2{%
 \expandafter\envdef\csname#1\endcsname {\setnormaldispenv #2}%
 \expandafter\envdef\csname small#1\endcsname {\setsmalldispenv #2}%
 \expandafter\let\csname E#1\endcsname \afterenvbreak
 \expandafter\let\csname Esmall#1\endcsname \afterenvbreak
}

% Define two environment synonyms (#1 and #2) for an environment.
\def\maketwodispenvdef#1#2#3{%
 \makedispenvdef{#1}{#3}%
 \makedispenvdef{#2}{#3}%
}
%
% @lisp: indented, narrowed, typewriter font;
% @example: same as @lisp.
%
% @smallexample and @smalllisp: use smaller fonts.
% Originally contributed by Pavel@xerox.
%
\maketwodispenvdef{lisp}{example}{%
 \nonfillstart
 \tt\setupmarkupstyle{example}%
 \let\kbdfont = \kbdexamplefont % Allow @kbd to do something special.
 \gobble % eat return
}
% @display/@smalldisplay: same as @lisp except keep current font.
%
```

```
\makedispenvdef{display}{%
 \nonfillstart
 \gobble
}

% @format/@smallformat: same as @display except don't narrow margins.
%
\makedispenvdef{format}{%
 \let\nonarrowing = t%
 \nonfillstart
 \gobble
}

% @flushleft: same as @format, but doesn't obey \SETdispenvsize.
\envdef\flushleft{%
 \let\nonarrowing = t%
 \nonfillstart
 \gobble
}
\let\Eflushleft = \afterenvbreak

% @flushright.
%
\envdef\flushright{%
 \let\nonarrowing = t%
 \nonfillstart
 \advance\leftskip by 0pt plus 1fill\relax
 \gobble
}
\let\Eflushright = \afterenvbreak


% @raggedright does more-or-less normal line breaking but no right
% justification.  From plain.tex.
\envdef\raggedright{%
 \rightskip0pt plus2em \spaceskip.3333em \xspaceskip.5em\relax
}
\let\Eraggedright\par

\envdef\raggedleft{%
 \parindent=0pt \leftskip0pt plus2em
 \spaceskip.3333em \xspaceskip.5em \parfillskip=0pt
 \hbadness=10000 % Last line will usually be underfull, so turn off
                 % badness reporting.
}
\let\Eraggedleft\par

\envdef\raggedcenter{%
```

```
 \parindent=0pt \rightskip0pt plus1em \leftskip0pt plus1em
 \spaceskip.3333em \xspaceskip.5em \parfillskip=0pt
 \hbadness=10000 % Last line will usually be underfull, so turn off
                 % badness reporting.
}
\let\Eraggedcenter\par


% @quotation does normal linebreaking (hence we can't use \nonfillstart)
% and narrows the margins.  We keep \parskip nonzero in general, since
% we're doing normal filling.  So, when using \aboveenvbreak and
% \afterenvbreak, temporarily make \parskip 0.
%
\makedispenvdef{quotation}{\quotationstart}
%
\def\quotationstart{%
 \indentedblockstart % same as \indentedblock, but increase right margin too.
 \ifx\nonarrowing\relax
   \advance\rightskip by \lispnarrowing
 \fi
 \parsearg\quotationlabel
}

% We have retained a nonzero parskip for the environment, since we're
% doing normal filling.
%
\def\Equotation{%
 \par
 \ifx\quotationauthor\thisisundefined\else
   % indent a bit.
   \leftline{\kern 2\leftskip \sl ---\quotationauthor}%
 \fi
 {\parskip=0pt \afterenvbreak}%
}
\def\Esmallquotation{\Equotation}

% If we're given an argument, typeset it in bold with a colon after.
\def\quotationlabel#1{%
 \def\temp{#1}%
 \ifx\temp\empty \else
   {\bf #1: }%
 \fi
}

% @indentedblock is like @quotation, but indents only on the left and
% has no optional argument.
%
\makedispenvdef{indentedblock}{\indentedblockstart}
```

```
%
\def\indentedblockstart{%
 {\parskip=0pt \aboveenvbreak}% because \aboveenvbreak inserts \parskip
 \parindent=0pt
 %
 % @cartouche defines \nonarrowing to inhibit narrowing at next level down.
 \ifx\nonarrowing\relax
   \advance\leftskip by \lispnarrowing
   \exdentamount = \lispnarrowing
 \else
   \let\nonarrowing = \relax
 \fi
}

% Keep a nonzero parskip for the environment, since we're doing normal filling.
%
\def\Eindentedblock{%
 \par
 {\parskip=0pt \afterenvbreak}%
}
\def\Esmallindentedblock{\Eindentedblock}


% LaTeX-like @verbatim...@end verbatim and @verb{<char>...<char>}
% If we want to allow any <char> as delimiter,
% we need the curly braces so that makeinfo sees the @verb command, eg:
% `@verbx...x' would look like the '@verbx' command.  --janneke@gnu.org
%
% [Knuth]: Donald Ervin Knuth, 1996.  The TeXbook.
%
% [Knuth] p.344; only we need to do the other characters Texinfo sets
% active too.  Otherwise, they get lost as the first character on a
% verbatim line.
\def\dospecials{%
 \do\ \do\\\do\{\do\}\do\$\do\&%
 \do\#\do\^\do\^^K\do\_\do\^^A\do\%\do\~%
 \do\<\do\>\do\|\do\@\do+\do\"%
 % Don't do the quotes -- if we do, @set txicodequoteundirected and
 % @set txicodequotebacktick will not have effect on @verb and
 % @verbatim, and ?` and !` ligatures won't get disabled.
 %\do\`\do\'%
}
%
% [Knuth] p. 380
\def\uncatcodespecials{%
 \def\do##1{\catcode`##1=\other}\dospecials}
%
% Setup for the @verb command.
```

```
%
% Eight spaces for a tab
\begingroup
 \catcode`\^^I=\active
 \gdef\tabeightspaces{\catcode`\^^I=\active\def^^I{\ \ \ \ \ \ \ \ }}
\endgroup
%
\def\setupverb{%
 \tt  % easiest (and conventionally used) font for verbatim
 \def\par{\leavevmode\endgraf}%
 \setupmarkupstyle{verb}%
 \tabeightspaces
 % Respect line breaks,
 % print special symbols as themselves, and
 % make each space count
 % must do in this order:
 \obeylines \uncatcodespecials \sepspaces
}

% Setup for the @verbatim environment
%
% Real tab expansion.
\newdimen\tabw \setbox0=\hbox{\tt\space} \tabw=8\wd0 % tab amount
%
% We typeset each line of the verbatim in an \hbox, so we can handle
% tabs.  The \global is in case the verbatim line starts with an accent,
% or some other command that starts with a begin-group.  Otherwise, the
% entire \verbbox would disappear at the corresponding end-group, before
% it is typeset.  Meanwhile, we can't have nested verbatim commands
% (can we?), so the \global won't be overwriting itself.
\newbox\verbbox
\def\starttabbox{\global\setbox\verbbox=\hbox\bgroup}
%
\begingroup
 \catcode`\^^I=\active
 \gdef\tabexpand{%
   \catcode`\^^I=\active
   \def^^I{\leavevmode\egroup
     \dimen\verbbox=\wd\verbbox % the width so far, or since the previous tab
     \divide\dimen\verbbox by\tabw
     \multiply\dimen\verbbox by\tabw % compute previous multiple of \tabw
     \advance\dimen\verbbox by\tabw  % advance to next multiple of \tabw
     \wd\verbbox=\dimen\verbbox \box\verbbox \starttabbox
   }%
 }
\endgroup

% start the verbatim environment.
```

```
\def\setupverbatim{%
 \let\nonarrowing = t%
 \nonfillstart
 \tt % easiest (and conventionally used) font for verbatim
 % The \leavevmode here is for blank lines.  Otherwise, we would
 % never \starttabox and the \egroup would end verbatim mode.
 \def\par{\leavevmode\egroup\box\verbbox\endgraf}%
 \tabexpand
 \setupmarkupstyle{verbatim}%
 % Respect line breaks,
 % print special symbols as themselves, and
 % make each space count.
 % Must do in this order:
 \obeylines \uncatcodespecials \sepspaces
 \everypar{\starttabbox}%
}

% Do the @verb magic: verbatim text is quoted by unique
% delimiter characters.  Before first delimiter expect a
% right brace, after last delimiter expect closing brace:
%
%    \def\doverb'{'<char>#1<char>'}'{#1}
%
% [Knuth] p. 382; only eat outer {}
\begingroup
 \catcode`[=1\catcode`]=2\catcode`\{=\other\catcode`\}=\other
 \gdef\doverb{#1[\def\next##1#1}[##1\endgroup]\next]
\endgroup
%
\def\verb{\begingroup\setupverb\doverb}
%
%
% Do the @verbatim magic: define the macro \doverbatim so that
% the (first) argument ends when '@end verbatim' is reached, ie:
%
%     \def\doverbatim#1@end verbatim{#1}
%
% For Texinfo it's a lot easier than for LaTeX,
% because texinfo's \verbatim doesn't stop at '\end{verbatim}':
% we need not redefine '\', '{' and '}'.
%
% Inspired by LaTeX's verbatim command set [latex.ltx]
%
\begingroup
 \catcode`\ =\active
 \obeylines %
 % ignore everything up to the first ^^M, that's the newline at the end
 % of the @verbatim input line itself.  Otherwise we get an extra blank
```

```
 % line in the output.
 \xdef\doverbatim#1^^M#2@end verbatim{#2\noexpand\end\gobble verbatim}%
 % We really want {...\end verbatim} in the body of the macro, but
 % without the active space; thus we have to use \xdef and \gobble.
\endgroup
%
\envdef\verbatim{%
   \setupverbatim\doverbatim
}
\let\Everbatim = \afterenvbreak


% @verbatiminclude FILE - insert text of file in verbatim environment.
%
\def\verbatiminclude{\parseargusing\filenamecatcodes\doverbatiminclude}
%
\def\doverbatiminclude#1{%
 {%
   \makevalueexpandable
   \setupverbatim
   \indexnofonts       % Allow `@@' and other weird things in file names.
   \wlog{texinfo.tex: doing @verbatiminclude of #1^^J}%
   \input #1
   \afterenvbreak
 }%
}

% @copying ... @end copying.
% Save the text away for @insertcopying later.
%
% We save the uninterpreted tokens, rather than creating a box.
% Saving the text in a box would be much easier, but then all the
% typesetting commands (@smallbook, font changes, etc.) have to be done
% beforehand -- and a) we want @copying to be done first in the source
% file; b) letting users define the frontmatter in as flexible order as
% possible is very desirable.
%
\def\copying{\checkenv{}\begingroup\scanargctxt\docopying}
\def\docopying#1@end copying{\endgroup\def\copyingtext{#1}}
%
\def\insertcopying{%
 \begingroup
   \parindent = 0pt  % paragraph indentation looks wrong on title page
   \scanexp\copyingtext
 \endgroup
}
```

```
\message{defuns,}
% @defun etc.

\newskip\defbodyindent \defbodyindent=.4in
\newskip\defargsindent \defargsindent=50pt
\newskip\deflastargmargin \deflastargmargin=18pt
\newcount\defunpenalty

% Start the processing of @deffn:
\def\startdefun{%
 \ifnum\lastpenalty<10000
   \medbreak
   \defunpenalty=10003 % Will keep this @deffn together with the
                       % following @def command, see below.
 \else
   % If there are two @def commands in a row, we'll have a \nobreak,
   % which is there to keep the function description together with its
   % header.  But if there's nothing but headers, we need to allow a
   % break somewhere.  Check specifically for penalty 10002, inserted
   % by \printdefunline, instead of 10000, since the sectioning
   % commands also insert a nobreak penalty, and we don't want to allow
   % a break between a section heading and a defun.
   %
   % As a further refinement, we avoid "club" headers by signalling
   % with penalty of 10003 after the very first @deffn in the
   % sequence (see above), and penalty of 10002 after any following
   % @def command.
   \ifnum\lastpenalty=10002 \penalty2000 \else \defunpenalty=10002 \fi
   %
   % Similarly, after a section heading, do not allow a break.
   % But do insert the glue.
   \medskip  % preceded by discardable penalty, so not a breakpoint
 \fi
 %
 \parindent=0in
 \advance\leftskip by \defbodyindent
 \exdentamount=\defbodyindent
}

\def\dodefunx#1{%
 % First, check whether we are in the right environment:
 \checkenv#1%
 %
 % As above, allow line break if we have multiple x headers in a row.
 % It's not a great place, though.
 \ifnum\lastpenalty=10002 \penalty3000 \else \defunpenalty=10002 \fi
 %
 % And now, it's time to reuse the body of the original defun:
```

```
 \expandafter\gobbledefun#1%
}
\def\gobbledefun#1\startdefun{}

% \printdefunline \deffnheader{text}
%
\def\printdefunline#1#2{%
 \begingroup
   % call \deffnheader:
   #1#2 \endheader
   % common ending:
   \interlinepenalty = 10000
   \advance\rightskip by 0pt plus 1fil\relax
   \endgraf
   \nobreak\vskip -\parskip
   \penalty\defunpenalty  % signal to \startdefun and \dodefunx
   % Some of the @defun-type tags do not enable magic parentheses,
   % rendering the following check redundant.  But we don't optimize.
   \checkparencounts
 \endgroup
}

\def\Edefun{\endgraf\medbreak}

% \makedefun{deffn} creates \deffn, \deffnx and \Edeffn;
% the only thing remaining is to define \deffnheader.
%
\def\makedefun#1{%
 \expandafter\let\csname E#1\endcsname = \Edefun
 \edef\temp{\noexpand\domakedefun
   \makecsname{#1}\makecsname{#1x}\makecsname{#1header}}%
 \temp
}

% \domakedefun \deffn \deffnx \deffnheader
%
% Define \deffn and \deffnx, without parameters.
% \deffnheader has to be defined explicitly.
%
\def\domakedefun#1#2#3{%
 \envdef#1{%
   \startdefun
   \doingtypefnfalse    % distinguish typed functions from all else
   \parseargusing\activeparens{\printdefunline#3}%
 }%
 \def#2{\dodefunx#1}%
 \def#3%
}
```

```
\newif\ifdoingtypefn       % doing typed function?
\newif\ifrettypeownline    % typeset return type on its own line?

% @deftypefnnewline on|off says whether the return type of typed functions
% are printed on their own line.  This affects @deftypefn, @deftypefun,
% @deftypeop, and @deftypemethod.
%
\parseargdef\deftypefnnewline{%
 \def\temp{#1}%
 \ifx\temp\onword
   \expandafter\let\csname SETtxideftypefnnl\endcsname
     = \empty
 \else\ifx\temp\offword
   \expandafter\let\csname SETtxideftypefnnl\endcsname
     = \relax
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @txideftypefnnl value `\temp',
               must be on|off}%
 \fi\fi
}

% Untyped functions:

% @deffn category name args
\makedefun{deffn}{\deffngeneral{}}

% @deffn category class name args
\makedefun{defop}#1 {\defopon{#1\ \putwordon}}

% \defopon {category on}class name args
\def\defopon#1#2 {\deffngeneral{\putwordon\ \code{#2}}{#1\ \code{#2}} }

% \deffngeneral {subind}category name args
%
\def\deffngeneral#1#2 #3 #4\endheader{%
 % Remember that \dosubind{fn}{foo}{} is equivalent to \doind{fn}{foo}.
 \dosubind{fn}{\code{#3}}{#1}%
 \defname{#2}{}{#3}\magicamp\defunargs{#4\unskip}%
}

% Typed functions:

% @deftypefn category type name args
\makedefun{deftypefn}{\deftypefngeneral{}}

% @deftypeop category class type name args
```

```
\makedefun{deftypeop}#1 {\deftypeopon{#1\ \putwordon}}

% \deftypeopon {category on}class type name args
\def\deftypeopon#1#2 {\deftypefngeneral{\putwordon\ \code{#2}}{#1\ \code{#2}} }

% \deftypefngeneral {subind}category type name args
%
\def\deftypefngeneral#1#2 #3 #4 #5\endheader{%
 \dosubind{fn}{\code{#4}}{#1}%
 \doingtypefntrue
 \defname{#2}{#3}{#4}\defunargs{#5\unskip}%
}

% Typed variables:

% @deftypevr category type var args
\makedefun{deftypevr}{\deftypecvgeneral{}}

% @deftypecv category class type var args
\makedefun{deftypecv}#1 {\deftypecvof{#1\ \putwordof}}

% \deftypecvof {category of}class type var args
\def\deftypecvof#1#2 {\deftypecvgeneral{\putwordof\ \code{#2}}{#1\ \code{#2}} }

% \deftypecvgeneral {subind}category type var args
%
\def\deftypecvgeneral#1#2 #3 #4 #5\endheader{%
 \dosubind{vr}{\code{#4}}{#1}%
 \defname{#2}{#3}{#4}\defunargs{#5\unskip}%
}

% Untyped variables:

% @defvr category var args
\makedefun{defvr}#1 {\deftypevrheader{#1} {} }

% @defcv category class var args
\makedefun{defcv}#1 {\defcvof{#1\ \putwordof}}

% \defcvof {category of}class var args
\def\defcvof#1#2 {\deftypecvof{#1}#2 {} }

% Types:

% @deftp category name args
\makedefun{deftp}#1 #2 #3\endheader{%
 \doind{tp}{\code{#2}}%
 \defname{#1}{}{#2}\defunargs{#3\unskip}%
```

```
}

% Remaining @defun-like shortcuts:
\makedefun{defun}{\deffnheader{\putwordDeffunc} }
\makedefun{defmac}{\deffnheader{\putwordDefmac} }
\makedefun{defspec}{\deffnheader{\putwordDefspec} }
\makedefun{deftypefun}{\deftypefnheader{\putwordDeffunc} }
\makedefun{defvar}{\defvrheader{\putwordDefvar} }
\makedefun{defopt}{\defvrheader{\putwordDefopt} }
\makedefun{deftypevar}{\deftypevrheader{\putwordDefvar} }
\makedefun{defmethod}{\defopon\putwordMethodon}
\makedefun{deftypemethod}{\deftypeopon\putwordMethodon}
\makedefun{defivar}{\defcvof\putwordInstanceVariableof}
\makedefun{deftypeivar}{\deftypecvof\putwordInstanceVariableof}

% \defname, which formats the name of the @def (not the args).
% #1 is the category, such as "Function".
% #2 is the return type, if any.
% #3 is the function name.
%
% We are followed by (but not passed) the arguments, if any.
%
\def\defname#1#2#3{%
 \par
 % Get the values of \leftskip and \rightskip as they were outside the @def...
 \advance\leftskip by -\defbodyindent
 %
 % Determine if we are typesetting the return type of a typed function
 % on a line by itself.
 \rettypeownlinefalse
 \ifdoingtypefn  % doing a typed function specifically?
   % then check user option for putting return type on its own line:
   \expandafter\ifx\csname SETtxideftypefnnl\endcsname\relax \else
     \rettypeownlinetrue
   \fi
 \fi
 %
 % How we'll format the category name.  Putting it in brackets helps
 % distinguish it from the body text that may end up on the next line
 % just below it.
 \def\temp{#1}%
 \setbox0=\hbox{\kern\deflastargmargin \ifx\temp\empty\else [\rm\temp]\fi}
 %
 % Figure out line sizes for the paragraph shape.  We'll always have at
 % least two.
 \tempnum = 2
 %
 % The first line needs space for \box0; but if \rightskip is nonzero,
```

```
% we need only space for the part of \box0 which exceeds it:
\dimen0=\hsize  \advance\dimen0 by -\wd0  \advance\dimen0 by \rightskip
%
% If doing a return type on its own line, we'll have another line.
\ifrettypeownline
  \advance\tempnum by 1
  \def\maybeshapeline{0in \hsize}%
\else
  \def\maybeshapeline{}%
\fi
%
% The continuations:
\dimen2=\hsize  \advance\dimen2 by -\defargsindent
%
% The final paragraph shape:
\parshape \tempnum  0in \dimen0  \maybeshapeline  \defargsindent \dimen2
%
% Put the category name at the right margin.
\noindent
\hbox to 0pt{%
  \hfil\box0 \kern-\hsize
  % \hsize has to be shortened this way:
  \kern\leftskip
  % Intentionally do not respect \rightskip, since we need the space.
}%
%
% Allow all lines to be underfull without complaint:
\tolerance=10000 \hbadness=10000
\exdentamount=\defbodyindent
{%
  % defun fonts. We use typewriter by default (used to be bold) because:
  % . we're printing identifiers, they should be in tt in principle.
  % . in languages with many accents, such as Czech or French, it's
  %   common to leave accents off identifiers.  The result looks ok in
  %   tt, but exceedingly strange in rm.
  % . we don't want -- and --- to be treated as ligatures.
  % . this still does not fix the ?` and !` ligatures, but so far no
  %   one has made identifiers using them :).
  \df \tt
  \def\temp{#2}% text of the return type
  \ifx\temp\empty\else
    \tclose{\temp}% typeset the return type
    \ifrettypeownline
      % put return type on its own line; prohibit line break following:
      \hfil\vadjust{\nobreak}\break
    \else
      \space  % type on same line, so just followed by a space
    \fi
```

```
  \fi          % no return type
  #3% output function name
 }%
 {\rm\enskip}% hskip 0.5 em of \tenrm
 %
 \boldbrax
 % arguments will be output next, if any.
}

% Print arguments in slanted roman (not ttsl), inconsistently with using
% tt for the name.  This is because literal text is sometimes needed in
% the argument list (groff manual), and ttsl and tt are not very
% distinguishable.  Prevent hyphenation at `-' chars.
%
\def\defunargs#1{%
 % use sl by default (not ttsl),
 % tt for the names.
 \df \sl \hyphenchar\font=0
 %
 % On the other hand, if an argument has two dashes (for instance), we
 % want a way to get ttsl.  We used to recommend @var for that, so
 % leave the code in, but it's strange for @var to lead to typewriter.
 % Nowadays we recommend @code, since the difference between a ttsl hyphen
 % and a tt hyphen is pretty tiny.  @code also disables ?` !`.
 \def\var##1{{\setupmarkupstyle{var}\ttslanted{##1}}}%
 #1%
 \sl\hyphenchar\font=45
}

% We want ()&[] to print specially on the defun line.
%
\def\activeparens{%
 \catcode`\(=\active \catcode`\)=\active
 \catcode`\[=\active \catcode`\]=\active
 \catcode`\&=\active
}

% Make control sequences which act like normal parenthesis chars.
\let\lparen = ( \let\rparen = )

% Be sure that we always have a definition for `(', etc.  For example,
% if the fn name has parens in it, \boldbrax will not be in effect yet,
% so TeX would otherwise complain about undefined control sequence.
{
 \activeparens
 \global\let(=\lparen \global\let)=\rparen
 \global\let[=\lbrack \global\let]=\rbrack
 \global\let& = \&
```

```
 \gdef\boldbrax{\let(=\opnr\let)=\clnr\let[=\lbrb\let]=\rbrb}
 \gdef\magicamp{\let&=\amprm}
}

\newcount\parencount

% If we encounter &foo, then turn on ()-hacking afterwards
\newif\ifampseen
\def\amprm#1 {\ampseentrue{\bf\&#1 }}

\def\parenfont{%
 \ifampseen
   % At the first level, print parens in roman,
   % otherwise use the default font.
   \ifnum \parencount=1 \rm \fi
 \else
   % The \sf parens (in \boldbrax) actually are a little bolder than
   % the contained text.  This is especially needed for [ and ] .
   \sf
 \fi
}
\def\infirstlevel#1{%
 \ifampseen
   \ifnum\parencount=1
     #1%
   \fi
 \fi
}
\def\bfafterword#1 {#1 \bf}

\def\opnr{%
 \global\advance\parencount by 1
 {\parenfont(}%
 \infirstlevel \bfafterword
}
\def\clnr{%
 {\parenfont)}%
 \infirstlevel \sl
 \global\advance\parencount by -1
}

\newcount\brackcount
\def\lbrb{%
 \global\advance\brackcount by 1
 {\bf[}%
}
\def\rbrb{%
```

```
 {\bf]}%
 \global\advance\brackcount by -1
}

\def\checkparencounts{%
 \ifnum\parencount=0 \else \badparencount \fi
 \ifnum\brackcount=0 \else \badbrackcount \fi
}
% these should not use \errmessage; the glibc manual, at least, actually
% has such constructs (when documenting function pointers).
\def\badparencount{%
 \message{Warning: unbalanced parentheses in @def...}%
 \global\parencount=0
}
\def\badbrackcount{%
 \message{Warning: unbalanced square brackets in @def...}%
 \global\brackcount=0
}


\message{macros,}
% @macro.

% To do this right we need a feature of e-TeX, \scantokens,
% which we arrange to emulate with a temporary file in ordinary TeX.
\ifx\eTeXversion\thisisundefined
 \newwrite\macscribble
 \def\scantokens#1{%
   \toks0={#1}%
   \immediate\openout\macscribble=\jobname.tmp
   \immediate\write\macscribble{\the\toks0}%
   \immediate\closeout\macscribble
   \input \jobname.tmp
 }
\fi

\def\scanmacro#1{\begingroup
 \newlinechar`\^^M
 \let\xeatspaces\eatspaces
 %
 % Undo catcode changes of \startcontents and \doprintindex
 % When called from @insertcopying or (short)caption, we need active
 % backslash to get it printed correctly.  Previously, we had
 % \catcode`\\=\other instead.  We'll see whether a problem appears
 % with macro expansion.    --kasal, 19aug04
 \catcode`\@=0 \catcode`\\=\active \escapechar=`\@
 %
 % ... and for \example:
```

```
 \spaceisspace
 %
 % The \empty here causes a following catcode 5 newline to be eaten as
 % part of reading whitespace after a control sequence.  It does not
 % eat a catcode 13 newline.  There's no good way to handle the two
 % cases (untried: maybe e-TeX's \everyeof could help, though plain TeX
 % would then have different behavior).  See the Macro Details node in
 % the manual for the workaround we recommend for macros and
 % line-oriented commands.
 %
 \scantokens{#1\empty}%
\endgroup}

\def\scanexp#1{%
 \edef\temp{\noexpand\scanmacro{#1}}%
 \temp
}

\newcount\paramno   % Count of parameters
\newtoks\macname    % Macro name
\newif\ifrecursive  % Is it recursive?

% List of all defined macros in the form
%    \definedummyword\macro1\definedummyword\macro2...
% Currently is also contains all @aliases; the list can be split
% if there is a need.
\def\macrolist{}

% Add the macro to \macrolist
\def\addtomacrolist#1{\expandafter \addtomacrolistxxx \csname#1\endcsname}
\def\addtomacrolistxxx#1{%
   \toks0 = \expandafter{\macrolist\definedummyword#1}%
   \xdef\macrolist{\the\toks0}%
}

% Utility routines.
% This does \let #1 = #2, with \csnames; that is,
%   \let \csname#1\endcsname = \csname#2\endcsname
% (except of course we have to play expansion games).
%
\def\cslet#1#2{%
 \expandafter\let
 \csname#1\expandafter\endcsname
 \csname#2\endcsname
}

% Trim leading and trailing spaces off a string.
% Concepts from aro-bend problem 15 (see CTAN).
```

```
{\catcode`\@=11
\gdef\eatspaces #1{\expandafter\trim@\expandafter{#1 }}
\gdef\trim@ #1{\trim@@ @#1 @ #1 @ @@}
\gdef\trim@@ #1@ #2@ #3@@{\trim@@@\empty #2 @}
\def\unbrace#1{#1}
\unbrace{\gdef\trim@@@ #1 } #2@{#1}
}

% Trim a single trailing ^^M off a string.
{\catcode`\^^M=\other \catcode`\Q=3%
\gdef\eatcr #1{\eatcra #1Q^^MQ}%
\gdef\eatcra#1^^MQ{\eatcrb#1Q}%
\gdef\eatcrb#1Q#2Q{#1}%
}

% Macro bodies are absorbed as an argument in a context where
% all characters are catcode 10, 11 or 12, except \ which is active
% (as in normal texinfo). It is necessary to change the definition of \
% to recognize macro arguments; this is the job of \mbodybackslash.
%
% Non-ASCII encodings make 8-bit characters active, so un-activate
% them to avoid their expansion.  Must do this non-globally, to
% confine the change to the current group.
%
% It's necessary to have hard CRs when the macro is executed. This is
% done by making ^^M (\endlinechar) catcode 12 when reading the macro
% body, and then making it the \newlinechar in \scanmacro.
%
\def\scanctxt{% used as subroutine
 \catcode`\"=\other
 \catcode`\+=\other
 \catcode`\<=\other
 \catcode`\>=\other
 \catcode`\@=\other
 \catcode`\^=\other
 \catcode`\_=\other
 \catcode`\|=\other
 \catcode`\~=\other
 \ifx\declaredencoding\ascii \else \setnonasciicharscatcodenonglobal\other \fi
}

\def\scanargctxt{% used for copying and captions, not macros.
 \scanctxt
 \catcode`\\=\other
 \catcode`\^^M=\other
}

\def\macrobodyctxt{% used for @macro definitions
```

```
 \scanctxt
 \catcode`\{=\other
 \catcode`\}=\other
 \catcode`\^^M=\other
 \usembodybackslash
}

\def\macroargctxt{% used when scanning invocations
 \scanctxt
 \catcode`\\=0
}
% why catcode 0 for \ in the above?  To recognize \\ \{ \} as "escapes"
% for the single characters \ { }.  Thus, we end up with the "commands"
% that would be written @\ @{ @} in a Texinfo document.
%
% We already have @{ and @}.  For @\, we define it here, and only for
% this purpose, to produce a typewriter backslash (so, the @\ that we
% define for @math can't be used with @macro calls):
%
\def\\{\normalbackslash}%
%
% We would like to do this for \, too, since that is what makeinfo does.
% But it is not possible, because Texinfo already has a command @, for a
% cedilla accent.  Documents must use @comma{} instead.
%
% \anythingelse will almost certainly be an error of some kind.


% \mbodybackslash is the definition of \ in @macro bodies.
% It maps \foo\ => \csname macarg.foo\endcsname => #N
% where N is the macro parameter number.
% We define \csname macarg.\endcsname to be \realbackslash, so
% \\ in macro replacement text gets you a backslash.
%
{\catcode`@=0 @catcode`@\=@active
@gdef@usembodybackslash{@let\=@mbodybackslash}
@gdef@mbodybackslash#1\{@csname macarg.#1@endcsname}
}
\expandafter\def\csname macarg.\endcsname{\realbackslash}

\def\margbackslash#1{\char`\#1 }

\def\macro{\recursivefalse\parsearg\macroxxx}
\def\rmacro{\recursivetrue\parsearg\macroxxx}

\def\macroxxx#1{%
 \getargs{#1}% now \macname is the macname and \argl the arglist
 \ifx\argl\empty       % no arguments
```

```
    \paramno=0\relax
  \else
    \expandafter\parsemargdef \argl;%
    \if\paramno>256\relax
      \ifx\eTeXversion\thisisundefined
        \errhelp = \EMsimple
        \errmessage{You need eTeX to compile a file with macros with more than 256 arguments}
      \fi
    \fi
  \fi
  \if1\csname ismacro.\the\macname\endcsname
    \message{Warning: redefining \the\macname}%
  \else
    \expandafter\ifx\csname \the\macname\endcsname \relax
    \else \errmessage{Macro name \the\macname\space already defined}\fi
    \global\cslet{macsave.\the\macname}{\the\macname}%
    \global\expandafter\let\csname ismacro.\the\macname\endcsname=1%
    \addtomacrolist{\the\macname}%
  \fi
  \begingroup \macrobodyctxt
  \ifrecursive \expandafter\parsermacbody
  \else \expandafter\parsemacbody
  \fi}

\parseargdef\unmacro{%
  \if1\csname ismacro.#1\endcsname
    \global\cslet{#1}{macsave.#1}%
    \global\expandafter\let \csname ismacro.#1\endcsname=0%
    % Remove the macro name from \macrolist:
    \begingroup
      \expandafter\let\csname#1\endcsname \relax
      \let\definedummyword\unmacrodo
      \xdef\macrolist{\macrolist}%
    \endgroup
  \else
    \errmessage{Macro #1 not defined}%
  \fi
}

% Called by \do from \dounmacro on each macro.  The idea is to omit any
% macro definitions that have been changed to \relax.
%
\def\unmacrodo#1{%
  \ifx #1\relax
    % remove this
  \else
    \noexpand\definedummyword \noexpand#1%
  \fi
```

```
}

% This makes use of the obscure feature that if the last token of a
% <parameter list> is #, then the preceding argument is delimited by
% an opening brace, and that opening brace is not consumed.
\def\getargs#1{\getargsxxx#1{}}
\def\getargsxxx#1#{\getmacname #1 \relax\getmacargs}
\def\getmacname#1 #2\relax{\macname={#1}}
\def\getmacargs#1{\def\argl{#1}}

% For macro processing make @ a letter so that we can make Texinfo private macro names.
\edef\texiatcatcode{\the\catcode`\@}
\catcode `@=11\relax

% Parse the optional {params} list.  Set up \paramno and \paramlist
% so \defmacro knows what to do.  Define \macarg.BLAH for each BLAH
% in the params list to some hook where the argument si to be expanded.  If
% there are less than 10 arguments that hook is to be replaced by ##N where N
% is the position in that list, that is to say the macro arguments are to be
% defined `a la TeX in the macro body.
%
% That gets used by \mbodybackslash (above).
%
% We need to get `macro parameter char #' into several definitions.
% The technique used is stolen from LaTeX: let \hash be something
% unexpandable, insert that wherever you need a #, and then redefine
% it to # just before using the token list produced.
%
% The same technique is used to protect \eatspaces till just before
% the macro is used.
%
% If there are 10 or more arguments, a different technique is used, where the
% hook remains in the body, and when macro is to be expanded the body is
% processed again to replace the arguments.
%
% In that case, the hook is \the\toks N-1, and we simply set \toks N-1 to the
% argument N value and then \edef  the body (nothing else will expand because of
% the catcode regime underwhich the body was input).
%
% If you compile with TeX (not eTeX), and you have macros with 10 or more
% arguments, you need that no macro has more than 256 arguments, otherwise an
% error is produced.
\def\parsemargdef#1;{%
 \paramno=0\def\paramlist{}%
 \let\hash\relax
 \let\xeatspaces\relax
 \parsemargdefxxx#1,;,%
 % In case that there are 10 or more arguments we parse again the arguments
```

```
 % list to set new definitions for the \macarg.BLAH macros corresponding to
 % each BLAH argument. It was anyhow needed to parse already once this list
 % in order to count the arguments, and as macros with at most 9 arguments
 % are by far more frequent than macro with 10 or more arguments, defining
 % twice the \macarg.BLAH macros does not cost too much processing power.
 \ifnum\paramno<10\relax\else
   \paramno0\relax
   \parsemmanyargdef@@#1,;,% 10 or more arguments
 \fi
}
\def\parsemargdefxxx#1,{%
 \if#1;\let\next=\relax
 \else \let\next=\parsemargdefxxx
   \advance\paramno by 1
   \expandafter\edef\csname macarg.\eatspaces{#1}\endcsname
       {\xeatspaces{\hash\the\paramno}}%
   \edef\paramlist{\paramlist\hash\the\paramno,}%
 \fi\next}

\def\parsemmanyargdef@@#1,{%
 \if#1;\let\next=\relax
 \else
   \let\next=\parsemmanyargdef@@
   \edef\tempb{\eatspaces{#1}}%
   \expandafter\def\expandafter\tempa
      \expandafter{\csname macarg.\tempb\endcsname}%
   % Note that we need some extra \noexpand\noexpand, this is because we
   % don't want \the  to be expanded in the \parsermacbody  as it uses an
   % \xdef .
   \expandafter\edef\tempa
     {\noexpand\noexpand\noexpand\the\toks\the\paramno}%
   \advance\paramno by 1\relax
 \fi\next}

% These two commands read recursive and nonrecursive macro bodies.
% (They're different since rec and nonrec macros end differently.)
%

\catcode `\@\texiatcatcode
\long\def\parsemacbody#1@end macro%
{\xdef\temp{\eatcr{#1}}\endgroup\defmacro}%
\long\def\parsermacbody#1@end rmacro%
{\xdef\temp{\eatcr{#1}}\endgroup\defmacro}%
\catcode `\@=11\relax

\let\endargs@\relax
\let\nil@\relax
\def\nilm@{\nil@}%
```

```
\long\def\nillm@{\nil@}%

% This macro is expanded during the Texinfo macro expansion, not during its
% definition.  It gets all the arguments values and assigns them to macros
% macarg.ARGNAME
%
% #1 is the macro name
% #2 is the list of argument names
% #3 is the list of argument values
\def\getargvals@#1#2#3{%
 \def\macargdeflist@{}%
 \def\saveparamlist@{#2}% Need to keep a copy for parameter expansion.
 \def\paramlist{#2,\nil@}%
 \def\macroname{#1}%
 \begingroup
 \macroargctxt
 \def\argvaluelist{#3,\nil@}%
 \def\@tempa{#3}%
 \ifx\@tempa\empty
   \setemptyargvalues@
 \else
   \getargvals@@
 \fi
}

%
\def\getargvals@@{%
 \ifx\paramlist\nilm@
     % Some sanity check needed here that \argvaluelist is also empty.
     \ifx\argvaluelist\nillm@
     \else
       \errhelp = \EMsimple
       \errmessage{Too many arguments in macro `\macroname'!}%
     \fi
     \let\next\macargexpandinbody@
 \else
   \ifx\argvaluelist\nillm@
      % No more arguments values passed to macro.  Set remaining named-arg
      % macros to empty.
      \let\next\setemptyargvalues@
   \else
     % pop current arg name into \@tempb
     \def\@tempa##1{\pop@{\@tempb}{\paramlist}##1\endargs@}%
     \expandafter\@tempa\expandafter{\paramlist}%
      % pop current argument value into \@tempc
     \def\@tempa##1{\longpop@{\@tempc}{\argvaluelist}##1\endargs@}%
     \expandafter\@tempa\expandafter{\argvaluelist}%
      % Here \@tempb is the current arg name and \@tempc is the current arg value.
```

```
      % First place the new argument macro definition into \@tempd
      \expandafter\macname\expandafter{\@tempc}%
      \expandafter\let\csname macarg.\@tempb\endcsname\relax
      \expandafter\def\expandafter\@tempe\expandafter{%
        \csname macarg.\@tempb\endcsname}%
      \edef\@tempd{\long\def\@tempe{\the\macname}}%
      \push@\@tempd\macargdeflist@
      \let\next\getargvals@@
    \fi
  \fi
  \next
}

\def\push@#1#2{%
  \expandafter\expandafter\expandafter\def
  \expandafter\expandafter\expandafter#2%
  \expandafter\expandafter\expandafter{%
  \expandafter#1#2}%
}

% Replace arguments by their values in the macro body, and place the result
% in macro \@tempa
\def\macvalstoargs@{%
  %  To do this we use the property that token registers that are \the'ed
  % within an \edef  expand only once. So we are going to place all argument
  % values into respective token registers.
  %
  % First we save the token context, and initialize argument numbering.
  \begingroup
    \paramno0\relax
    % Then, for each argument number #N, we place the corresponding argument
    % value into a new token list register \toks#N
    \expandafter\putargsintokens@\saveparamlist@,;,%
    % Then, we expand the body so that argument are replaced by their
    % values. The trick for values not to be expanded themselves is that they
    % are within tokens and that tokens expand only once in an \edef .
    \edef\@tempc{\csname mac.\macroname .body\endcsname}%
    % Now we restore the token stack pointer to free the token list registers
    % which we have used, but we make sure that expanded body is saved after
    % group.
    \expandafter
  \endgroup
  \expandafter\def\expandafter\@tempa\expandafter{\@tempc}%
  }

\def\macargexpandinbody@{%
  %% Define the named-macro outside of this group and then close this group.
  \expandafter
```

```
 \endgroup
 \macargdeflist@
 % First the replace in body the macro arguments by their values, the result
 % is in \@tempa .
 \macvalstoargs@
 % Then we point at the \norecurse or \gobble (for recursive) macro value
 % with \@tempb .
 \expandafter\let\expandafter\@tempb\csname mac.\macroname .recurse\endcsname
 % Depending on whether it is recursive or not, we need some tailing
 % \egroup .
 \ifx\@tempb\gobble
   \let\@tempc\relax
 \else
   \let\@tempc\egroup
 \fi
 % And now we do the real job:
 \edef\@tempd{\noexpand\@tempb{\macroname}\noexpand\scanmacro{\@tempa}\@tempc}%
 \@tempd
}

\def\putargsintokens@#1,{%
 \if#1;\let\next\relax
 \else
   \let\next\putargsintokens@
   % First we allocate the new token list register, and give it a temporary
   % alias \@tempb .
   \toksdef\@tempb\the\paramno
   % Then we place the argument value into that token list register.
   \expandafter\let\expandafter\@tempa\csname macarg.#1\endcsname
   \expandafter\@tempb\expandafter{\@tempa}%
   \advance\paramno by 1\relax
 \fi
 \next
}

% Save the token stack pointer into macro #1
\def\texisavetoksstackpoint#1{\edef#1{\the\@cclvi}}
% Restore the token stack pointer from number in macro #1
\def\texirestoretoksstackpoint#1{\expandafter\mathchardef\expandafter\@cclvi#1\relax}
% newtoks that can be used non \outer .
\def\texinonouternewtoks{\alloc@ 5\toks \toksdef \@cclvi}

% Tailing missing arguments are set to empty
\def\setemptyargvalues@{%
 \ifx\paramlist\nilm@
   \let\next\macargexpandinbody@
 \else
   \expandafter\setemptyargvaluesparser@\paramlist\endargs@
```

```
   \let\next\setemptyargvalues@
 \fi
 \next
}

\def\setemptyargvaluesparser@#1,#2\endargs@{%
 \expandafter\def\expandafter\@tempa\expandafter{%
   \expandafter\def\csname macarg.#1\endcsname{}}%
 \push@\@tempa\macargdeflist@
 \def\paramlist{#2}%
}

% #1 is the element target macro
% #2 is the list macro
% #3,#4\endargs@ is the list value
\def\pop@#1#2#3,#4\endargs@{%
  \def#1{#3}%
  \def#2{#4}%
}
\long\def\longpop@#1#2#3,#4\endargs@{%
  \long\def#1{#3}%
  \long\def#2{#4}%
}

% This defines a Texinfo @macro. There are eight cases: recursive and
% nonrecursive macros of zero, one, up to nine, and many arguments.
% Much magic with \expandafter here.
% \xdef is used so that macro definitions will survive the file
% they're defined in; @include reads the file inside a group.
%
\def\defmacro{%
 \let\hash=##% convert placeholders to macro parameter chars
 \ifrecursive
   \ifcase\paramno
   % 0
     \expandafter\xdef\csname\the\macname\endcsname{%
       \noexpand\scanmacro{\temp}}%
   \or % 1
     \expandafter\xdef\csname\the\macname\endcsname{%
        \bgroup\noexpand\macroargctxt
        \noexpand\braceorline
        \expandafter\noexpand\csname\the\macname xxx\endcsname}%
     \expandafter\xdef\csname\the\macname xxx\endcsname##1{%
        \egroup\noexpand\scanmacro{\temp}}%
   \else
     \ifnum\paramno<10\relax % at most 9
       \expandafter\xdef\csname\the\macname\endcsname{%
         \bgroup\noexpand\macroargctxt
```

```
        \noexpand\csname\the\macname xx\endcsname}%
      \expandafter\xdef\csname\the\macname xx\endcsname##1{%
          \expandafter\noexpand\csname\the\macname xxx\endcsname ##1,}%
      \expandafter\expandafter
      \expandafter\xdef
      \expandafter\expandafter
        \csname\the\macname xxx\endcsname
          \paramlist{\egroup\noexpand\scanmacro{\temp}}%
    \else % 10 or more
      \expandafter\xdef\csname\the\macname\endcsname{%
        \noexpand\getargvals@{\the\macname}{\argl}%
      }%
      \global\expandafter\let\csname mac.\the\macname .body\endcsname\temp
      \global\expandafter\let\csname mac.\the\macname .recurse\endcsname\gobble
    \fi
  \fi
\else
  \ifcase\paramno
  % 0
    \expandafter\xdef\csname\the\macname\endcsname{%
      \noexpand\norecurse{\the\macname}%
      \noexpand\scanmacro{\temp}\egroup}%
  \or % 1
    \expandafter\xdef\csname\the\macname\endcsname{%
       \bgroup\noexpand\macroargctxt
       \noexpand\braceorline
       \expandafter\noexpand\csname\the\macname xxx\endcsname}%
    \expandafter\xdef\csname\the\macname xxx\endcsname##1{%
      \egroup
      \noexpand\norecurse{\the\macname}%
      \noexpand\scanmacro{\temp}\egroup}%
  \else % at most 9
    \ifnum\paramno<10\relax
      \expandafter\xdef\csname\the\macname\endcsname{%
        \bgroup\noexpand\macroargctxt
        \expandafter\noexpand\csname\the\macname xx\endcsname}%
      \expandafter\xdef\csname\the\macname xx\endcsname##1{%
          \expandafter\noexpand\csname\the\macname xxx\endcsname ##1,}%
      \expandafter\expandafter
      \expandafter\xdef
      \expandafter\expandafter
      \csname\the\macname xxx\endcsname
      \paramlist{%
          \egroup
          \noexpand\norecurse{\the\macname}%
          \noexpand\scanmacro{\temp}\egroup}%
    \else % 10 or more:
      \expandafter\xdef\csname\the\macname\endcsname{%
```

```
        \noexpand\getargvals@{\the\macname}{\argl}%
      }%
      \global\expandafter\let\csname mac.\the\macname .body\endcsname\temp
      \global\expandafter\let\csname mac.\the\macname .recurse\endcsname\norecurse
    \fi
  \fi
 \fi}

\catcode `\@\texiatcatcode\relax

\def\norecurse#1{\bgroup\cslet{#1}{macsave.#1}}

% \braceorline decides whether the next nonwhitespace character is a
% {.  If so it reads up to the closing }, if not, it reads the whole
% line.  Whatever was read is then fed to the next control sequence
% as an argument (by \parsebrace or \parsearg).
%
\def\braceorline#1{\let\macnamexxx=#1\futurelet\nchar\braceorlinexxx}
\def\braceorlinexxx{%
 \ifx\nchar\bgroup\else
   \expandafter\parsearg
 \fi \macnamexxx}


% @alias.
% We need some trickery to remove the optional spaces around the equal
% sign.  Make them active and then expand them all to nothing.
%
\def\alias{\parseargusing\obeyspaces\aliasxxx}
\def\aliasxxx #1{\aliasyyy#1\relax}
\def\aliasyyy #1=#2\relax{%
 {%
   \expandafter\let\obeyedspace=\empty
   \addtomacrolist{#1}%
   \xdef\next{\global\let\makecsname{#1}=\makecsname{#2}}%
 }%
 \next
}


\message{cross references,}

\newwrite\auxfile
\newif\ifhavexrefs    % True if xref values are known.
\newif\ifwarnedxrefs  % True if we warned once that they aren't known.

% @inforef is relatively simple.
\def\inforef #1{\inforefzzz #1,,,,**}
```

```
\def\inforefzzz #1,#2,#3,#4**{%
 \putwordSee{} \putwordInfo{} \putwordfile{} \file{\ignorespaces #3{}},
 node \samp{\ignorespaces#1{}}}

% @node's only job in TeX is to define \lastnode, which is used in
% cross-references.  The @node line might or might not have commas, and
% might or might not have spaces before the first comma, like:
% @node foo , bar , ...
% We don't want such trailing spaces in the node name.
%
\parseargdef\node{\checkenv{}\donode #1 ,\finishnodeparse}
%
% also remove a trailing comma, in case of something like this:
% @node Help-Cross,  ,  , Cross-refs
\def\donode#1 ,#2\finishnodeparse{\dodonode #1,\finishnodeparse}
\def\dodonode#1,#2\finishnodeparse{\gdef\lastnode{#1}}

\let\nwnode=\node
\let\lastnode=\empty

% Write a cross-reference definition for the current node.  #1 is the
% type (Ynumbered, Yappendix, Ynothing).
%
\def\donoderef#1{%
 \ifx\lastnode\empty\else
   \setref{\lastnode}{#1}%
   \global\let\lastnode=\empty
 \fi
}

% @anchor{NAME} -- define xref target at arbitrary point.
%
\newcount\savesfregister
%
\def\savesf{\relax \ifhmode \savesfregister=\spacefactor \fi}
\def\restoresf{\relax \ifhmode \spacefactor=\savesfregister \fi}
\def\anchor#1{\savesf \setref{#1}{Ynothing}\restoresf \ignorespaces}

% \setref{NAME}{SNT} defines a cross-reference point NAME (a node or an
% anchor), which consists of three parts:
% 1) NAME-title - the current sectioning name taken from \lastsection,
%                 or the anchor name.
% 2) NAME-snt   - section number and type, passed as the SNT arg, or
%                 empty for anchors.
% 3) NAME-pg    - the page number.
%
% This is called from \donoderef, \anchor, and \dofloat.  In the case of
% floats, there is an additional part, which is not written here:
```

```
% 4) NAME-lof   - the text as it should appear in a @listoffloats.
%
\def\setref#1#2{%
 \pdfmkdest{#1}%
 \iflinks
   {%
     \atdummies  % preserve commands, but don't expand them
     \edef\writexrdef##1##2{%
 \write\auxfile{@xrdef{#1-% #1 of \setref, expanded by the \edef
   ##1}{##2}}% these are parameters of \writexrdef
     }%
     \toks0 = \expandafter{\lastsection}%
     \immediate \writexrdef{title}{\the\toks0 }%
     \immediate \writexrdef{snt}{\csname #2\endcsname}% \Ynumbered etc.
     \safewhatsit{\writexrdef{pg}{\folio}}% will be written later, at \shipout
   }%
 \fi
}

% @xrefautosectiontitle on|off says whether @section(ing) names are used
% automatically in xrefs, if the third arg is not explicitly specified.
% This was provided as a "secret" @set xref-automatic-section-title
% variable, now it's official.
%
\parseargdef\xrefautomaticsectiontitle{%
 \def\temp{#1}%
 \ifx\temp\onword
   \expandafter\let\csname SETxref-automatic-section-title\endcsname
     = \empty
 \else\ifx\temp\offword
   \expandafter\let\csname SETxref-automatic-section-title\endcsname
     = \relax
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @xrefautomaticsectiontitle value `\temp',
               must be on|off}%
 \fi\fi
}

%
% @xref, @pxref, and @ref generate cross-references.  For \xrefX, #1 is
% the node name, #2 the name of the Info cross-reference, #3 the printed
% node name, #4 the name of the Info file, #5 the name of the printed
% manual.  All but the node name can be omitted.
%
\def\pxref#1{\putwordsee{} \xrefX[#1,,,,,,]}
\def\xref#1{\putwordSee{} \xrefX[#1,,,,,,]}
\def\ref#1{\xrefX[#1,,,,,,]}
```

```
%
\newbox\toprefbox
\newbox\printedrefnamebox
\newbox\infofilenamebox
\newbox\printedmanualbox
%
\def\xrefX[#1,#2,#3,#4,#5,#6]{\begingroup
 \unsepspaces
 %
 % Get args without leading/trailing spaces.
 \def\printedrefname{\ignorespaces #3}%
 \setbox\printedrefnamebox = \hbox{\printedrefname\unskip}%
 %
 \def\infofilename{\ignorespaces #4}%
 \setbox\infofilenamebox = \hbox{\infofilename\unskip}%
 %
 \def\printedmanual{\ignorespaces #5}%
 \setbox\printedmanualbox  = \hbox{\printedmanual\unskip}%
 %
 % If the printed reference name (arg #3) was not explicitly given in
 % the @xref, figure out what we want to use.
 \ifdim \wd\printedrefnamebox = 0pt
   % No printed node name was explicitly given.
   \expandafter\ifx\csname SETxref-automatic-section-title\endcsname \relax
     % Not auto section-title: use node name inside the square brackets.
     \def\printedrefname{\ignorespaces #1}%
   \else
     % Auto section-title: use chapter/section title inside
     % the square brackets if we have it.
     \ifdim \wd\printedmanualbox > 0pt
       % It is in another manual, so we don't have it; use node name.
       \def\printedrefname{\ignorespaces #1}%
     \else
       \ifhavexrefs
         % We (should) know the real title if we have the xref values.
         \def\printedrefname{\refx{#1-title}{}}%
       \else
         % Otherwise just copy the Info node name.
         \def\printedrefname{\ignorespaces #1}%
       \fi%
     \fi
   \fi
 \fi
 %
 % Make link in pdf output.
 \ifpdf
   {\indexnofonts
    \turnoffactive
```

```
    \makevalueexpandable
    % This expands tokens, so do it after making catcode changes, so _
    % etc. don't get their TeX definitions.  This ignores all spaces in
    % #4, including (wrongly) those in the middle of the filename.
    \getfilename{#4}%
    %
    % This (wrongly) does not take account of leading or trailing
    % spaces in #1, which should be ignored.
    \edef\pdfxrefdest{#1}%
    \ifx\pdfxrefdest\empty
      \def\pdfxrefdest{Top}% no empty targets
    \else
      \txiescapepdf\pdfxrefdest  % escape PDF special chars
    \fi
    %
    \leavevmode
    \startlink attr{/Border [0 0 0]}%
    \ifnum\filenamelength>0
      goto file{\the\filename.pdf} name{\pdfxrefdest}%
    \else
      goto name{\pdfmkpgn{\pdfxrefdest}}%
    \fi
  }%
  \setcolor{\linkcolor}%
\fi
%
% Float references are printed completely differently: "Figure 1.2"
% instead of "[somenode], p.3".  We distinguish them by the
% LABEL-title being set to a magic string.
{%
  % Have to otherify everything special to allow the \csname to
  % include an _ in the xref name, etc.
  \indexnofonts
  \turnoffactive
  \expandafter\global\expandafter\let\expandafter\Xthisreftitle
    \csname XR#1-title\endcsname
}%
\iffloat\Xthisreftitle
  % If the user specified the print name (third arg) to the ref,
  % print it instead of our usual "Figure 1.2".
  \ifdim\wd\printedrefnamebox = 0pt
    \refx{#1-snt}{}%
  \else
    \printedrefname
  \fi
  %
  % If the user also gave the printed manual name (fifth arg), append
  % "in MANUALNAME".
```

```
  \ifdim \wd\printedmanualbox > 0pt
    \space \putwordin{} \cite{\printedmanual}%
  \fi
\else
  % node/anchor (non-float) references.
  %
  % If we use \unhbox to print the node names, TeX does not insert
  % empty discretionaries after hyphens, which means that it will not
  % find a line break at a hyphen in a node names.  Since some manuals
  % are best written with fairly long node names, containing hyphens,
  % this is a loss.  Therefore, we give the text of the node name
  % again, so it is as if TeX is seeing it for the first time.
  %
  \ifdim \wd\printedmanualbox > 0pt
    % Cross-manual reference with a printed manual name.
    %
    \crossmanualxref{\cite{\printedmanual\unskip}}%
  %
  \else\ifdim \wd\infofilenamebox > 0pt
    % Cross-manual reference with only an info filename (arg 4), no
    % printed manual name (arg 5).  This is essentially the same as
    % the case above; we output the filename, since we have nothing else.
    %
    \crossmanualxref{\code{\infofilename\unskip}}%
  %
  \else
    % Reference within this manual.
    %
    % _ (for example) has to be the character _ for the purposes of the
    % control sequence corresponding to the node, but it has to expand
    % into the usual \leavevmode...\vrule stuff for purposes of
    % printing. So we \turnoffactive for the \refx-snt, back on for the
    % printing, back off for the \refx-pg.
    {\turnoffactive
     % Only output a following space if the -snt ref is nonempty; for
     % @unnumbered and @anchor, it won't be.
     \setbox2 = \hbox{\ignorespaces \refx{#1-snt}{}}%
     \ifdim \wd2 > 0pt \refx{#1-snt}\space\fi
    }%
    % output the `[mynode]' via the macro below so it can be overridden.
    \xrefprintnodename\printedrefname
    %
    % But we always want a comma and a space:
    ,\space
    %
    % output the `page 3'.
    \turnoffactive \putwordpage\tie\refx{#1-pg}{}%
  \fi\fi
```

```
 \fi
 \endlink
\endgroup}

% Output a cross-manual xref to #1.  Used just above (twice).
%
% Only include the text "Section ``foo'' in" if the foo is neither
% missing or Top.  Thus, @xref{,,,foo,The Foo Manual} outputs simply
% "see The Foo Manual", the idea being to refer to the whole manual.
%
% But, this being TeX, we can't easily compare our node name against the
% string "Top" while ignoring the possible spaces before and after in
% the input.  By adding the arbitrary 7sp below, we make it much less
% likely that a real node name would have the same width as "Top" (e.g.,
% in a monospaced font).  Hopefully it will never happen in practice.
%
% For the same basic reason, we retypeset the "Top" at every
% reference, since the current font is indeterminate.
%
\def\crossmanualxref#1{%
 \setbox\toprefbox = \hbox{Top\kern7sp}%
 \setbox2 = \hbox{\ignorespaces \printedrefname \unskip \kern7sp}%
 \ifdim \wd2 > 7sp  % nonempty?
   \ifdim \wd2 = \wd\toprefbox \else  % same as Top?
     \putwordSection{} ``\printedrefname'' \putwordin{}\space
   \fi
 \fi
 #1%
}

% This macro is called from \xrefX for the `[nodename]' part of xref
% output.  It's a separate macro only so it can be changed more easily,
% since square brackets don't work well in some documents.  Particularly
% one that Bob is working on :).
%
\def\xrefprintnodename#1{[#1]}

% Things referred to by \setref.
%
\def\Ynothing{}
\def\Yomitfromtoc{}
\def\Ynumbered{%
 \ifnum\secno=0
   \putwordChapter@tie \the\chapno
 \else \ifnum\subsecno=0
   \putwordSection@tie \the\chapno.\the\secno
 \else \ifnum\subsubsecno=0
   \putwordSection@tie \the\chapno.\the\secno.\the\subsecno
```

```
 \else
   \putwordSection@tie \the\chapno.\the\secno.\the\subsecno.\the\subsubsecno
 \fi\fi\fi
}
\def\Yappendix{%
 \ifnum\secno=0
    \putwordAppendix@tie @char\the\appendixno{}%
 \else \ifnum\subsecno=0
    \putwordSection@tie @char\the\appendixno.\the\secno
 \else \ifnum\subsubsecno=0
   \putwordSection@tie @char\the\appendixno.\the\secno.\the\subsecno
 \else
   \putwordSection@tie
     @char\the\appendixno.\the\secno.\the\subsecno.\the\subsubsecno
 \fi\fi\fi
}

% Define \refx{NAME}{SUFFIX} to reference a cross-reference string named NAME.
% If its value is nonempty, SUFFIX is output afterward.
%
\def\refx#1#2{%
 {%
   \indexnofonts
   \otherbackslash
   \expandafter\global\expandafter\let\expandafter\thisrefX
     \csname XR#1\endcsname
 }%
 \ifx\thisrefX\relax
   % If not defined, say something at least.
   \angleleft un\-de\-fined\angleright
   \iflinks
     \ifhavexrefs
       {\toks0 = {#1}% avoid expansion of possibly-complex value
        \message{\linenumber Undefined cross reference `\the\toks0'.}}%
     \else
       \ifwarnedxrefs\else
         \global\warnedxrefstrue
         \message{Cross reference values unknown; you must run TeX again.}%
       \fi
     \fi
   \fi
 \else
   % It's defined, so just use it.
   \thisrefX
 \fi
 #2% Output the suffix in any case.
}
```

```
% This is the macro invoked by entries in the aux file.  Usually it's
% just a \def (we prepend XR to the control sequence name to avoid
% collisions).  But if this is a float type, we have more work to do.
%
\def\xrdef#1#2{%
 {% The node name might contain 8-bit characters, which in our current
  % implementation are changed to commands like @'e.  Don't let these
  % mess up the control sequence name.
   \indexnofonts
   \turnoffactive
   \xdef\safexrefname{#1}%
 }%
 %
 \expandafter\gdef\csname XR\safexrefname\endcsname{#2}% remember this xref
 %
 % Was that xref control sequence that we just defined for a float?
 \expandafter\iffloat\csname XR\safexrefname\endcsname
   % it was a float, and we have the (safe) float type in \iffloattype.
   \expandafter\let\expandafter\floatlist
     \csname floatlist\iffloattype\endcsname
   %
   % Is this the first time we've seen this float type?
   \expandafter\ifx\floatlist\relax
     \toks0 = {\do}% yes, so just \do
   \else
     % had it before, so preserve previous elements in list.
     \toks0 = \expandafter{\floatlist\do}%
   \fi
   %
   % Remember this xref in the control sequence \floatlistFLOATTYPE,
   % for later use in \listoffloats.
   \expandafter\xdef\csname floatlist\iffloattype\endcsname{\the\toks0
     {\safexrefname}}%
 \fi
}

% Read the last existing aux file, if any.  No error if none exists.
%
\def\tryauxfile{%
 \openin 1 \jobname.aux
 \ifeof 1 \else
   \readdatafile{aux}%
   \global\havexrefstrue
 \fi
 \closein 1
}

\def\setupdatafile{%
```

```
\catcode`\^^@=\other
\catcode`\^^A=\other
\catcode`\^^B=\other
\catcode`\^^C=\other
\catcode`\^^D=\other
\catcode`\^^E=\other
\catcode`\^^F=\other
\catcode`\^^G=\other
\catcode`\^^H=\other
\catcode`\^^K=\other
\catcode`\^^L=\other
\catcode`\^^N=\other
\catcode`\^^P=\other
\catcode`\^^Q=\other
\catcode`\^^R=\other
\catcode`\^^S=\other
\catcode`\^^T=\other
\catcode`\^^U=\other
\catcode`\^^V=\other
\catcode`\^^W=\other
\catcode`\^^X=\other
\catcode`\^^Z=\other
\catcode`\^^[=\other
\catcode`\^^\=\other
\catcode`\^^]=\other
\catcode`\^^^=\other
\catcode`\^^_=\other
% It was suggested to set the catcode of ^ to 7, which would allow ^^e4 etc.
% in xref tags, i.e., node names.  But since ^^e4 notation isn't
% supported in the main text, it doesn't seem desirable.  Furthermore,
% that is not enough: for node names that actually contain a ^
% character, we would end up writing a line like this: 'xrdef {'hat
% b-title}{'hat b} and \xrdef does a \csname...\endcsname on the first
% argument, and \hat is not an expandable control sequence.  It could
% all be worked out, but why?  Either we support ^^ or we don't.
%
% The other change necessary for this was to define \auxhat:
% \def\auxhat{\def^{'hat }}% extra space so ok if followed by letter
% and then to call \auxhat in \setq.
%
\catcode`\^=\other
%
% Special characters.  Should be turned off anyway, but...
\catcode`\~=\other
\catcode`\[=\other
\catcode`\]=\other
\catcode`\"=\other
\catcode`\_=\other
```

```
 \catcode`\|=\other
 \catcode`\<=\other
 \catcode`\>=\other
 \catcode`\$=\other
 \catcode`\#=\other
 \catcode`\&=\other
 \catcode`\%=\other
 \catcode`+=\other % avoid \+ for paranoia even though we've turned it off
 %
 % This is to support \ in node names and titles, since the \
 % characters end up in a \csname.  It's easier than
 % leaving it active and making its active definition an actual \
 % character.  What I don't understand is why it works in the *value*
 % of the xrdef.  Seems like it should be a catcode12 \, and that
 % should not typeset properly.  But it works, so I'm moving on for
 % now.  --karl, 15jan04.
 \catcode`\\=\other
 %
 % Make the characters 128-255 be printing characters.
 {%
   \count1=128
   \def\loop{%
     \catcode\count1=\other
     \advance\count1 by 1
     \ifnum \count1<256 \loop \fi
   }%
 }%
 %
 % @ is our escape character in .aux files, and we need braces.
 \catcode`\{=1
 \catcode`\}=2
 \catcode`\@=0
}

\def\readdatafile#1{%
\begingroup
 \setupdatafile
 \input\jobname.#1
\endgroup}


\message{insertions,}
% including footnotes.

\newcount \footnoteno

% The trailing space in the following definition for supereject is
% vital for proper filling; pages come out unaligned when you do a
```

```
% pagealignmacro call if that space before the closing brace is
% removed. (Generally, numeric constants should always be followed by a
% space to prevent strange expansion errors.)
\def\supereject{\par\penalty -20000\footnoteno =0 }

% @footnotestyle is meaningful for Info output only.
\let\footnotestyle=\comment

{\catcode `\@=11
%
% Auto-number footnotes.  Otherwise like plain.
\gdef\footnote{%
 \let\indent=\ptexindent
 \let\noindent=\ptexnoindent
 \global\advance\footnoteno by \@ne
 \edef\thisfootno{$^{\the\footnoteno}$}%
 %
 % In case the footnote comes at the end of a sentence, preserve the
 % extra spacing after we do the footnote number.
 \let\@sf\empty
 \ifhmode\edef\@sf{\spacefactor\the\spacefactor}\ptexslash\fi
 %
 % Remove inadvertent blank space before typesetting the footnote number.
 \unskip
 \thisfootno\@sf
 \dofootnote
}%

% Don't bother with the trickery in plain.tex to not require the
% footnote text as a parameter.  Our footnotes don't need to be so general.
%
% Oh yes, they do; otherwise, @ifset (and anything else that uses
% \parseargline) fails inside footnotes because the tokens are fixed when
% the footnote is read.  --karl, 16nov96.
%
\gdef\dofootnote{%
 \insert\footins\bgroup
 % We want to typeset this text as a normal paragraph, even if the
 % footnote reference occurs in (for example) a display environment.
 % So reset some parameters.
 \hsize=\pagewidth
 \interlinepenalty\interfootnotelinepenalty
 \splittopskip\ht\strutbox % top baseline for broken footnotes
 \splitmaxdepth\dp\strutbox
 \floatingpenalty\@MM
 \leftskip\z@skip
 \rightskip\z@skip
 \spaceskip\z@skip
```

```
 \xspaceskip\z@skip
 \parindent\defaultparindent
 %
 \smallfonts \rm
 %
 % Because we use hanging indentation in footnotes, a @noindent appears
 % to exdent this text, so make it be a no-op.  makeinfo does not use
 % hanging indentation so @noindent can still be needed within footnote
 % text after an @example or the like (not that this is good style).
 \let\noindent = \relax
 %
 % Hang the footnote text off the number.  Use \everypar in case the
 % footnote extends for more than one paragraph.
 \everypar = {\hang}%
 \textindent{\thisfootno}%
 %
 % Don't crash into the line above the footnote text.  Since this
 % expands into a box, it must come within the paragraph, lest it
 % provide a place where TeX can split the footnote.
 \footstrut
 %
 % Invoke rest of plain TeX footnote routine.
 \futurelet\next\fo@t
}
}%end \catcode `\@=11

% In case a @footnote appears in a vbox, save the footnote text and create
% the real \insert just after the vbox finished.  Otherwise, the insertion
% would be lost.
% Similarly, if a @footnote appears inside an alignment, save the footnote
% text to a box and make the \insert when a row of the table is finished.
% And the same can be done for other insert classes.  --kasal, 16nov03.

% Replace the \insert primitive by a cheating macro.
% Deeper inside, just make sure that the saved insertions are not spilled
% out prematurely.
%
\def\startsavinginserts{%
 \ifx \insert\ptexinsert
   \let\insert\saveinsert
 \else
   \let\checkinserts\relax
 \fi
}

% This \insert replacement works for both \insert\footins{foo} and
% \insert\footins\bgroup foo\egroup, but it doesn't work for \insert27{foo}.
%
```

```
\def\saveinsert#1{%
 \edef\next{\noexpand\savetobox \makeSAVEname#1}%
 \afterassignment\next
 % swallow the left brace
 \let\temp =
}
\def\makeSAVEname#1{\makecsname{SAVE\expandafter\gobble\string#1}}
\def\savetobox#1{\global\setbox#1 = \vbox\bgroup \unvbox#1}

\def\checksaveins#1{\ifvoid#1\else \placesaveins#1\fi}

\def\placesaveins#1{%
 \ptexinsert \csname\expandafter\gobblesave\string#1\endcsname
   {\box#1}%
}

% eat @SAVE -- beware, all of them have catcode \other:
{
 \def\dospecials{\do S\do A\do V\do E} \uncatcodespecials  %  ;-)
 \gdef\gobblesave @SAVE{}
}

% initialization:
\def\newsaveins #1{%
 \edef\next{\noexpand\newsaveinsX \makeSAVEname#1}%
 \next
}
\def\newsaveinsX #1{%
 \csname newbox\endcsname #1%
 \expandafter\def\expandafter\checkinserts\expandafter{\checkinserts
   \checksaveins #1}%
}

% initialize:
\let\checkinserts\empty
\newsaveins\footins
\newsaveins\margin


% @image.  We use the macros from epsf.tex to support this.
% If epsf.tex is not installed and @image is used, we complain.
%
% Check for and read epsf.tex up front.  If we read it only at @image
% time, we might be inside a group, and then its definitions would get
% undone and the next image would fail.
\openin 1 = epsf.tex
\ifeof 1 \else
 % Do not bother showing banner with epsf.tex v2.7k (available in
```

```
 % doc/epsf.tex and on ctan).
 \def\epsfannounce{\toks0 = }%
 \input epsf.tex
\fi
\closein 1
%
% We will only complain once about lack of epsf.tex.
\newif\ifwarnednoepsf
\newhelp\noepsfhelp{epsf.tex must be installed for images to
 work.  It is also included in the Texinfo distribution, or you can get
 it from ftp://tug.org/tex/epsf.tex.}
%
\def\image#1{%
 \ifx\epsfbox\thisisundefined
   \ifwarnednoepsf \else
     \errhelp = \noepsfhelp
     \errmessage{epsf.tex not found, images will be ignored}%
     \global\warnednoepsftrue
   \fi
 \else
   \imagexxx #1,,,,,\finish
 \fi
}
%
% Arguments to @image:
% #1 is (mandatory) image filename; we tack on .eps extension.
% #2 is (optional) width, #3 is (optional) height.
% #4 is (ignored optional) html alt text.
% #5 is (ignored optional) extension.
% #6 is just the usual extra ignored arg for parsing stuff.
\newif\ifimagevmode
\def\imagexxx#1,#2,#3,#4,#5,#6\finish{\begingroup
 \catcode`\^^M = 5     % in case we're inside an example
 \normalturnoffactive  % allow _ et al. in names
 % If the image is by itself, center it.
 \ifvmode
   \imagevmodetrue
 \else \ifx\centersub\centerV
   % for @center @image, we need a vbox so we can have our vertical space
   \imagevmodetrue
   \vbox\bgroup % vbox has better behavior than vtop herev
 \fi\fi
 %
 \ifimagevmode
   \nobreak\medskip
   % Usually we'll have text after the image which will insert
   % \parskip glue, so insert it here too to equalize the space
   % above and below.
```

```
  \nobreak\vskip\parskip
  \nobreak
 \fi
 %
 % Leave vertical mode so that indentation from an enclosing
 %  environment such as @quotation is respected.
 % However, if we're at the top level, we don't want the
 %  normal paragraph indentation.
 % On the other hand, if we are in the case of @center @image, we don't
 %  want to start a paragraph, which will create a hsize-width box and
 %  eradicate the centering.
 \ifx\centersub\centerV\else \noindent \fi
 %
 % Output the image.
 \ifpdf
  \dopdfimage{#1}{#2}{#3}%
 \else
  % \epsfbox itself resets \epsf?size at each figure.
  \setbox0 = \hbox{\ignorespaces #2}\ifdim\wd0 > 0pt \epsfxsize=#2\relax \fi
  \setbox0 = \hbox{\ignorespaces #3}\ifdim\wd0 > 0pt \epsfysize=#3\relax \fi
  \epsfbox{#1.eps}%
 \fi
 %
 \ifimagevmode
  \medskip  % space after a standalone image
 \fi
 \ifx\centersub\centerV \egroup \fi
\endgroup}


% @float FLOATTYPE,LABEL,LOC ... @end float for displayed figures, tables,
% etc.  We don't actually implement floating yet, we always include the
% float "here".  But it seemed the best name for the future.
%
\envparseargdef\float{\eatcommaspace\eatcommaspace\dofloat#1, , ,\finish}

% There may be a space before second and/or third parameter; delete it.
\def\eatcommaspace#1, {#1,}

% #1 is the optional FLOATTYPE, the text label for this float, typically
% "Figure", "Table", "Example", etc.  Can't contain commas.  If omitted,
% this float will not be numbered and cannot be referred to.
%
% #2 is the optional xref label.  Also must be present for the float to
% be referable.
%
% #3 is the optional positioning argument; for now, it is ignored.  It
% will somehow specify the positions allowed to float to (here, top, bottom).
```

```
%
% We keep a separate counter for each FLOATTYPE, which we reset at each
% chapter-level command.
\let\resetallfloatnos=\empty
%
\def\dofloat#1,#2,#3,#4\finish{%
 \let\thiscaption=\empty
 \let\thisshortcaption=\empty
 %
 % don't lose footnotes inside @float.
 %
 % BEWARE: when the floats start float, we have to issue warning whenever an
 % insert appears inside a float which could possibly float. --kasal, 26may04
 %
 \startsavinginserts
 %
 % We can't be used inside a paragraph.
 \par
 %
 \vtop\bgroup
  \def\floattype{#1}%
  \def\floatlabel{#2}%
  \def\floatloc{#3}% we do nothing with this yet.
  %
  \ifx\floattype\empty
    \let\safefloattype=\empty
  \else
    {%
      % the floattype might have accents or other special characters,
      % but we need to use it in a control sequence name.
      \indexnofonts
      \turnoffactive
      \xdef\safefloattype{\floattype}%
    }%
  \fi
  %
  % If label is given but no type, we handle that as the empty type.
  \ifx\floatlabel\empty \else
    % We want each FLOATTYPE to be numbered separately (Figure 1,
    % Table 1, Figure 2, ...).  (And if no label, no number.)
    %
    \expandafter\getfloatno\csname\safefloattype floatno\endcsname
    \global\advance\floatno by 1
    %
    {%
      % This magic value for \lastsection is output by \setref as the
      % XREFLABEL-title value.  \xrefX uses it to distinguish float
      % labels (which have a completely different output format) from
```

```
      % node and anchor labels.  And \xrdef uses it to construct the
      % lists of floats.
      %
      \edef\lastsection{\floatmagic=\safefloattype}%
      \setref{\floatlabel}{Yfloat}%
    }%
  \fi
  %
  % start with \parskip glue, I guess.
  \vskip\parskip
  %
  % Don't suppress indentation if a float happens to start a section.
  \restorefirstparagraphindent
}

% we have these possibilities:
% @float Foo,lbl & @caption{Cap}: Foo 1.1: Cap
% @float Foo,lbl & no caption:    Foo 1.1
% @float Foo & @caption{Cap}:     Foo: Cap
% @float Foo & no caption:        Foo
% @float ,lbl & Caption{Cap}:     1.1: Cap
% @float ,lbl & no caption:       1.1
% @float & @caption{Cap}:         Cap
% @float & no caption:
%
\def\Efloat{%
  \let\floatident = \empty
  %
  % In all cases, if we have a float type, it comes first.
  \ifx\floattype\empty \else \def\floatident{\floattype}\fi
  %
  % If we have an xref label, the number comes next.
  \ifx\floatlabel\empty \else
    \ifx\floattype\empty \else % if also had float type, need tie first.
      \appendtomacro\floatident{\tie}%
    \fi
    % the number.
    \appendtomacro\floatident{\chaplevelprefix\the\floatno}%
  \fi
  %
  % Start the printed caption with what we've constructed in
  % \floatident, but keep it separate; we need \floatident again.
  \let\captionline = \floatident
  %
  \ifx\thiscaption\empty \else
    \ifx\floatident\empty \else
 \appendtomacro\captionline{: }% had ident, so need a colon between
    \fi
```

```
    %
    % caption text.
    \appendtomacro\captionline{\scanexp\thiscaption}%
  \fi
  %
  % If we have anything to print, print it, with space before.
  % Eventually this needs to become an \insert.
  \ifx\captionline\empty \else
    \vskip.5\parskip
    \captionline
    %
    % Space below caption.
    \vskip\parskip
  \fi
  %
  % If have an xref label, write the list of floats info.  Do this
  % after the caption, to avoid chance of it being a breakpoint.
  \ifx\floatlabel\empty \else
    % Write the text that goes in the lof to the aux file as
    % \floatlabel-lof.  Besides \floatident, we include the short
    % caption if specified, else the full caption if specified, else nothing.
    {%
      \atdummies
      %
      % since we read the caption text in the macro world, where ^^M
      % is turned into a normal character, we have to scan it back, so
      % we don't write the literal three characters "^^M" into the aux file.
\scanexp{%
  \xdef\noexpand\gtemp{%
    \ifx\thisshortcaption\empty
      \thiscaption
    \else
      \thisshortcaption
    \fi
  }%
}%
      \immediate\write\auxfile{@xrdef{\floatlabel-lof}{\floatident
  \ifx\gtemp\empty \else : \gtemp \fi}}%
    }%
  \fi
\egroup  % end of \vtop
%
% place the captured inserts
%
% BEWARE: when the floats start floating, we have to issue warning
% whenever an insert appears inside a float which could possibly
% float. --kasal, 26may04
%
```

```
 \checkinserts
}

% Append the tokens #2 to the definition of macro #1, not expanding either.
%
\def\appendtomacro#1#2{%
 \expandafter\def\expandafter#1\expandafter{#1#2}%
}

% @caption, @shortcaption
%
\def\caption{\docaption\thiscaption}
\def\shortcaption{\docaption\thisshortcaption}
\def\docaption{\checkenv\float \bgroup\scanargctxt\defcaption}
\def\defcaption#1#2{\egroup \def#1{#2}}

% The parameter is the control sequence identifying the counter we are
% going to use.  Create it if it doesn't exist and assign it to \floatno.
\def\getfloatno#1{%
 \ifx#1\relax
    % Haven't seen this figure type before.
    \csname newcount\endcsname #1%
    %
    % Remember to reset this floatno at the next chap.
    \expandafter\gdef\expandafter\resetallfloatnos
      \expandafter{\resetallfloatnos #1=0 }%
 \fi
 \let\floatno#1%
}

% \setref calls this to get the XREFLABEL-snt value.  We want an @xref
% to the FLOATLABEL to expand to "Figure 3.1".  We call \setref when we
% first read the @float command.
%
\def\Yfloat{\floattype@tie \chaplevelprefix\the\floatno}%

% Magic string used for the XREFLABEL-title value, so \xrefX can
% distinguish floats from other xref types.
\def\floatmagic{!!float!!}

% #1 is the control sequence we are passed; we expand into a conditional
% which is true if #1 represents a float ref.  That is, the magic
% \lastsection value which we \setref above.
%
\def\iffloat#1{\expandafter\doiffloat#1==\finish}
%
% #1 is (maybe) the \floatmagic string.  If so, #2 will be the
% (safe) float type for this float.  We set \iffloattype to #2.
```

```
%
\def\doifffloat#1=#2=#3\finish{%
 \def\temp{#1}%
 \def\iffloattype{#2}%
 \ifx\temp\floatmagic
}

% @listoffloats FLOATTYPE - print a list of floats like a table of contents.
%
\parseargdef\listoffloats{%
 \def\floattype{#1}% floattype
 {%
   % the floattype might have accents or other special characters,
   % but we need to use it in a control sequence name.
   \indexnofonts
   \turnoffactive
   \xdef\safefloattype{\floattype}%
 }%
 %
 % \xrdef saves the floats as a \do-list in \floatlistSAFEFLOATTYPE.
 \expandafter\ifx\csname floatlist\safefloattype\endcsname \relax
   \ifhavexrefs
     % if the user said @listoffloats foo but never @float foo.
     \message{\linenumber No `\safefloattype' floats to list.}%
   \fi
 \else
   \begingroup
     \leftskip=\tocindent  % indent these entries like a toc
     \let\do=\listoffloatsdo
     \csname floatlist\safefloattype\endcsname
   \endgroup
 \fi
}

% This is called on each entry in a list of floats.  We're passed the
% xref label, in the form LABEL-title, which is how we save it in the
% aux file.  We strip off the -title and look up \XRLABEL-lof, which
% has the text we're supposed to typeset here.
%
% Figures without xref labels will not be included in the list (since
% they won't appear in the aux file).
%
\def\listoffloatsdo#1{\listoffloatsdoentry#1\finish}
\def\listoffloatsdoentry#1-title\finish{{%
 % Can't fully expand XR#1-lof because it can contain anything.  Just
 % pass the control sequence.  On the other hand, XR#1-pg is just the
 % page number, and we want to fully expand that so we can get a link
 % in pdf output.
```

```
 \toksA = \expandafter{\csname XR#1-lof\endcsname}%
 %
 % use the same \entry macro we use to generate the TOC and index.
 \edef\writeentry{\noexpand\entry{\the\toksA}{\csname XR#1-pg\endcsname}}%
 \writeentry
}}


\message{localization,}

% For single-language documents, @documentlanguage is usually given very
% early, just after @documentencoding.  Single argument is the language
% (de) or locale (de_DE) abbreviation.
%
{
 \catcode`\_ = \active
 \globaldefs=1
\parseargdef\documentlanguage{\begingroup
 \let_=\normalunderscore  % normal _ character for filenames
 \tex % read txi-??.tex file in plain TeX.
   % Read the file by the name they passed if it exists.
   \openin 1 txi-#1.tex
   \ifeof 1
     \documentlanguagetrywithoutunderscore{#1_\finish}%
   \else
     \globaldefs = 1  % everything in the txi-LL files needs to persist
     \input txi-#1.tex
   \fi
   \closein 1
 \endgroup % end raw TeX
\endgroup}
%
% If they passed de_DE, and txi-de_DE.tex doesn't exist,
% try txi-de.tex.
%
\gdef\documentlanguagetrywithoutunderscore#1_#2\finish{%
 \openin 1 txi-#1.tex
 \ifeof 1
   \errhelp = \nolanghelp
   \errmessage{Cannot read language file txi-#1.tex}%
 \else
   \globaldefs = 1  % everything in the txi-LL files needs to persist
   \input txi-#1.tex
 \fi
 \closein 1
}
}% end of special _ catcode
%
```

```
\newhelp\nolanghelp{The given language definition file cannot be found or
is empty.  Maybe you need to install it?  Putting it in the current
directory should work if nowhere else does.}

% This macro is called from txi-??.tex files; the first argument is the
% \language name to set (without the "\lang@" prefix), the second and
% third args are \{left,right}hyphenmin.
%
% The language names to pass are determined when the format is built.
% See the etex.log file created at that time, e.g.,
% /usr/local/texlive/2008/texmf-var/web2c/pdftex/etex.log.
%
% With TeX Live 2008, etex now includes hyphenation patterns for all
% available languages.  This means we can support hyphenation in
% Texinfo, at least to some extent.  (This still doesn't solve the
% accented characters problem.)
%
\catcode`@=11
\def\txisetlanguage#1#2#3{%
 % do not set the language if the name is undefined in the current TeX.
 \expandafter\ifx\csname lang@#1\endcsname \relax
   \message{no patterns for #1}%
 \else
   \global\language = \csname lang@#1\endcsname
 \fi
 % but there is no harm in adjusting the hyphenmin values regardless.
 \global\lefthyphenmin = #2\relax
 \global\righthyphenmin = #3\relax
}

% Helpers for encodings.
% Set the catcode of characters 128 through 255 to the specified number.
%
\def\setnonasciicharscatcode#1{%
  \count255=128
  \loop\ifnum\count255<256
     \global\catcode\count255=#1\relax
     \advance\count255 by 1
  \repeat
}

\def\setnonasciicharscatcodenonglobal#1{%
  \count255=128
  \loop\ifnum\count255<256
     \catcode\count255=#1\relax
     \advance\count255 by 1
  \repeat
}
```

```
% @documentencoding sets the definition of non-ASCII characters
% according to the specified encoding.
%
\parseargdef\documentencoding{%
 % Encoding being declared for the document.
 \def\declaredencoding{\csname #1.enc\endcsname}%
 %
 % Supported encodings: names converted to tokens in order to be able
 % to compare them with \ifx.
 \def\ascii{\csname US-ASCII.enc\endcsname}%
 \def\latnine{\csname ISO-8859-15.enc\endcsname}%
 \def\latone{\csname ISO-8859-1.enc\endcsname}%
 \def\lattwo{\csname ISO-8859-2.enc\endcsname}%
 \def\utfeight{\csname UTF-8.enc\endcsname}%
 %
 \ifx \declaredencoding \ascii
   \asciichardefs
 %
 \else \ifx \declaredencoding \lattwo
   \setnonasciicharscatcode\active
   \lattwochardefs
 %
 \else \ifx \declaredencoding \latone
   \setnonasciicharscatcode\active
   \latonechardefs
 %
 \else \ifx \declaredencoding \latnine
   \setnonasciicharscatcode\active
   \latninechardefs
 %
 \else \ifx \declaredencoding \utfeight
   \setnonasciicharscatcode\active
   \utfeightchardefs
 %
 \else
  \message{Unknown document encoding #1, ignoring.}%
 %
 \fi % utfeight
 \fi % latnine
 \fi % latone
 \fi % lattwo
 \fi % ascii
}

% A message to be logged when using a character that isn't available
% the default font encoding (OT1).
%
```

```
\def\missingcharmsg#1{\message{Character missing in OT1 encoding: #1.}}

% Take account of \c (plain) vs. \, (Texinfo) difference.
\def\cedilla#1{\ifx\c\ptexc\c{#1}\else\,{#1}\fi}

% First, make active non-ASCII characters in order for them to be
% correctly categorized when TeX reads the replacement text of
% macros containing the character definitions.
\setnonasciicharscatcode\active
%
% Latin1 (ISO-8859-1) character definitions.
\def\latonechardefs{%
 \gdef^^a0{\tie}
 \gdef^^a1{\exclamdown}
 \gdef^^a2{\missingcharmsg{CENT SIGN}}
 \gdef^^a3{{\pounds}}
 \gdef^^a4{\missingcharmsg{CURRENCY SIGN}}
 \gdef^^a5{\missingcharmsg{YEN SIGN}}
 \gdef^^a6{\missingcharmsg{BROKEN BAR}}
 \gdef^^a7{\S}
 \gdef^^a8{\"{}}
 \gdef^^a9{\copyright}
 \gdef^^aa{\ordf}
 \gdef^^ab{\guillemetleft}
 \gdef^^ac{$\lnot$}
 \gdef^^ad{\-}
 \gdef^^ae{\registeredsymbol}
 \gdef^^af{\={}}
 %
 \gdef^^b0{\textdegree}
 \gdef^^b1{$\pm$}
 \gdef^^b2{$^2$}
 \gdef^^b3{$^3$}
 \gdef^^b4{\'{}}
 \gdef^^b5{$\mu$}
 \gdef^^b6{\P}
 %
 \gdef^^b7{$^.$}
 \gdef^^b8{\cedilla\ }
 \gdef^^b9{$^1$}
 \gdef^^ba{\ordm}
 %
 \gdef^^bb{\guillemetright}
 \gdef^^bc{$1\over4$}
 \gdef^^bd{$1\over2$}
 \gdef^^be{$3\over4$}
 \gdef^^bf{\questiondown}
 %
```

```
\gdef^^c0{\`A}
\gdef^^c1{\'A}
\gdef^^c2{\^A}
\gdef^^c3{\~A}
\gdef^^c4{\"A}
\gdef^^c5{\ringaccent A}
\gdef^^c6{\AE}
\gdef^^c7{\cedilla C}
\gdef^^c8{\`E}
\gdef^^c9{\'E}
\gdef^^ca{\^E}
\gdef^^cb{\"E}
\gdef^^cc{\`I}
\gdef^^cd{\'I}
\gdef^^ce{\^I}
\gdef^^cf{\"I}
%
\gdef^^d0{\DH}
\gdef^^d1{\~N}
\gdef^^d2{\`O}
\gdef^^d3{\'O}
\gdef^^d4{\^O}
\gdef^^d5{\~O}
\gdef^^d6{\"O}
\gdef^^d7{$\times$}
\gdef^^d8{\O}
\gdef^^d9{\`U}
\gdef^^da{\'U}
\gdef^^db{\^U}
\gdef^^dc{\"U}
\gdef^^dd{\'Y}
\gdef^^de{\TH}
\gdef^^df{\ss}
%
\gdef^^e0{\`a}
\gdef^^e1{\'a}
\gdef^^e2{\^a}
\gdef^^e3{\~a}
\gdef^^e4{\"a}
\gdef^^e5{\ringaccent a}
\gdef^^e6{\ae}
\gdef^^e7{\cedilla c}
\gdef^^e8{\`e}
\gdef^^e9{\'e}
\gdef^^ea{\^e}
\gdef^^eb{\"e}
\gdef^^ec{\`{\dotless i}}
\gdef^^ed{\'{\dotless i}}
```

```
 \gdef^^ee{\^{\dotless i}}
 \gdef^^ef{\"{\dotless i}}
 %
 \gdef^^f0{\dh}
 \gdef^^f1{\~n}
 \gdef^^f2{\`o}
 \gdef^^f3{\'o}
 \gdef^^f4{\^o}
 \gdef^^f5{\~o}
 \gdef^^f6{\"o}
 \gdef^^f7{$\div$}
 \gdef^^f8{\o}
 \gdef^^f9{\`u}
 \gdef^^fa{\'u}
 \gdef^^fb{\^u}
 \gdef^^fc{\"u}
 \gdef^^fd{\'y}
 \gdef^^fe{\th}
 \gdef^^ff{\"y}
}

% Latin9 (ISO-8859-15) encoding character definitions.
\def\latninechardefs{%
 % Encoding is almost identical to Latin1.
 \latonechardefs
 %
 \gdef^^a4{\euro}
 \gdef^^a6{\v S}
 \gdef^^a8{\v s}
 \gdef^^b4{\v Z}
 \gdef^^b8{\v z}
 \gdef^^bc{\OE}
 \gdef^^bd{\oe}
 \gdef^^be{\"Y}
}

% Latin2 (ISO-8859-2) character definitions.
\def\lattwochardefs{%
 \gdef^^a0{\tie}
 \gdef^^a1{\ogonek{A}}
 \gdef^^a2{\u{}}
 \gdef^^a3{\L}
 \gdef^^a4{\missingcharmsg{CURRENCY SIGN}}
 \gdef^^a5{\v L}
 \gdef^^a6{\'S}
 \gdef^^a7{\S}
 \gdef^^a8{\"{}}
 \gdef^^a9{\v S}
```

```
\gdef^^aa{\cedilla S}
\gdef^^ab{\v T}
\gdef^^ac{\'Z}
\gdef^^ad{\-}
\gdef^^ae{\v Z}
\gdef^^af{\dotaccent Z}
%
\gdef^^b0{\textdegree}
\gdef^^b1{\ogonek{a}}
\gdef^^b2{\ogonek{ }}
\gdef^^b3{\l}
\gdef^^b4{\'{}}
\gdef^^b5{\v l}
\gdef^^b6{\'s}
\gdef^^b7{\v{}}
\gdef^^b8{\cedilla\ }
\gdef^^b9{\v s}
\gdef^^ba{\cedilla s}
\gdef^^bb{\v t}
\gdef^^bc{\'z}
\gdef^^bd{\H{}}
\gdef^^be{\v z}
\gdef^^bf{\dotaccent z}
%
\gdef^^c0{\'R}
\gdef^^c1{\'A}
\gdef^^c2{\^A}
\gdef^^c3{\u A}
\gdef^^c4{\"A}
\gdef^^c5{\'L}
\gdef^^c6{\'C}
\gdef^^c7{\cedilla C}
\gdef^^c8{\v C}
\gdef^^c9{\'E}
\gdef^^ca{\ogonek{E}}
\gdef^^cb{\"E}
\gdef^^cc{\v E}
\gdef^^cd{\'I}
\gdef^^ce{\^I}
\gdef^^cf{\v D}
%
\gdef^^d0{\DH}
\gdef^^d1{\'N}
\gdef^^d2{\v N}
\gdef^^d3{\'O}
\gdef^^d4{\^O}
\gdef^^d5{\H O}
\gdef^^d6{\"O}
```

```
 \gdef^^d7{$\times$}
 \gdef^^d8{\v R}
 \gdef^^d9{\ringaccent U}
 \gdef^^da{\'U}
 \gdef^^db{\H U}
 \gdef^^dc{\"U}
 \gdef^^dd{\'Y}
 \gdef^^de{\cedilla T}
 \gdef^^df{\ss}
 %
 \gdef^^e0{\'r}
 \gdef^^e1{\'a}
 \gdef^^e2{\^a}
 \gdef^^e3{\u a}
 \gdef^^e4{\"a}
 \gdef^^e5{\'l}
 \gdef^^e6{\'c}
 \gdef^^e7{\cedilla c}
 \gdef^^e8{\v c}
 \gdef^^e9{\'e}
 \gdef^^ea{\ogonek{e}}
 \gdef^^eb{\"e}
 \gdef^^ec{\v e}
 \gdef^^ed{\'{\dotless{i}}}
 \gdef^^ee{\^{\dotless{i}}}
 \gdef^^ef{\v d}
 %
 \gdef^^f0{\dh}
 \gdef^^f1{\'n}
 \gdef^^f2{\v n}
 \gdef^^f3{\'o}
 \gdef^^f4{\^o}
 \gdef^^f5{\H o}
 \gdef^^f6{\"o}
 \gdef^^f7{$\div$}
 \gdef^^f8{\v r}
 \gdef^^f9{\ringaccent u}
 \gdef^^fa{\'u}
 \gdef^^fb{\H u}
 \gdef^^fc{\"u}
 \gdef^^fd{\'y}
 \gdef^^fe{\cedilla t}
 \gdef^^ff{\dotaccent{}}
}

% UTF-8 character definitions.
%
% This code to support UTF-8 is based on LaTeX's utf8.def, with some
```

```
% changes for Texinfo conventions.  It is included here under the GPL by
% permission from Frank Mittelbach and the LaTeX team.
%
\newcount\countUTFx
\newcount\countUTFy
\newcount\countUTFz

\gdef\UTFviiiTwoOctets#1#2{\expandafter
  \UTFviiiDefined\csname u8:#1\string #2\endcsname}
%
\gdef\UTFviiiThreeOctets#1#2#3{\expandafter
  \UTFviiiDefined\csname u8:#1\string #2\string #3\endcsname}
%
\gdef\UTFviiiFourOctets#1#2#3#4{\expandafter
  \UTFviiiDefined\csname u8:#1\string #2\string #3\string #4\endcsname}

\gdef\UTFviiiDefined#1{%
 \ifx #1\relax
   \message{\linenumber Unicode char \string #1 not defined for Texinfo}%
 \else
   \expandafter #1%
 \fi
}

\begingroup
 \catcode`\~13
 \catcode`\"12

 \def\UTFviiiLoop{%
   \global\catcode\countUTFx\active
   \uccode`\~\countUTFx
   \uppercase\expandafter{\UTFviiiTmp}%
   \advance\countUTFx by 1
   \ifnum\countUTFx < \countUTFy
     \expandafter\UTFviiiLoop
   \fi}

 \countUTFx = "C2
 \countUTFy = "E0
 \def\UTFviiiTmp{%
   \xdef~{\noexpand\UTFviiiTwoOctets\string~}}
 \UTFviiiLoop

 \countUTFx = "E0
 \countUTFy = "F0
 \def\UTFviiiTmp{%
   \xdef~{\noexpand\UTFviiiThreeOctets\string~}}
 \UTFviiiLoop
```

```
 \countUTFx = "F0
 \countUTFy = "F4
 \def\UTFviiiTmp{%
   \xdef~{\noexpand\UTFviiiFourOctets\string~}}
 \UTFviiiLoop
\endgroup

\begingroup
 \catcode`\"=12
 \catcode`\<=12
 \catcode`\.=12
 \catcode`\,=12
 \catcode`\;=12
 \catcode`\!=12
 \catcode`\~=13

 \gdef\DeclareUnicodeCharacter#1#2{%
   \countUTFz = "#1\relax
   %\wlog{\space\space defining Unicode char U+#1 (decimal \the\countUTFz)}%
   \begingroup
     \parseXMLCharref
     \def\UTFviiiTwoOctets##1##2{%
       \csname u8:##1\string ##2\endcsname}%
     \def\UTFviiiThreeOctets##1##2##3{%
       \csname u8:##1\string ##2\string ##3\endcsname}%
     \def\UTFviiiFourOctets##1##2##3##4{%
       \csname u8:##1\string ##2\string ##3\string ##4\endcsname}%
     \expandafter\expandafter\expandafter\expandafter
      \expandafter\expandafter\expandafter
      \gdef\UTFviiiTmp{#2}%
   \endgroup}

 \gdef\parseXMLCharref{%
   \ifnum\countUTFz < "A0\relax
     \errhelp = \EMsimple
     \errmessage{Cannot define Unicode char value < 00A0}%
   \else\ifnum\countUTFz < "800\relax
     \parseUTFviiiA,%
     \parseUTFviiiB C\UTFviiiTwoOctets.,%
   \else\ifnum\countUTFz < "10000\relax
     \parseUTFviiiA;%
     \parseUTFviiiA,%
     \parseUTFviiiB E\UTFviiiThreeOctets.{,;}%
   \else
     \parseUTFviiiA;%
     \parseUTFviiiA,%
     \parseUTFviiiA!%
```

```
    \parseUTFviiiB F\UTFviiiFourOctets.{!,;}%
  \fi\fi\fi
 }

 \gdef\parseUTFviiiA#1{%
  \countUTFx = \countUTFz
  \divide\countUTFz by 64
  \countUTFy = \countUTFz
  \multiply\countUTFz by 64
  \advance\countUTFx by -\countUTFz
  \advance\countUTFx by 128
  \uccode `#1\countUTFx
  \countUTFz = \countUTFy}

 \gdef\parseUTFviiiB#1#2#3#4{%
  \advance\countUTFz by "#10\relax
  \uccode `#3\countUTFz
  \uppercase{\gdef\UTFviiiTmp{#2#3#4}}}
\endgroup

\def\utfeightchardefs{%
 \DeclareUnicodeCharacter{00A0}{\tie}
 \DeclareUnicodeCharacter{00A1}{\exclamdown}
 \DeclareUnicodeCharacter{00A3}{\pounds}
 \DeclareUnicodeCharacter{00A8}{\"{ }}
 \DeclareUnicodeCharacter{00A9}{\copyright}
 \DeclareUnicodeCharacter{00AA}{\ordf}
 \DeclareUnicodeCharacter{00AB}{\guillemetleft}
 \DeclareUnicodeCharacter{00AD}{\-}
 \DeclareUnicodeCharacter{00AE}{\registeredsymbol}
 \DeclareUnicodeCharacter{00AF}{\={ }}

 \DeclareUnicodeCharacter{00B0}{\ringaccent{ }}
 \DeclareUnicodeCharacter{00B4}{\'{ }}
 \DeclareUnicodeCharacter{00B8}{\cedilla{ }}
 \DeclareUnicodeCharacter{00BA}{\ordm}
 \DeclareUnicodeCharacter{00BB}{\guillemetright}
 \DeclareUnicodeCharacter{00BF}{\questiondown}

 \DeclareUnicodeCharacter{00C0}{\`A}
 \DeclareUnicodeCharacter{00C1}{\'A}
 \DeclareUnicodeCharacter{00C2}{\^A}
 \DeclareUnicodeCharacter{00C3}{\~A}
 \DeclareUnicodeCharacter{00C4}{\"A}
 \DeclareUnicodeCharacter{00C5}{\AA}
 \DeclareUnicodeCharacter{00C6}{\AE}
 \DeclareUnicodeCharacter{00C7}{\cedilla{C}}
 \DeclareUnicodeCharacter{00C8}{\`E}
```

```
\DeclareUnicodeCharacter{00C9}{\'E}
\DeclareUnicodeCharacter{00CA}{\^E}
\DeclareUnicodeCharacter{00CB}{\"E}
\DeclareUnicodeCharacter{00CC}{\`I}
\DeclareUnicodeCharacter{00CD}{\'I}
\DeclareUnicodeCharacter{00CE}{\^I}
\DeclareUnicodeCharacter{00CF}{\"I}

\DeclareUnicodeCharacter{00D0}{\DH}
\DeclareUnicodeCharacter{00D1}{\~N}
\DeclareUnicodeCharacter{00D2}{\`O}
\DeclareUnicodeCharacter{00D3}{\'O}
\DeclareUnicodeCharacter{00D4}{\^O}
\DeclareUnicodeCharacter{00D5}{\~O}
\DeclareUnicodeCharacter{00D6}{\"O}
\DeclareUnicodeCharacter{00D8}{\O}
\DeclareUnicodeCharacter{00D9}{\`U}
\DeclareUnicodeCharacter{00DA}{\'U}
\DeclareUnicodeCharacter{00DB}{\^U}
\DeclareUnicodeCharacter{00DC}{\"U}
\DeclareUnicodeCharacter{00DD}{\'Y}
\DeclareUnicodeCharacter{00DE}{\TH}
\DeclareUnicodeCharacter{00DF}{\ss}

\DeclareUnicodeCharacter{00E0}{\`a}
\DeclareUnicodeCharacter{00E1}{\'a}
\DeclareUnicodeCharacter{00E2}{\^a}
\DeclareUnicodeCharacter{00E3}{\~a}
\DeclareUnicodeCharacter{00E4}{\"a}
\DeclareUnicodeCharacter{00E5}{\aa}
\DeclareUnicodeCharacter{00E6}{\ae}
\DeclareUnicodeCharacter{00E7}{\cedilla{c}}
\DeclareUnicodeCharacter{00E8}{\`e}
\DeclareUnicodeCharacter{00E9}{\'e}
\DeclareUnicodeCharacter{00EA}{\^e}
\DeclareUnicodeCharacter{00EB}{\"e}
\DeclareUnicodeCharacter{00EC}{\`{\dotless{i}}}
\DeclareUnicodeCharacter{00ED}{\'{\dotless{i}}}
\DeclareUnicodeCharacter{00EE}{\^{\dotless{i}}}
\DeclareUnicodeCharacter{00EF}{\"{\dotless{i}}}

\DeclareUnicodeCharacter{00F0}{\dh}
\DeclareUnicodeCharacter{00F1}{\~n}
\DeclareUnicodeCharacter{00F2}{\`o}
\DeclareUnicodeCharacter{00F3}{\'o}
\DeclareUnicodeCharacter{00F4}{\^o}
\DeclareUnicodeCharacter{00F5}{\~o}
\DeclareUnicodeCharacter{00F6}{\"o}
```

```
\DeclareUnicodeCharacter{00F8}{\o}
\DeclareUnicodeCharacter{00F9}{\`u}
\DeclareUnicodeCharacter{00FA}{\'u}
\DeclareUnicodeCharacter{00FB}{\^u}
\DeclareUnicodeCharacter{00FC}{\"u}
\DeclareUnicodeCharacter{00FD}{\'y}
\DeclareUnicodeCharacter{00FE}{\th}
\DeclareUnicodeCharacter{00FF}{\"y}

\DeclareUnicodeCharacter{0100}{\=A}
\DeclareUnicodeCharacter{0101}{\=a}
\DeclareUnicodeCharacter{0102}{\u{A}}
\DeclareUnicodeCharacter{0103}{\u{a}}
\DeclareUnicodeCharacter{0104}{\ogonek{A}}
\DeclareUnicodeCharacter{0105}{\ogonek{a}}
\DeclareUnicodeCharacter{0106}{\'C}
\DeclareUnicodeCharacter{0107}{\'c}
\DeclareUnicodeCharacter{0108}{\^C}
\DeclareUnicodeCharacter{0109}{\^c}
\DeclareUnicodeCharacter{0118}{\ogonek{E}}
\DeclareUnicodeCharacter{0119}{\ogonek{e}}
\DeclareUnicodeCharacter{010A}{\dotaccent{C}}
\DeclareUnicodeCharacter{010B}{\dotaccent{c}}
\DeclareUnicodeCharacter{010C}{\v{C}}
\DeclareUnicodeCharacter{010D}{\v{c}}
\DeclareUnicodeCharacter{010E}{\v{D}}

\DeclareUnicodeCharacter{0112}{\=E}
\DeclareUnicodeCharacter{0113}{\=e}
\DeclareUnicodeCharacter{0114}{\u{E}}
\DeclareUnicodeCharacter{0115}{\u{e}}
\DeclareUnicodeCharacter{0116}{\dotaccent{E}}
\DeclareUnicodeCharacter{0117}{\dotaccent{e}}
\DeclareUnicodeCharacter{011A}{\v{E}}
\DeclareUnicodeCharacter{011B}{\v{e}}
\DeclareUnicodeCharacter{011C}{\^G}
\DeclareUnicodeCharacter{011D}{\^g}
\DeclareUnicodeCharacter{011E}{\u{G}}
\DeclareUnicodeCharacter{011F}{\u{g}}

\DeclareUnicodeCharacter{0120}{\dotaccent{G}}
\DeclareUnicodeCharacter{0121}{\dotaccent{g}}
\DeclareUnicodeCharacter{0124}{\^H}
\DeclareUnicodeCharacter{0125}{\^h}
\DeclareUnicodeCharacter{0128}{\~I}
\DeclareUnicodeCharacter{0129}{\~{\dotless{i}}}
\DeclareUnicodeCharacter{012A}{\=I}
\DeclareUnicodeCharacter{012B}{\={\dotless{i}}}
```

```
\DeclareUnicodeCharacter{012C}{\u{I}}
\DeclareUnicodeCharacter{012D}{\u{\dotless{i}}}

\DeclareUnicodeCharacter{0130}{\dotaccent{I}}
\DeclareUnicodeCharacter{0131}{\dotless{i}}
\DeclareUnicodeCharacter{0132}{IJ}
\DeclareUnicodeCharacter{0133}{ij}
\DeclareUnicodeCharacter{0134}{\^J}
\DeclareUnicodeCharacter{0135}{\^{\dotless{j}}}
\DeclareUnicodeCharacter{0139}{\'L}
\DeclareUnicodeCharacter{013A}{\'l}

\DeclareUnicodeCharacter{0141}{\L}
\DeclareUnicodeCharacter{0142}{\l}
\DeclareUnicodeCharacter{0143}{\'N}
\DeclareUnicodeCharacter{0144}{\'n}
\DeclareUnicodeCharacter{0147}{\v{N}}
\DeclareUnicodeCharacter{0148}{\v{n}}
\DeclareUnicodeCharacter{014C}{\=O}
\DeclareUnicodeCharacter{014D}{\=o}
\DeclareUnicodeCharacter{014E}{\u{O}}
\DeclareUnicodeCharacter{014F}{\u{o}}

\DeclareUnicodeCharacter{0150}{\H{O}}
\DeclareUnicodeCharacter{0151}{\H{o}}
\DeclareUnicodeCharacter{0152}{\OE}
\DeclareUnicodeCharacter{0153}{\oe}
\DeclareUnicodeCharacter{0154}{\'R}
\DeclareUnicodeCharacter{0155}{\'r}
\DeclareUnicodeCharacter{0158}{\v{R}}
\DeclareUnicodeCharacter{0159}{\v{r}}
\DeclareUnicodeCharacter{015A}{\'S}
\DeclareUnicodeCharacter{015B}{\'s}
\DeclareUnicodeCharacter{015C}{\^S}
\DeclareUnicodeCharacter{015D}{\^s}
\DeclareUnicodeCharacter{015E}{\cedilla{S}}
\DeclareUnicodeCharacter{015F}{\cedilla{s}}

\DeclareUnicodeCharacter{0160}{\v{S}}
\DeclareUnicodeCharacter{0161}{\v{s}}
\DeclareUnicodeCharacter{0162}{\cedilla{t}}
\DeclareUnicodeCharacter{0163}{\cedilla{T}}
\DeclareUnicodeCharacter{0164}{\v{T}}

\DeclareUnicodeCharacter{0168}{\~U}
\DeclareUnicodeCharacter{0169}{\~u}
\DeclareUnicodeCharacter{016A}{\=U}
\DeclareUnicodeCharacter{016B}{\=u}
```

```
\DeclareUnicodeCharacter{016C}{\u{U}}
\DeclareUnicodeCharacter{016D}{\u{u}}
\DeclareUnicodeCharacter{016E}{\ringaccent{U}}
\DeclareUnicodeCharacter{016F}{\ringaccent{u}}

\DeclareUnicodeCharacter{0170}{\H{U}}
\DeclareUnicodeCharacter{0171}{\H{u}}
\DeclareUnicodeCharacter{0174}{\^W}
\DeclareUnicodeCharacter{0175}{\^w}
\DeclareUnicodeCharacter{0176}{\^Y}
\DeclareUnicodeCharacter{0177}{\^y}
\DeclareUnicodeCharacter{0178}{\"Y}
\DeclareUnicodeCharacter{0179}{\'Z}
\DeclareUnicodeCharacter{017A}{\'z}
\DeclareUnicodeCharacter{017B}{\dotaccent{Z}}
\DeclareUnicodeCharacter{017C}{\dotaccent{z}}
\DeclareUnicodeCharacter{017D}{\v{Z}}
\DeclareUnicodeCharacter{017E}{\v{z}}

\DeclareUnicodeCharacter{01C4}{D\v{Z}}
\DeclareUnicodeCharacter{01C5}{D\v{z}}
\DeclareUnicodeCharacter{01C6}{d\v{z}}
\DeclareUnicodeCharacter{01C7}{LJ}
\DeclareUnicodeCharacter{01C8}{Lj}
\DeclareUnicodeCharacter{01C9}{lj}
\DeclareUnicodeCharacter{01CA}{NJ}
\DeclareUnicodeCharacter{01CB}{Nj}
\DeclareUnicodeCharacter{01CC}{nj}
\DeclareUnicodeCharacter{01CD}{\v{A}}
\DeclareUnicodeCharacter{01CE}{\v{a}}
\DeclareUnicodeCharacter{01CF}{\v{I}}

\DeclareUnicodeCharacter{01D0}{\v{\dotless{i}}}
\DeclareUnicodeCharacter{01D1}{\v{O}}
\DeclareUnicodeCharacter{01D2}{\v{o}}
\DeclareUnicodeCharacter{01D3}{\v{U}}
\DeclareUnicodeCharacter{01D4}{\v{u}}

\DeclareUnicodeCharacter{01E2}{\={\AE}}
\DeclareUnicodeCharacter{01E3}{\={\ae}}
\DeclareUnicodeCharacter{01E6}{\v{G}}
\DeclareUnicodeCharacter{01E7}{\v{g}}
\DeclareUnicodeCharacter{01E8}{\v{K}}
\DeclareUnicodeCharacter{01E9}{\v{k}}

\DeclareUnicodeCharacter{01F0}{\v{\dotless{j}}}
\DeclareUnicodeCharacter{01F1}{DZ}
\DeclareUnicodeCharacter{01F2}{Dz}
```

```
\DeclareUnicodeCharacter{01F3}{dz}
\DeclareUnicodeCharacter{01F4}{\'G}
\DeclareUnicodeCharacter{01F5}{\'g}
\DeclareUnicodeCharacter{01F8}{\`N}
\DeclareUnicodeCharacter{01F9}{\`n}
\DeclareUnicodeCharacter{01FC}{\'{\AE}}
\DeclareUnicodeCharacter{01FD}{\'{\ae}}
\DeclareUnicodeCharacter{01FE}{\'{\O}}
\DeclareUnicodeCharacter{01FF}{\'{\o}}

\DeclareUnicodeCharacter{021E}{\v{H}}
\DeclareUnicodeCharacter{021F}{\v{h}}

\DeclareUnicodeCharacter{0226}{\dotaccent{A}}
\DeclareUnicodeCharacter{0227}{\dotaccent{a}}
\DeclareUnicodeCharacter{0228}{\cedilla{E}}
\DeclareUnicodeCharacter{0229}{\cedilla{e}}
\DeclareUnicodeCharacter{022E}{\dotaccent{O}}
\DeclareUnicodeCharacter{022F}{\dotaccent{o}}

\DeclareUnicodeCharacter{0232}{\=Y}
\DeclareUnicodeCharacter{0233}{\=y}
\DeclareUnicodeCharacter{0237}{\dotless{j}}

\DeclareUnicodeCharacter{02DB}{\ogonek{ }}

\DeclareUnicodeCharacter{1E02}{\dotaccent{B}}
\DeclareUnicodeCharacter{1E03}{\dotaccent{b}}
\DeclareUnicodeCharacter{1E04}{\udotaccent{B}}
\DeclareUnicodeCharacter{1E05}{\udotaccent{b}}
\DeclareUnicodeCharacter{1E06}{\ubaraccent{B}}
\DeclareUnicodeCharacter{1E07}{\ubaraccent{b}}
\DeclareUnicodeCharacter{1E0A}{\dotaccent{D}}
\DeclareUnicodeCharacter{1E0B}{\dotaccent{d}}
\DeclareUnicodeCharacter{1E0C}{\udotaccent{D}}
\DeclareUnicodeCharacter{1E0D}{\udotaccent{d}}
\DeclareUnicodeCharacter{1E0E}{\ubaraccent{D}}
\DeclareUnicodeCharacter{1E0F}{\ubaraccent{d}}

\DeclareUnicodeCharacter{1E1E}{\dotaccent{F}}
\DeclareUnicodeCharacter{1E1F}{\dotaccent{f}}

\DeclareUnicodeCharacter{1E20}{\=G}
\DeclareUnicodeCharacter{1E21}{\=g}
\DeclareUnicodeCharacter{1E22}{\dotaccent{H}}
\DeclareUnicodeCharacter{1E23}{\dotaccent{h}}
\DeclareUnicodeCharacter{1E24}{\udotaccent{H}}
\DeclareUnicodeCharacter{1E25}{\udotaccent{h}}
```

```
\DeclareUnicodeCharacter{1E26}{\"H}
\DeclareUnicodeCharacter{1E27}{\"h}

\DeclareUnicodeCharacter{1E30}{\'K}
\DeclareUnicodeCharacter{1E31}{\'k}
\DeclareUnicodeCharacter{1E32}{\udotaccent{K}}
\DeclareUnicodeCharacter{1E33}{\udotaccent{k}}
\DeclareUnicodeCharacter{1E34}{\ubaraccent{K}}
\DeclareUnicodeCharacter{1E35}{\ubaraccent{k}}
\DeclareUnicodeCharacter{1E36}{\udotaccent{L}}
\DeclareUnicodeCharacter{1E37}{\udotaccent{l}}
\DeclareUnicodeCharacter{1E3A}{\ubaraccent{L}}
\DeclareUnicodeCharacter{1E3B}{\ubaraccent{l}}
\DeclareUnicodeCharacter{1E3E}{\'M}
\DeclareUnicodeCharacter{1E3F}{\'m}

\DeclareUnicodeCharacter{1E40}{\dotaccent{M}}
\DeclareUnicodeCharacter{1E41}{\dotaccent{m}}
\DeclareUnicodeCharacter{1E42}{\udotaccent{M}}
\DeclareUnicodeCharacter{1E43}{\udotaccent{m}}
\DeclareUnicodeCharacter{1E44}{\dotaccent{N}}
\DeclareUnicodeCharacter{1E45}{\dotaccent{n}}
\DeclareUnicodeCharacter{1E46}{\udotaccent{N}}
\DeclareUnicodeCharacter{1E47}{\udotaccent{n}}
\DeclareUnicodeCharacter{1E48}{\ubaraccent{N}}
\DeclareUnicodeCharacter{1E49}{\ubaraccent{n}}

\DeclareUnicodeCharacter{1E54}{\'P}
\DeclareUnicodeCharacter{1E55}{\'p}
\DeclareUnicodeCharacter{1E56}{\dotaccent{P}}
\DeclareUnicodeCharacter{1E57}{\dotaccent{p}}
\DeclareUnicodeCharacter{1E58}{\dotaccent{R}}
\DeclareUnicodeCharacter{1E59}{\dotaccent{r}}
\DeclareUnicodeCharacter{1E5A}{\udotaccent{R}}
\DeclareUnicodeCharacter{1E5B}{\udotaccent{r}}
\DeclareUnicodeCharacter{1E5E}{\ubaraccent{R}}
\DeclareUnicodeCharacter{1E5F}{\ubaraccent{r}}

\DeclareUnicodeCharacter{1E60}{\dotaccent{S}}
\DeclareUnicodeCharacter{1E61}{\dotaccent{s}}
\DeclareUnicodeCharacter{1E62}{\udotaccent{S}}
\DeclareUnicodeCharacter{1E63}{\udotaccent{s}}
\DeclareUnicodeCharacter{1E6A}{\dotaccent{T}}
\DeclareUnicodeCharacter{1E6B}{\dotaccent{t}}
\DeclareUnicodeCharacter{1E6C}{\udotaccent{T}}
\DeclareUnicodeCharacter{1E6D}{\udotaccent{t}}
\DeclareUnicodeCharacter{1E6E}{\ubaraccent{T}}
\DeclareUnicodeCharacter{1E6F}{\ubaraccent{t}}
```

```
\DeclareUnicodeCharacter{1E7C}{\~V}
\DeclareUnicodeCharacter{1E7D}{\~v}
\DeclareUnicodeCharacter{1E7E}{\udotaccent{V}}
\DeclareUnicodeCharacter{1E7F}{\udotaccent{v}}

\DeclareUnicodeCharacter{1E80}{\`W}
\DeclareUnicodeCharacter{1E81}{\`w}
\DeclareUnicodeCharacter{1E82}{\'W}
\DeclareUnicodeCharacter{1E83}{\'w}
\DeclareUnicodeCharacter{1E84}{\"W}
\DeclareUnicodeCharacter{1E85}{\"w}
\DeclareUnicodeCharacter{1E86}{\dotaccent{W}}
\DeclareUnicodeCharacter{1E87}{\dotaccent{w}}
\DeclareUnicodeCharacter{1E88}{\udotaccent{W}}
\DeclareUnicodeCharacter{1E89}{\udotaccent{w}}
\DeclareUnicodeCharacter{1E8A}{\dotaccent{X}}
\DeclareUnicodeCharacter{1E8B}{\dotaccent{x}}
\DeclareUnicodeCharacter{1E8C}{\"X}
\DeclareUnicodeCharacter{1E8D}{\"x}
\DeclareUnicodeCharacter{1E8E}{\dotaccent{Y}}
\DeclareUnicodeCharacter{1E8F}{\dotaccent{y}}

\DeclareUnicodeCharacter{1E90}{\^Z}
\DeclareUnicodeCharacter{1E91}{\^z}
\DeclareUnicodeCharacter{1E92}{\udotaccent{Z}}
\DeclareUnicodeCharacter{1E93}{\udotaccent{z}}
\DeclareUnicodeCharacter{1E94}{\ubaraccent{Z}}
\DeclareUnicodeCharacter{1E95}{\ubaraccent{z}}
\DeclareUnicodeCharacter{1E96}{\ubaraccent{h}}
\DeclareUnicodeCharacter{1E97}{\"t}
\DeclareUnicodeCharacter{1E98}{\ringaccent{w}}
\DeclareUnicodeCharacter{1E99}{\ringaccent{y}}

\DeclareUnicodeCharacter{1EA0}{\udotaccent{A}}
\DeclareUnicodeCharacter{1EA1}{\udotaccent{a}}

\DeclareUnicodeCharacter{1EB8}{\udotaccent{E}}
\DeclareUnicodeCharacter{1EB9}{\udotaccent{e}}
\DeclareUnicodeCharacter{1EBC}{\~E}
\DeclareUnicodeCharacter{1EBD}{\~e}

\DeclareUnicodeCharacter{1ECA}{\udotaccent{I}}
\DeclareUnicodeCharacter{1ECB}{\udotaccent{i}}
\DeclareUnicodeCharacter{1ECC}{\udotaccent{O}}
\DeclareUnicodeCharacter{1ECD}{\udotaccent{o}}

\DeclareUnicodeCharacter{1EE4}{\udotaccent{U}}
```

```
 \DeclareUnicodeCharacter{1EE5}{\udotaccent{u}}

 \DeclareUnicodeCharacter{1EF2}{\`Y}
 \DeclareUnicodeCharacter{1EF3}{\`y}
 \DeclareUnicodeCharacter{1EF4}{\udotaccent{Y}}

 \DeclareUnicodeCharacter{1EF8}{\~Y}
 \DeclareUnicodeCharacter{1EF9}{\~y}

 \DeclareUnicodeCharacter{2013}{--}
 \DeclareUnicodeCharacter{2014}{---}
 \DeclareUnicodeCharacter{2018}{\quoteleft}
 \DeclareUnicodeCharacter{2019}{\quoteright}
 \DeclareUnicodeCharacter{201A}{\quotesinglbase}
 \DeclareUnicodeCharacter{201C}{\quotedblleft}
 \DeclareUnicodeCharacter{201D}{\quotedblright}
 \DeclareUnicodeCharacter{201E}{\quotedblbase}
 \DeclareUnicodeCharacter{2022}{\bullet}
 \DeclareUnicodeCharacter{2026}{\dots}
 \DeclareUnicodeCharacter{2039}{\guilsinglleft}
 \DeclareUnicodeCharacter{203A}{\guilsinglright}
 \DeclareUnicodeCharacter{20AC}{\euro}

 \DeclareUnicodeCharacter{2192}{\expansion}
 \DeclareUnicodeCharacter{21D2}{\result}

 \DeclareUnicodeCharacter{2212}{\minus}
 \DeclareUnicodeCharacter{2217}{\point}
 \DeclareUnicodeCharacter{2261}{\equiv}
}% end of \utfeightchardefs


% US-ASCII character definitions.
\def\asciichardefs{% nothing need be done
  \relax
}

% Make non-ASCII characters printable again for compatibility with
% existing Texinfo documents that may use them, even without declaring a
% document encoding.
%
\setnonasciicharscatcode \other


\message{formatting,}

\newdimen\defaultparindent \defaultparindent = 15pt
```

```
\chapheadingskip = 15pt plus 4pt minus 2pt
\secheadingskip = 12pt plus 3pt minus 2pt
\subsecheadingskip = 9pt plus 2pt minus 2pt

% Prevent underfull vbox error messages.
\vbadness = 10000

% Don't be very finicky about underfull hboxes, either.
\hbadness = 6666

% Following George Bush, get rid of widows and orphans.
\widowpenalty=10000
\clubpenalty=10000

% Use TeX 3.0's \emergencystretch to help line breaking, but if we're
% using an old version of TeX, don't do anything.  We want the amount of
% stretch added to depend on the line length, hence the dependence on
% \hsize.  We call this whenever the paper size is set.
%
\def\setemergencystretch{%
 \ifx\emergencystretch\thisisundefined
   % Allow us to assign to \emergencystretch anyway.
   \def\emergencystretch{\dimen0}%
 \else
   \emergencystretch = .15\hsize
 \fi
}

% Parameters in order: 1) textheight; 2) textwidth;
% 3) voffset; 4) hoffset; 5) binding offset; 6) topskip;
% 7) physical page height; 8) physical page width.
%
% We also call \setleading{\textleading}, so the caller should define
% \textleading.  The caller should also set \parskip.
%
\def\internalpagesizes#1#2#3#4#5#6#7#8{%
 \voffset = #3\relax
 \topskip = #6\relax
 \splittopskip = \topskip
 %
 \vsize = #1\relax
 \advance\vsize by \topskip
 \outervsize = \vsize
 \advance\outervsize by 2\topandbottommargin
 \pageheight = \vsize
 %
 \hsize = #2\relax
 \outerhsize = \hsize
```

```
 \advance\outerhsize by 0.5in
 \pagewidth = \hsize
 %
 \normaloffset = #4\relax
 \bindingoffset = #5\relax
 %
 \ifpdf
   \pdfpageheight #7\relax
   \pdfpagewidth #8\relax
   % if we don't reset these, they will remain at "1 true in" of
   % whatever layout pdftex was dumped with.
   \pdfhorigin = 1 true in
   \pdfvorigin = 1 true in
 \fi
 %
 \setleading{\textleading}
 %
 \parindent = \defaultparindent
 \setemergencystretch
}

% @letterpaper (the default).
\def\letterpaper{{\globaldefs = 1
 \parskip = 3pt plus 2pt minus 1pt
 \textleading = 13.2pt
 %
 % If page is nothing but text, make it come out even.
 \internalpagesizes{607.2pt}{6in}% that's 46 lines
                   {\voffset}{.25in}%
                   {\bindingoffset}{36pt}%
                   {11in}{8.5in}%
}}

% Use @smallbook to reset parameters for 7x9.25 trim size.
\def\smallbook{{\globaldefs = 1
 \parskip = 2pt plus 1pt
 \textleading = 12pt
 %
 \internalpagesizes{7.5in}{5in}%
                   {-.2in}{0in}%
                   {\bindingoffset}{16pt}%
                   {9.25in}{7in}%
 %
 \lispnarrowing = 0.3in
 \tolerance = 700
 \hfuzz = 1pt
 \contentsrightmargin = 0pt
 \defbodyindent = .5cm
```

```
}}

% Use @smallerbook to reset parameters for 6x9 trim size.
% (Just testing, parameters still in flux.)
\def\smallerbook{{\globaldefs = 1
 \parskip = 1.5pt plus 1pt
 \textleading = 12pt
 %
 \internalpagesizes{7.4in}{4.8in}%
                {-.2in}{-.4in}%
                {0pt}{14pt}%
                {9in}{6in}%
 %
 \lispnarrowing = 0.25in
 \tolerance = 700
 \hfuzz = 1pt
 \contentsrightmargin = 0pt
 \defbodyindent = .4cm
}}

% Use @afourpaper to print on European A4 paper.
\def\afourpaper{{\globaldefs = 1
 \parskip = 3pt plus 2pt minus 1pt
 \textleading = 13.2pt
 %
 % Double-side printing via postscript on Laserjet 4050
 % prints double-sided nicely when \bindingoffset=10mm and \hoffset=-6mm.
 % To change the settings for a different printer or situation, adjust
 % \normaloffset until the front-side and back-side texts align.  Then
 % do the same for \bindingoffset.  You can set these for testing in
 % your texinfo source file like this:
 % @tex
 % \global\normaloffset = -6mm
 % \global\bindingoffset = 10mm
 % @end tex
 \internalpagesizes{673.2pt}{160mm}% that's 51 lines
                {\voffset}{\hoffset}%
                {\bindingoffset}{44pt}%
                {297mm}{210mm}%
 %
 \tolerance = 700
 \hfuzz = 1pt
 \contentsrightmargin = 0pt
 \defbodyindent = 5mm
}}

% Use @afivepaper to print on European A5 paper.
% From romildo@urano.iceb.ufop.br, 2 July 2000.
```

```
% He also recommends making @example and @lisp be small.
\def\afivepaper{{\globaldefs = 1
 \parskip = 2pt plus 1pt minus 0.1pt
 \textleading = 12.5pt
 %
 \internalpagesizes{160mm}{120mm}%
                {\voffset}{\hoffset}%
                {\bindingoffset}{8pt}%
                {210mm}{148mm}%
 %
 \lispnarrowing = 0.2in
 \tolerance = 800
 \hfuzz = 1.2pt
 \contentsrightmargin = 0pt
 \defbodyindent = 2mm
 \tableindent = 12mm
}}

% A specific text layout, 24x15cm overall, intended for A4 paper.
\def\afourlatex{{\globaldefs = 1
 \afourpaper
 \internalpagesizes{237mm}{150mm}%
                {\voffset}{4.6mm}%
                {\bindingoffset}{7mm}%
                {297mm}{210mm}%
 %
 % Must explicitly reset to 0 because we call \afourpaper.
 \globaldefs = 0
}}

% Use @afourwide to print on A4 paper in landscape format.
\def\afourwide{{\globaldefs = 1
 \afourpaper
 \internalpagesizes{241mm}{165mm}%
                {\voffset}{-2.95mm}%
                {\bindingoffset}{7mm}%
                {297mm}{210mm}%
 \globaldefs = 0
}}

% @pagesizes TEXTHEIGHT[,TEXTWIDTH]
% Perhaps we should allow setting the margins, \topskip, \parskip,
% and/or leading, also. Or perhaps we should compute them somehow.
%
\parseargdef\pagesizes{\pagesizesyyy #1,,\finish}
\def\pagesizesyyy#1,#2,#3\finish{{%
 \setbox0 = \hbox{\ignorespaces #2}\ifdim\wd0 > 0pt \hsize=#2\relax \fi
 \globaldefs = 1
```

```
 %
 \parskip = 3pt plus 2pt minus 1pt
 \setleading{\textleading}%
 %
 \dimen0 = #1\relax
 \advance\dimen0 by \voffset
 %
 \dimen2 = \hsize
 \advance\dimen2 by \normaloffset
 %
 \internalpagesizes{#1}{\hsize}%
                {\voffset}{\normaloffset}%
                {\bindingoffset}{44pt}%
                {\dimen0}{\dimen2}%
}}

% Set default to letter.
%
\letterpaper


\message{and turning on texinfo input format.}

\def^^L{\par} % remove \outer, so ^L can appear in an @comment

% DEL is a comment character, in case @c does not suffice.
\catcode`\^^? = 14

% Define macros to output various characters with catcode for normal text.
\catcode`\"=\other \def\normaldoublequote{"}
\catcode`\$=\other \def\normaldollar{$}%$ font-lock fix
\catcode`\+=\other \def\normalplus{+}
\catcode`\<=\other \def\normalless{<}
\catcode`\>=\other \def\normalgreater{>}
\catcode`\^=\other \def\normalcaret{^}
\catcode`\_=\other \def\normalunderscore{_}
\catcode`\|=\other \def\normalverticalbar{|}
\catcode`\~=\other \def\normaltilde{~}

% This macro is used to make a character print one way in \tt
% (where it can probably be output as-is), and another way in other fonts,
% where something hairier probably needs to be done.
%
% #1 is what to print if we are indeed using \tt; #2 is what to print
% otherwise.  Since all the Computer Modern typewriter fonts have zero
% interword stretch (and shrink), and it is reasonable to expect all
% typewriter fonts to have this, we can check that font parameter.
%
```

```
\def\ifusingtt#1#2{\ifdim \fontdimen3\font=0pt #1\else #2\fi}

% Same as above, but check for italic font.  Actually this also catches
% non-italic slanted fonts since it is impossible to distinguish them from
% italic fonts.  But since this is only used by $ and it uses \sl anyway
% this is not a problem.
\def\ifusingit#1#2{\ifdim \fontdimen1\font>0pt #1\else #2\fi}

% Turn off all special characters except @
% (and those which the user can use as if they were ordinary).
% Most of these we simply print from the \tt font, but for some, we can
% use math or other variants that look better in normal text.

\catcode`\"=\active
\def\activedoublequote{{\tt\char34}}
\let"=\activedoublequote
\catcode`\~=\active
\def~{{\tt\char126}}
\chardef\hat=`\^
\catcode`\^=\active
\def^{{\tt \hat}}

\catcode`\_=\active
\def_{\ifusingtt\normalunderscore\_}
\let\realunder=_
% Subroutine for the previous macro.
\def\_{\leavevmode \kern.07em \vbox{\hrule width.3em height.1ex}\kern .07em }

\catcode`\|=\active
\def|{{\tt\char124}}
\chardef \less=`\<
\catcode`\<=\active
\def<{{\tt \less}}
\chardef \gtr=`\>
\catcode`\>=\active
\def>{{\tt \gtr}}
\catcode`\+=\active
\def+{{\tt \char 43}}
\catcode`\$=\active
\def${\ifusingit{{\sl\$}}\normaldollar}%$ font-lock fix

% If a .fmt file is being used, characters that might appear in a file
% name cannot be active until we have parsed the command line.
% So turn them off again, and have \everyjob (or @setfilename) turn them on.
% \otherifyactive is called near the end of this file.
\def\otherifyactive{\catcode`+=\other \catcode`\_=\other}

% Used sometimes to turn off (effectively) the active characters even after
```

```
% parsing them.
\def\turnoffactive{%
 \normalturnoffactive
 \otherbackslash
}

\catcode`\@=0

% \backslashcurfont outputs one backslash character in current font,
% as in \char`\\.
\global\chardef\backslashcurfont=`\\
\global\let\rawbackslashxx=\backslashcurfont  % let existing .??s files work

% \realbackslash is an actual character `\' with catcode other, and
% \doublebackslash is two of them (for the pdf outlines).
{\catcode`\\=\other @gdef@realbackslash{\} @gdef@doublebackslash{\\}}

% In texinfo, backslash is an active character; it prints the backslash
% in fixed width font.
\catcode`\\=\active  % @ for escape char from now on.

% The story here is that in math mode, the \char of \backslashcurfont
% ends up printing the roman \ from the math symbol font (because \char
% in math mode uses the \mathcode, and plain.tex sets
% \mathcode`\\="026E).  It seems better for @backslashchar{} to always
% print a typewriter backslash, hence we use an explicit \mathchar,
% which is the decimal equivalent of "715c (class 7, e.g., use \fam;
% ignored family value; char position "5C).  We can't use " for the
% usual hex value because it has already been made active.
@def@normalbackslash{{@tt @ifmmode @mathchar29020 @else @backslashcurfont @fi}}
@let@backslashchar = @normalbackslash % @backslashchar{} is for user documents.

% On startup, @fixbackslash assigns:
%  @let \ = @normalbackslash
% \rawbackslash defines an active \ to do \backslashcurfont.
% \otherbackslash defines an active \ to be a literal `\' character with
% catcode other.  We switch back and forth between these.
@gdef@rawbackslash{@let\=@backslashcurfont}
@gdef@otherbackslash{@let\=@realbackslash}

% Same as @turnoffactive except outputs \ as {\tt\char`\\} instead of
% the literal character `\'.  Also revert - to its normal character, in
% case the active - from code has slipped in.
%
{@catcode`- = @active
@gdef@normalturnoffactive{%
  @let-=@normaldash
  @let"=@normaldoublequote
```

```
  @let$=@normaldollar %$ font-lock fix
  @let+=@normalplus
  @let<=@normalless
  @let>=@normalgreater
  @let\=@normalbackslash
  @let^=@normalcaret
  @let_=@normalunderscore
  @let|=@normalverticalbar
  @let~=@normaltilde
  @markupsetuplqdefault
  @markupsetuprqdefault
  @unsepspaces
}
}

% Make _ and + \other characters, temporarily.
% This is canceled by @fixbackslash.
@otherifyactive

% If a .fmt file is being used, we don't want the `\input texinfo' to show up.
% That is what \eatinput is for; after that, the `\' should revert to printing
% a backslash.
%
@gdef@eatinput input texinfo{@fixbackslash}
@global@let\ = @eatinput

% On the other hand, perhaps the file did not have a `\input texinfo'. Then
% the first `\' in the file would cause an error. This macro tries to fix
% that, assuming it is called before the first `\' could plausibly occur.
% Also turn back on active characters that might appear in the input
% file name, in case not using a pre-dumped format.
%
@gdef@fixbackslash{%
 @ifx\@eatinput @let\ = @normalbackslash @fi
 @catcode`+=@active
 @catcode`@_=@active
}

% Say @foo, not \foo, in error messages.
@escapechar = `@@

% These (along with & and #) are made active for url-breaking, so need
% active definitions as the normal characters.
@def@normaldot{.}
@def@normalquest{?}
@def@normalslash{/}

% These look ok in all fonts, so just make them not special.
```

```
% @hashchar{} gets its own user-level command, because of #line.
@catcode`@& = @other @def@normalamp{&}
@catcode`@# = @other @def@normalhash{#}
@catcode`@% = @other @def@normalpercent{%}

@let @hashchar = @normalhash

@c Finally, make ` and ' active, so that txicodequoteundirected and
@c txicodequotebacktick work right in, e.g., @w{@code{`foo'}}.  If we
@c don't make ` and ' active, @code will not get them as active chars.
@c Do this last of all since we use ` in the previous @catcode assignments.
@catcode`@'=@active
@catcode`@`=@active
@markupsetuplqdefault
@markupsetuprqdefault

@c Local variables:
@c eval: (add-hook 'write-file-hooks 'time-stamp)
@c page-delimiter: "^\\\\message"
@c time-stamp-start: "def\\\\texinfoversion{"
@c time-stamp-format: "%:y-%02m-%02d.%02H"
@c time-stamp-end: "}"
@c End:

@c vim:sw=2:

@ignore
  arch-tag: e1b36e32-c96e-4135-a41a-0b2efa2ea115
@end ignore
```

1.74 libffi/doc 3.2.1

1.74.1 Available under license :

```
#!/bin/sh

# ***** BEGIN LICENSE BLOCK *****
# Version: MPL 1.1/GPL 2.0/LGPL 2.1
#
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# License.
```

```
#
# The Original Code is the MSVC wrappificator.
#
# The Initial Developer of the Original Code is
# Timothy Wall <twalljava@dev.java.net>.
# Portions created by the Initial Developer are Copyright (C) 2009
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# and other provisions required by the GPL or the LGPL. If you do not delete
# the provisions above, a recipient may use your version of this file under
# the terms of any one of the MPL, the GPL or the LGPL.
#
# ***** END LICENSE BLOCK *****

#
# GCC-compatible wrapper for cl.exe and ml.exe. Arguments are given in GCC
# format and translated into something sensible for cl or ml.
#

args_orig=$@
args="-nologo -W3"
static_crt=
debug_crt=
cl="cl"
ml="ml"
safeseh="-safeseh"
output=

while [ $# -gt 0 ]
do
 case $1
 in
   -fexceptions)
     # Don't enable exceptions for now.
     #args="$args -EHac"
     shift 1
   ;;
```

```
-m32)
  shift 1
;;
-m64)
  ml="ml64" # "$MSVC/x86_amd64/ml64"
  safeseh=
  shift 1
;;
-clang-cl)
  cl="clang-cl"
  safeseh=
  shift 1
;;
-O0)
  args="$args -Od"
  shift 1
;;
-O*)
  # Runtime error checks (enabled by setting -RTC1 in the -DFFI_DEBUG
  # case below) are not compatible with optimization flags and will
  # cause the build to fail. Therefore, drop the optimization flag if
  # -DFFI_DEBUG is also set.
  case $args_orig in
    *-DFFI_DEBUG*)
      args="$args"
    ;;
    *)
      # The ax_cc_maxopt.m4 macro from the upstream autoconf-archive
      # project doesn't support MSVC and therefore ends up trying to
      # use -O3. Use the equivalent "max optimization" flag for MSVC
      # instead of erroring out.
      case $1 in
        -O3)
          args="$args -O2"
        ;;
        *)
          args="$args $1"
        ;;
      esac
      opt="true"
    ;;
  esac
  shift 1
;;
-g)
  # Enable debug symbol generation.
  args="$args -Zi"
  shift 1
```

```
;;
-DFFI_DEBUG)
  # Enable runtime error checks.
  args="$args -RTC1"
  defines="$defines $1"
  shift 1
;;
-DUSE_STATIC_RTL)
  # Link against static CRT.
  static_crt=1
  shift 1
;;
-DUSE_DEBUG_RTL)
  # Link against debug CRT.
  debug_crt=1
  shift 1
;;
-c)
  args="$args -c"
  args="$(echo $args | sed 's%/Fe%/Fo%g')"
  single="-c"
  shift 1
;;
-D*=*)
  name="$(echo $1|sed 's/-D\([^=][^=]*\)=.*/\1/g')"
  value="$(echo $1|sed 's/-D[^=][^=]*=//g')"
  args="$args -D${name}='$value'"
  defines="$defines -D${name}='$value'"
  shift 1
;;
-D*)
  args="$args $1"
  defines="$defines $1"
  shift 1
;;
-I)
  args="$args -I$2"
  includes="$includes -I$2"
  shift 2
;;
-I*)
  args="$args $1"
  includes="$includes $1"
  shift 1
;;
-W|-Wextra)
  # TODO map extra warnings
  shift 1
```

```
;;
-Wall)
  # -Wall on MSVC is overzealous, and we already build with -W3. Nothing
  # to do here.
  shift 1
;;
-pedantic)
  # libffi tests -pedantic with -Wall, so drop it also.
  shift 1
;;
-Werror)
  args="$args -WX"
  shift 1
;;
-W*)
  # TODO map specific warnings
  shift 1
;;
-S)
  args="$args -FAs"
  shift 1
;;
-o)
  outdir="$(dirname $2)"
  base="$(basename $2|sed 's/\.[^.]*//g')"
  if [ -n "$single" ]; then
    output="-Fo$2"
  else
    output="-Fe$2"
  fi
  if [ -n "$assembly" ]; then
    args="$args $output"
  else
    args="$args $output -Fd$outdir/$base -Fp$outdir/$base -Fa$outdir/$base"
  fi
  shift 2
;;
*.S)
  src=$1
  assembly="true"
  shift 1
;;
*.c)
  args="$args $1"
  shift 1
;;
*)
  # Assume it's an MSVC argument, and pass it through.
```

```
    args="$args $1"
    shift 1
  ;;
 esac
done

# If -Zi is specified, certain optimizations are implicitly disabled
# by MSVC. Add back those optimizations if this is an optimized build.
# NOTE: These arguments must come after all others.
if [ -n "$opt" ]; then
  args="$args -link -OPT:REF -OPT:ICF -INCREMENTAL:NO"
fi

if [ -n "$static_crt" ]; then
  md=-MT
else
  md=-MD
fi

if [ -n "$debug_crt" ]; then
  md="${md}d"
fi

if [ -n "$assembly" ]; then
  if [ -z "$outdir" ]; then
    outdir="."
  fi
  ppsrc="$outdir/$(basename $src|sed 's/.S$/.asm/g')"
  echo "$cl -nologo -EP $includes $defines $src > $ppsrc"
  "$cl" -nologo -EP $includes $defines $src > $ppsrc || exit $?
  output="$(echo $output | sed 's%/F[dpa][^ ]*%%g')"
  args="-nologo $safeseh $single $output $ppsrc"

  echo "$ml $args"
  eval "\"$ml\" $args"
  result=$?

  # required to fix ml64 broken output?
  #mv *.obj $outdir
else
  args="$md $args"
  echo "$cl $args"
  # Return an error code of 1 if an invalid command line parameter is passed
  # instead of just ignoring it.
  eval "(\"$cl\" $args 2>&1 1>&3 | \
       awk '{print \$0} /D9002/ {error=1} END{exit error}' >&2) 3>&1"
  result=$?
fi
```

```
exit $result

% texinfo.tex -- TeX macros to handle Texinfo files.
%
% Load plain if necessary, i.e., if running under initex.
\expandafter\ifx\csname fmtname\endcsname\relax\input plain\fi
%
\def\texinfoversion{2013-02-01.11}
%
% Copyright 1985, 1986, 1988, 1990, 1991, 1992, 1993, 1994, 1995,
% 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006,
% 2007, 2008, 2009, 2010, 2011, 2012, 2013 Free Software Foundation, Inc.
%
% This texinfo.tex file is free software: you can redistribute it and/or
% modify it under the terms of the GNU General Public License as
% published by the Free Software Foundation, either version 3 of the
% License, or (at your option) any later version.
%
% This texinfo.tex file is distributed in the hope that it will be
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% As a special exception, when this file is read by TeX when processing
% a Texinfo source document, you may use the result without
% restriction. This Exception is an additional permission under section 7
% of the GNU General Public License, version 3 ("GPLv3").
%
% Please try the latest version of texinfo.tex before submitting bug
% reports; you can get the latest version from:
%   http://ftp.gnu.org/gnu/texinfo/ (the Texinfo release area), or
%   http://ftpmirror.gnu.org/texinfo/ (same, via a mirror), or
%   http://www.gnu.org/software/texinfo/ (the Texinfo home page)
% The texinfo.tex in any given distribution could well be out
% of date, so if that's what you're using, please check.
%
% Send bug reports to bug-texinfo@gnu.org.  Please include including a
% complete document in each bug report with which we can reproduce the
% problem.  Patches are, of course, greatly appreciated.
%
% To process a Texinfo manual with TeX, it's most reliable to use the
% texi2dvi shell script that comes with the distribution.  For a simple
% manual foo.texi, however, you can get away with this:
%   tex foo.texi
```

```
%   texindex foo.??
%   tex foo.texi
%   tex foo.texi
%   dvips foo.dvi -o  # or whatever; this makes foo.ps.
% The extra TeX runs get the cross-reference information correct.
% Sometimes one run after texindex suffices, and sometimes you need more
% than two; texi2dvi does it as many times as necessary.
%
% It is possible to adapt texinfo.tex for other languages, to some
% extent.  You can get the existing language-specific files from the
% full Texinfo distribution.
%
% The GNU Texinfo home page is http://www.gnu.org/software/texinfo.


\message{Loading texinfo [version \texinfoversion]:}

% If in a .fmt file, print the version number
% and turn on active characters that we couldn't do earlier because
% they might have appeared in the input file name.
\everyjob{\message{[Texinfo version \texinfoversion]}%
 \catcode`+=\active \catcode`\_=\active}

\chardef\other=12

% We never want plain's \outer definition of \+ in Texinfo.
% For @tex, we can use \tabalign.
\let\+ = \relax

% Save some plain tex macros whose names we will redefine.
\let\ptexb=\b
\let\ptexbullet=\bullet
\let\ptexc=\c
\let\ptexcomma=\,
\let\ptexdot=\.
\let\ptexdots=\dots
\let\ptexend=\end
\let\ptexequiv=\equiv
\let\ptexexclam=\!
\let\ptexfootnote=\footnote
\let\ptexgtr=>
\let\ptexhat=^
\let\ptexi=\i
\let\ptexindent=\indent
\let\ptexinsert=\insert
\let\ptexlbrace=\{
\let\ptexless=<
\let\ptexnewwrite\newwrite
```

```
\let\ptexnoindent=\noindent
\let\ptexplus=+
\let\ptexraggedright=\raggedright
\let\ptexrbrace=\}
\let\ptexslash=\/
\let\ptexstar=\*
\let\ptext=\t
\let\ptextop=\top
{\catcode`\'=\active \global\let\ptexquoteright'}% active in plain's math mode

% If this character appears in an error message or help string, it
% starts a new line in the output.
\newlinechar = `^^J

% Use TeX 3.0's \inputlineno to get the line number, for better error
% messages, but if we're using an old version of TeX, don't do anything.
%
\ifx\inputlineno\thisisundefined
 \let\linenumber = \empty % Pre-3.0.
\else
 \def\linenumber{l.\the\inputlineno:\space}
\fi

% Set up fixed words for English if not already set.
\ifx\putwordAppendix\undefined  \gdef\putwordAppendix{Appendix}\fi
\ifx\putwordChapter\undefined   \gdef\putwordChapter{Chapter}\fi
\ifx\putworderror\undefined     \gdef\putworderror{error}\fi
\ifx\putwordfile\undefined      \gdef\putwordfile{file}\fi
\ifx\putwordin\undefined        \gdef\putwordin{in}\fi
\ifx\putwordIndexIsEmpty\undefined       \gdef\putwordIndexIsEmpty{(Index is empty)}\fi
\ifx\putwordIndexNonexistent\undefined   \gdef\putwordIndexNonexistent{(Index is nonexistent)}\fi
\ifx\putwordInfo\undefined      \gdef\putwordInfo{Info}\fi
\ifx\putwordInstanceVariableof\undefined \gdef\putwordInstanceVariableof{Instance Variable of}\fi
\ifx\putwordMethodon\undefined  \gdef\putwordMethodon{Method on}\fi
\ifx\putwordNoTitle\undefined   \gdef\putwordNoTitle{No Title}\fi
\ifx\putwordof\undefined        \gdef\putwordof{of}\fi
\ifx\putwordon\undefined        \gdef\putwordon{on}\fi
\ifx\putwordpage\undefined      \gdef\putwordpage{page}\fi
\ifx\putwordsection\undefined   \gdef\putwordsection{section}\fi
\ifx\putwordSection\undefined   \gdef\putwordSection{Section}\fi
\ifx\putwordsee\undefined       \gdef\putwordsee{see}\fi
\ifx\putwordSee\undefined       \gdef\putwordSee{See}\fi
\ifx\putwordShortTOC\undefined  \gdef\putwordShortTOC{Short Contents}\fi
\ifx\putwordTOC\undefined       \gdef\putwordTOC{Table of Contents}\fi
%
\ifx\putwordMJan\undefined \gdef\putwordMJan{January}\fi
\ifx\putwordMFeb\undefined \gdef\putwordMFeb{February}\fi
\ifx\putwordMMar\undefined \gdef\putwordMMar{March}\fi
```

```
\ifx\putwordMApr\undefined \gdef\putwordMApr{April}\fi
\ifx\putwordMMay\undefined \gdef\putwordMMay{May}\fi
\ifx\putwordMJun\undefined \gdef\putwordMJun{June}\fi
\ifx\putwordMJul\undefined \gdef\putwordMJul{July}\fi
\ifx\putwordMAug\undefined \gdef\putwordMAug{August}\fi
\ifx\putwordMSep\undefined \gdef\putwordMSep{September}\fi
\ifx\putwordMOct\undefined \gdef\putwordMOct{October}\fi
\ifx\putwordMNov\undefined \gdef\putwordMNov{November}\fi
\ifx\putwordMDec\undefined \gdef\putwordMDec{December}\fi
%
\ifx\putwordDefmac\undefined    \gdef\putwordDefmac{Macro}\fi
\ifx\putwordDefspec\undefined   \gdef\putwordDefspec{Special Form}\fi
\ifx\putwordDefvar\undefined    \gdef\putwordDefvar{Variable}\fi
\ifx\putwordDefopt\undefined    \gdef\putwordDefopt{User Option}\fi
\ifx\putwordDeffunc\undefined   \gdef\putwordDeffunc{Function}\fi

% Since the category of space is not known, we have to be careful.
\chardef\spacecat = 10
\def\spaceisspace{\catcode`\ =\spacecat}

% sometimes characters are active, so we need control sequences.
\chardef\ampChar   = `\&
\chardef\colonChar = `\:
\chardef\commaChar = `\,
\chardef\dashChar  = `\-
\chardef\dotChar   = `\.
\chardef\exclamChar= `\!
\chardef\hashChar  = `\#
\chardef\lquoteChar= `\`
\chardef\questChar = `\?
\chardef\rquoteChar= `\'
\chardef\semiChar  = `\;
\chardef\slashChar = `\/
\chardef\underChar = `\_

% Ignore a token.
%
\def\gobble#1{}

% The following is used inside several \edef's.
\def\makecsname#1{\expandafter\noexpand\csname#1\endcsname}

% Hyphenation fixes.
\hyphenation{
 Flor-i-da Ghost-script Ghost-view Mac-OS Post-Script
 ap-pen-dix bit-map bit-maps
 data-base data-bases eshell fall-ing half-way long-est man-u-script
 man-u-scripts mini-buf-fer mini-buf-fers over-view par-a-digm
```

```
 par-a-digms rath-er rec-tan-gu-lar ro-bot-ics se-vere-ly set-up spa-ces
 spell-ing spell-ings
 stand-alone strong-est time-stamp time-stamps which-ever white-space
 wide-spread wrap-around
}

% Margin to add to right of even pages, to left of odd pages.
\newdimen\bindingoffset
\newdimen\normaloffset
\newdimen\pagewidth \newdimen\pageheight

% For a final copy, take out the rectangles
% that mark overfull boxes (in case you have decided
% that the text looks ok even though it passes the margin).
%
\def\finalout{\overfullrule=0pt }

% Sometimes it is convenient to have everything in the transcript file
% and nothing on the terminal.  We don't just call \tracingall here,
% since that produces some useless output on the terminal.  We also make
% some effort to order the tracing commands to reduce output in the log
% file; cf. trace.sty in LaTeX.
%
\def\gloggingall{\begingroup \globaldefs = 1 \loggingall \endgroup}%
\def\loggingall{%
 \tracingstats2
 \tracingpages1
 \tracinglostchars2  % 2 gives us more in etex
 \tracingparagraphs1
 \tracingoutput1
 \tracingmacros2
 \tracingrestores1
 \showboxbreadth\maxdimen \showboxdepth\maxdimen
 \ifx\eTeXversion\thisisundefined\else % etex gives us more logging
   \tracingscantokens1
   \tracingifs1
   \tracinggroups1
   \tracingnesting2
   \tracingassigns1
 \fi
 \tracingcommands3  % 3 gives us more in etex
 \errorcontextlines16
}%

% @errormsg{MSG}.  Do the index-like expansions on MSG, but if things
% aren't perfect, it's not the end of the world, being an error message,
% after all.
%
```

```
\def\errormsg{\begingroup \indexnofonts \doerrormsg}
\def\doerrormsg#1{\errmessage{#1}}

% add check for \lastpenalty to plain's definitions.  If the last thing
% we did was a \nobreak, we don't want to insert more space.
%
\def\smallbreak{\ifnum\lastpenalty<10000\par\ifdim\lastskip<\smallskipamount
 \removelastskip\penalty-50\smallskip\fi\fi}
\def\medbreak{\ifnum\lastpenalty<10000\par\ifdim\lastskip<\medskipamount
 \removelastskip\penalty-100\medskip\fi\fi}
\def\bigbreak{\ifnum\lastpenalty<10000\par\ifdim\lastskip<\bigskipamount
 \removelastskip\penalty-200\bigskip\fi\fi}

% Do @cropmarks to get crop marks.
%
\newif\ifcropmarks
\let\cropmarks = \cropmarkstrue
%
% Dimensions to add cropmarks at corners.
% Added by P. A. MacKay, 12 Nov. 1986
%
\newdimen\outerhsize \newdimen\outervsize % set by the paper size routines
\newdimen\cornerlong  \cornerlong=1pc
\newdimen\cornerthick \cornerthick=.3pt
\newdimen\topandbottommargin \topandbottommargin=.75in

% Output a mark which sets \thischapter, \thissection and \thiscolor.
% We dump everything together because we only have one kind of mark.
% This works because we only use \botmark / \topmark, not \firstmark.
%
% A mark contains a subexpression of the \ifcase ... \fi construct.
% \get*marks macros below extract the needed part using \ifcase.
%
% Another complication is to let the user choose whether \thischapter
% (\thissection) refers to the chapter (section) in effect at the top
% of a page, or that at the bottom of a page.  The solution is
% described on page 260 of The TeXbook.  It involves outputting two
% marks for the sectioning macros, one before the section break, and
% one after.  I won't pretend I can describe this better than DEK...
\def\domark{%
 \toks0=\expandafter{\lastchapterdefs}%
 \toks2=\expandafter{\lastsectiondefs}%
 \toks4=\expandafter{\prevchapterdefs}%
 \toks6=\expandafter{\prevsectiondefs}%
 \toks8=\expandafter{\lastcolordefs}%
 \mark{%
                \the\toks0 \the\toks2
    \noexpand\or \the\toks4 \the\toks6
```

```
   \noexpand\else \the\toks8
 }%
}
% \topmark doesn't work for the very first chapter (after the title
% page or the contents), so we use \firstmark there -- this gets us
% the mark with the chapter defs, unless the user sneaks in, e.g.,
% @setcolor (or @url, or @link, etc.) between @contents and the very
% first @chapter.
\def\gettopheadingmarks{%
 \ifcase0\topmark\fi
 \ifx\thischapter\empty \ifcase0\firstmark\fi \fi
}
\def\getbottomheadingmarks{\ifcase1\botmark\fi}
\def\getcolormarks{\ifcase2\topmark\fi}

% Avoid "undefined control sequence" errors.
\def\lastchapterdefs{}
\def\lastsectiondefs{}
\def\prevchapterdefs{}
\def\prevsectiondefs{}
\def\lastcolordefs{}

% Main output routine.
\chardef\PAGE = 255
\output = {\onepageout{\pagecontents\PAGE}}

\newbox\headlinebox
\newbox\footlinebox

% \onepageout takes a vbox as an argument.  Note that \pagecontents
% does insertions, but you have to call it yourself.
\def\onepageout#1{%
 \ifcropmarks \hoffset=0pt \else \hoffset=\normaloffset \fi
 %
 \ifodd\pageno  \advance\hoffset by \bindingoffset
 \else \advance\hoffset by -\bindingoffset\fi
 %
 % Do this outside of the \shipout so @code etc. will be expanded in
 % the headline as they should be, not taken literally (outputting "code).
 \ifodd\pageno \getoddheadingmarks \else \getevenheadingmarks \fi
 \setbox\headlinebox = \vbox{\let\hsize=\pagewidth \makeheadline}%
 \ifodd\pageno \getoddfootingmarks \else \getevenfootingmarks \fi
 \setbox\footlinebox = \vbox{\let\hsize=\pagewidth \makefootline}%
 %
 {%
   % Have to do this stuff outside the \shipout because we want it to
   % take effect in \write's, yet the group defined by the \vbox ends
   % before the \shipout runs.
```

```
%
\indexdummies         % don't expand commands in the output.
\normalturnoffactive  % \ in index entries must not stay \, e.g., if
          % the page break happens to be in the middle of an example.
          % We don't want .vr (or whatever) entries like this:
          % \entry{{\tt \indexbackslash }acronym}{32}{\code {\acronym}}
          % "\acronym" won't work when it's read back in;
          % it needs to be
          % {\code {{\tt \backslashcurfont }acronym}
\shipout\vbox{%
  % Do this early so pdf references go to the beginning of the page.
  \ifpdfmakepagedest \pdfdest name{\the\pageno} xyz\fi
  %
  \ifcropmarks \vbox to \outervsize\bgroup
    \hsize = \outerhsize
    \vskip-\topandbottommargin
    \vtop to0pt{%
      \line{\ewtop\hfil\ewtop}%
      \nointerlineskip
      \line{%
        \vbox{\moveleft\cornerthick\nstop}%
        \hfill
        \vbox{\moveright\cornerthick\nstop}%
      }%
      \vss}%
    \vskip\topandbottommargin
    \line\bgroup
      \hfil % center the page within the outer (page) hsize.
      \ifodd\pageno\hskip\bindingoffset\fi
      \vbox\bgroup
  \fi
  %
  \unvbox\headlinebox
  \pagebody{#1}%
  \ifdim\ht\footlinebox > 0pt
    % Only leave this space if the footline is nonempty.
    % (We lessened \vsize for it in \oddfootingyyy.)
    % The \baselineskip=24pt in plain's \makefootline has no effect.
    \vskip 24pt
    \unvbox\footlinebox
  \fi
  %
  \ifcropmarks
      \egroup % end of \vbox\bgroup
    \hfil\egroup % end of (centering) \line\bgroup
    \vskip\topandbottommargin plus1fill minus1fill
    \boxmaxdepth = \cornerthick
    \vbox to0pt{\vss
```

```
        \line{%
          \vbox{\moveleft\cornerthick\nsbot}%
          \hfill
          \vbox{\moveright\cornerthick\nsbot}%
        }%
        \nointerlineskip
        \line{\ewbot\hfil\ewbot}%
      }%
    \egroup % \vbox from first cropmarks clause
    \fi
  }% end of \shipout\vbox
 }% end of group with \indexdummies
 \advancepageno
 \ifnum\outputpenalty>-20000 \else\dosupereject\fi
}

\newinsert\margin \dimen\margin=\maxdimen

\def\pagebody#1{\vbox to\pageheight{\boxmaxdepth=\maxdepth #1}}
{\catcode`\@ =11
\gdef\pagecontents#1{\ifvoid\topins\else\unvbox\topins\fi
% marginal hacks, juha@viisa.uucp (Juha Takala)
\ifvoid\margin\else % marginal info is present
 \rlap{\kern\hsize\vbox to\z@{\kern1pt\box\margin \vss}}\fi
\dimen@=\dp#1\relax \unvbox#1\relax
\ifvoid\footins\else\vskip\skip\footins\footnoterule \unvbox\footins\fi
\ifr@ggedbottom \kern-\dimen@ \vfil \fi}
}

% Here are the rules for the cropmarks.  Note that they are
% offset so that the space between them is truly \outerhsize or \outervsize
% (P. A. MacKay, 12 November, 1986)
%
\def\ewtop{\vrule height\cornerthick depth0pt width\cornerlong}
\def\nstop{\vbox
 {\hrule height\cornerthick depth\cornerlong width\cornerthick}}
\def\ewbot{\vrule height0pt depth\cornerthick width\cornerlong}
\def\nsbot{\vbox
 {\hrule height\cornerlong depth\cornerthick width\cornerthick}}

% Parse an argument, then pass it to #1.  The argument is the rest of
% the input line (except we remove a trailing comment).  #1 should be a
% macro which expects an ordinary undelimited TeX argument.
%
\def\parsearg{\parseargusing{}}
\def\parseargusing#1#2{%
 \def\argtorun{#2}%
 \begingroup
```

```
  \obeylines
  \spaceisspace
  #1%
  \parseargline\empty% Insert the \empty token, see \finishparsearg below.
}

{\obeylines %
 \gdef\parseargline#1^^M{%
  \endgroup % End of the group started in \parsearg.
  \argremovecomment #1\comment\ArgTerm%
 }%
}

% First remove any @comment, then any @c comment.
\def\argremovecomment#1\comment#2\ArgTerm{\argremovec #1\c\ArgTerm}
\def\argremovec#1\c#2\ArgTerm{\argcheckspaces#1\^^M\ArgTerm}

% Each occurrence of `\^^M' or `<space>\^^M' is replaced by a single space.
%
% \argremovec might leave us with trailing space, e.g.,
%    @end itemize  @c foo
% This space token undergoes the same procedure and is eventually removed
% by \finishparsearg.
%
\def\argcheckspaces#1\^^M{\argcheckspacesX#1\^^M \^^M}
\def\argcheckspacesX#1 \^^M{\argcheckspacesY#1\^^M}
\def\argcheckspacesY#1\^^M#2\^^M#3\ArgTerm{%
 \def\temp{#3}%
 \ifx\temp\empty
  % Do not use \next, perhaps the caller of \parsearg uses it; reuse \temp:
  \let\temp\finishparsearg
 \else
  \let\temp\argcheckspaces
 \fi
 % Put the space token in:
 \temp#1 #3\ArgTerm
}

% If a _delimited_ argument is enclosed in braces, they get stripped; so
% to get _exactly_ the rest of the line, we had to prevent such situation.
% We prepended an \empty token at the very beginning and we expand it now,
% just before passing the control to \argtorun.
% (Similarly, we have to think about #3 of \argcheckspacesY above: it is
% either the null string, or it ends with \^^M---thus there is no danger
% that a pair of braces would be stripped.
%
% But first, we have to remove the trailing space token.
%
```

```
\def\finishparsearg#1 \ArgTerm{\expandafter\argtorun\expandafter{#1}}

% \parseargdef\foo{...}
% is roughly equivalent to
% \def\foo{\parsearg\Xfoo}
% \def\Xfoo#1{...}
%
% Actually, I use \csname\string\foo\endcsname, ie. \\foo, as it is my
% favourite TeX trick.  --kasal, 16nov03

\def\parseargdef#1{%
 \expandafter \doparseargdef \csname\string#1\endcsname #1%
}
\def\doparseargdef#1#2{%
 \def#2{\parsearg#1}%
 \def#1##1%
}

% Several utility definitions with active space:
{
 \obeyspaces
 \gdef\obeyedspace{ }

 % Make each space character in the input produce a normal interword
 % space in the output.  Don't allow a line break at this space, as this
 % is used only in environments like @example, where each line of input
 % should produce a line of output anyway.
 %
 \gdef\sepspaces{\obeyspaces\let =\tie}

 % If an index command is used in an @example environment, any spaces
 % therein should become regular spaces in the raw index file, not the
 % expansion of \tie (\leavevmode \penalty \@M \ ).
 \gdef\unsepspaces{\let =\space}
}


\def\flushcr{\ifx\par\lisppar \def\next##1{}\else \let\next=\relax \fi \next}

% Define the framework for environments in texinfo.tex.  It's used like this:
%
%   \envdef\foo{...}
%   \def\Efoo{...}
%
% It's the responsibility of \envdef to insert \begingroup before the
% actual body; @end closes the group after calling \Efoo.  \envdef also
% defines \thisenv, so the current environment is known; @end checks
% whether the environment name matches.  The \checkenv macro can also be
```

```
% used to check whether the current environment is the one expected.
%
% Non-false conditionals (@iftex, @ifset) don't fit into this, so they
% are not treated as environments; they don't open a group.  (The
% implementation of @end takes care not to call \endgroup in this
% special case.)


% At run-time, environments start with this:
\def\startenvironment#1{\begingroup\def\thisenv{#1}}
% initialize
\let\thisenv\empty

% ... but they get defined via ``\envdef\foo{...}'':
\long\def\envdef#1#2{\def#1{\startenvironment#1#2}}
\def\envparseargdef#1#2{\parseargdef#1{\startenvironment#1#2}}

% Check whether we're in the right environment:
\def\checkenv#1{%
 \def\temp{#1}%
 \ifx\thisenv\temp
 \else
   \badenverr
 \fi
}

% Environment mismatch, #1 expected:
\def\badenverr{%
 \errhelp = \EMsimple
 \errmessage{This command can appear only \inenvironment\temp,
   not \inenvironment\thisenv}%
}
\def\inenvironment#1{%
 \ifx#1\empty
   outside of any environment%
 \else
   in environment \expandafter\string#1%
 \fi
}

% @end foo executes the definition of \Efoo.
% But first, it executes a specialized version of \checkenv
%
\parseargdef\end{%
 \if 1\csname iscond.#1\endcsname
 \else
   % The general wording of \badenverr may not be ideal.
   \expandafter\checkenv\csname#1\endcsname
```

```
   \csname E#1\endcsname
   \endgroup
 \fi
}

\newhelp\EMsimple{Press RETURN to continue.}


% Be sure we're in horizontal mode when doing a tie, since we make space
% equivalent to this in @example-like environments. Otherwise, a space
% at the beginning of a line will start with \penalty -- and
% since \penalty is valid in vertical mode, we'd end up putting the
% penalty on the vertical list instead of in the new paragraph.
{\catcode`@ = 11
% Avoid using \@M directly, because that causes trouble
% if the definition is written into an index file.
\global\let\tiepenalty = \@M
\gdef\tie{\leavevmode\penalty\tiepenalty\ }
}

% @: forces normal size whitespace following.
\def\:{\spacefactor=1000 }

% @* forces a line break.
\def\*{\unskip\hfil\break\hbox{}\ignorespaces}

% @/ allows a line break.
\let\/=\allowbreak

% @. is an end-of-sentence period.
\def\.{.\spacefactor=\endofsentencespacefactor\space}

% @! is an end-of-sentence bang.
\def\!{!\spacefactor=\endofsentencespacefactor\space}

% @? is an end-of-sentence query.
\def\?{?\spacefactor=\endofsentencespacefactor\space}

% @frenchspacing on|off  says whether to put extra space after punctuation.
%
\def\onword{on}
\def\offword{off}
%
\parseargdef\frenchspacing{%
 \def\temp{#1}%
 \ifx\temp\onword \plainfrenchspacing
 \else\ifx\temp\offword \plainnonfrenchspacing
 \else
```

```
  \errhelp = \EMsimple
  \errmessage{Unknown @frenchspacing option `\temp', must be on|off}%
 \fi\fi
}

% @w prevents a word break.  Without the \leavevmode, @w at the
% beginning of a paragraph, when TeX is still in vertical mode, would
% produce a whole line of output instead of starting the paragraph.
\def\w#1{\leavevmode\hbox{#1}}

% @group ... @end group forces ... to be all on one page, by enclosing
% it in a TeX vbox.  We use \vtop instead of \vbox to construct the box
% to keep its height that of a normal line.  According to the rules for
% \topskip (p.114 of the TeXbook), the glue inserted is
% max (\topskip - \ht (first item), 0).  If that height is large,
% therefore, no glue is inserted, and the space between the headline and
% the text is small, which looks bad.
%
% Another complication is that the group might be very large.  This can
% cause the glue on the previous page to be unduly stretched, because it
% does not have much material.  In this case, it's better to add an
% explicit \vfill so that the extra space is at the bottom.  The
% threshold for doing this is if the group is more than \vfilllimit
% percent of a page (\vfilllimit can be changed inside of @tex).
%
\newbox\groupbox
\def\vfilllimit{0.7}
%
\envdef\group{%
 \ifnum\catcode`\^^M=\active \else
  \errhelp = \groupinvalidhelp
  \errmessage{@group invalid in context where filling is enabled}%
 \fi
 \startsavinginserts
 %
 \setbox\groupbox = \vtop\bgroup
  % Do @comment since we are called inside an environment such as
  % @example, where each end-of-line in the input causes an
  % end-of-line in the output.  We don't want the end-of-line after
  % the `@group' to put extra space in the output.  Since @group
  % should appear on a line by itself (according to the Texinfo
  % manual), we don't worry about eating any user text.
  \comment
}
%
% The \vtop produces a box with normal height and large depth; thus, TeX puts
% \baselineskip glue before it, and (when the next line of text is done)
% \lineskip glue after it.  Thus, space below is not quite equal to space
```

```
% above.  But it's pretty close.
\def\Egroup{%
   % To get correct interline space between the last line of the group
   % and the first line afterwards, we have to propagate \prevdepth.
   \endgraf % Not \par, as it may have been set to \lisppar.
   \global\dimen1 = \prevdepth
 \egroup           % End the \vtop.
 % \dimen0 is the vertical size of the group's box.
 \dimen0 = \ht\groupbox  \advance\dimen0 by \dp\groupbox
 % \dimen2 is how much space is left on the page (more or less).
 \dimen2 = \pageheight   \advance\dimen2 by -\pagetotal
 % if the group doesn't fit on the current page, and it's a big big
 % group, force a page break.
 \ifdim \dimen0 > \dimen2
   \ifdim \pagetotal < \vfilllimit\pageheight
     \page
   \fi
 \fi
 \box\groupbox
 \prevdepth = \dimen1
 \checkinserts
}
%
% TeX puts in an \escapechar (i.e., `@') at the beginning of the help
% message, so this ends up printing `@group can only ...'.
%
\newhelp\groupinvalidhelp{%
group can only be used in environments such as @example,^^J%
where each line of input produces a line of output.}

% @need space-in-mils
% forces a page break if there is not space-in-mils remaining.

\newdimen\mil  \mil=0.001in

\parseargdef\need{%
 % Ensure vertical mode, so we don't make a big box in the middle of a
 % paragraph.
 \par
 %
 % If the @need value is less than one line space, it's useless.
 \dimen0 = #1\mil
 \dimen2 = \ht\strutbox
 \advance\dimen2 by \dp\strutbox
 \ifdim\dimen0 > \dimen2
   %
   % Do a \strut just to make the height of this box be normal, so the
   % normal leading is inserted relative to the preceding line.
```

```
  % And a page break here is fine.
  \vtop to #1\mil{\strut\vfil}%
  %
  % TeX does not even consider page breaks if a penalty added to the
  % main vertical list is 10000 or more.  But in order to see if the
  % empty box we just added fits on the page, we must make it consider
  % page breaks.  On the other hand, we don't want to actually break the
  % page after the empty box.  So we use a penalty of 9999.
  %
  % There is an extremely small chance that TeX will actually break the
  % page at this \penalty, if there are no other feasible breakpoints in
  % sight.  (If the user is using lots of big @group commands, which
  % almost-but-not-quite fill up a page, TeX will have a hard time doing
  % good page breaking, for example.)  However, I could not construct an
  % example where a page broke at this \penalty; if it happens in a real
  % document, then we can reconsider our strategy.
  \penalty9999
  %
  % Back up by the size of the box, whether we did a page break or not.
  \kern -#1\mil
  %
  % Do not allow a page break right after this kern.
  \nobreak
 \fi
}

% @br   forces paragraph break (and is undocumented).

\let\br = \par

% @page forces the start of a new page.
%
\def\page{\par\vfill\supereject}

% @exdent text....
% outputs text on separate line in roman font, starting at standard page margin

% This records the amount of indent in the innermost environment.
% That's how much \exdent should take out.
\newskip\exdentamount

% This defn is used inside fill environments such as @defun.
\parseargdef\exdent{\hfil\break\hbox{\kern -\exdentamount{\rm#1}}\hfil\break}

% This defn is used inside nofill environments such as @example.
\parseargdef\nofillexdent{{\advance \leftskip by -\exdentamount
 \leftline{\hskip\leftskip{\rm#1}}}}
```

```
% @inmargin{WHICH}{TEXT} puts TEXT in the WHICH margin next to the current
% paragraph.  For more general purposes, use the \margin insertion
% class.  WHICH is `l' or `r'.  Not documented, written for gawk manual.
%
\newskip\inmarginspacing \inmarginspacing=1cm
\def\strutdepth{\dp\strutbox}
%
\def\doinmargin#1#2{\strut\vadjust{%
 \nobreak
 \kern-\strutdepth
 \vtop to \strutdepth{%
   \baselineskip=\strutdepth
   \vss
   % if you have multiple lines of stuff to put here, you'll need to
   % make the vbox yourself of the appropriate size.
   \ifx#1l%
     \llap{\ignorespaces #2\hskip\inmarginspacing}%
   \else
     \rlap{\hskip\hsize \hskip\inmarginspacing \ignorespaces #2}%
   \fi
   \null
 }%
}}
\def\inleftmargin{\doinmargin l}
\def\inrightmargin{\doinmargin r}
%
% @inmargin{TEXT [, RIGHT-TEXT]}
% (if RIGHT-TEXT is given, use TEXT for left page, RIGHT-TEXT for right;
% else use TEXT for both).
%
\def\inmargin#1{\parseinmargin #1,,\finish}
\def\parseinmargin#1,#2,#3\finish{% not perfect, but better than nothing.
 \setbox0 = \hbox{\ignorespaces #2}%
 \ifdim\wd0 > 0pt
   \def\lefttext{#1}%  have both texts
   \def\righttext{#2}%
 \else
   \def\lefttext{#1}%  have only one text
   \def\righttext{#1}%
 \fi
 %
 \ifodd\pageno
   \def\temp{\inrightmargin\righttext}% odd page -> outside is right margin
 \else
   \def\temp{\inleftmargin\lefttext}%
 \fi
 \temp
}
```

```
% @| inserts a changebar to the left of the current line.  It should
% surround any changed text.  This approach does *not* work if the
% change spans more than two lines of output.  To handle that, we would
% have adopt a much more difficult approach (putting marks into the main
% vertical list for the beginning and end of each change).  This command
% is not documented, not supported, and doesn't work.
%
\def\|{%
 % \vadjust can only be used in horizontal mode.
 \leavevmode
 %
 % Append this vertical mode material after the current line in the output.
 \vadjust{%
   % We want to insert a rule with the height and depth of the current
   % leading; that is exactly what \strutbox is supposed to record.
   \vskip-\baselineskip
   %
   % \vadjust-items are inserted at the left edge of the type.  So
   % the \llap here moves out into the left-hand margin.
   \llap{%
     %
     % For a thicker or thinner bar, change the `1pt'.
     \vrule height\baselineskip width1pt
     %
     % This is the space between the bar and the text.
     \hskip 12pt
   }%
 }%
}

% @include FILE -- \input text of FILE.
%
\def\include{\parseargusing\filenamecatcodes\includezzz}
\def\includezzz#1{%
 \pushthisfilestack
 \def\thisfile{#1}%
 {%
   \makevalueexpandable  % we want to expand any @value in FILE.
   \turnoffactive        % and allow special characters in the expansion
   \indexnofonts         % Allow `@@' and other weird things in file names.
   \wlog{texinfo.tex: doing @include of #1^^J}%
   \edef\temp{\noexpand\input #1 }%
   %
   % This trickery is to read FILE outside of a group, in case it makes
   % definitions, etc.
   \expandafter
 }\temp
```

```
 \popthisfilestack
}
\def\filenamecatcodes{%
 \catcode`\\=\other
 \catcode`~=\other
 \catcode`^=\other
 \catcode`_=\other
 \catcode`|=\other
 \catcode`<=\other
 \catcode`>=\other
 \catcode`+=\other
 \catcode`-=\other
 \catcode`\`=\other
 \catcode`\'=\other
}

\def\pushthisfilestack{%
 \expandafter\pushthisfilestackX\popthisfilestack\StackTerm
}
\def\pushthisfilestackX{%
 \expandafter\pushthisfilestackY\thisfile\StackTerm
}
\def\pushthisfilestackY #1\StackTerm #2\StackTerm {%
 \gdef\popthisfilestack{\gdef\thisfile{#1}\gdef\popthisfilestack{#2}}%
}

\def\popthisfilestack{\errthisfilestackempty}
\def\errthisfilestackempty{\errmessage{Internal error:
 the stack of filenames is empty.}}
%
\def\thisfile{}

% @center line
% outputs that line, centered.
%
\parseargdef\center{%
 \ifhmode
   \let\centersub\centerH
 \else
   \let\centersub\centerV
 \fi
 \centersub{\hfil \ignorespaces#1\unskip \hfil}%
 \let\centersub\relax % don't let the definition persist, just in case
}
\def\centerH#1{{%
 \hfil\break
 \advance\hsize by -\leftskip
 \advance\hsize by -\rightskip
```

```
 \line{#1}%
 \break
}}
%
\newcount\centerpenalty
\def\centerV#1{%
 % The idea here is the same as in \startdefun, \cartouche, etc.: if
 % @center is the first thing after a section heading, we need to wipe
 % out the negative parskip inserted by \sectionheading, but still
 % prevent a page break here.
 \centerpenalty = \lastpenalty
 \ifnum\centerpenalty>10000 \vskip\parskip \fi
 \ifnum\centerpenalty>9999 \penalty\centerpenalty \fi
 \line{\kern\leftskip #1\kern\rightskip}%
}

% @sp n   outputs n lines of vertical space
%
\parseargdef\sp{\vskip #1\baselineskip}

% @comment ...line which is ignored...
% @c is the same as @comment
% @ignore ... @end ignore  is another way to write a comment
%
\def\comment{\begingroup \catcode`\^^M=\other%
\catcode`\@=\other \catcode`\{=\other \catcode`\}=\other%
\commentxxx}
{\catcode`\^^M=\other \gdef\commentxxx#1^^M{\endgroup}}
%
\let\c=\comment

% @paragraphindent NCHARS
% We'll use ems for NCHARS, close enough.
% NCHARS can also be the word `asis' or `none'.
% We cannot feasibly implement @paragraphindent asis, though.
%
\def\asisword{asis} % no translation, these are keywords
\def\noneword{none}
%
\parseargdef\paragraphindent{%
 \def\temp{#1}%
 \ifx\temp\asisword
 \else
   \ifx\temp\noneword
     \defaultparindent = 0pt
   \else
     \defaultparindent = #1em
   \fi
```

```
 \fi
 \parindent = \defaultparindent
}

% @exampleindent NCHARS
% We'll use ems for NCHARS like @paragraphindent.
% It seems @exampleindent asis isn't necessary, but
% I preserve it to make it similar to @paragraphindent.
\parseargdef\exampleindent{%
 \def\temp{#1}%
 \ifx\temp\asisword
 \else
   \ifx\temp\noneword
     \lispnarrowing = 0pt
   \else
     \lispnarrowing = #1em
   \fi
 \fi
}

% @firstparagraphindent WORD
% If WORD is `none', then suppress indentation of the first paragraph
% after a section heading.  If WORD is `insert', then do indent at such
% paragraphs.
%
% The paragraph indentation is suppressed or not by calling
% \suppressfirstparagraphindent, which the sectioning commands do.
% We switch the definition of this back and forth according to WORD.
% By default, we suppress indentation.
%
\def\suppressfirstparagraphindent{\dosuppressfirstparagraphindent}
\def\insertword{insert}
%
\parseargdef\firstparagraphindent{%
 \def\temp{#1}%
 \ifx\temp\noneword
   \let\suppressfirstparagraphindent = \dosuppressfirstparagraphindent
 \else\ifx\temp\insertword
   \let\suppressfirstparagraphindent = \relax
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @firstparagraphindent option `\temp'}%
 \fi\fi
}

% Here is how we actually suppress indentation.  Redefine \everypar to
% \kern backwards by \parindent, and then reset itself to empty.
%
```

```
% We also make \indent itself not actually do anything until the next
% paragraph.
%
\gdef\dosuppressfirstparagraphindent{%
 \gdef\indent{%
   \restorefirstparagraphindent
   \indent
 }%
 \gdef\noindent{%
   \restorefirstparagraphindent
   \noindent
 }%
 \global\everypar = {%
   \kern -\parindent
   \restorefirstparagraphindent
 }%
}

\gdef\restorefirstparagraphindent{%
 \global \let \indent = \ptexindent
 \global \let \noindent = \ptexnoindent
 \global \everypar = {}%
}


% @refill is a no-op.
\let\refill=\relax

% If working on a large document in chapters, it is convenient to
% be able to disable indexing, cross-referencing, and contents, for test runs.
% This is done with @novalidate (before @setfilename).
%
\newif\iflinks \linkstrue % by default we want the aux files.
\let\novalidate = \linksfalse

% @setfilename is done at the beginning of every texinfo file.
% So open here the files we need to have open while reading the input.
% This makes it possible to make a .fmt file for texinfo.
\def\setfilename{%
  \fixbackslash  % Turn off hack to swallow `\input texinfo'.
  \iflinks
    \tryauxfile
    % Open the new aux file.  TeX will close it automatically at exit.
    \immediate\openout\auxfile=\jobname.aux
  \fi % \openindices needs to do some work in any case.
  \openindices
  \let\setfilename=\comment % Ignore extra @setfilename cmds.
  %
```

```
  % If texinfo.cnf is present on the system, read it.
  % Useful for site-wide @afourpaper, etc.
  \openin 1 texinfo.cnf
  \ifeof 1 \else \input texinfo.cnf \fi
  \closein 1
  %
  \comment % Ignore the actual filename.
}

% Called from \setfilename.
%
\def\openindices{%
 \newindex{cp}%
 \newcodeindex{fn}%
 \newcodeindex{vr}%
 \newcodeindex{tp}%
 \newcodeindex{ky}%
 \newcodeindex{pg}%
}

% @bye.
\outer\def\bye{\pagealignmacro\tracingstats=1\ptexend}


\message{pdf,}
% adobe `portable' document format
\newcount\tempnum
\newcount\lnkcount
\newtoks\filename
\newcount\filenamelength
\newcount\pgn
\newtoks\toksA
\newtoks\toksB
\newtoks\toksC
\newtoks\toksD
\newbox\boxA
\newcount\countA
\newif\ifpdf
\newif\ifpdfmakepagedest

% when pdftex is run in dvi mode, \pdfoutput is defined (so \pdfoutput=1
% can be set).  So we test for \relax and 0 as well as being undefined.
\ifx\pdfoutput\thisisundefined
\else
 \ifx\pdfoutput\relax
 \else
   \ifcase\pdfoutput
   \else
```

```
    \pdftrue
  \fi
 \fi
\fi

% PDF uses PostScript string constants for the names of xref targets,
% for display in the outlines, and in other places.  Thus, we have to
% double any backslashes.  Otherwise, a name like "\node" will be
% interpreted as a newline (\n), followed by o, d, e.  Not good.
%
% See http://www.ntg.nl/pipermail/ntg-pdftex/2004-July/000654.html and
% related messages.  The final outcome is that it is up to the TeX user
% to double the backslashes and otherwise make the string valid, so
% that's what we do.  pdftex 1.30.0 (ca.2005) introduced a primitive to
% do this reliably, so we use it.

% #1 is a control sequence in which to do the replacements,
% which we \xdef.
\def\txiescapepdf#1{%
 \ifx\pdfescapestring\thisisundefined
   % No primitive available; should we give a warning or log?
   % Many times it won't matter.
 \else
   % The expandable \pdfescapestring primitive escapes parentheses,
   % backslashes, and other special chars.
   \xdef#1{\pdfescapestring{#1}}%
 \fi
}

\newhelp\nopdfimagehelp{Texinfo supports .png, .jpg, .jpeg, and .pdf images
with PDF output, and none of those formats could be found.  (.eps cannot
be supported due to the design of the PDF format; use regular TeX (DVI
output) for that.)}

\ifpdf
 %
 % Color manipulation macros based on pdfcolor.tex,
 % except using rgb instead of cmyk; the latter is said to render as a
 % very dark gray on-screen and a very dark halftone in print, instead
 % of actual black.
 \def\rgbDarkRed{0.50 0.09 0.12}
 \def\rgbBlack{0 0 0}
 %
 % k sets the color for filling (usual text, etc.);
 % K sets the color for stroking (thin rules, e.g., normal _'s).
 \def\pdfsetcolor#1{\pdfliteral{#1 rg  #1 RG}}
 %
 % Set color, and create a mark which defines \thiscolor accordingly,
```

```
% so that \makeheadline knows which color to restore.
\def\setcolor#1{%
  \xdef\lastcolordefs{\gdef\noexpand\thiscolor{#1}}%
  \domark
  \pdfsetcolor{#1}%
}
%
\def\maincolor{\rgbBlack}
\pdfsetcolor{\maincolor}
\edef\thiscolor{\maincolor}
\def\lastcolordefs{}
%
\def\makefootline{%
  \baselineskip24pt
  \line{\pdfsetcolor{\maincolor}\the\footline}%
}
%
\def\makeheadline{%
  \vbox to 0pt{%
    \vskip-22.5pt
    \line{%
      \vbox to8.5pt{}%
      % Extract \thiscolor definition from the marks.
      \getcolormarks
      % Typeset the headline with \maincolor, then restore the color.
      \pdfsetcolor{\maincolor}\the\headline\pdfsetcolor{\thiscolor}%
    }%
    \vss
  }%
  \nointerlineskip
}
%
%
\pdfcatalog{/PageMode /UseOutlines}
%
% #1 is image name, #2 width (might be empty/whitespace), #3 height (ditto).
\def\dopdfimage#1#2#3{%
  \def\pdfimagewidth{#2}\setbox0 = \hbox{\ignorespaces #2}%
  \def\pdfimageheight{#3}\setbox2 = \hbox{\ignorespaces #3}%
  %
  % pdftex (and the PDF format) support .pdf, .png, .jpg (among
  % others).  Let's try in that order, PDF first since if
  % someone has a scalable image, presumably better to use that than a
  % bitmap.
  \let\pdfimgext=\empty
  \begingroup
    \openin 1 #1.pdf \ifeof 1
      \openin 1 #1.PDF \ifeof 1
```

```
      \openin 1 #1.png \ifeof 1
        \openin 1 #1.jpg \ifeof 1
          \openin 1 #1.jpeg \ifeof 1
            \openin 1 #1.JPG \ifeof 1
              \errhelp = \nopdfimagehelp
              \errmessage{Could not find image file #1 for pdf}%
            \else \gdef\pdfimgext{JPG}%
            \fi
          \else \gdef\pdfimgext{jpeg}%
          \fi
        \else \gdef\pdfimgext{jpg}%
        \fi
      \else \gdef\pdfimgext{png}%
      \fi
    \else \gdef\pdfimgext{PDF}%
    \fi
  \else \gdef\pdfimgext{pdf}%
  \fi
  \closein 1
\endgroup
%
% without \immediate, ancient pdftex seg faults when the same image is
% included twice.  (Version 3.14159-pre-1.0-unofficial-20010704.)
\ifnum\pdftexversion < 14
  \immediate\pdfimage
\else
  \immediate\pdfximage
\fi
  \ifdim \wd0 >0pt width \pdfimagewidth \fi
  \ifdim \wd2 >0pt height \pdfimageheight \fi
  \ifnum\pdftexversion<13
     #1.\pdfimgext
   \else
     {#1.\pdfimgext}%
   \fi
\ifnum\pdftexversion < 14 \else
  \pdfrefximage \pdflastximage
\fi}
%
\def\pdfmkdest#1{{%
  % We have to set dummies so commands such as @code, and characters
  % such as \, aren't expanded when present in a section title.
  \indexnofonts
  \turnoffactive
  \makevalueexpandable
  \def\pdfdestname{#1}%
  \txiescapepdf\pdfdestname
  \safewhatsit{\pdfdest name{\pdfdestname} xyz}%
```

```
}}
%
% used to mark target names; must be expandable.
\def\pdfmkpgn#1{#1}
%
% by default, use a color that is dark enough to print on paper as
% nearly black, but still distinguishable for online viewing.
\def\urlcolor{\rgbDarkRed}
\def\linkcolor{\rgbDarkRed}
\def\endlink{\setcolor{\maincolor}\pdfendlink}
%
% Adding outlines to PDF; macros for calculating structure of outlines
% come from Petr Olsak
\def\expnumber#1{\expandafter\ifx\csname#1\endcsname\relax 0%
  \else \csname#1\endcsname \fi}
\def\advancenumber#1{\tempnum=\expnumber{#1}\relax
  \advance\tempnum by 1
  \expandafter\xdef\csname#1\endcsname{\the\tempnum}}
%
% #1 is the section text, which is what will be displayed in the
% outline by the pdf viewer.  #2 is the pdf expression for the number
% of subentries (or empty, for subsubsections).  #3 is the node text,
% which might be empty if this toc entry had no corresponding node.
% #4 is the page number
%
\def\dopdfoutline#1#2#3#4{%
  % Generate a link to the node text if that exists; else, use the
  % page number.  We could generate a destination for the section
  % text in the case where a section has no node, but it doesn't
  % seem worth the trouble, since most documents are normally structured.
  \edef\pdfoutlinedest{#3}%
  \ifx\pdfoutlinedest\empty
    \def\pdfoutlinedest{#4}%
  \else
    \txiescapepdf\pdfoutlinedest
  \fi
  %
  % Also escape PDF chars in the display string.
  \edef\pdfoutlinetext{#1}%
  \txiescapepdf\pdfoutlinetext
  %
  \pdfoutline goto name{\pdfmkpgn{\pdfoutlinedest}}#2{\pdfoutlinetext}%
}
%
\def\pdfmakeoutlines{%
  \begingroup
    % Read toc silently, to get counts of subentries for \pdfoutline.
    \def\partentry##1##2##3##4{}% ignore parts in the outlines
```

```
   \def\numchapentry##1##2##3##4{%
\def\thischapnum{##2}%
\def\thissecnum{0}%
\def\thissubsecnum{0}%
   }%
   \def\numsecentry##1##2##3##4{%
\advancenumber{chap\thischapnum}%
\def\thissecnum{##2}%
\def\thissubsecnum{0}%
   }%
   \def\numsubsecentry##1##2##3##4{%
\advancenumber{sec\thissecnum}%
\def\thissubsecnum{##2}%
   }%
   \def\numsubsubsecentry##1##2##3##4{%
\advancenumber{subsec\thissubsecnum}%
   }%
   \def\thischapnum{0}%
   \def\thissecnum{0}%
   \def\thissubsecnum{0}%
   %
   % use \def rather than \let here because we redefine \chapentry et
   % al. a second time, below.
   \def\appentry{\numchapentry}%
   \def\appsecentry{\numsecentry}%
   \def\appsubsecentry{\numsubsecentry}%
   \def\appsubsubsecentry{\numsubsubsecentry}%
   \def\unnchapentry{\numchapentry}%
   \def\unnsecentry{\numsecentry}%
   \def\unnsubsecentry{\numsubsecentry}%
   \def\unnsubsubsecentry{\numsubsubsecentry}%
   \readdatafile{toc}%
   %
   % Read toc second time, this time actually producing the outlines.
   % The `-' means take the \expnumber as the absolute number of
   % subentries, which we calculated on our first read of the .toc above.
   %
   % We use the node names as the destinations.
   \def\numchapentry##1##2##3##4{%
     \dopdfoutline{##1}{count-\expnumber{chap##2}}{##3}{##4}}%
   \def\numsecentry##1##2##3##4{%
     \dopdfoutline{##1}{count-\expnumber{sec##2}}{##3}{##4}}%
   \def\numsubsecentry##1##2##3##4{%
     \dopdfoutline{##1}{count-\expnumber{subsec##2}}{##3}{##4}}%
   \def\numsubsubsecentry##1##2##3##4{% count is always zero
     \dopdfoutline{##1}{}{##3}{##4}}%
   %
   % PDF outlines are displayed using system fonts, instead of
```

```
    % document fonts.  Therefore we cannot use special characters,
    % since the encoding is unknown.  For example, the eogonek from
    % Latin 2 (0xea) gets translated to a | character.  Info from
    % Staszek Wawrykiewicz, 19 Jan 2004 04:09:24 +0100.
    %
    % TODO this right, we have to translate 8-bit characters to
    % their "best" equivalent, based on the @documentencoding.  Too
    % much work for too little return.  Just use the ASCII equivalents
    % we use for the index sort strings.
    %
    \indexnofonts
    \setupdatafile
    % We can have normal brace characters in the PDF outlines, unlike
    % Texinfo index files.  So set that up.
    \def\{{\lbracecharliteral}%
    \def\}{\rbracecharliteral}%
    \catcode`\\=\active \otherbackslash
    \input \tocreadfilename
  \endgroup
}
{\catcode`[=1 \catcode`]=2
 \catcode`{=\other \catcode`}=\other
 \gdef\lbracecharliteral[{]%
 \gdef\rbracecharliteral[}]%
]
%
\def\skipspaces#1{\def\PP{#1}\def\D{|}%
  \ifx\PP\D\let\nextsp\relax
  \else\let\nextsp\skipspaces
    \addtokens{\filename}{\PP}%
    \advance\filenamelength by 1
  \fi
  \nextsp}
\def\getfilename#1{%
  \filenamelength=0
  % If we don't expand the argument now, \skipspaces will get
  % snagged on things like "@value{foo}".
  \edef\temp{#1}%
  \expandafter\skipspaces\temp|\relax
}
\ifnum\pdftexversion < 14
  \let \startlink \pdfannotlink
\else
  \let \startlink \pdfstartlink
\fi
% make a live url in pdf output.
\def\pdfurl#1{%
  \begingroup
```

```
    % it seems we really need yet another set of dummies; have not
    % tried to figure out what each command should do in the context
    % of @url.  for now, just make @/ a no-op, that's the only one
    % people have actually reported a problem with.
    %
    \normalturnoffactive
    \def\@{@}%
    \let\/=\empty
    \makevalueexpandable
    % do we want to go so far as to use \indexnofonts instead of just
    % special-casing \var here?
    \def\var##1{##1}%
    %
    \leavevmode\setcolor{\urlcolor}%
    \startlink attr{/Border [0 0 0]}%
      user{/Subtype /Link /A << /S /URI /URI (#1) >>}%
  \endgroup}
\def\pdfgettoks#1.{\setbox\boxA=\hbox{\toksA={#1.}\toksB={}\maketoks}}
\def\addtokens#1#2{\edef\addtoks{\noexpand#1={\the#1#2}}\addtoks}
\def\adn#1{\addtokens{\toksC}{#1}\global\countA=1\let\next=\maketoks}
\def\poptoks#1#2|ENDTOKS|{\let\first=#1\toksD={#1}\toksA={#2}}
\def\maketoks{%
  \expandafter\poptoks\the\toksA|ENDTOKS|\relax
  \ifx\first0\adn0
  \else\ifx\first1\adn1 \else\ifx\first2\adn2 \else\ifx\first3\adn3
  \else\ifx\first4\adn4 \else\ifx\first5\adn5 \else\ifx\first6\adn6
  \else\ifx\first7\adn7 \else\ifx\first8\adn8 \else\ifx\first9\adn9
  \else
    \ifnum0=\countA\else\makelink\fi
    \ifx\first.\let\next=\done\else
      \let\next=\maketoks
      \addtokens{\toksB}{\the\toksD}
      \ifx\first,\addtokens{\toksB}{\space}\fi
    \fi
  \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi
  \next}
\def\makelink{\addtokens{\toksB}%
  {\noexpand\pdflink{\the\toksC}}\toksC={}\global\countA=0}
\def\pdflink#1{%
  \startlink attr{/Border [0 0 0]} goto name{\pdfmkpgn{#1}}
  \setcolor{\linkcolor}#1\endlink}
\def\done{\edef\st{\global\noexpand\toksA={\the\toksB}}\st}
\else
 % non-pdf mode
 \let\pdfmkdest = \gobble
 \let\pdfurl = \gobble
 \let\endlink = \relax
 \let\setcolor = \gobble
```

```
 \let\pdfsetcolor = \gobble
 \let\pdfmakeoutlines = \relax
\fi  % \ifx\pdfoutput


\message{fonts,}

% Change the current font style to #1, remembering it in \curfontstyle.
% For now, we do not accumulate font styles: @b{@i{foo}} prints foo in
% italics, not bold italics.
%
\def\setfontstyle#1{%
 \def\curfontstyle{#1}% not as a control sequence, because we are \edef'd.
 \csname ten#1\endcsname  % change the current font
}

% Select #1 fonts with the current style.
%
\def\selectfonts#1{\csname #1fonts\endcsname \csname\curfontstyle\endcsname}

\def\rm{\fam=0 \setfontstyle{rm}}
\def\it{\fam=\itfam \setfontstyle{it}}
\def\sl{\fam=\slfam \setfontstyle{sl}}
\def\bf{\fam=\bffam \setfontstyle{bf}}\def\bfstylename{bf}
\def\tt{\fam=\ttfam \setfontstyle{tt}}

% Unfortunately, we have to override this for titles and the like, since
% in those cases "rm" is bold.  Sigh.
\def\rmisbold{\rm\def\curfontstyle{bf}}

% Texinfo sort of supports the sans serif font style, which plain TeX does not.
% So we set up a \sf.
\newfam\sffam
\def\sf{\fam=\sffam \setfontstyle{sf}}
\let\li = \sf % Sometimes we call it \li, not \sf.

% We don't need math for this font style.
\def\ttsl{\setfontstyle{ttsl}}



% Set the baselineskip to #1, and the lineskip and strut size
% correspondingly.  There is no deep meaning behind these magic numbers
% used as factors; they just match (closely enough) what Knuth defined.
%
\def\lineskipfactor{.08333}
\def\strutheightpercent{.70833}
\def\strutdepthpercent {.29167}
%
```

```
% can get a sort of poor man's double spacing by redefining this.
\def\baselinefactor{1}
%
\newdimen\textleading
\def\setleading#1{%
 \dimen0 = #1\relax
 \normalbaselineskip = \baselinefactor\dimen0
 \normallineskip = \lineskipfactor\normalbaselineskip
 \normalbaselines
 \setbox\strutbox =\hbox{%
   \vrule width0pt height\strutheightpercent\baselineskip
                 depth \strutdepthpercent \baselineskip
 }%
}

% PDF CMaps.  See also LaTeX's t1.cmap.
%
% do nothing with this by default.
\expandafter\let\csname cmapOT1\endcsname\gobble
\expandafter\let\csname cmapOT1IT\endcsname\gobble
\expandafter\let\csname cmapOT1TT\endcsname\gobble

% if we are producing pdf, and we have \pdffontattr, then define cmaps.
% (\pdffontattr was introduced many years ago, but people still run
% older pdftex's; it's easy to conditionalize, so we do.)
\ifpdf \ifx\pdffontattr\thisisundefined \else
 \begingroup
   \catcode`\^^M=\active \def^^M{^^J}% Output line endings as the ^^J char.
   \catcode`\%=12 \immediate\pdfobj stream {%!PS-Adobe-3.0 Resource-CMap
%%DocumentNeededResources: ProcSet (CIDInit)
%%IncludeResource: ProcSet (CIDInit)
%%BeginResource: CMap (TeX-OT1-0)
%%Title: (TeX-OT1-0 TeX OT1 0)
%%Version: 1.000
%%EndComments
/CIDInit /ProcSet findresource begin
12 dict begin
begincmap
/CIDSystemInfo
<< /Registry (TeX)
/Ordering (OT1)
/Supplement 0
>> def
/CMapName /TeX-OT1-0 def
/CMapType 2 def
1 begincodespacerange
<00> <7F>
endcodespacerange
```

```
8 beginbfrange
<00> <01> <0393>
<09> <0A> <03A8>
<23> <26> <0023>
<28> <3B> <0028>
<3F> <5B> <003F>
<5D> <5E> <005D>
<61> <7A> <0061>
<7B> <7C> <2013>
endbfrange
40 beginbfchar
<02> <0398>
<03> <039B>
<04> <039E>
<05> <03A0>
<06> <03A3>
<07> <03D2>
<08> <03A6>
<0B> <00660066>
<0C> <00660069>
<0D> <0066006C>
<0E> <006600660069>
<0F> <00660066006C>
<10> <0131>
<11> <0237>
<12> <0060>
<13> <00B4>
<14> <02C7>
<15> <02D8>
<16> <00AF>
<17> <02DA>
<18> <00B8>
<19> <00DF>
<1A> <00E6>
<1B> <0153>
<1C> <00F8>
<1D> <00C6>
<1E> <0152>
<1F> <00D8>
<21> <0021>
<22> <201D>
<27> <2019>
<3C> <00A1>
<3D> <003D>
<3E> <00BF>
<5C> <201C>
<5F> <02D9>
<60> <2018>
```

```
<7D> <02DD>
<7E> <007E>
<7F> <00A8>
endbfchar
endcmap
CMapName currentdict /CMap defineresource pop
end
end
%%EndResource
%%EOF
   }\endgroup
 \expandafter\edef\csname cmapOT1\endcsname#1{%
   \pdffontattr#1{/ToUnicode \the\pdflastobj\space 0 R}%
 }%
%
% \cmapOT1IT
 \begingroup
   \catcode`\^^M=\active \def^^M{^^J}% Output line endings as the ^^J char.
   \catcode`\%=12 \immediate\pdfobj stream {%!PS-Adobe-3.0 Resource-CMap
%%DocumentNeededResources: ProcSet (CIDInit)
%%IncludeResource: ProcSet (CIDInit)
%%BeginResource: CMap (TeX-OT1IT-0)
%%Title: (TeX-OT1IT-0 TeX OT1IT 0)
%%Version: 1.000
%%EndComments
/CIDInit /ProcSet findresource begin
12 dict begin
begincmap
/CIDSystemInfo
<< /Registry (TeX)
/Ordering (OT1IT)
/Supplement 0
>> def
/CMapName /TeX-OT1IT-0 def
/CMapType 2 def
1 begincodespacerange
<00> <7F>
endcodespacerange
8 beginbfrange
<00> <01> <0393>
<09> <0A> <03A8>
<25> <26> <0025>
<28> <3B> <0028>
<3F> <5B> <003F>
<5D> <5E> <005D>
<61> <7A> <0061>
<7B> <7C> <2013>
endbfrange
```

```
42 beginbfchar
<02> <0398>
<03> <039B>
<04> <039E>
<05> <03A0>
<06> <03A3>
<07> <03D2>
<08> <03A6>
<0B> <00660066>
<0C> <00660069>
<0D> <0066006C>
<0E> <006600660069>
<0F> <00660066006C>
<10> <0131>
<11> <0237>
<12> <0060>
<13> <00B4>
<14> <02C7>
<15> <02D8>
<16> <00AF>
<17> <02DA>
<18> <00B8>
<19> <00DF>
<1A> <00E6>
<1B> <0153>
<1C> <00F8>
<1D> <00C6>
<1E> <0152>
<1F> <00D8>
<21> <0021>
<22> <201D>
<23> <0023>
<24> <00A3>
<27> <2019>
<3C> <00A1>
<3D> <003D>
<3E> <00BF>
<5C> <201C>
<5F> <02D9>
<60> <2018>
<7D> <02DD>
<7E> <007E>
<7F> <00A8>
endbfchar
endcmap
CMapName currentdict /CMap defineresource pop
end
end
```

```
%%EndResource
%%EOF
   }\endgroup
 \expandafter\edef\csname cmapOT1IT\endcsname#1{%
   \pdffontattr#1{/ToUnicode \the\pdflastobj\space 0 R}%
 }%
%
% \cmapOT1TT
 \begingroup
   \catcode`\^^M=\active \def^^M{^^J}% Output line endings as the ^^J char.
   \catcode`\%=12 \immediate\pdfobj stream {%!PS-Adobe-3.0 Resource-CMap
%%DocumentNeededResources: ProcSet (CIDInit)
%%IncludeResource: ProcSet (CIDInit)
%%BeginResource: CMap (TeX-OT1TT-0)
%%Title: (TeX-OT1TT-0 TeX OT1TT 0)
%%Version: 1.000
%%EndComments
/CIDInit /ProcSet findresource begin
12 dict begin
begincmap
/CIDSystemInfo
<< /Registry (TeX)
/Ordering (OT1TT)
/Supplement 0
>> def
/CMapName /TeX-OT1TT-0 def
/CMapType 2 def
1 begincodespacerange
<00> <7F>
endcodespacerange
5 beginbfrange
<00> <01> <0393>
<09> <0A> <03A8>
<21> <26> <0021>
<28> <5F> <0028>
<61> <7E> <0061>
endbfrange
32 beginbfchar
<02> <0398>
<03> <039B>
<04> <039E>
<05> <03A0>
<06> <03A3>
<07> <03D2>
<08> <03A6>
<0B> <2191>
<0C> <2193>
<0D> <0027>
```

```
<0E> <00A1>
<0F> <00BF>
<10> <0131>
<11> <0237>
<12> <0060>
<13> <00B4>
<14> <02C7>
<15> <02D8>
<16> <00AF>
<17> <02DA>
<18> <00B8>
<19> <00DF>
<1A> <00E6>
<1B> <0153>
<1C> <00F8>
<1D> <00C6>
<1E> <0152>
<1F> <00D8>
<20> <2423>
<27> <2019>
<60> <2018>
<7F> <00A8>
endbfchar
endcmap
CMapName currentdict /CMap defineresource pop
end
end
%%EndResource
%%EOF
   }\endgroup
 \expandafter\edef\csname cmapOT1TT\endcsname#1{%
   \pdffontattr#1{/ToUnicode \the\pdflastobj\space 0 R}%
 }%
\fi\fi


% Set the font macro #1 to the font named \fontprefix#2.
% #3 is the font's design size, #4 is a scale factor, #5 is the CMap
% encoding (only OT1, OT1IT and OT1TT are allowed, or empty to omit).
% Example:
% #1 = \textrm
% #2 = \rmshape
% #3 = 10
% #4 = \mainmagstep
% #5 = OT1
%
\def\setfont#1#2#3#4#5{%
 \font#1=\fontprefix#2#3 scaled #4
```

```
 \csname cmap#5\endcsname#1%
}
% This is what gets called when #5 of \setfont is empty.
\let\cmap\gobble
%
% (end of cmaps)

% Use cm as the default font prefix.
% To specify the font prefix, you must define \fontprefix
% before you read in texinfo.tex.
\ifx\fontprefix\thisisundefined
\def\fontprefix{cm}
\fi
% Support font families that don't use the same naming scheme as CM.
\def\rmshape{r}
\def\rmbshape{bx}               % where the normal face is bold
\def\bfshape{b}
\def\bxshape{bx}
\def\ttshape{tt}
\def\ttbshape{tt}
\def\ttslshape{sltt}
\def\itshape{ti}
\def\itbshape{bxti}
\def\slshape{sl}
\def\slbshape{bxsl}
\def\sfshape{ss}
\def\sfbshape{ss}
\def\scshape{csc}
\def\scbshape{csc}

% Definitions for a main text size of 11pt.  (The default in Texinfo.)
%
\def\definetextfontsizexi{%
% Text fonts (11.2pt, magstep1).
\def\textnominalsize{11pt}
\edef\mainmagstep{\magstephalf}
\setfont\textrm\rmshape{10}{\mainmagstep}{OT1}
\setfont\texttt\ttshape{10}{\mainmagstep}{OT1TT}
\setfont\textbf\bfshape{10}{\mainmagstep}{OT1}
\setfont\textit\itshape{10}{\mainmagstep}{OT1IT}
\setfont\textsl\slshape{10}{\mainmagstep}{OT1}
\setfont\textsf\sfshape{10}{\mainmagstep}{OT1}
\setfont\textsc\scshape{10}{\mainmagstep}{OT1}
\setfont\texttsl\ttslshape{10}{\mainmagstep}{OT1TT}
\font\texti=cmmi10 scaled \mainmagstep
\font\textsy=cmsy10 scaled \mainmagstep
\def\textecsize{1095}
```

```
% A few fonts for @defun names and args.
\setfont\defbf\bfshape{10}{\magstep1}{OT1}
\setfont\deftt\ttshape{10}{\magstep1}{OT1TT}
\setfont\defttsl\ttslshape{10}{\magstep1}{OT1TT}
\def\df{\let\tentt=\deftt \let\tenbf = \defbf \let\tenttsl=\defttsl \bf}

% Fonts for indices, footnotes, small examples (9pt).
\def\smallnominalsize{9pt}
\setfont\smallrm\rmshape{9}{1000}{OT1}
\setfont\smalltt\ttshape{9}{1000}{OT1TT}
\setfont\smallbf\bfshape{10}{900}{OT1}
\setfont\smallit\itshape{9}{1000}{OT1IT}
\setfont\smallsl\slshape{9}{1000}{OT1}
\setfont\smallsf\sfshape{9}{1000}{OT1}
\setfont\smallsc\scshape{10}{900}{OT1}
\setfont\smallttsl\ttslshape{10}{900}{OT1TT}
\font\smalli=cmmi9
\font\smallsy=cmsy9
\def\smallecsize{0900}

% Fonts for small examples (8pt).
\def\smallernominalsize{8pt}
\setfont\smallerrm\rmshape{8}{1000}{OT1}
\setfont\smallertt\ttshape{8}{1000}{OT1TT}
\setfont\smallerbf\bfshape{10}{800}{OT1}
\setfont\smallerit\itshape{8}{1000}{OT1IT}
\setfont\smallersl\slshape{8}{1000}{OT1}
\setfont\smallersf\sfshape{8}{1000}{OT1}
\setfont\smallersc\scshape{10}{800}{OT1}
\setfont\smallerttsl\ttslshape{10}{800}{OT1TT}
\font\smalleri=cmmi8
\font\smallersy=cmsy8
\def\smallerecsize{0800}

% Fonts for title page (20.4pt):
\def\titlenominalsize{20pt}
\setfont\titlerm\rmbshape{12}{\magstep3}{OT1}
\setfont\titleit\itbshape{10}{\magstep4}{OT1IT}
\setfont\titlesl\slbshape{10}{\magstep4}{OT1}
\setfont\titlett\ttbshape{12}{\magstep3}{OT1TT}
\setfont\titlettsl\ttslshape{10}{\magstep4}{OT1TT}
\setfont\titlesf\sfbshape{17}{\magstep1}{OT1}
\let\titlebf=\titlerm
\setfont\titlesc\scbshape{10}{\magstep4}{OT1}
\font\titlei=cmmi12 scaled \magstep3
\font\titlesy=cmsy10 scaled \magstep4
\def\titleecsize{2074}
```

```
% Chapter (and unnumbered) fonts (17.28pt).
\def\chapnominalsize{17pt}
\setfont\chaprm\rmbshape{12}{\magstep2}{OT1}
\setfont\chapit\itbshape{10}{\magstep3}{OT1IT}
\setfont\chapsl\slbshape{10}{\magstep3}{OT1}
\setfont\chaptt\ttbshape{12}{\magstep2}{OT1TT}
\setfont\chapttsl\ttslshape{10}{\magstep3}{OT1TT}
\setfont\chapsf\sfbshape{17}{1000}{OT1}
\let\chapbf=\chaprm
\setfont\chapsc\scbshape{10}{\magstep3}{OT1}
\font\chapi=cmmi12 scaled \magstep2
\font\chapsy=cmsy10 scaled \magstep3
\def\chapecsize{1728}

% Section fonts (14.4pt).
\def\secnominalsize{14pt}
\setfont\secrm\rmbshape{12}{\magstep1}{OT1}
\setfont\secit\itbshape{10}{\magstep2}{OT1IT}
\setfont\secsl\slbshape{10}{\magstep2}{OT1}
\setfont\sectt\ttbshape{12}{\magstep1}{OT1TT}
\setfont\secttsl\ttslshape{10}{\magstep2}{OT1TT}
\setfont\secsf\sfbshape{12}{\magstep1}{OT1}
\let\secbf\secrm
\setfont\secsc\scbshape{10}{\magstep2}{OT1}
\font\seci=cmmi12 scaled \magstep1
\font\secsy=cmsy10 scaled \magstep2
\def\sececsize{1440}

% Subsection fonts (13.15pt).
\def\ssecnominalsize{13pt}
\setfont\ssecrm\rmbshape{12}{\magstephalf}{OT1}
\setfont\ssecit\itbshape{10}{1315}{OT1IT}
\setfont\ssecsl\slbshape{10}{1315}{OT1}
\setfont\ssectt\ttbshape{12}{\magstephalf}{OT1TT}
\setfont\ssecttsl\ttslshape{10}{1315}{OT1TT}
\setfont\ssecsf\sfbshape{12}{\magstephalf}{OT1}
\let\ssecbf\ssecrm
\setfont\ssecsc\scbshape{10}{1315}{OT1}
\font\sseci=cmmi12 scaled \magstephalf
\font\ssecsy=cmsy10 scaled 1315
\def\ssececsize{1200}

% Reduced fonts for @acro in text (10pt).
\def\reducednominalsize{10pt}
\setfont\reducedrm\rmshape{10}{1000}{OT1}
\setfont\reducedtt\ttshape{10}{1000}{OT1TT}
\setfont\reducedbf\bfshape{10}{1000}{OT1}
\setfont\reducedit\itshape{10}{1000}{OT1IT}
```

```
\setfont\reducedsl\slshape{10}{1000}{OT1}
\setfont\reducedsf\sfshape{10}{1000}{OT1}
\setfont\reducedsc\scshape{10}{1000}{OT1}
\setfont\reducedttsl\ttslshape{10}{1000}{OT1TT}
\font\reducedi=cmmi10
\font\reducedsy=cmsy10
\def\reducedecsize{1000}

\textleading = 13.2pt % line spacing for 11pt CM
\textfonts          % reset the current fonts
\rm
} % end of 11pt text font size definitions, \definetextfontsizexi


% Definitions to make the main text be 10pt Computer Modern, with
% section, chapter, etc., sizes following suit.  This is for the GNU
% Press printing of the Emacs 22 manual.  Maybe other manuals in the
% future.  Used with @smallbook, which sets the leading to 12pt.
%
\def\definetextfontsizex{%
% Text fonts (10pt).
\def\textnominalsize{10pt}
\edef\mainmagstep{1000}
\setfont\textrm\rmshape{10}{\mainmagstep}{OT1}
\setfont\texttt\ttshape{10}{\mainmagstep}{OT1TT}
\setfont\textbf\bfshape{10}{\mainmagstep}{OT1}
\setfont\textit\itshape{10}{\mainmagstep}{OT1IT}
\setfont\textsl\slshape{10}{\mainmagstep}{OT1}
\setfont\textsf\sfshape{10}{\mainmagstep}{OT1}
\setfont\textsc\scshape{10}{\mainmagstep}{OT1}
\setfont\texttttsl\ttslshape{10}{\mainmagstep}{OT1TT}
\font\texti=cmmi10 scaled \mainmagstep
\font\textsy=cmsy10 scaled \mainmagstep
\def\textecsize{1000}

% A few fonts for @defun names and args.
\setfont\defbf\bfshape{10}{\magstephalf}{OT1}
\setfont\deftt\ttshape{10}{\magstephalf}{OT1TT}
\setfont\defttsl\ttslshape{10}{\magstephalf}{OT1TT}
\def\df{\let\tentt=\deftt \let\tenbf = \defbf \let\tenttsl=\defttsl \bf}

% Fonts for indices, footnotes, small examples (9pt).
\def\smallnominalsize{9pt}
\setfont\smallrm\rmshape{9}{1000}{OT1}
\setfont\smalltt\ttshape{9}{1000}{OT1TT}
\setfont\smallbf\bfshape{10}{900}{OT1}
\setfont\smallit\itshape{9}{1000}{OT1IT}
\setfont\smallsl\slshape{9}{1000}{OT1}
```

```
\setfont\smallsf\sfshape{9}{1000}{OT1}
\setfont\smallsc\scshape{10}{900}{OT1}
\setfont\smallttsl\ttslshape{10}{900}{OT1TT}
\font\smalli=cmmi9
\font\smallsy=cmsy9
\def\smallecsize{0900}

% Fonts for small examples (8pt).
\def\smallernominalsize{8pt}
\setfont\smallerrm\rmshape{8}{1000}{OT1}
\setfont\smallertt\ttshape{8}{1000}{OT1TT}
\setfont\smallerbf\bfshape{10}{800}{OT1}
\setfont\smallerit\itshape{8}{1000}{OT1IT}
\setfont\smallersl\slshape{8}{1000}{OT1}
\setfont\smallersf\sfshape{8}{1000}{OT1}
\setfont\smallersc\scshape{10}{800}{OT1}
\setfont\smallerttsl\ttslshape{10}{800}{OT1TT}
\font\smalleri=cmmi8
\font\smallersy=cmsy8
\def\smallerecsize{0800}

% Fonts for title page (20.4pt):
\def\titlenominalsize{20pt}
\setfont\titlerm\rmbshape{12}{\magstep3}{OT1}
\setfont\titleit\itbshape{10}{\magstep4}{OT1IT}
\setfont\titlesl\slbshape{10}{\magstep4}{OT1}
\setfont\titlett\ttbshape{12}{\magstep3}{OT1TT}
\setfont\titlettsl\ttslshape{10}{\magstep4}{OT1TT}
\setfont\titlesf\sfbshape{17}{\magstep1}{OT1}
\let\titlebf=\titlerm
\setfont\titlesc\scbshape{10}{\magstep4}{OT1}
\font\titlei=cmmi12 scaled \magstep3
\font\titlesy=cmsy10 scaled \magstep4
\def\titleecsize{2074}

% Chapter fonts (14.4pt).
\def\chapnominalsize{14pt}
\setfont\chaprm\rmbshape{12}{\magstep1}{OT1}
\setfont\chapit\itbshape{10}{\magstep2}{OT1IT}
\setfont\chapsl\slbshape{10}{\magstep2}{OT1}
\setfont\chaptt\ttbshape{12}{\magstep1}{OT1TT}
\setfont\chapttsl\ttslshape{10}{\magstep2}{OT1TT}
\setfont\chapsf\sfbshape{12}{\magstep1}{OT1}
\let\chapbf\chaprm
\setfont\chapsc\scbshape{10}{\magstep2}{OT1}
\font\chapi=cmmi12 scaled \magstep1
\font\chapsy=cmsy10 scaled \magstep2
\def\chapecsize{1440}
```

```
% Section fonts (12pt).
\def\secnominalsize{12pt}
\setfont\secrm\rmbshape{12}{1000}{OT1}
\setfont\secit\itbshape{10}{\magstep1}{OT1IT}
\setfont\secsl\slbshape{10}{\magstep1}{OT1}
\setfont\sectt\ttbshape{12}{1000}{OT1TT}
\setfont\secttsl\ttslshape{10}{\magstep1}{OT1TT}
\setfont\secsf\sfbshape{12}{1000}{OT1}
\let\secbf\secrm
\setfont\secsc\scbshape{10}{\magstep1}{OT1}
\font\seci=cmmi12
\font\secsy=cmsy10 scaled \magstep1
\def\sececsize{1200}

% Subsection fonts (10pt).
\def\ssecnominalsize{10pt}
\setfont\ssecrm\rmbshape{10}{1000}{OT1}
\setfont\ssecit\itbshape{10}{1000}{OT1IT}
\setfont\ssecsl\slbshape{10}{1000}{OT1}
\setfont\ssectt\ttbshape{10}{1000}{OT1TT}
\setfont\ssecttsl\ttslshape{10}{1000}{OT1TT}
\setfont\ssecsf\sfbshape{10}{1000}{OT1}
\let\ssecbf\ssecrm
\setfont\ssecsc\scbshape{10}{1000}{OT1}
\font\sseci=cmmi10
\font\ssecsy=cmsy10
\def\ssececsize{1000}

% Reduced fonts for @acro in text (9pt).
\def\reducednominalsize{9pt}
\setfont\reducedrm\rmshape{9}{1000}{OT1}
\setfont\reducedtt\ttshape{9}{1000}{OT1TT}
\setfont\reducedbf\bfshape{10}{900}{OT1}
\setfont\reducedit\itshape{9}{1000}{OT1IT}
\setfont\reducedsl\slshape{9}{1000}{OT1}
\setfont\reducedsf\sfshape{9}{1000}{OT1}
\setfont\reducedsc\scshape{10}{900}{OT1}
\setfont\reducedttsl\ttslshape{10}{900}{OT1TT}
\font\reducedi=cmmi9
\font\reducedsy=cmsy9
\def\reducedecsize{0900}

\divide\parskip by 2  % reduce space between paragraphs
\textleading = 12pt   % line spacing for 10pt CM
\textfonts            % reset the current fonts
\rm
} % end of 10pt text font size definitions, \definetextfontsizex
```

```
% We provide the user-level command
%   @fonttextsize 10
% (or 11) to redefine the text font size.  pt is assumed.
%
\def\xiword{11}
\def\xword{10}
\def\xwordpt{10pt}
%
\parseargdef\fonttextsize{%
 \def\textsizearg{#1}%
 %\wlog{doing @fonttextsize \textsizearg}%
 %
 % Set \globaldefs so that documents can use this inside @tex, since
 % makeinfo 4.8 does not support it, but we need it nonetheless.
 %
\begingroup \globaldefs=1
 \ifx\textsizearg\xword \definetextfontsizex
 \else \ifx\textsizearg\xiword \definetextfontsizexi
 \else
   \errhelp=\EMsimple
   \errmessage{@fonttextsize only supports `10' or `11', not `\textsizearg'}
 \fi\fi
\endgroup
}


% In order for the font changes to affect most math symbols and letters,
% we have to define the \textfont of the standard families.  Since
% texinfo doesn't allow for producing subscripts and superscripts except
% in the main text, we don't bother to reset \scriptfont and
% \scriptscriptfont (which would also require loading a lot more fonts).
%
\def\resetmathfonts{%
 \textfont0=\tenrm \textfont1=\teni \textfont2=\tensy
 \textfont\itfam=\tenit \textfont\slfam=\tensl \textfont\bffam=\tenbf
 \textfont\ttfam=\tentt \textfont\sffam=\tensf
}

% The font-changing commands redefine the meanings of \tenSTYLE, instead
% of just \STYLE.  We do this because \STYLE needs to also set the
% current \fam for math mode.  Our \STYLE (e.g., \rm) commands hardwire
% \tenSTYLE to set the current font.
%
% Each font-changing command also sets the names \lsize (one size lower)
% and \lllsize (three sizes lower).  These relative commands are used in
% the LaTeX logo and acronyms.
```

```
%
% This all needs generalizing, badly.
%
\def\textfonts{%
 \let\tenrm=\textrm \let\tenit=\textit \let\tensl=\textsl
 \let\tenbf=\textbf \let\tentt=\texttt \let\smallcaps=\textsc
 \let\tensf=\textsf \let\teni=\texti \let\tensy=\textsy
 \let\tenttsl=\textttsl
 \def\curfontsize{text}%
 \def\lsize{reduced}\def\lllsize{smaller}%
 \resetmathfonts \setleading{\textleading}}
\def\titlefonts{%
 \let\tenrm=\titlerm \let\tenit=\titleit \let\tensl=\titlesl
 \let\tenbf=\titlebf \let\tentt=\titlett \let\smallcaps=\titlesc
 \let\tensf=\titlesf \let\teni=\titlei \let\tensy=\titlesy
 \let\tenttsl=\titlettsl
 \def\curfontsize{title}%
 \def\lsize{chap}\def\lllsize{subsec}%
 \resetmathfonts \setleading{27pt}}
\def\titlefont#1{{\titlefonts\rmisbold #1}}
\def\chapfonts{%
 \let\tenrm=\chaprm \let\tenit=\chapit \let\tensl=\chapsl
 \let\tenbf=\chapbf \let\tentt=\chaptt \let\smallcaps=\chapsc
 \let\tensf=\chapsf \let\teni=\chapi \let\tensy=\chapsy
 \let\tenttsl=\chapttsl
 \def\curfontsize{chap}%
 \def\lsize{sec}\def\lllsize{text}%
 \resetmathfonts \setleading{19pt}}
\def\secfonts{%
 \let\tenrm=\secrm \let\tenit=\secit \let\tensl=\secsl
 \let\tenbf=\secbf \let\tentt=\sectt \let\smallcaps=\secsc
 \let\tensf=\secsf \let\teni=\seci \let\tensy=\secsy
 \let\tenttsl=\secttsl
 \def\curfontsize{sec}%
 \def\lsize{subsec}\def\lllsize{reduced}%
 \resetmathfonts \setleading{16pt}}
\def\subsecfonts{%
 \let\tenrm=\ssecrm \let\tenit=\ssecit \let\tensl=\ssecsl
 \let\tenbf=\ssecbf \let\tentt=\ssectt \let\smallcaps=\ssecsc
 \let\tensf=\ssecsf \let\teni=\sseci \let\tensy=\ssecsy
 \let\tenttsl=\ssecttsl
 \def\curfontsize{ssec}%
 \def\lsize{text}\def\lllsize{small}%
 \resetmathfonts \setleading{15pt}}
\let\subsubsecfonts = \subsecfonts
\def\reducedfonts{%
 \let\tenrm=\reducedrm \let\tenit=\reducedit \let\tensl=\reducedsl
 \let\tenbf=\reducedbf \let\tentt=\reducedtt \let\reducedcaps=\reducedsc
```

```
 \let\tensf=\reducedsf \let\teni=\reducedi \let\tensy=\reducedsy
 \let\tenttsl=\reducedttsl
 \def\curfontsize{reduced}%
 \def\lsize{small}\def\lllsize{smaller}%
 \resetmathfonts \setleading{10.5pt}}
\def\smallfonts{%
 \let\tenrm=\smallrm \let\tenit=\smallit \let\tensl=\smallsl
 \let\tenbf=\smallbf \let\tentt=\smalltt \let\smallcaps=\smallsc
 \let\tensf=\smallsf \let\teni=\smalli \let\tensy=\smallsy
 \let\tenttsl=\smallttsl
 \def\curfontsize{small}%
 \def\lsize{smaller}\def\lllsize{smaller}%
 \resetmathfonts \setleading{10.5pt}}
\def\smallerfonts{%
 \let\tenrm=\smallerrm \let\tenit=\smallerit \let\tensl=\smallersl
 \let\tenbf=\smallerbf \let\tentt=\smallertt \let\smallcaps=\smallersc
 \let\tensf=\smallersf \let\teni=\smalleri \let\tensy=\smallersy
 \let\tenttsl=\smallerttsl
 \def\curfontsize{smaller}%
 \def\lsize{smaller}\def\lllsize{smaller}%
 \resetmathfonts \setleading{9.5pt}}

% Fonts for short table of contents.
\setfont\shortcontrm\rmshape{12}{1000}{OT1}
\setfont\shortcontbf\bfshape{10}{\magstep1}{OT1}  % no cmb12
\setfont\shortcontsl\slshape{12}{1000}{OT1}
\setfont\shortconttt\ttshape{12}{1000}{OT1TT}

% Define these just so they can be easily changed for other fonts.
\def\angleleft{$\langle$}
\def\angleright{$\rangle$}

% Set the fonts to use with the @small... environments.
\let\smallexamplefonts = \smallfonts

% About \smallexamplefonts.  If we use \smallfonts (9pt), @smallexample
% can fit this many characters:
%   8.5x11=86   smallbook=72  a4=90  a5=69
% If we use \scriptfonts (8pt), then we can fit this many characters:
%   8.5x11=90+  smallbook=80  a4=90+  a5=77
% For me, subjectively, the few extra characters that fit aren't worth
% the additional smallness of 8pt.  So I'm making the default 9pt.
%
% By the way, for comparison, here's what fits with @example (10pt):
%   8.5x11=71  smallbook=60  a4=75  a5=58
% --karl, 24jan03.

% Set up the default fonts, so we can use them for creating boxes.
```

```
%
\definetextfontsizexi


\message{markup,}

% Check if we are currently using a typewriter font.  Since all the
% Computer Modern typewriter fonts have zero interword stretch (and
% shrink), and it is reasonable to expect all typewriter fonts to have
% this property, we can check that font parameter.
%
\def\ifmonospace{\ifdim\fontdimen3\font=0pt }

% Markup style infrastructure.  \defmarkupstylesetup\INITMACRO will
% define and register \INITMACRO to be called on markup style changes.
% \INITMACRO can check \currentmarkupstyle for the innermost
% style and the set of \ifmarkupSTYLE switches for all styles
% currently in effect.
\newif\ifmarkupvar
\newif\ifmarkupsamp
\newif\ifmarkupkey
%\newif\ifmarkupfile % @file == @samp.
%\newif\ifmarkupoption % @option == @samp.
\newif\ifmarkupcode
\newif\ifmarkupkbd
%\newif\ifmarkupenv % @env == @code.
%\newif\ifmarkupcommand % @command == @code.
\newif\ifmarkuptex % @tex (and part of @math, for now).
\newif\ifmarkupexample
\newif\ifmarkupverb
\newif\ifmarkupverbatim

\let\currentmarkupstyle\empty

\def\setupmarkupstyle#1{%
 \csname markup#1true\endcsname
 \def\currentmarkupstyle{#1}%
 \markupstylesetup
}

\let\markupstylesetup\empty

\def\defmarkupstylesetup#1{%
 \expandafter\def\expandafter\markupstylesetup
   \expandafter{\markupstylesetup #1}%
 \def#1%
}
```

```
% Markup style setup for left and right quotes.
\defmarkupstylesetup\markupsetuplq{%
 \expandafter\let\expandafter \temp
   \csname markupsetuplq\currentmarkupstyle\endcsname
 \ifx\temp\relax \markupsetuplqdefault \else \temp \fi
}

\defmarkupstylesetup\markupsetuprq{%
 \expandafter\let\expandafter \temp
   \csname markupsetuprq\currentmarkupstyle\endcsname
 \ifx\temp\relax \markupsetuprqdefault \else \temp \fi
}

{
\catcode`\'=\active
\catcode`\`=\active

\gdef\markupsetuplqdefault{\let`\lq}
\gdef\markupsetuprqdefault{\let'\rq}

\gdef\markupsetcodequoteleft{\let`\codequoteleft}
\gdef\markupsetcodequoteright{\let'\codequoteright}
}

\let\markupsetuplqcode \markupsetcodequoteleft
\let\markupsetuprqcode \markupsetcodequoteright
%
\let\markupsetuplqexample \markupsetcodequoteleft
\let\markupsetuprqexample \markupsetcodequoteright
%
\let\markupsetuplqkbd     \markupsetcodequoteleft
\let\markupsetuprqkbd     \markupsetcodequoteright
%
\let\markupsetuplqsamp \markupsetcodequoteleft
\let\markupsetuprqsamp \markupsetcodequoteright
%
\let\markupsetuplqverb \markupsetcodequoteleft
\let\markupsetuprqverb \markupsetcodequoteright
%
\let\markupsetuplqverbatim \markupsetcodequoteleft
\let\markupsetuprqverbatim \markupsetcodequoteright

% Allow an option to not use regular directed right quote/apostrophe
% (char 0x27), but instead the undirected quote from cmtt (char 0x0d).
% The undirected quote is ugly, so don't make it the default, but it
% works for pasting with more pdf viewers (at least evince), the
% lilypond developers report.  xpdf does work with the regular 0x27.
%
```

```
\def\codequoteright{%
 \expandafter\ifx\csname SETtxicodequoteundirected\endcsname\relax
   \expandafter\ifx\csname SETcodequoteundirected\endcsname\relax
     '%
   \else \char'15 \fi
 \else \char'15 \fi
}
%
% and a similar option for the left quote char vs. a grave accent.
% Modern fonts display ASCII 0x60 as a grave accent, so some people like
% the code environments to do likewise.
%
\def\codequoteleft{%
 \expandafter\ifx\csname SETtxicodequotebacktick\endcsname\relax
   \expandafter\ifx\csname SETcodequotebacktick\endcsname\relax
     % [Knuth] pp. 380,381,391
     % \relax disables Spanish ligatures ?` and !` of \tt font.
     \relax`%
   \else \char'22 \fi
 \else \char'22 \fi
}

% Commands to set the quote options.
%
\parseargdef\codequoteundirected{%
 \def\temp{#1}%
 \ifx\temp\onword
   \expandafter\let\csname SETtxicodequoteundirected\endcsname
     = t%
 \else\ifx\temp\offword
   \expandafter\let\csname SETtxicodequoteundirected\endcsname
     = \relax
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @codequoteundirected value `\temp', must be on|off}%
 \fi\fi
}
%
\parseargdef\codequotebacktick{%
 \def\temp{#1}%
 \ifx\temp\onword
   \expandafter\let\csname SETtxicodequotebacktick\endcsname
     = t%
 \else\ifx\temp\offword
   \expandafter\let\csname SETtxicodequotebacktick\endcsname
     = \relax
 \else
   \errhelp = \EMsimple
```

```
   \errmessage{Unknown @codequotebacktick value `\temp', must be on|off}%
 \fi\fi
}

% [Knuth] pp. 380,381,391, disable Spanish ligatures ?` and !` of \tt font.
\def\noligaturesquoteleft{\relax\lq}

% Count depth in font-changes, for error checks
\newcount\fontdepth \fontdepth=0

% Font commands.

% #1 is the font command (\sl or \it), #2 is the text to slant.
% If we are in a monospaced environment, however, 1) always use \ttsl,
% and 2) do not add an italic correction.
\def\dosmartslant#1#2{%
 \ifusingtt
   {{\ttsl #2}\let\next=\relax}%
   {\def\next{{#1#2}\futurelet\next\smartitaliccorrection}}%
 \next
}
\def\smartslanted{\dosmartslant\sl}
\def\smartitalic{\dosmartslant\it}

% Output an italic correction unless \next (presumed to be the following
% character) is such as not to need one.
\def\smartitaliccorrection{%
 \ifx\next,%
 \else\ifx\next-%
 \else\ifx\next.%
 \else\ptexslash
 \fi\fi\fi
 \aftersmartic
}

% Unconditional use \ttsl, and no ic.  @var is set to this for defuns.
\def\ttslanted#1{{\ttsl #1}}

% @cite is like \smartslanted except unconditionally use \sl.  We never want
% ttsl for book titles, do we?
\def\cite#1{{\sl #1}\futurelet\next\smartitaliccorrection}

\def\aftersmartic{}
\def\var#1{%
 \let\saveaftersmartic = \aftersmartic
 \def\aftersmartic{\null\let\aftersmartic=\saveaftersmartic}%
 \smartslanted{#1}%
}
```

```
\let\i=\smartitalic
\let\slanted=\smartslanted
\let\dfn=\smartslanted
\let\emph=\smartitalic

% Explicit font changes: @r, @sc, undocumented @ii.
\def\r#1{{\rm #1}}              % roman font
\def\sc#1{{\smallcaps#1}}       % smallcaps font
\def\ii#1{{\it #1}}             % italic font

% @b, explicit bold.  Also @strong.
\def\b#1{{\bf #1}}
\let\strong=\b

% @sansserif, explicit sans.
\def\sansserif#1{{\sf #1}}

% We can't just use \exhyphenpenalty, because that only has effect at
% the end of a paragraph.  Restore normal hyphenation at the end of the
% group within which \nohyphenation is presumably called.
%
\def\nohyphenation{\hyphenchar\font = -1  \aftergroup\restorehyphenation}
\def\restorehyphenation{\hyphenchar\font = `- }

% Set sfcode to normal for the chars that usually have another value.
% Can't use plain's \frenchspacing because it uses the `\x notation, and
% sometimes \x has an active definition that messes things up.
%
\catcode`@=11
 \def\plainfrenchspacing{%
   \sfcode\dotChar  =\@m \sfcode\questChar=\@m \sfcode\exclamChar=\@m
   \sfcode\colonChar=\@m \sfcode\semiChar =\@m \sfcode\commaChar =\@m
   \def\endofsentencespacefactor{1000}% for @. and friends
 }
 \def\plainnonfrenchspacing{%
   \sfcode`\.3000\sfcode`\?3000\sfcode`\!3000
   \sfcode`\:2000\sfcode`\;1500\sfcode`\,1250
   \def\endofsentencespacefactor{3000}% for @. and friends
 }
\catcode`@=\other
\def\endofsentencespacefactor{3000}% default

% @t, explicit typewriter.
\def\t#1{%
 {\tt \rawbackslash \plainfrenchspacing #1}%
 \null
}
```

```
% @samp.
\def\samp#1{{\setupmarkupstyle{samp}\lq\tclose{#1}\rq\null}}

% @indicateurl is \samp, that is, with quotes.
\let\indicateurl=\samp

% @code (and similar) prints in typewriter, but with spaces the same
% size as normal in the surrounding text, without hyphenation, etc.
% This is a subroutine for that.
\def\tclose#1{%
 {%
   % Change normal interword space to be same as for the current font.
   \spaceskip = \fontdimen2\font
   %
   % Switch to typewriter.
   \tt
   %
   % But `\ ' produces the large typewriter interword space.
   \def\ {{\spaceskip = 0pt{} }}%
   %
   % Turn off hyphenation.
   \nohyphenation
   %
   \rawbackslash
   \plainfrenchspacing
   #1%
 }%
 \null % reset spacefactor to 1000
}

% We *must* turn on hyphenation at `-' and `_' in @code.
% Otherwise, it is too hard to avoid overfull hboxes
% in the Emacs manual, the Library manual, etc.
%
% Unfortunately, TeX uses one parameter (\hyphenchar) to control
% both hyphenation at - and hyphenation within words.
% We must therefore turn them both off (\tclose does that)
% and arrange explicitly to hyphenate at a dash.
%  -- rms.
{
 \catcode`\-=\active \catcode`\_=\active
 \catcode`\'=\active \catcode`\`=\active
 \global\let'=\rq \global\let`=\lq  % default definitions
 %
 \global\def\code{\begingroup
   \setupmarkupstyle{code}%
   % The following should really be moved into \setupmarkupstyle handlers.
```

```
   \catcode\dashChar=\active  \catcode\underChar=\active
   \ifallowcodebreaks
    \let-\codedash
    \let_\codeunder
   \else
    \let-\normaldash
    \let_\realunder
   \fi
   \codex
 }
}

\def\codex #1{\tclose{#1}\endgroup}

\def\normaldash{-}
\def\codedash{-\discretionary{}{}{}}
\def\codeunder{%
 % this is all so @math{@code{var_name}+1} can work.  In math mode, _
 % is "active" (mathcode"8000) and \normalunderscore (or \char95, etc.)
 % will therefore expand the active definition of _, which is us
 % (inside @code that is), therefore an endless loop.
 \ifusingtt{\ifmmode
            \mathchar"075F % class 0=ordinary, family 7=ttfam, pos 0x5F=_.
           \else\normalunderscore \fi
           \discretionary{}{}{}}%
          {\_}%
}

% An additional complication: the above will allow breaks after, e.g.,
% each of the four underscores in __typeof__.  This is bad.
% @allowcodebreaks provides a document-level way to turn breaking at -
% and _ on and off.
%
\newif\ifallowcodebreaks  \allowcodebreakstrue

\def\keywordtrue{true}
\def\keywordfalse{false}

\parseargdef\allowcodebreaks{%
 \def\txiarg{#1}%
 \ifx\txiarg\keywordtrue
   \allowcodebreakstrue
 \else\ifx\txiarg\keywordfalse
   \allowcodebreaksfalse
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @allowcodebreaks option `\txiarg', must be true|false}%
 \fi\fi
```

```
}

% For @command, @env, @file, @option quotes seem unnecessary,
% so use \code rather than \samp.
\let\command=\code
\let\env=\code
\let\file=\code
\let\option=\code

% @uref (abbreviation for `urlref') takes an optional (comma-separated)
% second argument specifying the text to display and an optional third
% arg as text to display instead of (rather than in addition to) the url
% itself.  First (mandatory) arg is the url.
% (This \urefnobreak definition isn't used now, leaving it for a while
% for comparison.)
\def\urefnobreak#1{\dourefnobreak #1,,,\finish}
\def\dourefnobreak#1,#2,#3,#4\finish{\begingroup
 \unsepspaces
 \pdfurl{#1}%
 \setbox0 = \hbox{\ignorespaces #3}%
 \ifdim\wd0 > 0pt
   \unhbox0 % third arg given, show only that
 \else
   \setbox0 = \hbox{\ignorespaces #2}%
   \ifdim\wd0 > 0pt
     \ifpdf
       \unhbox0            % PDF: 2nd arg given, show only it
     \else
       \unhbox0\ (\code{#1})% DVI: 2nd arg given, show both it and url
     \fi
   \else
     \code{#1}% only url given, so show it
   \fi
 \fi
 \endlink
\endgroup}

% This \urefbreak definition is the active one.
\def\urefbreak{\begingroup \urefcatcodes \dourefbreak}
\let\uref=\urefbreak
\def\dourefbreak#1{\urefbreakfinish #1,,,\finish}
\def\urefbreakfinish#1,#2,#3,#4\finish{% doesn't work in @example
 \unsepspaces
 \pdfurl{#1}%
 \setbox0 = \hbox{\ignorespaces #3}%
 \ifdim\wd0 > 0pt
   \unhbox0 % third arg given, show only that
 \else
```

```
  \setbox0 = \hbox{\ignorespaces #2}%
  \ifdim\wd0 > 0pt
    \ifpdf
      \unhbox0            % PDF: 2nd arg given, show only it
    \else
      \unhbox0\ (\urefcode{#1})% DVI: 2nd arg given, show both it and url
    \fi
  \else
    \urefcode{#1}% only url given, so show it
  \fi
 \fi
 \endlink
\endgroup}

% Allow line breaks around only a few characters (only).
\def\urefcatcodes{%
 \catcode\ampChar=\active   \catcode\dotChar=\active
 \catcode\hashChar=\active  \catcode\questChar=\active
 \catcode\slashChar=\active
}
{
 \urefcatcodes
 %
 \global\def\urefcode{\begingroup
   \setupmarkupstyle{code}%
   \urefcatcodes
   \let&\urefcodeamp
   \let.\urefcodedot
   \let#\urefcodehash
   \let?\urefcodequest
   \let/\urefcodeslash
   \codex
 }
 %
 % By default, they are just regular characters.
 \global\def&{\normalamp}
 \global\def.{\normaldot}
 \global\def#{\normalhash}
 \global\def?{\normalquest}
 \global\def/{\normalslash}
}

% we put a little stretch before and after the breakable chars, to help
% line breaking of long url's.  The unequal skips make look better in
% cmtt at least, especially for dots.
\def\urefprestretch{\urefprebreak \hskip0pt plus.13em }
\def\urefpoststretch{\urefpostbreak \hskip0pt plus.1em }
%
```

```
\def\urefcodeamp{\urefprestretch \&\urefpoststretch}
\def\urefcodedot{\urefprestretch .\urefpoststretch}
\def\urefcodehash{\urefprestretch \#\urefpoststretch}
\def\urefcodequest{\urefprestretch ?\urefpoststretch}
\def\urefcodeslash{\futurelet\next\urefcodeslashfinish}
{
 \catcode`\/=\active
 \global\def\urefcodeslashfinish{%
   \urefprestretch \slashChar
   % Allow line break only after the final / in a sequence of
   % slashes, to avoid line break between the slashes in http://.
   \ifx\next/\else \urefpoststretch \fi
 }
}

% One more complication: by default we'll break after the special
% characters, but some people like to break before the special chars, so
% allow that.  Also allow no breaking at all, for manual control.
%
\parseargdef\urefbreakstyle{%
 \def\txiarg{#1}%
 \ifx\txiarg\wordnone
   \def\urefprebreak{\nobreak}\def\urefpostbreak{\nobreak}
 \else\ifx\txiarg\wordbefore
   \def\urefprebreak{\allowbreak}\def\urefpostbreak{\nobreak}
 \else\ifx\txiarg\wordafter
   \def\urefprebreak{\nobreak}\def\urefpostbreak{\allowbreak}
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @urefbreakstyle setting `\txiarg'}%
 \fi\fi\fi
}
\def\wordafter{after}
\def\wordbefore{before}
\def\wordnone{none}

\urefbreakstyle after

% @url synonym for @uref, since that's how everyone uses it.
%
\let\url=\uref

% rms does not like angle brackets --karl, 17may97.
% So now @email is just like @uref, unless we are pdf.
%
%\def\email#1{\angleleft{\tt #1}\angleright}
\ifpdf
 \def\email#1{\doemail#1,,\finish}
```

```
 \def\doemail#1,#2,#3\finish{\begingroup
   \unsepspaces
   \pdfurl{mailto:#1}%
   \setbox0 = \hbox{\ignorespaces #2}%
   \ifdim\wd0>0pt\unhbox0\else\code{#1}\fi
   \endlink
 \endgroup}
\else
 \let\email=\uref
\fi

% @kbdinputstyle -- arg is `distinct' (@kbd uses slanted tty font always),
%   `example' (@kbd uses ttsl only inside of @example and friends),
%   or `code' (@kbd uses normal tty font always).
\parseargdef\kbdinputstyle{%
 \def\txiarg{#1}%
 \ifx\txiarg\worddistinct
   \gdef\kbdexamplefont{\ttsl}\gdef\kbdfont{\ttsl}%
 \else\ifx\txiarg\wordexample
   \gdef\kbdexamplefont{\ttsl}\gdef\kbdfont{\tt}%
 \else\ifx\txiarg\wordcode
   \gdef\kbdexamplefont{\tt}\gdef\kbdfont{\tt}%
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @kbdinputstyle setting `\txiarg'}%
 \fi\fi\fi
}
\def\worddistinct{distinct}
\def\wordexample{example}
\def\wordcode{code}

% Default is `distinct'.
\kbdinputstyle distinct

% @kbd is like @code, except that if the argument is just one @key command,
% then @kbd has no effect.
\def\kbd#1{{\def\look{#1}\expandafter\kbdsub\look??\par}}

\def\xkey{\key}
\def\kbdsub#1#2#3\par{%
 \def\one{#1}\def\three{#3}\def\threex{??}%
 \ifx\one\xkey\ifx\threex\three \key{#2}%
 \else{\tclose{\kbdfont\setupmarkupstyle{kbd}\look}}\fi
 \else{\tclose{\kbdfont\setupmarkupstyle{kbd}\look}}\fi
}

% definition of @key that produces a lozenge.  Doesn't adjust to text size.
%\setfont\keyrm\rmshape{8}{1000}{OT1}
```

```
%\font\keysy=cmsy9
%\def\key#1{{\keyrm\textfont2=\keysy \leavevmode\hbox{%
%  \raise0.4pt\hbox{\angleleft}\kern-.08em\vtop{%
%    \vbox{\hrule\kern-0.4pt
%     \hbox{\raise0.4pt\hbox{\vphantom{\angleleft}}#1}}%
%    \kern-0.4pt\hrule}%
%  \kern-.06em\raise0.4pt\hbox{\angleright}}}}

% definition of @key with no lozenge.  If the current font is already
% monospace, don't change it; that way, we respect @kbdinputstyle.  But
% if it isn't monospace, then use \tt.
%
\def\key#1{{\setupmarkupstyle{key}%
 \nohyphenation
 \ifmonospace\else\tt\fi
 #1}\null}

% @clicksequence{File @click{} Open ...}
\def\clicksequence#1{\begingroup #1\endgroup}

% @clickstyle @arrow   (by default)
\parseargdef\clickstyle{\def\click{#1}}
\def\click{\arrow}

% Typeset a dimension, e.g., `in' or `pt'.  The only reason for the
% argument is to make the input look right: @dmn{pt} instead of @dmn{}pt.
%
\def\dmn#1{\thinspace #1}

% @l was never documented to mean ``switch to the Lisp font",
% and it is not used as such in any manual I can find.  We need it for
% Polish suppressed-l.  --karl, 22sep96.
%\def\l#1{{\li #1}\null}

% @acronym for "FBI", "NATO", and the like.
% We print this one point size smaller, since it's intended for
% all-uppercase.
%
\def\acronym#1{\doacronym #1,,\finish}
\def\doacronym#1,#2,#3\finish{%
 {\selectfonts\lsize #1}%
 \def\temp{#2}%
 \ifx\temp\empty \else
   \space ({\unsepspaces \ignorespaces \temp \unskip})%
 \fi
 \null % reset \spacefactor=1000
}
```

```
% @abbr for "Comput. J." and the like.
% No font change, but don't do end-of-sentence spacing.
%
\def\abbr#1{\doabbr #1,,\finish}
\def\doabbr#1,#2,#3\finish{%
 {\plainfrenchspacing #1}%
 \def\temp{#2}%
 \ifx\temp\empty \else
   \space ({\unsepspaces \ignorespaces \temp \unskip})%
 \fi
 \null % reset \spacefactor=1000
}

% @asis just yields its argument.  Used with @table, for example.
%
\def\asis#1{#1}

% @math outputs its argument in math mode.
%
% One complication: _ usually means subscripts, but it could also mean
% an actual _ character, as in @math{@var{some_variable} + 1}.  So make
% _ active, and distinguish by seeing if the current family is \slfam,
% which is what @var uses.
{
 \catcode`\_ = \active
 \gdef\mathunderscore{%
   \catcode`\_=\active
   \def_{\ifnum\fam=\slfam \_\else\sb\fi}%
 }
}
% Another complication: we want \\ (and @\) to output a math (or tt) \.
% FYI, plain.tex uses \\ as a temporary control sequence (for no
% particular reason), but this is not advertised and we don't care.
%
% The \mathchar is class=0=ordinary, family=7=ttfam, position=5C=\.
\def\mathbackslash{\ifnum\fam=\ttfam \mathchar"075C \else\backslash \fi}
%
\def\math{%
 \tex
 \mathunderscore
 \let\\ = \mathbackslash
 \mathactive
 % make the texinfo accent commands work in math mode
 \let\"=\ddot
 \let\'=\acute
 \let\==\bar
 \let\^=\hat
 \let\`=\grave
```

```
 \let\u=\breve
 \let\v=\check
 \let\~=\tilde
 \let\dotaccent=\dot
 $\finishmath
}
\def\finishmath#1{#1$\endgroup}  % Close the group opened by \tex.

% Some active characters (such as <) are spaced differently in math.
% We have to reset their definitions in case the @math was an argument
% to a command which sets the catcodes (such as @item or @section).
%
{
 \catcode`^ = \active
 \catcode`< = \active
 \catcode`> = \active
 \catcode`+ = \active
 \catcode`' = \active
 \gdef\mathactive{%
   \let^ = \ptexhat
   \let< = \ptexless
   \let> = \ptexgtr
   \let+ = \ptexplus
   \let' = \ptexquoteright
 }
}

% ctrl is no longer a Texinfo command, but leave this definition for fun.
\def\ctrl #1{{\tt \rawbackslash \hat}#1}

% @inlinefmt{FMTNAME,PROCESSED-TEXT} and @inlineraw{FMTNAME,RAW-TEXT}.
% Ignore unless FMTNAME == tex; then it is like @iftex and @tex,
% except specified as a normal braced arg, so no newlines to worry about.
%
\def\outfmtnametex{tex}
%
\long\def\inlinefmt#1{\doinlinefmt #1,\finish}
\long\def\doinlinefmt#1,#2,\finish{%
 \def\inlinefmtname{#1}%
 \ifx\inlinefmtname\outfmtnametex \ignorespaces #2\fi
}
% For raw, must switch into @tex before parsing the argument, to avoid
% setting catcodes prematurely.  Doing it this way means that, for
% example, @inlineraw{html, foo{bar} gets a parse error instead of being
% ignored.  But this isn't important because if people want a literal
% *right* brace they would have to use a command anyway, so they may as
% well use a command to get a left brace too.  We could re-use the
% delimiter character idea from \verb, but it seems like overkill.
```

```
%
\long\def\inlineraw{\tex \doinlineraw}
\long\def\doinlineraw#1{\doinlinerawtwo #1,\finish}
\def\doinlinerawtwo#1,#2,\finish{%
 \def\inlinerawname{#1}%
 \ifx\inlinerawname\outfmtnametex \ignorespaces #2\fi
 \endgroup % close group opened by \tex.
}


\message{glyphs,}
% and logos.

% @@ prints an @, as does @atchar{}.
\def\@{\char64 }
\let\atchar=\@

% @{ @} @lbracechar{} @rbracechar{} all generate brace characters.
% Unless we're in typewriter, use \ecfont because the CM text fonts do
% not have braces, and we don't want to switch into math.
\def\mylbrace{{\ifmonospace\else\ecfont\fi \char123}}
\def\myrbrace{{\ifmonospace\else\ecfont\fi \char125}}
\let\{=\mylbrace \let\lbracechar=\{
\let\}=\myrbrace \let\rbracechar=\}
\begingroup
 % Definitions to produce \{ and \} commands for indices,
 % and @{ and @} for the aux/toc files.
 \catcode`\{ = \other \catcode`\} = \other
 \catcode`\[ = 1 \catcode`\] = 2
 \catcode`\! = 0 \catcode`\\ = \other
 !gdef!lbracecmd[\{]%
 !gdef!rbracecmd[\}]%
 !gdef!lbraceatcmd[@{]%
 !gdef!rbraceatcmd[@}]%
!endgroup

% @comma{} to avoid , parsing problems.
\let\comma = ,

% Accents: @, @dotaccent @ringaccent @ubaraccent @udotaccent
% Others are defined by plain TeX: @` @' @" @^ @~ @= @u @v @H.
\let\, = \ptexc
\let\dotaccent = \ptexdot
\def\ringaccent#1{{\accent23 #1}}
\let\tieaccent = \ptext
\let\ubaraccent = \ptexb
\let\udotaccent = \d
```

```
% Other special characters: @questiondown @exclamdown @ordf @ordm
% Plain TeX defines: @AA @AE @O @OE @L (plus lowercase versions) @ss.
\def\questiondown{?`}
\def\exclamdown{!`}
\def\ordf{\leavevmode\raise1ex\hbox{\selectfonts\lllsize \underbar{a}}}
\def\ordm{\leavevmode\raise1ex\hbox{\selectfonts\lllsize \underbar{o}}}

% Dotless i and dotless j, used for accents.
\def\imacro{i}
\def\jmacro{j}
\def\dotless#1{%
 \def\temp{#1}%
 \ifx\temp\imacro \ifmmode\imath \else\ptexi \fi
 \else\ifx\temp\jmacro \ifmmode\jmath \else\j \fi
 \else \errmessage{@dotless can be used only with i or j}%
 \fi\fi
}

% The \TeX{} logo, as in plain, but resetting the spacing so that a
% period following counts as ending a sentence.  (Idea found in latex.)
%
\edef\TeX{\TeX \spacefactor=1000 }

% @LaTeX{} logo.  Not quite the same results as the definition in
% latex.ltx, since we use a different font for the raised A; it's most
% convenient for us to use an explicitly smaller font, rather than using
% the \scriptstyle font (since we don't reset \scriptstyle and
% \scriptscriptstyle).
%
\def\LaTeX{%
 L\kern-.36em
 {\setbox0=\hbox{T}%
  \vbox to \ht0{\hbox{%
    \ifx\textnominalsize\xwordpt
      % for 10pt running text, \lllsize (8pt) is too small for the A in LaTeX.
      % Revert to plain's \scriptsize, which is 7pt.
      \count255=\the\fam $\fam\count255 \scriptstyle A$%
    \else
      % For 11pt, we can use our lllsize.
      \selectfonts\lllsize A%
    \fi
    }%
    \vss
 }}%
 \kern-.15em
 \TeX
}
```

```
% Some math mode symbols.
\def\bullet{$\ptexbullet$}
\def\geq{\ifmmode \ge\else $\ge$\fi}
\def\leq{\ifmmode \le\else $\le$\fi}
\def\minus{\ifmmode -\else $-$\fi}

% @dots{} outputs an ellipsis using the current font.
% We do .5em per period so that it has the same spacing in the cm
% typewriter fonts as three actual period characters; on the other hand,
% in other typewriter fonts three periods are wider than 1.5em.  So do
% whichever is larger.
%
\def\dots{%
 \leavevmode
 \setbox0=\hbox{...}% get width of three periods
 \ifdim\wd0 > 1.5em
   \dimen0 = \wd0
 \else
   \dimen0 = 1.5em
 \fi
 \hbox to \dimen0{%
   \hskip 0pt plus.25fil
   .\hskip 0pt plus1fil
   .\hskip 0pt plus1fil
   .\hskip 0pt plus.5fil
 }%
}

% @enddots{} is an end-of-sentence ellipsis.
%
\def\enddots{%
 \dots
 \spacefactor=\endofsentencespacefactor
}

% @point{}, @result{}, @expansion{}, @print{}, @equiv{}.
%
% Since these characters are used in examples, they should be an even number of
% \tt widths. Each \tt character is 1en, so two makes it 1em.
%
\def\point{$\star$}
\def\arrow{\leavevmode\raise.05ex\hbox to 1em{\hfil$\rightarrow$\hfil}}
\def\result{\leavevmode\raise.05ex\hbox to 1em{\hfil$\Rightarrow$\hfil}}
\def\expansion{\leavevmode\hbox to 1em{\hfil$\mapsto$\hfil}}
\def\print{\leavevmode\lower.1ex\hbox to 1em{\hfil$\dashv$\hfil}}
\def\equiv{\leavevmode\hbox to 1em{\hfil$\ptexequiv$\hfil}}

% The @error{} command.
```

```
% Adapted from the TeXbook's \boxit.
%
\newbox\errorbox
%
{\tentt \global\dimen0 = 3em}% Width of the box.
\dimen2 = .55pt % Thickness of rules
% The text. (`r' is open on the right, `e' somewhat less so on the left.)
\setbox0 = \hbox{\kern-.75pt \reducedsf \putworderror\kern-1.5pt}
%
\setbox\errorbox=\hbox to \dimen0{\hfil
  \hsize = \dimen0 \advance\hsize by -5.8pt % Space to left+right.
  \advance\hsize by -2\dimen2 % Rules.
  \vbox{%
    \hrule height\dimen2
    \hbox{\vrule width\dimen2 \kern3pt          % Space to left of text.
      \vtop{\kern2.4pt \box0 \kern2.4pt}% Space above/below.
      \kern3pt\vrule width\dimen2}% Space to right.
    \hrule height\dimen2}
   \hfil}
%
\def\error{\leavevmode\lower.7ex\copy\errorbox}

% @pounds{} is a sterling sign, which Knuth put in the CM italic font.
%
\def\pounds{{\it\$}}

% @euro{} comes from a separate font, depending on the current style.
% We use the free feym* fonts from the eurosym package by Henrik
% Theiling, which support regular, slanted, bold and bold slanted (and
% "outlined" (blackboard board, sort of) versions, which we don't need).
% It is available from http://www.ctan.org/tex-archive/fonts/eurosym.
%
% Although only regular is the truly official Euro symbol, we ignore
% that.  The Euro is designed to be slightly taller than the regular
% font height.
%
% feymr - regular
% feymo - slanted
% feybr - bold
% feybo - bold slanted
%
% There is no good (free) typewriter version, to my knowledge.
% A feymr10 euro is ~7.3pt wide, while a normal cmtt10 char is ~5.25pt wide.
% Hmm.
%
% Also doesn't work in math.  Do we need to do math with euro symbols?
% Hope not.
%
```

```
%
\def\euro{{\eurofont e}}
\def\eurofont{%
 % We set the font at each command, rather than predefining it in
 % \textfonts and the other font-switching commands, so that
 % installations which never need the symbol don't have to have the
 % font installed.
 %
 % There is only one designed size (nominal 10pt), so we always scale
 % that to the current nominal size.
 %
 % By the way, simply using "at 1em" works for cmr10 and the like, but
 % does not work for cmbx10 and other extended/shrunken fonts.
 %
 \def\eurosize{\csname\curfontsize nominalsize\endcsname}%
 %
 \ifx\curfontstyle\bfstylename
   % bold:
   \font\thiseurofont = \ifusingit{feybo10}{feybr10} at \eurosize
 \else
   % regular:
   \font\thiseurofont = \ifusingit{feymo10}{feymr10} at \eurosize
 \fi
 \thiseurofont
}

% Glyphs from the EC fonts.  We don't use \let for the aliases, because
% sometimes we redefine the original macro, and the alias should reflect
% the redefinition.
%
% Use LaTeX names for the Icelandic letters.
\def\DH{{\ecfont \char"D0}} % Eth
\def\dh{{\ecfont \char"F0}} % eth
\def\TH{{\ecfont \char"DE}} % Thorn
\def\th{{\ecfont \char"FE}} % thorn
%
\def\guillemetleft{{\ecfont \char"13}}
\def\guillemotleft{\guillemetleft}
\def\guillemetright{{\ecfont \char"14}}
\def\guillemotright{\guillemetright}
\def\guilsinglleft{{\ecfont \char"0E}}
\def\guilsinglright{{\ecfont \char"0F}}
\def\quotedblbase{{\ecfont \char"12}}
\def\quotesinglbase{{\ecfont \char"0D}}
%
% This positioning is not perfect (see the ogonek LaTeX package), but
% we have the precomposed glyphs for the most common cases.  We put the
% tests to use those glyphs in the single \ogonek macro so we have fewer
```

```
% dummy definitions to worry about for index entries, etc.
%
% ogonek is also used with other letters in Lithuanian (IOU), but using
% the precomposed glyphs for those is not so easy since they aren't in
% the same EC font.
\def\ogonek#1{{%
 \def\temp{#1}%
 \ifx\temp\macrocharA\Aogonek
 \else\ifx\temp\macrochara\aogonek
 \else\ifx\temp\macrocharE\Eogonek
 \else\ifx\temp\macrochare\eogonek
 \else
   \ecfont \setbox0=\hbox{#1}%
   \ifdim\ht0=1ex\accent"0C #1%
   \else\ooalign{\unhbox0\crcr\hidewidth\char"0C \hidewidth}%
   \fi
 \fi\fi\fi\fi
 }%
}
\def\Aogonek{{\ecfont \char"81}}\def\macrocharA{A}
\def\aogonek{{\ecfont \char"A1}}\def\macrochara{a}
\def\Eogonek{{\ecfont \char"86}}\def\macrocharE{E}
\def\eogonek{{\ecfont \char"A6}}\def\macrochare{e}
%
% Use the ec* fonts (cm-super in outline format) for non-CM glyphs.
\def\ecfont{%
 % We can't distinguish serif/sans and italic/slanted, but this
 % is used for crude hacks anyway (like adding French and German
 % quotes to documents typeset with CM, where we lose kerning), so
 % hopefully nobody will notice/care.
 \edef\ecsize{\csname\curfontsize ecsize\endcsname}%
 \edef\nominalsize{\csname\curfontsize nominalsize\endcsname}%
 \ifmonospace
   % typewriter:
   \font\thisecfont = ectt\ecsize \space at \nominalsize
 \else
   \ifx\curfontstyle\bfstylename
     % bold:
     \font\thisecfont = ecb\ifusingit{i}{x}\ecsize \space at \nominalsize
   \else
     % regular:
     \font\thisecfont = ec\ifusingit{ti}{rm}\ecsize \space at \nominalsize
   \fi
 \fi
 \thisecfont
}

% @registeredsymbol - R in a circle.  The font for the R should really
```

```
% be smaller yet, but lllsize is the best we can do for now.
% Adapted from the plain.tex definition of \copyright.
%
\def\registeredsymbol{%
 $^{{\ooalign{\hfil\raise.07ex\hbox{\selectfonts\lllsize R}%
            \hfil\crcr\Orb}}%
   }$%
}

% @textdegree - the normal degrees sign.
%
\def\textdegree{$^\circ$}

% Laurent Siebenmann reports \Orb undefined with:
%  Textures 1.7.7 (preloaded format=plain 93.10.14)  (68K)  16 APR 2004 02:38
% so we'll define it if necessary.
%
\ifx\Orb\thisisundefined
\def\Orb{\mathhexbox20D}
\fi

% Quotes.
\chardef\quotedblleft="5C
\chardef\quotedblright=`\"
\chardef\quoteleft=`\`
\chardef\quoteright=`\'


\message{page headings,}

\newskip\titlepagetopglue \titlepagetopglue = 1.5in
\newskip\titlepagebottomglue \titlepagebottomglue = 2pc

% First the title page.  Must do @settitle before @titlepage.
\newif\ifseenauthor
\newif\iffinishedtitlepage

% Do an implicit @contents or @shortcontents after @end titlepage if the
% user says @setcontentsaftertitlepage or @setshortcontentsaftertitlepage.
%
\newif\ifsetcontentsaftertitlepage
\let\setcontentsaftertitlepage = \setcontentsaftertitlepagetrue
\newif\ifsetshortcontentsaftertitlepage
\let\setshortcontentsaftertitlepage = \setshortcontentsaftertitlepagetrue

\parseargdef\shorttitlepage{%
 \begingroup \hbox{}\vskip 1.5in \chaprm \centerline{#1}%
 \endgroup\page\hbox{}\page}
```

```
\envdef\titlepage{%
 % Open one extra group, as we want to close it in the middle of \Etitlepage.
 \begingroup
   \parindent=0pt \textfonts
   % Leave some space at the very top of the page.
   \vglue\titlepagetopglue
   % No rule at page bottom unless we print one at the top with @title.
   \finishedtitlepagetrue
   %
   % Most title ``pages'' are actually two pages long, with space
   % at the top of the second.  We don't want the ragged left on the second.
   \let\oldpage = \page
   \def\page{%
     \iffinishedtitlepage\else
  \finishtitlepage
     \fi
     \let\page = \oldpage
     \page
     \null
   }%
}

\def\Etitlepage{%
   \iffinishedtitlepage\else
 \finishtitlepage
   \fi
   % It is important to do the page break before ending the group,
   % because the headline and footline are only empty inside the group.
   % If we use the new definition of \page, we always get a blank page
   % after the title page, which we certainly don't want.
   \oldpage
 \endgroup
 %
 % Need this before the \...aftertitlepage checks so that if they are
 % in effect the toc pages will come out with page numbers.
 \HEADINGSon
 %
 % If they want short, they certainly want long too.
 \ifsetshortcontentsaftertitlepage
   \shortcontents
   \contents
   \global\let\shortcontents = \relax
   \global\let\contents = \relax
 \fi
 %
 \ifsetcontentsaftertitlepage
   \contents
```

```
   \global\let\contents = \relax
   \global\let\shortcontents = \relax
 \fi
}

\def\finishtitlepage{%
 \vskip4pt \hrule height 2pt width \hsize
 \vskip\titlepagebottomglue
 \finishedtitlepagetrue
}

% Settings used for typesetting titles: no hyphenation, no indentation,
% don't worry much about spacing, ragged right.  This should be used
% inside a \vbox, and fonts need to be set appropriately first.  Because
% it is always used for titles, nothing else, we call \rmisbold.  \par
% should be specified before the end of the \vbox, since a vbox is a group.
%
\def\raggedtitlesettings{%
 \rmisbold
 \hyphenpenalty=10000
 \parindent=0pt
 \tolerance=5000
 \ptexraggedright
}

% Macros to be used within @titlepage:

\let\subtitlerm=\tenrm
\def\subtitlefont{\subtitlerm \normalbaselineskip = 13pt \normalbaselines}

\parseargdef\title{%
 \checkenv\titlepage
 \vbox{\titlefonts \raggedtitlesettings #1\par}%
 % print a rule at the page bottom also.
 \finishedtitlepagefalse
 \vskip4pt \hrule height 4pt width \hsize \vskip4pt
}

\parseargdef\subtitle{%
 \checkenv\titlepage
 {\subtitlefont \rightline{#1}}%
}

% @author should come last, but may come many times.
% It can also be used inside @quotation.
%
\parseargdef\author{%
 \def\temp{\quotation}%
```

```
 \ifx\thisenv\temp
   \def\quotationauthor{#1}% printed in \Equotation.
 \else
   \checkenv\titlepage
   \ifseenauthor\else \vskip 0pt plus 1filll \seenauthortrue \fi
   {\secfonts\rmisbold \leftline{#1}}%
 \fi
}


% Set up page headings and footings.

\let\thispage=\folio

\newtoks\evenheadline    % headline on even pages
\newtoks\oddheadline     % headline on odd pages
\newtoks\evenfootline    % footline on even pages
\newtoks\oddfootline     % footline on odd pages

% Now make TeX use those variables
\headline={{\textfonts\rm \ifodd\pageno \the\oddheadline
                    \else \the\evenheadline \fi}}
\footline={{\textfonts\rm \ifodd\pageno \the\oddfootline
                    \else \the\evenfootline \fi}\HEADINGShook}
\let\HEADINGShook=\relax

% Commands to set those variables.
% For example, this is what  @headings on  does
% @evenheading @thistitle|@thispage|@thischapter
% @oddheading @thischapter|@thispage|@thistitle
% @evenfooting @thisfile||
% @oddfooting ||@thisfile


\def\evenheading{\parsearg\evenheadingxxx}
\def\evenheadingxxx #1{\evenheadingyyy #1\|\|\|\|\finish}
\def\evenheadingyyy #1\|#2\|#3\|#4\finish{%
\global\evenheadline={\rlap{\centerline{#2}}\line{#1\hfil#3}}}

\def\oddheading{\parsearg\oddheadingxxx}
\def\oddheadingxxx #1{\oddheadingyyy #1\|\|\|\|\finish}
\def\oddheadingyyy #1\|#2\|#3\|#4\finish{%
\global\oddheadline={\rlap{\centerline{#2}}\line{#1\hfil#3}}}

\parseargdef\everyheading{\oddheadingxxx{#1}\evenheadingxxx{#1}}%

\def\evenfooting{\parsearg\evenfootingxxx}
\def\evenfootingxxx #1{\evenfootingyyy #1\|\|\|\|\finish}
```

```
\def\evenfootingyyy #1\|#2\|#3\|#4\finish{%
\global\evenfootline={\rlap{\centerline{#2}}\line{#1\hfil#3}}}

\def\oddfooting{\parsearg\oddfootingxxx}
\def\oddfootingxxx #1{\oddfootingyyy #1\|\|\|\|\finish}
\def\oddfootingyyy #1\|#2\|#3\|#4\finish{%
 \global\oddfootline = {\rlap{\centerline{#2}}\line{#1\hfil#3}}%
 %
 % Leave some space for the footline.  Hopefully ok to assume
 % @evenfooting will not be used by itself.
 \global\advance\pageheight by -12pt
 \global\advance\vsize by -12pt
}

\parseargdef\everyfooting{\oddfootingxxx{#1}\evenfootingxxx{#1}}

% @evenheadingmarks top     \thischapter <- chapter at the top of a page
% @evenheadingmarks bottom  \thischapter <- chapter at the bottom of a page
%
% The same set of arguments for:
%
% @oddheadingmarks
% @evenfootingmarks
% @oddfootingmarks
% @everyheadingmarks
% @everyfootingmarks

\def\evenheadingmarks{\headingmarks{even}{heading}}
\def\oddheadingmarks{\headingmarks{odd}{heading}}
\def\evenfootingmarks{\headingmarks{even}{footing}}
\def\oddfootingmarks{\headingmarks{odd}{footing}}
\def\everyheadingmarks#1 {\headingmarks{even}{heading}{#1}
                    \headingmarks{odd}{heading}{#1} }
\def\everyfootingmarks#1 {\headingmarks{even}{footing}{#1}
                    \headingmarks{odd}{footing}{#1} }
% #1 = even/odd, #2 = heading/footing, #3 = top/bottom.
\def\headingmarks#1#2#3 {%
 \expandafter\let\expandafter\temp \csname get#3headingmarks\endcsname
 \global\expandafter\let\csname get#1#2marks\endcsname \temp
}

\everyheadingmarks bottom
\everyfootingmarks bottom

% @headings double      turns headings on for double-sided printing.
% @headings single      turns headings on for single-sided printing.
% @headings off         turns them off.
% @headings on          same as @headings double, retained for compatibility.
```

```
% @headings after       turns on double-sided headings after this page.
% @headings doubleafter turns on double-sided headings after this page.
% @headings singleafter turns on single-sided headings after this page.
% By default, they are off at the start of a document,
% and turned `on' after @end titlepage.

\def\headings #1 {\csname HEADINGS#1\endcsname}

\def\headingsoff{% non-global headings elimination
 \evenheadline={\hfil}\evenfootline={\hfil}%
  \oddheadline={\hfil}\oddfootline={\hfil}%
}

\def\HEADINGSoff{{\globaldefs=1 \headingsoff}} % global setting
\HEADINGSoff  % it's the default

% When we turn headings on, set the page number to 1.
% For double-sided printing, put current file name in lower left corner,
% chapter name on inside top of right hand pages, document
% title on inside top of left hand pages, and page numbers on outside top
% edge of all pages.
\def\HEADINGSdouble{%
\global\pageno=1
\global\evenfootline={\hfil}
\global\oddfootline={\hfil}
\global\evenheadline={\line{\folio\hfil\thistitle}}
\global\oddheadline={\line{\thischapter\hfil\folio}}
\global\let\contentsalignmacro = \chapoddpage
}
\let\contentsalignmacro = \chappager

% For single-sided printing, chapter title goes across top left of page,
% page number on top right.
\def\HEADINGSsingle{%
\global\pageno=1
\global\evenfootline={\hfil}
\global\oddfootline={\hfil}
\global\evenheadline={\line{\thischapter\hfil\folio}}
\global\oddheadline={\line{\thischapter\hfil\folio}}
\global\let\contentsalignmacro = \chappager
}
\def\HEADINGSon{\HEADINGSdouble}

\def\HEADINGSafter{\let\HEADINGShook=\HEADINGSdoublex}
\let\HEADINGSdoubleafter=\HEADINGSafter
\def\HEADINGSdoublex{%
\global\evenfootline={\hfil}
\global\oddfootline={\hfil}
```

```
\global\evenheadline={\line{\folio\hfil\thistitle}}
\global\oddheadline={\line{\thischapter\hfil\folio}}
\global\let\contentsalignmacro = \chapoddpage
}

\def\HEADINGSsingleafter{\let\HEADINGShook=\HEADINGSsinglex}
\def\HEADINGSsinglex{%
\global\evenfootline={\hfil}
\global\oddfootline={\hfil}
\global\evenheadline={\line{\thischapter\hfil\folio}}
\global\oddheadline={\line{\thischapter\hfil\folio}}
\global\let\contentsalignmacro = \chappager
}

% Subroutines used in generating headings
% This produces Day Month Year style of output.
% Only define if not already defined, in case a txi-??.tex file has set
% up a different format (e.g., txi-cs.tex does this).
\ifx\today\thisisundefined
\def\today{%
 \number\day\space
 \ifcase\month
 \or\putwordMJan\or\putwordMFeb\or\putwordMMar\or\putwordMApr
 \or\putwordMMay\or\putwordMJun\or\putwordMJul\or\putwordMAug
 \or\putwordMSep\or\putwordMOct\or\putwordMNov\or\putwordMDec
 \fi
 \space\number\year}
\fi

% @settitle line...  specifies the title of the document, for headings.
% It generates no output of its own.
\def\thistitle{\putwordNoTitle}
\def\settitle{\parsearg{\gdef\thistitle}}


\message{tables,}
% Tables -- @table, @ftable, @vtable, @item(x).

% default indentation of table text
\newdimen\tableindent \tableindent=.8in
% default indentation of @itemize and @enumerate text
\newdimen\itemindent  \itemindent=.3in
% margin between end of table item and start of table text.
\newdimen\itemmargin  \itemmargin=.1in

% used internally for \itemindent minus \itemmargin
\newdimen\itemmax
```

```
% Note @table, @ftable, and @vtable define @item, @itemx, etc., with
% these defs.
% They also define \itemindex
% to index the item name in whatever manner is desired (perhaps none).

\newif\ifitemxneedsnegativevskip

\def\itemxpar{\par\ifitemxneedsnegativevskip\nobreak\vskip-\parskip\nobreak\fi}

\def\internalBitem{\smallbreak \parsearg\itemzzz}
\def\internalBitemx{\itemxpar \parsearg\itemzzz}

\def\itemzzz #1{\begingroup %
 \advance\hsize by -\rightskip
 \advance\hsize by -\tableindent
 \setbox0=\hbox{\itemindicate{#1}}%
 \itemindex{#1}%
 \nobreak % This prevents a break before @itemx.
 %
 % If the item text does not fit in the space we have, put it on a line
 % by itself, and do not allow a page break either before or after that
 % line.  We do not start a paragraph here because then if the next
 % command is, e.g., @kindex, the whatsit would get put into the
 % horizontal list on a line by itself, resulting in extra blank space.
 \ifdim \wd0>\itemmax
   %
   % Make this a paragraph so we get the \parskip glue and wrapping,
   % but leave it ragged-right.
   \begingroup
     \advance\leftskip by-\tableindent
     \advance\hsize by\tableindent
     \advance\rightskip by0pt plus1fil\relax
     \leavevmode\unhbox0\par
   \endgroup
   %
   % We're going to be starting a paragraph, but we don't want the
   % \parskip glue -- logically it's part of the @item we just started.
   \nobreak \vskip-\parskip
   %
   % Stop a page break at the \parskip glue coming up.  However, if
   % what follows is an environment such as @example, there will be no
   % \parskip glue; then the negative vskip we just inserted would
   % cause the example and the item to crash together.  So we use this
   % bizarre value of 10001 as a signal to \aboveenvbreak to insert
   % \parskip glue after all.  Section titles are handled this way also.
   %
   \penalty 10001
   \endgroup
```

```
   \itemxneedsnegativevskipfalse
 \else
   % The item text fits into the space.  Start a paragraph, so that the
   % following text (if any) will end up on the same line.
   \noindent
   % Do this with kerns and \unhbox so that if there is a footnote in
   % the item text, it can migrate to the main vertical list and
   % eventually be printed.
   \nobreak\kern-\tableindent
   \dimen0 = \itemmax  \advance\dimen0 by \itemmargin \advance\dimen0 by -\wd0
   \unhbox0
   \nobreak\kern\dimen0
   \endgroup
   \itemxneedsnegativevskiptrue
 \fi
}

\def\item{\errmessage{@item while not in a list environment}}
\def\itemx{\errmessage{@itemx while not in a list environment}}

% @table, @ftable, @vtable.
\envdef\table{%
 \let\itemindex\gobble
 \tablecheck{table}%
}
\envdef\ftable{%
 \def\itemindex ##1{\doind {fn}{\code{##1}}}%
 \tablecheck{ftable}%
}
\envdef\vtable{%
 \def\itemindex ##1{\doind {vr}{\code{##1}}}%
 \tablecheck{vtable}%
}
\def\tablecheck#1{%
 \ifnum \the\catcode`\^^M=\active
   \endgroup
   \errmessage{This command won't work in this context; perhaps the problem is
     that we are \inenvironment\thisenv}%
   \def\next{\doignore{#1}}%
 \else
   \let\next\tablex
 \fi
 \next
}
\def\tablex#1{%
 \def\itemindicate{#1}%
 \parsearg\tabley
}
```

```
\def\tabley#1{%
 {%
   \makevalueexpandable
   \edef\temp{\noexpand\tablez #1\space\space\space}%
   \expandafter
 }\temp \endtablez
}
\def\tablez #1 #2 #3 #4\endtablez{%
 \aboveenvbreak
 \ifnum 0#1>0 \advance \leftskip by #1\mil \fi
 \ifnum 0#2>0 \tableindent=#2\mil \fi
 \ifnum 0#3>0 \advance \rightskip by #3\mil \fi
 \itemmax=\tableindent
 \advance \itemmax by -\itemmargin
 \advance \leftskip by \tableindent
 \exdentamount=\tableindent
 \parindent = 0pt
 \parskip = \smallskipamount
 \ifdim \parskip=0pt \parskip=2pt \fi
 \let\item = \internalBitem
 \let\itemx = \internalBitemx
}
\def\Etable{\endgraf\afterenvbreak}
\let\Eftable\Etable
\let\Evtable\Etable
\let\Eitemize\Etable
\let\Eenumerate\Etable

% This is the counter used by @enumerate, which is really @itemize

\newcount \itemno

\envdef\itemize{\parsearg\doitemize}

\def\doitemize#1{%
 \aboveenvbreak
 \itemmax=\itemindent
 \advance\itemmax by -\itemmargin
 \advance\leftskip by \itemindent
 \exdentamount=\itemindent
 \parindent=0pt
 \parskip=\smallskipamount
 \ifdim\parskip=0pt \parskip=2pt \fi
 %
 % Try typesetting the item mark that if the document erroneously says
 % something like @itemize @samp (intending @table), there's an error
 % right away at the @itemize.  It's not the best error message in the
 % world, but it's better than leaving it to the @item.  This means if
```

```
 % the user wants an empty mark, they have to say @w{} not just @w.
 \def\itemcontents{#1}%
 \setbox0 = \hbox{\itemcontents}%
 %
 % @itemize with no arg is equivalent to @itemize @bullet.
 \ifx\itemcontents\empty\def\itemcontents{\bullet}\fi
 %
 \let\item=\itemizeitem
}

% Definition of @item while inside @itemize and @enumerate.
%
\def\itemizeitem{%
 \advance\itemno by 1  % for enumerations
 {\let\par=\endgraf \smallbreak}% reasonable place to break
 {%
  % If the document has an @itemize directly after a section title, a
  % \nobreak will be last on the list, and \sectionheading will have
  % done a \vskip-\parskip.  In that case, we don't want to zero
  % parskip, or the item text will crash with the heading.  On the
  % other hand, when there is normal text preceding the item (as there
  % usually is), we do want to zero parskip, or there would be too much
  % space.  In that case, we won't have a \nobreak before.  At least
  % that's the theory.
  \ifnum\lastpenalty<10000 \parskip=0in \fi
  \noindent
  \hbox to 0pt{\hss \itemcontents \kern\itemmargin}%
  %
  \vadjust{\penalty 1200}}% not good to break after first line of item.
 \flushcr
}

% \splitoff TOKENS\endmark defines \first to be the first token in
% TOKENS, and \rest to be the remainder.
%
\def\splitoff#1#2\endmark{\def\first{#1}\def\rest{#2}}%

% Allow an optional argument of an uppercase letter, lowercase letter,
% or number, to specify the first label in the enumerated list.  No
% argument is the same as `1'.
%
\envparseargdef\enumerate{\enumeratey #1  \endenumeratey}
\def\enumeratey #1 #2\endenumeratey{%
 % If we were given no argument, pretend we were given `1'.
 \def\thearg{#1}%
 \ifx\thearg\empty \def\thearg{1}\fi
 %
 % Detect if the argument is a single token.  If so, it might be a
```

```
% letter.  Otherwise, the only valid thing it can be is a number.
% (We will always have one token, because of the test we just made.
% This is a good thing, since \splitoff doesn't work given nothing at
% all -- the first parameter is undelimited.)
\expandafter\splitoff\thearg\endmark
\ifx\rest\empty
  % Only one token in the argument.  It could still be anything.
  % A ``lowercase letter'' is one whose \lccode is nonzero.
  % An ``uppercase letter'' is one whose \lccode is both nonzero, and
  %   not equal to itself.
  % Otherwise, we assume it's a number.
  %
  % We need the \relax at the end of the \ifnum lines to stop TeX from
  % continuing to look for a <number>.
  %
  \ifnum\lccode\expandafter`\thearg=0\relax
    \numericenumerate % a number (we hope)
  \else
    % It's a letter.
    \ifnum\lccode\expandafter`\thearg=\expandafter`\thearg\relax
      \lowercaseenumerate % lowercase letter
    \else
      \uppercaseenumerate % uppercase letter
    \fi
  \fi
\else
  % Multiple tokens in the argument.  We hope it's a number.
  \numericenumerate
\fi
}

% An @enumerate whose labels are integers.  The starting integer is
% given in \thearg.
%
\def\numericenumerate{%
 \itemno = \thearg
 \startenumeration{\the\itemno}%
}

% The starting (lowercase) letter is in \thearg.
\def\lowercaseenumerate{%
 \itemno = \expandafter`\thearg
 \startenumeration{%
  % Be sure we're not beyond the end of the alphabet.
  \ifnum\itemno=0
    \errmessage{No more lowercase letters in @enumerate; get a bigger
                alphabet}%
  \fi
```

```
   \char\lccode\itemno
 }%
}

% The starting (uppercase) letter is in \thearg.
\def\uppercaseenumerate{%
 \itemno = \expandafter`\thearg
 \startenumeration{%
   % Be sure we're not beyond the end of the alphabet.
   \ifnum\itemno=0
     \errmessage{No more uppercase letters in @enumerate; get a bigger
                 alphabet}
   \fi
   \char\uccode\itemno
 }%
}

% Call \doitemize, adding a period to the first argument and supplying the
% common last two arguments.  Also subtract one from the initial value in
% \itemno, since @item increments \itemno.
%
\def\startenumeration#1{%
 \advance\itemno by -1
 \doitemize{#1.}\flushcr
}

% @alphaenumerate and @capsenumerate are abbreviations for giving an arg
% to @enumerate.
%
\def\alphaenumerate{\enumerate{a}}
\def\capsenumerate{\enumerate{A}}
\def\Ealphaenumerate{\Eenumerate}
\def\Ecapsenumerate{\Eenumerate}


% @multitable macros
% Amy Hendrickson, 8/18/94, 3/6/96
%
% @multitable ... @end multitable will make as many columns as desired.
% Contents of each column will wrap at width given in preamble.  Width
% can be specified either with sample text given in a template line,
% or in percent of \hsize, the current width of text on page.

% Table can continue over pages but will only break between lines.

% To make preamble:
%
% Either define widths of columns in terms of percent of \hsize:
```

```
%   @multitable @columnfractions .25 .3 .45
%   @item ...
%
%   Numbers following @columnfractions are the percent of the total
%   current hsize to be used for each column. You may use as many
%   columns as desired.


% Or use a template:
%   @multitable {Column 1 template} {Column 2 template} {Column 3 template}
%   @item ...
%   using the widest term desired in each column.

% Each new table line starts with @item, each subsequent new column
% starts with @tab. Empty columns may be produced by supplying @tab's
% with nothing between them for as many times as empty columns are needed,
% ie, @tab@tab@tab will produce two empty columns.

% @item, @tab do not need to be on their own lines, but it will not hurt
% if they are.

% Sample multitable:

%   @multitable {Column 1 template} {Column 2 template} {Column 3 template}
%   @item first col stuff @tab second col stuff @tab third col
%   @item
%   first col stuff
%   @tab
%   second col stuff
%   @tab
%   third col
%   @item first col stuff @tab second col stuff
%   @tab Many paragraphs of text may be used in any column.
%
%       They will wrap at the width determined by the template.
%   @item@tab@tab This will be in third column.
%   @end multitable

% Default dimensions may be reset by user.
% @multitableparskip is vertical space between paragraphs in table.
% @multitableparindent is paragraph indent in table.
% @multitablecolmargin is horizontal space to be left between columns.
% @multitablelinespace is space to leave between table items, baseline
%                                         to baseline.
%   0pt means it depends on current normal line spacing.
%
\newskip\multitableparskip
\newskip\multitableparindent
```

```
\newdimen\multitablecolspace
\newskip\multitablelinespace
\multitableparskip=0pt
\multitableparindent=6pt
\multitablecolspace=12pt
\multitablelinespace=0pt

% Macros used to set up halign preamble:
%
\let\endsetuptable\relax
\def\xendsetuptable{\endsetuptable}
\let\columnfractions\relax
\def\xcolumnfractions{\columnfractions}
\newif\ifsetpercent

% #1 is the @columnfraction, usually a decimal number like .5, but might
% be just 1.  We just use it, whatever it is.
%
\def\pickupwholefraction#1 {%
 \global\advance\colcount by 1
 \expandafter\xdef\csname col\the\colcount\endcsname{#1\hsize}%
 \setuptable
}

\newcount\colcount
\def\setuptable#1{%
 \def\firstarg{#1}%
 \ifx\firstarg\xendsetuptable
   \let\go = \relax
 \else
   \ifx\firstarg\xcolumnfractions
     \global\setpercenttrue
   \else
     \ifsetpercent
       \let\go\pickupwholefraction
     \else
       \global\advance\colcount by 1
       \setbox0=\hbox{#1\unskip\space}% Add a normal word space as a
               % separator; typically that is always in the input, anyway.
       \expandafter\xdef\csname col\the\colcount\endcsname{\the\wd0}%
     \fi
   \fi
   \ifx\go\pickupwholefraction
     % Put the argument back for the \pickupwholefraction call, so
     % we'll always have a period there to be parsed.
     \def\go{\pickupwholefraction#1}%
   \else
     \let\go = \setuptable
```

```
  \fi%
 \fi
 \go
}

% multitable-only commands.
%
% @headitem starts a heading row, which we typeset in bold.
% Assignments have to be global since we are inside the implicit group
% of an alignment entry.  \everycr resets \everytab so we don't have to
% undo it ourselves.
\def\headitemfont{\b}% for people to use in the template row; not changeable
\def\headitem{%
 \checkenv\multitable
 \crcr
 \global\everytab={\bf}% can't use \headitemfont since the parsing differs
 \the\everytab % for the first item
}%
%
% A \tab used to include \hskip1sp.  But then the space in a template
% line is not enough.  That is bad.  So let's go back to just `&' until
% we again encounter the problem the 1sp was intended to solve.
%     --karl, nathan@acm.org, 20apr99.
\def\tab{\checkenv\multitable &\the\everytab}%

% @multitable ... @end multitable definitions:
%
\newtoks\everytab  % insert after every tab.
%
\envdef\multitable{%
 \vskip\parskip
 \startsavinginserts
 %
 % @item within a multitable starts a normal row.
 % We use \def instead of \let so that if one of the multitable entries
 % contains an @itemize, we don't choke on the \item (seen as \crcr aka
 % \endtemplate) expanding \doitemize.
 \def\item{\crcr}%
 %
 \tolerance=9500
 \hbadness=9500
 \setmultitablespacing
 \parskip=\multitableparskip
 \parindent=\multitableparindent
 \overfullrule=0pt
 \global\colcount=0
 %
 \everycr = {%
```

```
  \noalign{%
    \global\everytab={}%
    \global\colcount=0 % Reset the column counter.
    % Check for saved footnotes, etc.
    \checkinserts
    % Keeps underfull box messages off when table breaks over pages.
    %\filbreak
 % Maybe so, but it also creates really weird page breaks when the
 % table breaks over pages. Wouldn't \vfil be better?  Wait until the
 % problem manifests itself, so it can be fixed for real --karl.
  }%
 }%
 %
 \parsearg\domultitable
}
\def\domultitable#1{%
 % To parse everything between @multitable and @item:
 \setuptable#1 \endsetuptable
 %
 % This preamble sets up a generic column definition, which will
 % be used as many times as user calls for columns.
 % \vtop will set a single line and will also let text wrap and
 % continue for many paragraphs if desired.
 \halign\bgroup &%
  \global\advance\colcount by 1
  \multistrut
  \vtop{%
    % Use the current \colcount to find the correct column width:
    \hsize=\expandafter\csname col\the\colcount\endcsname
    %
    % In order to keep entries from bumping into each other
    % we will add a \leftskip of \multitablecolspace to all columns after
    % the first one.
    %
    % If a template has been used, we will add \multitablecolspace
    % to the width of each template entry.
    %
    % If the user has set preamble in terms of percent of \hsize we will
    % use that dimension as the width of the column, and the \leftskip
    % will keep entries from bumping into each other.  Table will start at
    % left margin and final column will justify at right margin.
    %
    % Make sure we don't inherit \rightskip from the outer environment.
    \rightskip=0pt
    \ifnum\colcount=1
 % The first column will be indented with the surrounding text.
 \advance\hsize by\leftskip
    \else
```

```
 \ifsetpercent \else
   % If user has not set preamble in terms of percent of \hsize
   % we will advance \hsize by \multitablecolspace.
   \advance\hsize by \multitablecolspace
 \fi
      % In either case we will make \leftskip=\multitablecolspace:
    \leftskip=\multitablecolspace
    \fi
    % Ignoring space at the beginning and end avoids an occasional spurious
    % blank line, when TeX decides to break the line at the space before the
    % box from the multistrut, so the strut ends up on a line by itself.
    % For example:
    % @multitable @columnfractions .11 .89
    % @item @code{#}
    % @tab Legal holiday which is valid in major parts of the whole country.
    % Is automatically provided with highlighting sequences respectively
    % marking characters.
    \noindent\ignorespaces##\unskip\multistrut
   }\cr
}
\def\Emultitable{%
 \crcr
 \egroup % end the \halign
 \global\setpercentfalse
}

\def\setmultitablespacing{%
 \def\multistrut{\strut}% just use the standard line spacing
 %
 % Compute \multitablelinespace (if not defined by user) for use in
 % \multitableparskip calculation.  We used define \multistrut based on
 % this, but (ironically) that caused the spacing to be off.
 % See bug-texinfo report from Werner Lemberg, 31 Oct 2004 12:52:20 +0100.
\ifdim\multitablelinespace=0pt
\setbox0=\vbox{X}\global\multitablelinespace=\the\baselineskip
\global\advance\multitablelinespace by-\ht0
\fi
% Test to see if parskip is larger than space between lines of
% table. If not, do nothing.
%       If so, set to same dimension as multitablelinespace.
\ifdim\multitableparskip>\multitablelinespace
\global\multitableparskip=\multitablelinespace
\global\advance\multitableparskip-7pt % to keep parskip somewhat smaller
                                      % than skip between lines in the table.
\fi%
\ifdim\multitableparskip=0pt
\global\multitableparskip=\multitablelinespace
\global\advance\multitableparskip-7pt % to keep parskip somewhat smaller
```

```
                                % than skip between lines in the table.
\fi}


\message{conditionals,}

% @iftex, @ifnotdocbook, @ifnothtml, @ifnotinfo, @ifnotplaintext,
% @ifnotxml always succeed.  They currently do nothing; we don't
% attempt to check whether the conditionals are properly nested.  But we
% have to remember that they are conditionals, so that @end doesn't
% attempt to close an environment group.
%
\def\makecond#1{%
 \expandafter\let\csname #1\endcsname = \relax
 \expandafter\let\csname iscond.#1\endcsname = 1
}
\makecond{iftex}
\makecond{ifnotdocbook}
\makecond{ifnothtml}
\makecond{ifnotinfo}
\makecond{ifnotplaintext}
\makecond{ifnotxml}

% Ignore @ignore, @ifhtml, @ifinfo, and the like.
%
\def\direntry{\doignore{direntry}}
\def\documentdescription{\doignore{documentdescription}}
\def\docbook{\doignore{docbook}}
\def\html{\doignore{html}}
\def\ifdocbook{\doignore{ifdocbook}}
\def\ifhtml{\doignore{ifhtml}}
\def\ifinfo{\doignore{ifinfo}}
\def\ifnottex{\doignore{ifnottex}}
\def\ifplaintext{\doignore{ifplaintext}}
\def\ifxml{\doignore{ifxml}}
\def\ignore{\doignore{ignore}}
\def\menu{\doignore{menu}}
\def\xml{\doignore{xml}}

% Ignore text until a line `@end #1', keeping track of nested conditionals.
%
% A count to remember the depth of nesting.
\newcount\doignorecount

\def\doignore#1{\begingroup
 % Scan in ``verbatim" mode:
 \obeylines
 \catcode`\@ = \other
```

```
 \catcode`\{ = \other
 \catcode`\} = \other
 %
 % Make sure that spaces turn into tokens that match what \doignoretext wants.
 \spaceisspace
 %
 % Count number of #1's that we've seen.
 \doignorecount = 0
 %
 % Swallow text until we reach the matching `@end #1'.
 \dodoignore{#1}%
}

{ \catcode`_=11 % We want to use \_STOP_ which cannot appear in texinfo source.
 \obeylines %
 %
 \gdef\dodoignore#1{%
   % #1 contains the command name as a string, e.g., `ifinfo'.
   %
   % Define a command to find the next `@end #1'.
   \long\def\doignoretext##1^^M@end #1{%
     \doignoretextyyy##1^^M@#1\_STOP_}%
   %
   % And this command to find another #1 command, at the beginning of a
   % line.  (Otherwise, we would consider a line `@c @ifset', for
   % example, to count as an @ifset for nesting.)
   \long\def\doignoretextyyy##1^^M@#1##2\_STOP_{\doignoreyyy{##2}\_STOP_}%
   %
   % And now expand that command.
   \doignoretext ^^M%
 }%
}

\def\doignoreyyy#1{%
 \def\temp{#1}%
 \ifx\temp\empty   % Nothing found.
   \let\next\doignoretextzzz
 \else     % Found a nested condition, ...
   \advance\doignorecount by 1
   \let\next\doignoretextyyy  % ..., look for another.
   % If we're here, #1 ends with ^^M\ifinfo (for example).
 \fi
 \next #1% the token \_STOP_ is present just after this macro.
}

% We have to swallow the remaining "\_STOP_".
%
\def\doignoretextzzz#1{%
```

```
 \ifnum\doignorecount = 0 % We have just found the outermost @end.
   \let\next\enddoignore
 \else    % Still inside a nested condition.
   \advance\doignorecount by -1
   \let\next\doignoretext      % Look for the next @end.
 \fi
 \next
}

% Finish off ignored text.
{ \obeylines%
 % Ignore anything after the last `@end #1'; this matters in verbatim
 % environments, where otherwise the newline after an ignored conditional
 % would result in a blank line in the output.
 \gdef\enddoignore#1^^M{\endgroup\ignorespaces}%
}


% @set VAR sets the variable VAR to an empty value.
% @set VAR REST-OF-LINE sets VAR to the value REST-OF-LINE.
%
% Since we want to separate VAR from REST-OF-LINE (which might be
% empty), we can't just use \parsearg; we have to insert a space of our
% own to delimit the rest of the line, and then take it out again if we
% didn't need it.
% We rely on the fact that \parsearg sets \catcode`\ =10.
%
\parseargdef\set{\setyyy#1 \endsetyyy}
\def\setyyy#1 #2\endsetyyy{%
 {%
   \makevalueexpandable
   \def\temp{#2}%
   \edef\next{\gdef\makecsname{SET#1}}%
   \ifx\temp\empty
     \next{}%
   \else
     \setzzz#2\endsetzzz
   \fi
 }%
}
% Remove the trailing space \setxxx inserted.
\def\setzzz#1 \endsetzzz{\next{#1}}

% @clear VAR clears (i.e., unsets) the variable VAR.
%
\parseargdef\clear{%
 {%
   \makevalueexpandable
```

```
  \global\expandafter\let\csname SET#1\endcsname=\relax
 }%
}

% @value{foo} gets the text saved in variable foo.
\def\value{\begingroup\makevalueexpandable\valuexxx}
\def\valuexxx#1{\expandablevalue{#1}\endgroup}
{
 \catcode`\- = \active \catcode`\_ = \active
 %
 \gdef\makevalueexpandable{%
  \let\value = \expandablevalue
  % We don't want these characters active, ...
  \catcode`\-=\other \catcode`\_=\other
  % ..., but we might end up with active ones in the argument if
  % we're called from @code, as @code{@value{foo-bar_}}, though.
  % So \let them to their normal equivalents.
  \let-\normaldash \let_\normalunderscore
 }
}

% We have this subroutine so that we can handle at least some @value's
% properly in indexes (we call \makevalueexpandable in \indexdummies).
% The command has to be fully expandable (if the variable is set), since
% the result winds up in the index file.  This means that if the
% variable's value contains other Texinfo commands, it's almost certain
% it will fail (although perhaps we could fix that with sufficient work
% to do a one-level expansion on the result, instead of complete).
%
\def\expandablevalue#1{%
 \expandafter\ifx\csname SET#1\endcsname\relax
  {[No value for ``#1'']}%
  \message{Variable `#1', used in @value, is not set.}%
 \else
  \csname SET#1\endcsname
 \fi
}

% @ifset VAR ... @end ifset reads the `...' iff VAR has been defined
% with @set.
%
% To get special treatment of `@end ifset,' call \makeond and the redefine.
%
\makecond{ifset}
\def\ifset{\parsearg{\doifset{\let\next=\ifsetfail}}}
\def\doifset#1#2{%
 {%
  \makevalueexpandable
```

```
  \let\next=\empty
  \expandafter\ifx\csname SET#2\endcsname\relax
    #1% If not set, redefine \next.
  \fi
  \expandafter
 }\next
}
\def\ifsetfail{\doignore{ifset}}

% @ifclear VAR ... @end executes the `...' iff VAR has never been
% defined with @set, or has been undefined with @clear.
%
% The `\else' inside the `\doifset' parameter is a trick to reuse the
% above code: if the variable is not set, do nothing, if it is set,
% then redefine \next to \ifclearfail.
%
\makecond{ifclear}
\def\ifclear{\parsearg{\doifset{\else \let\next=\ifclearfail}}}
\def\ifclearfail{\doignore{ifclear}}

% @ifcommandisdefined CMD ... @end executes the `...' if CMD (written
% without the @) is in fact defined.  We can only feasibly check at the
% TeX level, so something like `mathcode' is going to considered
% defined even though it is not a Texinfo command.
%
\makecond{ifcommanddefined}
\def\ifcommanddefined{\parsearg{\doifcmddefined{\let\next=\ifcmddefinedfail}}}
%
\def\doifcmddefined#1#2{{%
  \makevalueexpandable
  \let\next=\empty
  \expandafter\ifx\csname #2\endcsname\relax
    #1% If not defined, \let\next as above.
  \fi
  \expandafter
 }\next
}
\def\ifcmddefinedfail{\doignore{ifcommanddefined}}

% @ifcommandnotdefined CMD ... handled similar to @ifclear above.
\makecond{ifcommandnotdefined}
\def\ifcommandnotdefined{%
 \parsearg{\doifcmddefined{\else \let\next=\ifcmdnotdefinedfail}}}
\def\ifcmdnotdefinedfail{\doignore{ifcommandnotdefined}}

% Set the `txicommandconditionals' variable, so documents have a way to
% test if the @ifcommand...defined conditionals are available.
\set txicommandconditionals
```

```
% @dircategory CATEGORY  -- specify a category of the dir file
% which this file should belong to.  Ignore this in TeX.
\let\dircategory=\comment

% @defininfoenclose.
\let\definfoenclose=\comment


\message{indexing,}
% Index generation facilities

% Define \newwrite to be identical to plain tex's \newwrite
% except not \outer, so it can be used within macros and \if's.
\edef\newwrite{\makecsname{ptexnewwrite}}

% \newindex {foo} defines an index named foo.
% It automatically defines \fooindex such that
% \fooindex ...rest of line... puts an entry in the index foo.
% It also defines \fooindfile to be the number of the output channel for
% the file that accumulates this index.  The file's extension is foo.
% The name of an index should be no more than 2 characters long
% for the sake of vms.
%
\def\newindex#1{%
 \iflinks
   \expandafter\newwrite \csname#1indfile\endcsname
   \openout \csname#1indfile\endcsname \jobname.#1 % Open the file
 \fi
 \expandafter\xdef\csname#1index\endcsname{%     % Define @#1index
   \noexpand\doindex{#1}}
}

% @defindex foo  ==  \newindex{foo}
%
\def\defindex{\parsearg\newindex}

% Define @defcodeindex, like @defindex except put all entries in @code.
%
\def\defcodeindex{\parsearg\newcodeindex}
%
\def\newcodeindex#1{%
 \iflinks
   \expandafter\newwrite \csname#1indfile\endcsname
   \openout \csname#1indfile\endcsname \jobname.#1
 \fi
 \expandafter\xdef\csname#1index\endcsname{%
   \noexpand\docodeindex{#1}}%
```

```
}


% @synindex foo bar    makes index foo feed into index bar.
% Do this instead of @defindex foo if you don't want it as a separate index.
%
% @syncodeindex foo bar   similar, but put all entries made for index foo
% inside @code.
%
\def\synindex#1 #2 {\dosynindex\doindex{#1}{#2}}
\def\syncodeindex#1 #2 {\dosynindex\docodeindex{#1}{#2}}

% #1 is \doindex or \docodeindex, #2 the index getting redefined (foo),
% #3 the target index (bar).
\def\dosynindex#1#2#3{%
 % Only do \closeout if we haven't already done it, else we'll end up
 % closing the target index.
 \expandafter \ifx\csname donesynindex#2\endcsname \relax
   % The \closeout helps reduce unnecessary open files; the limit on the
   % Acorn RISC OS is a mere 16 files.
   \expandafter\closeout\csname#2indfile\endcsname
   \expandafter\let\csname donesynindex#2\endcsname = 1
 \fi
 % redefine \fooindfile:
 \expandafter\let\expandafter\temp\expandafter=\csname#3indfile\endcsname
 \expandafter\let\csname#2indfile\endcsname=\temp
 % redefine \fooindex:
 \expandafter\xdef\csname#2index\endcsname{\noexpand#1{#3}}%
}

% Define \doindex, the driver for all \fooindex macros.
% Argument #1 is generated by the calling \fooindex macro,
%  and it is "foo", the name of the index.

% \doindex just uses \parsearg; it calls \doind for the actual work.
% This is because \doind is more useful to call from other macros.

% There is also \dosubind {index}{topic}{subtopic}
% which makes an entry in a two-level index such as the operation index.

\def\doindex#1{\edef\indexname{#1}\parsearg\singleindexer}
\def\singleindexer #1{\doind{\indexname}{#1}}

% like the previous two, but they put @code around the argument.
\def\docodeindex#1{\edef\indexname{#1}\parsearg\singlecodeindexer}
\def\singlecodeindexer #1{\doind{\indexname}{\code{#1}}}

% Take care of Texinfo commands that can appear in an index entry.
```

```
% Since there are some commands we want to expand, and others we don't,
% we have to laboriously prevent expansion for those that we don't.
%
\def\indexdummies{%
 \escapechar = `\\     % use backslash in output files.
 \def\@{@}% change to @@ when we switch to @ as escape char in index files.
 \def\ {\realbackslash\space }%
 %
 % Need these unexpandable (because we define \tt as a dummy)
 % definitions when @{ or @} appear in index entry text.  Also, more
 % complicated, when \tex is in effect and \{ is a \delimiter again.
 % We can't use \lbracecmd and \rbracecmd because texindex assumes
 % braces and backslashes are used only as delimiters.  Perhaps we
 % should define @lbrace and @rbrace commands a la @comma.
 \def\{{{\tt\char123}}%
 \def\}{{\tt\char125}}%
 %
 % I don't entirely understand this, but when an index entry is
 % generated from a macro call, the \endinput which \scanmacro inserts
 % causes processing to be prematurely terminated.  This is,
 % apparently, because \indexsorttmp is fully expanded, and \endinput
 % is an expandable command.  The redefinition below makes \endinput
 % disappear altogether for that purpose -- although logging shows that
 % processing continues to some further point.  On the other hand, it
 % seems \endinput does not hurt in the printed index arg, since that
 % is still getting written without apparent harm.
 %
 % Sample source (mac-idx3.tex, reported by Graham Percival to
 % help-texinfo, 22may06):
 % @macro funindex {WORD}
 % @findex xyz
 % @end macro
 % ...
 % @funindex commtest
 %
 % The above is not enough to reproduce the bug, but it gives the flavor.
 %
 % Sample whatsit resulting:
 % .@write3{\entry{xyz}{@folio }{@code {xyz@endinput }}}
 %
 % So:
 \let\endinput = \empty
 %
 % Do the redefinitions.
 \commondummies
}

% For the aux and toc files, @ is the escape character.  So we want to
```

```
% redefine everything using @ as the escape character (instead of
% \realbackslash, still used for index files).  When everything uses @,
% this will be simpler.
%
\def\atdummies{%
 \def\@{@@}%
 \def\ {@ }%
 \let\{ = \lbraceatcmd
 \let\} = \rbraceatcmd
 %
 % Do the redefinitions.
 \commondummies
 \otherbackslash
}

% Called from \indexdummies and \atdummies.
%
\def\commondummies{%
 %
 % \definedummyword defines \#1 as \string\#1\space, thus effectively
 % preventing its expansion.  This is used only for control words,
 % not control letters, because the \space would be incorrect for
 % control characters, but is needed to separate the control word
 % from whatever follows.
 %
 % For control letters, we have \definedummyletter, which omits the
 % space.
 %
 % These can be used both for control words that take an argument and
 % those that do not.  If it is followed by {arg} in the input, then
 % that will dutifully get written to the index (or wherever).
 %
 \def\definedummyword  ##1{\def##1{\string##1\space}}%
 \def\definedummyletter##1{\def##1{\string##1}}%
 \let\definedummyaccent\definedummyletter
 %
 \commondummiesnofonts
 %
 \definedummyletter\_%
 \definedummyletter\-%
 %
 % Non-English letters.
 \definedummyword\AA
 \definedummyword\AE
 \definedummyword\DH
 \definedummyword\L
 \definedummyword\O
 \definedummyword\OE
```

```
\definedummyword\TH
\definedummyword\aa
\definedummyword\ae
\definedummyword\dh
\definedummyword\exclamdown
\definedummyword\l
\definedummyword\o
\definedummyword\oe
\definedummyword\ordf
\definedummyword\ordm
\definedummyword\questiondown
\definedummyword\ss
\definedummyword\th
%
% Although these internal commands shouldn't show up, sometimes they do.
\definedummyword\bf
\definedummyword\gtr
\definedummyword\hat
\definedummyword\less
\definedummyword\sf
\definedummyword\sl
\definedummyword\tclose
\definedummyword\tt
%
\definedummyword\LaTeX
\definedummyword\TeX
%
% Assorted special characters.
\definedummyword\arrow
\definedummyword\bullet
\definedummyword\comma
\definedummyword\copyright
\definedummyword\registeredsymbol
\definedummyword\dots
\definedummyword\enddots
\definedummyword\entrybreak
\definedummyword\equiv
\definedummyword\error
\definedummyword\euro
\definedummyword\expansion
\definedummyword\geq
\definedummyword\guillemetleft
\definedummyword\guillemetright
\definedummyword\guilsinglleft
\definedummyword\guilsinglright
\definedummyword\lbracechar
\definedummyword\leq
\definedummyword\minus
```

```
 \definedummyword\ogonek
 \definedummyword\pounds
 \definedummyword\point
 \definedummyword\print
 \definedummyword\quotedblbase
 \definedummyword\quotedblleft
 \definedummyword\quotedblright
 \definedummyword\quoteleft
 \definedummyword\quoteright
 \definedummyword\quotesinglbase
 \definedummyword\rbracechar
 \definedummyword\result
 \definedummyword\textdegree
 %
 % We want to disable all macros so that they are not expanded by \write.
 \macrolist
 %
 \normalturnoffactive
 %
 % Handle some cases of @value -- where it does not contain any
 % (non-fully-expandable) commands.
 \makevalueexpandable
}

% \commondummiesnofonts: common to \commondummies and \indexnofonts.
%
\def\commondummiesnofonts{%
 % Control letters and accents.
 \definedummyletter\!%
 \definedummyaccent\"%
 \definedummyaccent\'%
 \definedummyletter\*%
 \definedummyaccent\,%
 \definedummyletter\.%
 \definedummyletter\/%
 \definedummyletter\:%
 \definedummyaccent\=%
 \definedummyletter\?%
 \definedummyaccent\^%
 \definedummyaccent\`%
 \definedummyaccent\~%
 \definedummyword\u
 \definedummyword\v
 \definedummyword\H
 \definedummyword\dotaccent
 \definedummyword\ogonek
 \definedummyword\ringaccent
 \definedummyword\tieaccent
```

```
\definedummyword\ubaraccent
\definedummyword\udotaccent
\definedummyword\dotless
%
% Texinfo font commands.
\definedummyword\b
\definedummyword\i
\definedummyword\r
\definedummyword\sansserif
\definedummyword\sc
\definedummyword\slanted
\definedummyword\t
%
% Commands that take arguments.
\definedummyword\abbr
\definedummyword\acronym
\definedummyword\anchor
\definedummyword\cite
\definedummyword\code
\definedummyword\command
\definedummyword\dfn
\definedummyword\dmn
\definedummyword\email
\definedummyword\emph
\definedummyword\env
\definedummyword\file
\definedummyword\image
\definedummyword\indicateurl
\definedummyword\inforef
\definedummyword\kbd
\definedummyword\key
\definedummyword\math
\definedummyword\option
\definedummyword\pxref
\definedummyword\ref
\definedummyword\samp
\definedummyword\strong
\definedummyword\tie
\definedummyword\uref
\definedummyword\url
\definedummyword\var
\definedummyword\verb
\definedummyword\w
\definedummyword\xref
}

% \indexnofonts is used when outputting the strings to sort the index
% by, and when constructing control sequence names.  It eliminates all
```

```
% control sequences and just writes whatever the best ASCII sort string
% would be for a given command (usually its argument).
%
\def\indexnofonts{%
 % Accent commands should become @asis.
 \def\definedummyaccent##1{\let##1\asis}%
 % We can just ignore other control letters.
 \def\definedummyletter##1{\let##1\empty}%
 % All control words become @asis by default; overrides below.
 \let\definedummyword\definedummyaccent
 %
 \commondummiesnofonts
 %
 % Don't no-op \tt, since it isn't a user-level command
 % and is used in the definitions of the active chars like <, >, |, etc.
 % Likewise with the other plain tex font commands.
 %\let\tt=\asis
 %
 \def\ { }%
 \def\@{@}%
 \def\_{\normalunderscore}%
 \def\-{}% @- shouldn't affect sorting
 %
 % Unfortunately, texindex is not prepared to handle braces in the
 % content at all.  So for index sorting, we map @{ and @} to strings
 % starting with |, since that ASCII character is between ASCII { and }.
 \def\{{|a}%
 \def\lbracechar{|a}%
 %
 \def\}{|b}%
 \def\rbracechar{|b}%
 %
 % Non-English letters.
 \def\AA{AA}%
 \def\AE{AE}%
 \def\DH{DZZ}%
 \def\L{L}%
 \def\OE{OE}%
 \def\O{O}%
 \def\TH{ZZZ}%
 \def\aa{aa}%
 \def\ae{ae}%
 \def\dh{dzz}%
 \def\exclamdown{!}%
 \def\l{l}%
 \def\oe{oe}%
 \def\ordf{a}%
 \def\ordm{o}%
```

```
\def\o{o}%
\def\questiondown{?}%
\def\ss{ss}%
\def\th{zzz}%
%
\def\LaTeX{LaTeX}%
\def\TeX{TeX}%
%
% Assorted special characters.
% (The following {} will end up in the sort string, but that's ok.)
\def\arrow{->}%
\def\bullet{bullet}%
\def\comma{,}%
\def\copyright{copyright}%
\def\dots{...}%
\def\enddots{...}%
\def\equiv{==}%
\def\error{error}%
\def\euro{euro}%
\def\expansion{==>}%
\def\geq{>=}%
\def\guillemetleft{<<}%
\def\guillemetright{>>}%
\def\guilsinglleft{<}%
\def\guilsinglright{>}%
\def\leq{<=}%
\def\minus{-}%
\def\point{.}%
\def\pounds{pounds}%
\def\print{-|}%
\def\quotedblbase{"}%
\def\quotedblleft{"}%
\def\quotedblright{"}%
\def\quoteleft{`}%
\def\quoteright{'}%
\def\quotesinglbase{,}%
\def\registeredsymbol{R}%
\def\result{=>}%
\def\textdegree{o}%
%
\expandafter\ifx\csname SETtxiindexlquoteignore\endcsname\relax
\else \indexlquoteignore \fi
%
% We need to get rid of all macros, leaving only the arguments (if present).
% Of course this is not nearly correct, but it is the best we can do for now.
% makeinfo does not expand macros in the argument to @deffn, which ends up
% writing an index entry, and texindex isn't prepared for an index sort entry
% that starts with \.
```

```
 %
 % Since macro invocations are followed by braces, we can just redefine them
 % to take a single TeX argument.  The case of a macro invocation that
 % goes to end-of-line is not handled.
 %
 \macrolist
}

% Undocumented (for FSFS 2nd ed.): @set txiindexlquoteignore makes us
% ignore left quotes in the sort term.
{\catcode`\`=\active
\gdef\indexlquoteignore{\let`=\empty}}

\let\indexbackslash=0  %overridden during \printindex.
\let\SETmarginindex=\relax % put index entries in margin (undocumented)?

% Most index entries go through here, but \dosubind is the general case.
% #1 is the index name, #2 is the entry text.
\def\doind#1#2{\dosubind{#1}{#2}{}}

% Workhorse for all \fooindexes.
% #1 is name of index, #2 is stuff to put there, #3 is subentry --
% empty if called from \doind, as we usually are (the main exception
% is with most defuns, which call us directly).
%
\def\dosubind#1#2#3{%
 \iflinks
 {%
   % Store the main index entry text (including the third arg).
   \toks0 = {#2}%
   % If third arg is present, precede it with a space.
   \def\thirdarg{#3}%
   \ifx\thirdarg\empty \else
     \toks0 = \expandafter{\the\toks0 \space #3}%
   \fi
   %
   \edef\writeto{\csname#1indfile\endcsname}%
   %
   \safewhatsit\dosubindwrite
 }%
 \fi
}

% Write the entry in \toks0 to the index file:
%
\def\dosubindwrite{%
 % Put the index entry in the margin if desired.
 \ifx\SETmarginindex\relax\else
```

```
  \insert\margin{\hbox{\vrule height8pt depth3pt width0pt \the\toks0}}%
 \fi
 %
 % Remember, we are within a group.
 \indexdummies % Must do this here, since \bf, etc expand at this stage
 \def\backslashcurfont{\indexbackslash}% \indexbackslash isn't defined now
    % so it will be output as is; and it will print as backslash.
 %
 % Process the index entry with all font commands turned off, to
 % get the string to sort by.
 {\indexnofonts
  \edef\temp{\the\toks0}% need full expansion
  \xdef\indexsorttmp{\temp}%
 }%
 %
 % Set up the complete index entry, with both the sort key and
 % the original text, including any font commands.  We write
 % three arguments to \entry to the .?? file (four in the
 % subentry case), texindex reduces to two when writing the .??s
 % sorted result.
 \edef\temp{%
   \write\writeto{%
     \string\entry{\indexsorttmp}{\noexpand\folio}{\the\toks0}}%
 }%
 \temp
}

% Take care of unwanted page breaks/skips around a whatsit:
%
% If a skip is the last thing on the list now, preserve it
% by backing up by \lastskip, doing the \write, then inserting
% the skip again.  Otherwise, the whatsit generated by the
% \write or \pdfdest will make \lastskip zero.  The result is that
% sequences like this:
% @end defun
% @tindex whatever
% @defun ...
% will have extra space inserted, because the \medbreak in the
% start of the @defun won't see the skip inserted by the @end of
% the previous defun.
%
% But don't do any of this if we're not in vertical mode.  We
% don't want to do a \vskip and prematurely end a paragraph.
%
% Avoid page breaks due to these extra skips, too.
%
% But wait, there is a catch there:
% We'll have to check whether \lastskip is zero skip.  \ifdim is not
```

```
% sufficient for this purpose, as it ignores stretch and shrink parts
% of the skip.  The only way seems to be to check the textual
% representation of the skip.
%
% The following is almost like \def\zeroskipmacro{0.0pt} except that
% the ``p'' and ``t'' characters have catcode \other, not 11 (letter).
%
\edef\zeroskipmacro{\expandafter\the\csname z@skip\endcsname}
%
\newskip\whatsitskip
\newcount\whatsitpenalty
%
% ..., ready, GO:
%
\def\safewhatsit#1{\ifhmode
 #1%
\else
 % \lastskip and \lastpenalty cannot both be nonzero simultaneously.
 \whatsitskip = \lastskip
 \edef\lastskipmacro{\the\lastskip}%
 \whatsitpenalty = \lastpenalty
 %
 % If \lastskip is nonzero, that means the last item was a
 % skip.  And since a skip is discardable, that means this
 % -\whatsitskip glue we're inserting is preceded by a
 % non-discardable item, therefore it is not a potential
 % breakpoint, therefore no \nobreak needed.
 \ifx\lastskipmacro\zeroskipmacro
 \else
   \vskip-\whatsitskip
 \fi
 %
 #1%
 %
 \ifx\lastskipmacro\zeroskipmacro
   % If \lastskip was zero, perhaps the last item was a penalty, and
   % perhaps it was >=10000, e.g., a \nobreak.  In that case, we want
   % to re-insert the same penalty (values >10000 are used for various
   % signals); since we just inserted a non-discardable item, any
   % following glue (such as a \parskip) would be a breakpoint.  For example:
   %   @deffn deffn-whatever
   %   @vindex index-whatever
   %   Description.
   % would allow a break between the index-whatever whatsit
   % and the "Description." paragraph.
   \ifnum\whatsitpenalty>9999 \penalty\whatsitpenalty \fi
 \else
   % On the other hand, if we had a nonzero \lastskip,
```

```
   % this make-up glue would be preceded by a non-discardable item
   % (the whatsit from the \write), so we must insert a \nobreak.
   \nobreak\vskip\whatsitskip
 \fi
\fi}

% The index entry written in the file actually looks like
%  \entry {sortstring}{page}{topic}
% or
%  \entry {sortstring}{page}{topic}{subtopic}
% The texindex program reads in these files and writes files
% containing these kinds of lines:
%  \initial {c}
%     before the first topic whose initial is c
%  \entry {topic}{pagelist}
%     for a topic that is used without subtopics
%  \primary {topic}
%     for the beginning of a topic that is used with subtopics
%  \secondary {subtopic}{pagelist}
%     for each subtopic.

% Define the user-accessible indexing commands
% @findex, @vindex, @kindex, @cindex.

\def\findex {\fnindex}
\def\kindex {\kyindex}
\def\cindex {\cpindex}
\def\vindex {\vrindex}
\def\tindex {\tpindex}
\def\pindex {\pgindex}

\def\cindexsub {\begingroup\obeylines\cindexsub}
{\obeylines %
\gdef\cindexsub "#1" #2^^M{\endgroup %
\dosubind{cp}{#2}{#1}}}

% Define the macros used in formatting output of the sorted index material.

% @printindex causes a particular index (the ??s file) to get printed.
% It does not print any chapter heading (usually an @unnumbered).
%
\parseargdef\printindex{\begingroup
 \dobreak \chapheadingskip{10000}%
 %
 \smallfonts \rm
 \tolerance = 9500
 \plainfrenchspacing
 \everypar = {}% don't want the \kern\-parindent from indentation suppression.
```

```
 %
 % See if the index file exists and is nonempty.
 % Change catcode of @ here so that if the index file contains
 % \initial {@}
 % as its first line, TeX doesn't complain about mismatched braces
 % (because it thinks @} is a control sequence).
 \catcode`\@ = 11
 \openin 1 \jobname.#1s
 \ifeof 1
   % \enddoublecolumns gets confused if there is no text in the index,
   % and it loses the chapter title and the aux file entries for the
   % index.  The easiest way to prevent this problem is to make sure
   % there is some text.
   \putwordIndexNonexistent
 \else
   %
   % If the index file exists but is empty, then \openin leaves \ifeof
   % false.  We have to make TeX try to read something from the file, so
   % it can discover if there is anything in it.
   \read 1 to \temp
   \ifeof 1
     \putwordIndexIsEmpty
   \else
     % Index files are almost Texinfo source, but we use \ as the escape
     % character.  It would be better to use @, but that's too big a change
     % to make right now.
     \def\indexbackslash{\backslashcurfont}%
     \catcode`\\ = 0
     \escapechar = `\\
     \begindoublecolumns
     \input \jobname.#1s
     \enddoublecolumns
   \fi
 \fi
 \closein 1
\endgroup}

% These macros are used by the sorted index file itself.
% Change them to control the appearance of the index.

\def\initial#1{{%
 % Some minor font changes for the special characters.
 \let\tentt=\sectt \let\tt=\sectt \let\sf=\sectt
 %
 % Remove any glue we may have, we'll be inserting our own.
 \removelastskip
 %
 % We like breaks before the index initials, so insert a bonus.
```

```
 \nobreak
 \vskip 0pt plus 3\baselineskip
 \penalty 0
 \vskip 0pt plus -3\baselineskip
 %
 % Typeset the initial.  Making this add up to a whole number of
 % baselineskips increases the chance of the dots lining up from column
 % to column.  It still won't often be perfect, because of the stretch
 % we need before each entry, but it's better.
 %
 % No shrink because it confuses \balancecolumns.
 \vskip 1.67\baselineskip plus .5\baselineskip
 \leftline{\secbf #1}%
 % Do our best not to break after the initial.
 \nobreak
 \vskip .33\baselineskip plus .1\baselineskip
}}

% \entry typesets a paragraph consisting of the text (#1), dot leaders, and
% then page number (#2) flushed to the right margin.  It is used for index
% and table of contents entries.  The paragraph is indented by \leftskip.
%
% A straightforward implementation would start like this:
% \def\entry#1#2{...
% But this freezes the catcodes in the argument, and can cause problems to
% @code, which sets - active.  This problem was fixed by a kludge---
% ``-'' was active throughout whole index, but this isn't really right.
% The right solution is to prevent \entry from swallowing the whole text.
%                                --kasal, 21nov03
\def\entry{%
 \begingroup
   %
   % Start a new paragraph if necessary, so our assignments below can't
   % affect previous text.
   \par
   %
   % Do not fill out the last line with white space.
   \parfillskip = 0in
   %
   % No extra space above this paragraph.
   \parskip = 0in
   %
   % Do not prefer a separate line ending with a hyphen to fewer lines.
   \finalhyphendemerits = 0
   %
   % \hangindent is only relevant when the entry text and page number
   % don't both fit on one line.  In that case, bob suggests starting the
   % dots pretty far over on the line.  Unfortunately, a large
```

```
  % indentation looks wrong when the entry text itself is broken across
  % lines.  So we use a small indentation and put up with long leaders.
  %
  % \hangafter is reset to 1 (which is the value we want) at the start
  % of each paragraph, so we need not do anything with that.
  \hangindent = 2em
  %
  % When the entry text needs to be broken, just fill out the first line
  % with blank space.
  \rightskip = 0pt plus1fil
  %
  % A bit of stretch before each entry for the benefit of balancing
  % columns.
  \vskip 0pt plus1pt
  %
  % When reading the text of entry, convert explicit line breaks
  % from @* into spaces.  The user might give these in long section
  % titles, for instance.
  \def\*{\unskip\space\ignorespaces}%
  \def\entrybreak{\hfil\break}%
  %
  % Swallow the left brace of the text (first parameter):
  \afterassignment\doentry
  \let\temp =
}
\def\entrybreak{\unskip\space\ignorespaces}%
\def\doentry{%
  \bgroup % Instead of the swallowed brace.
    \noindent
    \aftergroup\finishentry
    % And now comes the text of the entry.
}
\def\finishentry#1{%
  % #1 is the page number.
  %
  % The following is kludged to not output a line of dots in the index if
  % there are no page numbers.  The next person who breaks this will be
  % cursed by a Unix daemon.
  \setbox\boxA = \hbox{#1}%
  \ifdim\wd\boxA = 0pt
    \ %
  \else
    %
    % If we must, put the page number on a line of its own, and fill out
    % this line with blank space.  (The \hfil is overwhelmed with the
    % fill leaders glue in \indexdotfill if the page number does fit.)
    \hfil\penalty50
    \null\nobreak\indexdotfill % Have leaders before the page number.
```

```
    %
    % The `\ ' here is removed by the implicit \unskip that TeX does as
    % part of (the primitive) \par.  Without it, a spurious underfull
    % \hbox ensues.
    \ifpdf
 \pdfgettoks#1.%
 \ \the\toksA
    \else
 \ #1%
    \fi
   \fi
   \par
 \endgroup
}

% Like plain.tex's \dotfill, except uses up at least 1 em.
\def\indexdotfill{\cleaders
 \hbox{$\mathsurround=0pt \mkern1.5mu.\mkern1.5mu$}\hskip 1em plus 1fill}

\def\primary #1{\line{#1\hfil}}

\newskip\secondaryindent \secondaryindent=0.5cm
\def\secondary#1#2{{%
 \parfillskip=0in
 \parskip=0in
 \hangindent=1in
 \hangafter=1
 \noindent\hskip\secondaryindent\hbox{#1}\indexdotfill
 \ifpdf
   \pdfgettoks#2.\ \the\toksA % The page number ends the paragraph.
 \else
   #2
 \fi
 \par
}}

% Define two-column mode, which we use to typeset indexes.
% Adapted from the TeXbook, page 416, which is to say,
% the manmac.tex format used to print the TeXbook itself.
\catcode`\@=11

\newbox\partialpage
\newdimen\doublecolumnhsize

\def\begindoublecolumns{\begingroup % ended by \enddoublecolumns
 % Grab any single-column material above us.
 \output = {%
   %
```

```
  % Here is a possibility not foreseen in manmac: if we accumulate a
  % whole lot of material, we might end up calling this \output
  % routine twice in a row (see the doublecol-lose test, which is
  % essentially a couple of indexes with @setchapternewpage off).  In
  % that case we just ship out what is in \partialpage with the normal
  % output routine.  Generally, \partialpage will be empty when this
  % runs and this will be a no-op.  See the indexspread.tex test case.
  \ifvoid\partialpage \else
    \onepageout{\pagecontents\partialpage}%
  \fi
  %
  \global\setbox\partialpage = \vbox{%
    % Unvbox the main output page.
    \unvbox\PAGE
    \kern-\topskip \kern\baselineskip
  }%
}%
\eject % run that output routine to set \partialpage
%
% Use the double-column output routine for subsequent pages.
\output = {\doublecolumnout}%
%
% Change the page size parameters.  We could do this once outside this
% routine, in each of @smallbook, @afourpaper, and the default 8.5x11
% format, but then we repeat the same computation.  Repeating a couple
% of assignments once per index is clearly meaningless for the
% execution time, so we may as well do it in one place.
%
% First we halve the line length, less a little for the gutter between
% the columns.  We compute the gutter based on the line length, so it
% changes automatically with the paper format.  The magic constant
% below is chosen so that the gutter has the same value (well, +-<1pt)
% as it did when we hard-coded it.
%
% We put the result in a separate register, \doublecolumhsize, so we
% can restore it in \pagesofar, after \hsize itself has (potentially)
% been clobbered.
%
\doublecolumnhsize = \hsize
  \advance\doublecolumnhsize by -.04154\hsize
  \divide\doublecolumnhsize by 2
\hsize = \doublecolumnhsize
%
% Double the \vsize as well.  (We don't need a separate register here,
% since nobody clobbers \vsize.)
\vsize = 2\vsize
}
```

```
% The double-column output routine for all double-column pages except
% the last.
%
\def\doublecolumnout{%
 \splittopskip=\topskip \splitmaxdepth=\maxdepth
 % Get the available space for the double columns -- the normal
 % (undoubled) page height minus any material left over from the
 % previous page.
 \dimen@ = \vsize
 \divide\dimen@ by 2
 \advance\dimen@ by -\ht\partialpage
 %
 % box0 will be the left-hand column, box2 the right.
 \setbox0=\vsplit255 to\dimen@ \setbox2=\vsplit255 to\dimen@
 \onepageout\pagesofar
 \unvbox255
 \penalty\outputpenalty
}
%
% Re-output the contents of the output page -- any previous material,
% followed by the two boxes we just split, in box0 and box2.
\def\pagesofar{%
 \unvbox\partialpage
 %
 \hsize = \doublecolumnhsize
 \wd0=\hsize \wd2=\hsize
 \hbox to\pagewidth{\box0\hfil\box2}%
}
%
% All done with double columns.
\def\enddoublecolumns{%
 % The following penalty ensures that the page builder is exercised
 % _before_ we change the output routine.  This is necessary in the
 % following situation:
 %
 % The last section of the index consists only of a single entry.
 % Before this section, \pagetotal is less than \pagegoal, so no
 % break occurs before the last section starts.  However, the last
 % section, consisting of \initial and the single \entry, does not
 % fit on the page and has to be broken off.  Without the following
 % penalty the page builder will not be exercised until \eject
 % below, and by that time we'll already have changed the output
 % routine to the \balancecolumns version, so the next-to-last
 % double-column page will be processed with \balancecolumns, which
 % is wrong:  The two columns will go to the main vertical list, with
 % the broken-off section in the recent contributions.  As soon as
 % the output routine finishes, TeX starts reconsidering the page
 % break.  The two columns and the broken-off section both fit on the
```

```
% page, because the two columns now take up only half of the page
% goal.  When TeX sees \eject from below which follows the final
% section, it invokes the new output routine that we've set after
% \balancecolumns below; \onepageout will try to fit the two columns
% and the final section into the vbox of \pageheight (see
% \pagebody), causing an overfull box.
%
% Note that glue won't work here, because glue does not exercise the
% page builder, unlike penalties (see The TeXbook, pp. 280-281).
\penalty0
%
\output = {%
  % Split the last of the double-column material.  Leave it on the
  % current page, no automatic page break.
  \balancecolumns
  %
  % If we end up splitting too much material for the current page,
  % though, there will be another page break right after this \output
  % invocation ends.  Having called \balancecolumns once, we do not
  % want to call it again.  Therefore, reset \output to its normal
  % definition right away.  (We hope \balancecolumns will never be
  % called on to balance too much material, but if it is, this makes
  % the output somewhat more palatable.)
  \global\output = {\onepageout{\pagecontents\PAGE}}%
 }%
 \eject
 \endgroup % started in \begindoublecolumns
 %
 % \pagegoal was set to the doubled \vsize above, since we restarted
 % the current page.  We're now back to normal single-column
 % typesetting, so reset \pagegoal to the normal \vsize (after the
 % \endgroup where \vsize got restored).
 \pagegoal = \vsize
}
%
% Called at the end of the double column material.
\def\balancecolumns{%
 \setbox0 = \vbox{\unvbox255}% like \box255 but more efficient, see p.120.
 \dimen@ = \ht0
 \advance\dimen@ by \topskip
 \advance\dimen@ by-\baselineskip
 \divide\dimen@ by 2 % target to split to
 %debug\message{final 2-column material height=\the\ht0, target=\the\dimen@.}%
 \splittopskip = \topskip
 % Loop until we get a decent breakpoint.
 {%
  \vbadness = 10000
  \loop
```

```
    \global\setbox3 = \copy0
    \global\setbox1 = \vsplit3 to \dimen@
  \ifdim\ht3>\dimen@
    \global\advance\dimen@ by 1pt
  \repeat
 }%
 %debug\message{split to \the\dimen@, column heights: \the\ht1, \the\ht3.}%
 \setbox0=\vbox to\dimen@{\unvbox1}%
 \setbox2=\vbox to\dimen@{\unvbox3}%
 %
 \pagesofar
}
\catcode`\@ = \other


\message{sectioning,}
% Chapters, sections, etc.

% Let's start with @part.
\outer\parseargdef\part{\partzzz{#1}}
\def\partzzz#1{%
 \chapoddpage
 \null
 \vskip.3\vsize  % move it down on the page a bit
 \begingroup
   \noindent \titlefonts\rmisbold #1\par % the text
   \let\lastnode=\empty      % no node to associate with
   \writetocentry{part}{#1}{}% but put it in the toc
   \headingsoff              % no headline or footline on the part page
   \chapoddpage
 \endgroup
}

% \unnumberedno is an oxymoron.  But we count the unnumbered
% sections so that we can refer to them unambiguously in the pdf
% outlines by their "section number".  We avoid collisions with chapter
% numbers by starting them at 10000.  (If a document ever has 10000
% chapters, we're in trouble anyway, I'm sure.)
\newcount\unnumberedno \unnumberedno = 10000
\newcount\chapno
\newcount\secno        \secno=0
\newcount\subsecno     \subsecno=0
\newcount\subsubsecno  \subsubsecno=0

% This counter is funny since it counts through charcodes of letters A, B, ...
\newcount\appendixno  \appendixno = `\@
%
% \def\appendixletter{\char\the\appendixno}
```

```
% We do the following ugly conditional instead of the above simple
% construct for the sake of pdftex, which needs the actual
% letter in the expansion, not just typeset.
%
\def\appendixletter{%
 \ifnum\appendixno=`A A%
 \else\ifnum\appendixno=`B B%
 \else\ifnum\appendixno=`C C%
 \else\ifnum\appendixno=`D D%
 \else\ifnum\appendixno=`E E%
 \else\ifnum\appendixno=`F F%
 \else\ifnum\appendixno=`G G%
 \else\ifnum\appendixno=`H H%
 \else\ifnum\appendixno=`I I%
 \else\ifnum\appendixno=`J J%
 \else\ifnum\appendixno=`K K%
 \else\ifnum\appendixno=`L L%
 \else\ifnum\appendixno=`M M%
 \else\ifnum\appendixno=`N N%
 \else\ifnum\appendixno=`O O%
 \else\ifnum\appendixno=`P P%
 \else\ifnum\appendixno=`Q Q%
 \else\ifnum\appendixno=`R R%
 \else\ifnum\appendixno=`S S%
 \else\ifnum\appendixno=`T T%
 \else\ifnum\appendixno=`U U%
 \else\ifnum\appendixno=`V V%
 \else\ifnum\appendixno=`W W%
 \else\ifnum\appendixno=`X X%
 \else\ifnum\appendixno=`Y Y%
 \else\ifnum\appendixno=`Z Z%
 % The \the is necessary, despite appearances, because \appendixletter is
 % expanded while writing the .toc file.  \char\appendixno is not
 % expandable, thus it is written literally, thus all appendixes come out
 % with the same letter (or @) in the toc without it.
 \else\char\the\appendixno
 \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi
 \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi}

% Each @chapter defines these (using marks) as the number+name, number
% and name of the chapter.  Page headings and footings can use
% these.  @section does likewise.
\def\thischapter{}
\def\thischapternum{}
\def\thischaptername{}
\def\thissection{}
\def\thissectionnum{}
\def\thissectionname{}
```

```
\newcount\absseclevel % used to calculate proper heading level
\newcount\secbase\secbase=0 % @raisesections/@lowersections modify this count

% @raisesections: treat @section as chapter, @subsection as section, etc.
\def\raisesections{\global\advance\secbase by -1}
\let\up=\raisesections % original BFox name

% @lowersections: treat @chapter as section, @section as subsection, etc.
\def\lowersections{\global\advance\secbase by 1}
\let\down=\lowersections % original BFox name

% we only have subsub.
\chardef\maxseclevel = 3
%
% A numbered section within an unnumbered changes to unnumbered too.
% To achieve this, remember the "biggest" unnum. sec. we are currently in:
\chardef\unnlevel = \maxseclevel
%
% Trace whether the current chapter is an appendix or not:
% \chapheadtype is "N" or "A", unnumbered chapters are ignored.
\def\chapheadtype{N}

% Choose a heading macro
% #1 is heading type
% #2 is heading level
% #3 is text for heading
\def\genhead#1#2#3{%
 % Compute the abs. sec. level:
 \absseclevel=#2
 \advance\absseclevel by \secbase
 % Make sure \absseclevel doesn't fall outside the range:
 \ifnum \absseclevel < 0
   \absseclevel = 0
 \else
   \ifnum \absseclevel > 3
     \absseclevel = 3
   \fi
 \fi
 % The heading type:
 \def\headtype{#1}%
 \if \headtype U%
   \ifnum \absseclevel < \unnlevel
     \chardef\unnlevel = \absseclevel
   \fi
 \else
   % Check for appendix sections:
   \ifnum \absseclevel = 0
```

```
    \edef\chapheadtype{\headtype}%
  \else
    \if \headtype A\if \chapheadtype N%
 \errmessage{@appendix... within a non-appendix chapter}%
    \fi\fi
  \fi
  % Check for numbered within unnumbered:
  \ifnum \absseclevel > \unnlevel
    \def\headtype{U}%
  \else
    \chardef\unnlevel = 3
  \fi
 \fi
 % Now print the heading:
 \if \headtype U%
  \ifcase\absseclevel
 \unnumberedzzz{#3}%
  \or \unnumberedseczzz{#3}%
  \or \unnumberedsubseczzz{#3}%
  \or \unnumberedsubsubseczzz{#3}%
  \fi
 \else
  \if \headtype A%
    \ifcase\absseclevel
  \appendixzzz{#3}%
    \or \appendixsectionzzz{#3}%
    \or \appendixsubseczzz{#3}%
    \or \appendixsubsubseczzz{#3}%
    \fi
  \else
    \ifcase\absseclevel
  \chapterzzz{#3}%
    \or \seczzz{#3}%
    \or \numberedsubseczzz{#3}%
    \or \numberedsubsubseczzz{#3}%
    \fi
  \fi
 \fi
 \suppressfirstparagraphindent
}

% an interface:
\def\numhead{\genhead N}
\def\apphead{\genhead A}
\def\unnmhead{\genhead U}

% @chapter, @appendix, @unnumbered.  Increment top-level counter, reset
% all lower-level sectioning counters to zero.
```

```
%
% Also set \chaplevelprefix, which we prepend to @float sequence numbers
% (e.g., figures), q.v.  By default (before any chapter), that is empty.
\let\chaplevelprefix = \empty
%
\outer\parseargdef\chapter{\numhead0{#1}} % normally numhead0 calls chapterzzz
\def\chapterzzz#1{%
 % section resetting is \global in case the chapter is in a group, such
 % as an @include file.
 \global\secno=0 \global\subsecno=0 \global\subsubsecno=0
   \global\advance\chapno by 1
 %
 % Used for \float.
 \gdef\chaplevelprefix{\the\chapno.}%
 \resetallfloatnos
 %
 % \putwordChapter can contain complex things in translations.
 \toks0=\expandafter{\putwordChapter}%
 \message{\the\toks0 \space \the\chapno}%
 %
 % Write the actual heading.
 \chapmacro{#1}{Ynumbered}{\the\chapno}%
 %
 % So @section and the like are numbered underneath this chapter.
 \global\let\section = \numberedsec
 \global\let\subsection = \numberedsubsec
 \global\let\subsubsection = \numberedsubsubsec
}

\outer\parseargdef\appendix{\apphead0{#1}} % normally calls appendixzzz
%
\def\appendixzzz#1{%
 \global\secno=0 \global\subsecno=0 \global\subsubsecno=0
   \global\advance\appendixno by 1
 \gdef\chaplevelprefix{\appendixletter.}%
 \resetallfloatnos
 %
 % \putwordAppendix can contain complex things in translations.
 \toks0=\expandafter{\putwordAppendix}%
 \message{\the\toks0 \space \appendixletter}%
 %
 \chapmacro{#1}{Yappendix}{\appendixletter}%
 %
 \global\let\section = \appendixsec
 \global\let\subsection = \appendixsubsec
 \global\let\subsubsection = \appendixsubsubsec
}
```

```
% normally unnmhead0 calls unnumberedzzz:
\outer\parseargdef\unnumbered{\unnmhead0{#1}}
\def\unnumberedzzz#1{%
 \global\secno=0 \global\subsecno=0 \global\subsubsecno=0
   \global\advance\unnumberedno by 1
 %
 % Since an unnumbered has no number, no prefix for figures.
 \global\let\chaplevelprefix = \empty
 \resetallfloatnos
 %
 % This used to be simply \message{#1}, but TeX fully expands the
 % argument to \message.  Therefore, if #1 contained @-commands, TeX
 % expanded them.  For example, in `@unnumbered The @cite{Book}', TeX
 % expanded @cite (which turns out to cause errors because \cite is meant
 % to be executed, not expanded).
 %
 % Anyway, we don't want the fully-expanded definition of @cite to appear
 % as a result of the \message, we just want `@cite' itself.  We use
 % \the<toks register> to achieve this: TeX expands \the<toks> only once,
 % simply yielding the contents of <toks register>.  (We also do this for
 % the toc entries.)
 \toks0 = {#1}%
 \message{(\the\toks0)}%
 %
 \chapmacro{#1}{Ynothing}{\the\unnumberedno}%
 %
 \global\let\section = \unnumberedsec
 \global\let\subsection = \unnumberedsubsec
 \global\let\subsubsection = \unnumberedsubsubsec
}

% @centerchap is like @unnumbered, but the heading is centered.
\outer\parseargdef\centerchap{%
 % Well, we could do the following in a group, but that would break
 % an assumption that \chapmacro is called at the outermost level.
 % Thus we are safer this way:  --kasal, 24feb04
 \let\centerparametersmaybe = \centerparameters
 \unnmhead0{#1}%
 \let\centerparametersmaybe = \relax
}

% @top is like @unnumbered.
\let\top\unnumbered

% Sections.
%
\outer\parseargdef\numberedsec{\numhead1{#1}} % normally calls seczzz
\def\seczzz#1{%
```

```
 \global\subsecno=0 \global\subsubsecno=0  \global\advance\secno by 1
 \sectionheading{#1}{sec}{Ynumbered}{\the\chapno.\the\secno}%
}

% normally calls appendixsectionzzz:
\outer\parseargdef\appendixsection{\apphead1{#1}}
\def\appendixsectionzzz#1{%
 \global\subsecno=0 \global\subsubsecno=0  \global\advance\secno by 1
 \sectionheading{#1}{sec}{Yappendix}{\appendixletter.\the\secno}%
}
\let\appendixsec\appendixsection

% normally calls unnumberedseczzz:
\outer\parseargdef\unnumberedsec{\unnmhead1{#1}}
\def\unnumberedseczzz#1{%
 \global\subsecno=0 \global\subsubsecno=0  \global\advance\secno by 1
 \sectionheading{#1}{sec}{Ynothing}{\the\unnumberedno.\the\secno}%
}

% Subsections.
%
% normally calls numberedsubseczzz:
\outer\parseargdef\numberedsubsec{\numhead2{#1}}
\def\numberedsubseczzz#1{%
 \global\subsubsecno=0  \global\advance\subsecno by 1
 \sectionheading{#1}{subsec}{Ynumbered}{\the\chapno.\the\secno.\the\subsecno}%
}

% normally calls appendixsubseczzz:
\outer\parseargdef\appendixsubsec{\apphead2{#1}}
\def\appendixsubseczzz#1{%
 \global\subsubsecno=0  \global\advance\subsecno by 1
 \sectionheading{#1}{subsec}{Yappendix}%
            {\appendixletter.\the\secno.\the\subsecno}%
}

% normally calls unnumberedsubseczzz:
\outer\parseargdef\unnumberedsubsec{\unnmhead2{#1}}
\def\unnumberedsubseczzz#1{%
 \global\subsubsecno=0  \global\advance\subsecno by 1
 \sectionheading{#1}{subsec}{Ynothing}%
            {\the\unnumberedno.\the\secno.\the\subsecno}%
}

% Subsubsections.
%
% normally numberedsubsubseczzz:
\outer\parseargdef\numberedsubsubsec{\numhead3{#1}}
```

```
\def\numberedsubsubseczzz#1{%
 \global\advance\subsubsecno by 1
 \sectionheading{#1}{subsubsec}{Ynumbered}%
            {\the\chapno.\the\secno.\the\subsecno.\the\subsubsecno}%
}

% normally appendixsubsubseczzz:
\outer\parseargdef\appendixsubsubsec{\apphead3{#1}}
\def\appendixsubsubseczzz#1{%
 \global\advance\subsubsecno by 1
 \sectionheading{#1}{subsubsec}{Yappendix}%
            {\appendixletter.\the\secno.\the\subsecno.\the\subsubsecno}%
}

% normally unnumberedsubsubseczzz:
\outer\parseargdef\unnumberedsubsubsec{\unnmhead3{#1}}
\def\unnumberedsubsubseczzz#1{%
 \global\advance\subsubsecno by 1
 \sectionheading{#1}{subsubsec}{Ynothing}%
            {\the\unnumberedno.\the\secno.\the\subsecno.\the\subsubsecno}%
}

% These macros control what the section commands do, according
% to what kind of chapter we are in (ordinary, appendix, or unnumbered).
% Define them by default for a numbered chapter.
\let\section = \numberedsec
\let\subsection = \numberedsubsec
\let\subsubsection = \numberedsubsubsec

% Define @majorheading, @heading and @subheading

\def\majorheading{%
 {\advance\chapheadingskip by 10pt \chapbreak }%
 \parsearg\chapheadingzzz
}

\def\chapheading{\chapbreak \parsearg\chapheadingzzz}
\def\chapheadingzzz#1{%
 \vbox{\chapfonts \raggedtitlesettings #1\par}%
 \nobreak\bigskip \nobreak
 \suppressfirstparagraphindent
}

% @heading, @subheading, @subsubheading.
\parseargdef\heading{\sectionheading{#1}{sec}{Yomitfromtoc}{}
 \suppressfirstparagraphindent}
\parseargdef\subheading{\sectionheading{#1}{subsec}{Yomitfromtoc}{}
 \suppressfirstparagraphindent}
```

```
\parseargdef\subsubheading{\sectionheading{#1}{subsubsec}{Yomitfromtoc}{}
 \suppressfirstparagraphindent}

% These macros generate a chapter, section, etc. heading only
% (including whitespace, linebreaking, etc. around it),
% given all the information in convenient, parsed form.

% Args are the skip and penalty (usually negative)
\def\dobreak#1#2{\par\ifdim\lastskip<#1\removelastskip\penalty#2\vskip#1\fi}

% Parameter controlling skip before chapter headings (if needed)
\newskip\chapheadingskip

% Define plain chapter starts, and page on/off switching for it.
\def\chapbreak{\dobreak \chapheadingskip {-4000}}
\def\chappager{\par\vfill\supereject}
% Because \domark is called before \chapoddpage, the filler page will
% get the headings for the next chapter, which is wrong.  But we don't
% care -- we just disable all headings on the filler page.
\def\chapoddpage{%
 \chappager
 \ifodd\pageno \else
   \begingroup
     \headingsoff
     \null
     \chappager
   \endgroup
 \fi
}

\def\setchapternewpage #1 {\csname CHAPPAG#1\endcsname}

\def\CHAPPAGoff{%
\global\let\contentsalignmacro = \chappager
\global\let\pchapsepmacro=\chapbreak
\global\let\pagealignmacro=\chappager}

\def\CHAPPAGon{%
\global\let\contentsalignmacro = \chappager
\global\let\pchapsepmacro=\chappager
\global\let\pagealignmacro=\chappager
\global\def\HEADINGSon{\HEADINGSsingle}}

\def\CHAPPAGodd{%
\global\let\contentsalignmacro = \chapoddpage
\global\let\pchapsepmacro=\chapoddpage
\global\let\pagealignmacro=\chapoddpage
\global\def\HEADINGSon{\HEADINGSdouble}}
```

```
\CHAPPAGon

% Chapter opening.
%
% #1 is the text, #2 is the section type (Ynumbered, Ynothing,
% Yappendix, Yomitfromtoc), #3 the chapter number.
%
% To test against our argument.
\def\Ynothingkeyword{Ynothing}
\def\Yomitfromtockeyword{Yomitfromtoc}
\def\Yappendixkeyword{Yappendix}
%
\def\chapmacro#1#2#3{%
 % Insert the first mark before the heading break (see notes for \domark).
 \let\prevchapterdefs=\lastchapterdefs
 \let\prevsectiondefs=\lastsectiondefs
 \gdef\lastsectiondefs{\gdef\thissectionname{}\gdef\thissectionnum{}%
                 \gdef\thissection{}}%
 %
 \def\temptype{#2}%
 \ifx\temptype\Ynothingkeyword
   \gdef\lastchapterdefs{\gdef\thischaptername{#1}\gdef\thischapternum{}%
                 \gdef\thischapter{\thischaptername}}%
 \else\ifx\temptype\Yomitfromtockeyword
   \gdef\lastchapterdefs{\gdef\thischaptername{#1}\gdef\thischapternum{}%
                 \gdef\thischapter{}}%
 \else\ifx\temptype\Yappendixkeyword
   \toks0={#1}%
   \xdef\lastchapterdefs{%
     \gdef\noexpand\thischaptername{\the\toks0}%
     \gdef\noexpand\thischapternum{\appendixletter}%
     % \noexpand\putwordAppendix avoids expanding indigestible
     % commands in some of the translations.
     \gdef\noexpand\thischapter{\noexpand\putwordAppendix{}
                     \noexpand\thischapternum:
                     \noexpand\thischaptername}%
   }%
 \else
   \toks0={#1}%
   \xdef\lastchapterdefs{%
     \gdef\noexpand\thischaptername{\the\toks0}%
     \gdef\noexpand\thischapternum{\the\chapno}%
     % \noexpand\putwordChapter avoids expanding indigestible
     % commands in some of the translations.
     \gdef\noexpand\thischapter{\noexpand\putwordChapter{}
                     \noexpand\thischapternum:
                     \noexpand\thischaptername}%
```

```
  }%
\fi\fi\fi
%
% Output the mark.  Pass it through \safewhatsit, to take care of
% the preceding space.
\safewhatsit\domark
%
% Insert the chapter heading break.
\pchapsepmacro
%
% Now the second mark, after the heading break.  No break points
% between here and the heading.
\let\prevchapterdefs=\lastchapterdefs
\let\prevsectiondefs=\lastsectiondefs
\domark
%
{%
  \chapfonts \rmisbold
  %
  % Have to define \lastsection before calling \donoderef, because the
  % xref code eventually uses it.  On the other hand, it has to be called
  % after \pchapsepmacro, or the headline will change too soon.
  \gdef\lastsection{#1}%
  %
  % Only insert the separating space if we have a chapter/appendix
  % number, and don't print the unnumbered ``number''.
  \ifx\temptype\Ynothingkeyword
    \setbox0 = \hbox{}%
    \def\toctype{unnchap}%
  \else\ifx\temptype\Yomitfromtockeyword
    \setbox0 = \hbox{}% contents like unnumbered, but no toc entry
    \def\toctype{omit}%
  \else\ifx\temptype\Yappendixkeyword
    \setbox0 = \hbox{\putwordAppendix{} #3\enspace}%
    \def\toctype{app}%
  \else
    \setbox0 = \hbox{#3\enspace}%
    \def\toctype{numchap}%
  \fi\fi\fi
  %
  % Write the toc entry for this chapter.  Must come before the
  % \donoderef, because we include the current node name in the toc
  % entry, and \donoderef resets it to empty.
  \writetocentry{\toctype}{#1}{#3}%
  %
  % For pdftex, we have to write out the node definition (aka, make
  % the pdfdest) after any page break, but before the actual text has
  % been typeset.  If the destination for the pdf outline is after the
```

```
  % text, then jumping from the outline may wind up with the text not
  % being visible, for instance under high magnification.
  \donoderef{#2}%
  %
  % Typeset the actual heading.
  \nobreak % Avoid page breaks at the interline glue.
  \vbox{\raggedtitlesettings \hangindent=\wd0 \centerparametersmaybe
      \unhbox0 #1\par}%
 }%
 \nobreak\bigskip % no page break after a chapter title
 \nobreak
}

% @centerchap -- centered and unnumbered.
\let\centerparametersmaybe = \relax
\def\centerparameters{%
 \advance\rightskip by 3\rightskip
 \leftskip = \rightskip
 \parfillskip = 0pt
}


% I don't think this chapter style is supported any more, so I'm not
% updating it with the new noderef stuff.  We'll see.  --karl, 11aug03.
%
\def\setchapterstyle #1 {\csname CHAPF#1\endcsname}
%
\def\unnchfopen #1{%
 \chapoddpage
 \vbox{\chapfonts \raggedtitlesettings #1\par}%
 \nobreak\bigskip\nobreak
}
\def\chfopen #1#2{\chapoddpage {\chapfonts
\vbox to 3in{\vfil \hbox to\hsize{\hfil #2} \hbox to\hsize{\hfil #1} \vfil}}%
\par\penalty 5000 %
}
\def\centerchfopen #1{%
 \chapoddpage
 \vbox{\chapfonts \raggedtitlesettings \hfill #1\hfill}%
 \nobreak\bigskip \nobreak
}
\def\CHAPFopen{%
 \global\let\chapmacro=\chfopen
 \global\let\centerchapmacro=\centerchfopen}


% Section titles.  These macros combine the section number parts and
% call the generic \sectionheading to do the printing.
```

```
%
\newskip\secheadingskip
\def\secheadingbreak{\dobreak \secheadingskip{-1000}}

% Subsection titles.
\newskip\subsecheadingskip
\def\subsecheadingbreak{\dobreak \subsecheadingskip{-500}}

% Subsubsection titles.
\def\subsubsecheadingskip{\subsecheadingskip}
\def\subsubsecheadingbreak{\subsecheadingbreak}


% Print any size, any type, section title.
%
% #1 is the text, #2 is the section level (sec/subsec/subsubsec), #3 is
% the section type for xrefs (Ynumbered, Ynothing, Yappendix), #4 is the
% section number.
%
\def\seckeyword{sec}
%
\def\sectionheading#1#2#3#4{%
 {%
  \checkenv{}% should not be in an environment.
  %
  % Switch to the right set of fonts.
  \csname #2fonts\endcsname \rmisbold
  %
  \def\sectionlevel{#2}%
  \def\temptype{#3}%
  %
  % Insert first mark before the heading break (see notes for \domark).
  \let\prevsectiondefs=\lastsectiondefs
  \ifx\temptype\Ynothingkeyword
    \ifx\sectionlevel\seckeyword
      \gdef\lastsectiondefs{\gdef\thissectionname{#1}\gdef\thissectionnum{}%
                            \gdef\thissection{\thissectionname}}%
    \fi
  \else\ifx\temptype\Yomitfromtockeyword
    % Don't redefine \thissection.
  \else\ifx\temptype\Yappendixkeyword
    \ifx\sectionlevel\seckeyword
      \toks0={#1}%
      \xdef\lastsectiondefs{%
        \gdef\noexpand\thissectionname{\the\toks0}%
        \gdef\noexpand\thissectionnum{#4}%
        % \noexpand\putwordSection avoids expanding indigestible
        % commands in some of the translations.
```

```
      \gdef\noexpand\thissection{\noexpand\putwordSection{}
                          \noexpand\thissectionnum:
                          \noexpand\thissectionname}%
    }%
  \fi
\else
  \ifx\sectionlevel\seckeyword
    \toks0={#1}%
    \xdef\lastsectiondefs{%
      \gdef\noexpand\thissectionname{\the\toks0}%
      \gdef\noexpand\thissectionnum{#4}%
      % \noexpand\putwordSection avoids expanding indigestible
      % commands in some of the translations.
      \gdef\noexpand\thissection{\noexpand\putwordSection{}
                          \noexpand\thissectionnum:
                          \noexpand\thissectionname}%
    }%
  \fi
\fi\fi\fi
%
% Go into vertical mode.  Usually we'll already be there, but we
% don't want the following whatsit to end up in a preceding paragraph
% if the document didn't happen to have a blank line.
\par
%
% Output the mark.  Pass it through \safewhatsit, to take care of
% the preceding space.
\safewhatsit\domark
%
% Insert space above the heading.
\csname #2headingbreak\endcsname
%
% Now the second mark, after the heading break.  No break points
% between here and the heading.
\let\prevsectiondefs=\lastsectiondefs
\domark
%
% Only insert the space after the number if we have a section number.
\ifx\temptype\Ynothingkeyword
  \setbox0 = \hbox{}%
  \def\toctype{unn}%
  \gdef\lastsection{#1}%
\else\ifx\temptype\Yomitfromtockeyword
  % for @headings -- no section number, don't include in toc,
  % and don't redefine \lastsection.
  \setbox0 = \hbox{}%
  \def\toctype{omit}%
  \let\sectionlevel=\empty
```

```
  \else\ifx\temptype\Yappendixkeyword
    \setbox0 = \hbox{#4\enspace}%
    \def\toctype{app}%
    \gdef\lastsection{#1}%
  \else
    \setbox0 = \hbox{#4\enspace}%
    \def\toctype{num}%
    \gdef\lastsection{#1}%
  \fi\fi\fi
  %
  % Write the toc entry (before \donoderef).  See comments in \chapmacro.
  \writetocentry{\toctype\sectionlevel}{#1}{#4}%
  %
  % Write the node reference (= pdf destination for pdftex).
  % Again, see comments in \chapmacro.
  \donoderef{#3}%
  %
  % Interline glue will be inserted when the vbox is completed.
  % That glue will be a valid breakpoint for the page, since it'll be
  % preceded by a whatsit (usually from the \donoderef, or from the
  % \writetocentry if there was no node).  We don't want to allow that
  % break, since then the whatsits could end up on page n while the
  % section is on page n+1, thus toc/etc. are wrong.  Debian bug 276000.
  \nobreak
  %
  % Output the actual section heading.
  \vbox{\hyphenpenalty=10000 \tolerance=5000 \parindent=0pt \ptexraggedright
        \hangindent=\wd0  % zero if no section number
        \unhbox0 #1}%
}%
% Add extra space after the heading -- half of whatever came above it.
% Don't allow stretch, though.
\kern .5 \csname #2headingskip\endcsname
%
% Do not let the kern be a potential breakpoint, as it would be if it
% was followed by glue.
\nobreak
%
% We'll almost certainly start a paragraph next, so don't let that
% glue accumulate.  (Not a breakpoint because it's preceded by a
% discardable item.)  However, when a paragraph is not started next
% (\startdefun, \cartouche, \center, etc.), this needs to be wiped out
% or the negative glue will cause weirdly wrong output, typically
% obscuring the section heading with something else.
\vskip-\parskip
%
% This is so the last item on the main vertical list is a known
% \penalty > 10000, so \startdefun, etc., can recognize the situation
```

```
 % and do the needful.
 \penalty 10001
}


\message{toc,}
% Table of contents.
\newwrite\tocfile

% Write an entry to the toc file, opening it if necessary.
% Called from @chapter, etc.
%
% Example usage: \writetocentry{sec}{Section Name}{\the\chapno.\the\secno}
% We append the current node name (if any) and page number as additional
% arguments for the \{chap,sec,...}entry macros which will eventually
% read this.  The node name is used in the pdf outlines as the
% destination to jump to.
%
% We open the .toc file for writing here instead of at @setfilename (or
% any other fixed time) so that @contents can be anywhere in the document.
% But if #1 is `omit', then we don't do anything.  This is used for the
% table of contents chapter openings themselves.
%
\newif\iftocfileopened
\def\omitkeyword{omit}%
%
\def\writetocentry#1#2#3{%
 \edef\writetoctype{#1}%
 \ifx\writetoctype\omitkeyword \else
   \iftocfileopened\else
     \immediate\openout\tocfile = \jobname.toc
     \global\tocfileopenedtrue
   \fi
   %
   \iflinks
     {\atdummies
      \edef\temp{%
        \write\tocfile{@#1entry{#2}{#3}{\lastnode}{\noexpand\folio}}}%
      \temp
     }%
   \fi
 \fi
 %
 % Tell \shipout to create a pdf destination on each page, if we're
 % writing pdf.  These are used in the table of contents.  We can't
 % just write one on every page because the title pages are numbered
 % 1 and 2 (the page numbers aren't printed), and so are the first
 % two pages of the document.  Thus, we'd have two destinations named
```

```
 % `1', and two named `2'.
 \ifpdf \global\pdfmakepagedesttrue \fi
}


% These characters do not print properly in the Computer Modern roman
% fonts, so we must take special care.  This is more or less redundant
% with the Texinfo input format setup at the end of this file.
%
\def\activecatcodes{%
 \catcode`\"=\active
 \catcode`\$=\active
 \catcode`\<=\active
 \catcode`\>=\active
 \catcode`\\=\active
 \catcode`\^=\active
 \catcode`\_=\active
 \catcode`\|=\active
 \catcode`\~=\active
}


% Read the toc file, which is essentially Texinfo input.
\def\readtocfile{%
 \setupdatafile
 \activecatcodes
 \input \tocreadfilename
}

\newskip\contentsrightmargin \contentsrightmargin=1in
\newcount\savepageno
\newcount\lastnegativepageno \lastnegativepageno = -1

% Prepare to read what we've written to \tocfile.
%
\def\startcontents#1{%
 % If @setchapternewpage on, and @headings double, the contents should
 % start on an odd page, unlike chapters.  Thus, we maintain
 % \contentsalignmacro in parallel with \pagealignmacro.
 % From: Torbjorn Granlund <tege@matematik.su.se>
 \contentsalignmacro
 \immediate\closeout\tocfile
 %
 % Don't need to put `Contents' or `Short Contents' in the headline.
 % It is abundantly clear what they are.
 \chapmacro{#1}{Yomitfromtoc}{}%
 %
 \savepageno = \pageno
```

```
 \begingroup                % Set up to handle contents files properly.
   \raggedbottom             % Worry more about breakpoints than the bottom.
   \advance\hsize by -\contentsrightmargin % Don't use the full line length.
   %
   % Roman numerals for page numbers.
   \ifnum \pageno>0 \global\pageno = \lastnegativepageno \fi
}

% redefined for the two-volume lispref.  We always output on
% \jobname.toc even if this is redefined.
%
\def\tocreadfilename{\jobname.toc}

% Normal (long) toc.
%
\def\contents{%
 \startcontents{\putwordTOC}%
   \openin 1 \tocreadfilename\space
   \ifeof 1 \else
     \readtocfile
   \fi
   \vfill \eject
   \contentsalignmacro % in case @setchapternewpage odd is in effect
   \ifeof 1 \else
     \pdfmakeoutlines
   \fi
   \closein 1
 \endgroup
 \lastnegativepageno = \pageno
 \global\pageno = \savepageno
}

% And just the chapters.
\def\summarycontents{%
 \startcontents{\putwordShortTOC}%
   %
   \let\partentry = \shortpartentry
   \let\numchapentry = \shortchapentry
   \let\appentry = \shortchapentry
   \let\unnchapentry = \shortunnchapentry
   % We want a true roman here for the page numbers.
   \secfonts
   \let\rm=\shortcontrm \let\bf=\shortcontbf
   \let\sl=\shortcontsl \let\tt=\shortconttt
   \rm
   \hyphenpenalty = 10000
   \advance\baselineskip by 1pt % Open it up a little.
   \def\numsecentry##1##2##3##4{}
```

```
  \let\appsecentry = \numsecentry
  \let\unnsecentry = \numsecentry
  \let\numsubsecentry = \numsecentry
  \let\appsubsecentry = \numsecentry
  \let\unnsubsecentry = \numsecentry
  \let\numsubsubsecentry = \numsecentry
  \let\appsubsubsecentry = \numsecentry
  \let\unnsubsubsecentry = \numsecentry
  \openin 1 \tocreadfilename\space
  \ifeof 1 \else
    \readtocfile
  \fi
  \closein 1
  \vfill \eject
  \contentsalignmacro % in case @setchapternewpage odd is in effect
 \endgroup
 \lastnegativepageno = \pageno
 \global\pageno = \savepageno
}
\let\shortcontents = \summarycontents

% Typeset the label for a chapter or appendix for the short contents.
% The arg is, e.g., `A' for an appendix, or `3' for a chapter.
%
\def\shortchaplabel#1{%
 % This space should be enough, since a single number is .5em, and the
 % widest letter (M) is 1em, at least in the Computer Modern fonts.
 % But use \hss just in case.
 % (This space doesn't include the extra space that gets added after
 % the label; that gets put in by \shortchapentry above.)
 %
 % We'd like to right-justify chapter numbers, but that looks strange
 % with appendix letters.  And right-justifying numbers and
 % left-justifying letters looks strange when there is less than 10
 % chapters.  Have to read the whole toc once to know how many chapters
 % there are before deciding ...
 \hbox to 1em{#1\hss}%
}

% These macros generate individual entries in the table of contents.
% The first argument is the chapter or section name.
% The last argument is the page number.
% The arguments in between are the chapter number, section number, ...

% Parts, in the main contents.  Replace the part number, which doesn't
% exist, with an empty box.  Let's hope all the numbers have the same width.
% Also ignore the page number, which is conventionally not printed.
\def\numeralbox{\setbox0=\hbox{8}\hbox to \wd0{\hfil}}
```

```
\def\partentry#1#2#3#4{\dochapentry{\numeralbox\labelspace#1}{}}
%
% Parts, in the short toc.
\def\shortpartentry#1#2#3#4{%
 \penalty-300
 \vskip.5\baselineskip plus.15\baselineskip minus.1\baselineskip
 \shortchapentry{{\bf #1}}{\numeralbox}{}{}%
}

% Chapters, in the main contents.
\def\numchapentry#1#2#3#4{\dochapentry{#2\labelspace#1}{#4}}
%
% Chapters, in the short toc.
% See comments in \dochapentry re vbox and related settings.
\def\shortchapentry#1#2#3#4{%
 \tocentry{\shortchaplabel{#2}\labelspace #1}{\doshortpageno\bgroup#4\egroup}%
}

% Appendices, in the main contents.
% Need the word Appendix, and a fixed-size box.
%
\def\appendixbox#1{%
 % We use M since it's probably the widest letter.
 \setbox0 = \hbox{\putwordAppendix{} M}%
 \hbox to \wd0{\putwordAppendix{} #1\hss}}
%
\def\appentry#1#2#3#4{\dochapentry{\appendixbox{#2}\labelspace#1}{#4}}

% Unnumbered chapters.
\def\unnchapentry#1#2#3#4{\dochapentry{#1}{#4}}
\def\shortunnchapentry#1#2#3#4{\tocentry{#1}{\doshortpageno\bgroup#4\egroup}}

% Sections.
\def\numsecentry#1#2#3#4{\dosecentry{#2\labelspace#1}{#4}}
\let\appsecentry=\numsecentry
\def\unnsecentry#1#2#3#4{\dosecentry{#1}{#4}}

% Subsections.
\def\numsubsecentry#1#2#3#4{\dosubsecentry{#2\labelspace#1}{#4}}
\let\appsubsecentry=\numsubsecentry
\def\unnsubsecentry#1#2#3#4{\dosubsecentry{#1}{#4}}

% And subsubsections.
\def\numsubsubsecentry#1#2#3#4{\dosubsubsecentry{#2\labelspace#1}{#4}}
\let\appsubsubsecentry=\numsubsubsecentry
\def\unnsubsubsecentry#1#2#3#4{\dosubsubsecentry{#1}{#4}}

% This parameter controls the indentation of the various levels.
```

```
% Same as \defaultparindent.
\newdimen\tocindent \tocindent = 15pt

% Now for the actual typesetting. In all these, #1 is the text and #2 is the
% page number.
%
% If the toc has to be broken over pages, we want it to be at chapters
% if at all possible; hence the \penalty.
\def\dochapentry#1#2{%
  \penalty-300 \vskip1\baselineskip plus.33\baselineskip minus.25\baselineskip
  \begingroup
    \chapentryfonts
    \tocentry{#1}{\dopageno\bgroup#2\egroup}%
  \endgroup
  \nobreak\vskip .25\baselineskip plus.1\baselineskip
}

\def\dosecentry#1#2{\begingroup
 \secentryfonts \leftskip=\tocindent
 \tocentry{#1}{\dopageno\bgroup#2\egroup}%
\endgroup}

\def\dosubsecentry#1#2{\begingroup
 \subsecentryfonts \leftskip=2\tocindent
 \tocentry{#1}{\dopageno\bgroup#2\egroup}%
\endgroup}

\def\dosubsubsecentry#1#2{\begingroup
 \subsubsecentryfonts \leftskip=3\tocindent
 \tocentry{#1}{\dopageno\bgroup#2\egroup}%
\endgroup}

% We use the same \entry macro as for the index entries.
\let\tocentry = \entry

% Space between chapter (or whatever) number and the title.
\def\labelspace{\hskip1em \relax}

\def\dopageno#1{{\rm #1}}
\def\doshortpageno#1{{\rm #1}}

\def\chapentryfonts{\secfonts \rm}
\def\secentryfonts{\textfonts}
\def\subsecentryfonts{\textfonts}
\def\subsubsecentryfonts{\textfonts}


\message{environments,}
```

```
% @foo ... @end foo.

% @tex ... @end tex    escapes into raw TeX temporarily.
% One exception: @ is still an escape character, so that @end tex works.
% But \@ or @@ will get a plain @ character.

\envdef\tex{%
 \setupmarkupstyle{tex}%
 \catcode `\\=0 \catcode `\{=1 \catcode `\}=2
 \catcode `\$=3 \catcode `\&=4 \catcode `\#=6
 \catcode `\^=7 \catcode `\_=8 \catcode `\~=\active \let~=\tie
 \catcode `\%=14
 \catcode `\+=\other
 \catcode `\"=\other
 \catcode `\|=\other
 \catcode `\<=\other
 \catcode `\>=\other
 \catcode`\`=\other
 \catcode`\'=\other
 \escapechar=`\\
 %
 % ' is active in math mode (mathcode"8000).  So reset it, and all our
 % other math active characters (just in case), to plain's definitions.
 \mathactive
 %
 \let\b=\ptexb
 \let\bullet=\ptexbullet
 \let\c=\ptexc
 \let\,=\ptexcomma
 \let\.=\ptexdot
 \let\dots=\ptexdots
 \let\equiv=\ptexequiv
 \let\!=\ptexexclam
 \let\i=\ptexi
 \let\indent=\ptexindent
 \let\noindent=\ptexnoindent
 \let\{=\ptexlbrace
 \let\+=\tabalign
 \let\}=\ptexrbrace
 \let\/=\ptexslash
 \let\*=\ptexstar
 \let\t=\ptext
 \expandafter \let\csname top\endcsname=\ptextop  % outer
 \let\frenchspacing=\plainfrenchspacing
 %
 \def\endldots{\mathinner{\ldots\ldots\ldots\ldots}}%
 \def\enddots{\relax\ifmmode\endldots\else$\mathsurround=0pt \endldots\,$\fi}%
 \def\@{@}%
```

```
}
% There is no need to define \Etex.

% Define @lisp ... @end lisp.
% @lisp environment forms a group so it can rebind things,
% including the definition of @end lisp (which normally is erroneous).

% Amount to narrow the margins by for @lisp.
\newskip\lispnarrowing \lispnarrowing=0.4in

% This is the definition that ^^M gets inside @lisp, @example, and other
% such environments.  \null is better than a space, since it doesn't
% have any width.
\def\lisppar{\null\endgraf}

% This space is always present above and below environments.
\newskip\envskipamount \envskipamount = 0pt

% Make spacing and below environment symmetrical.  We use \parskip here
% to help in doing that, since in @example-like environments \parskip
% is reset to zero; thus the \afterenvbreak inserts no space -- but the
% start of the next paragraph will insert \parskip.
%
\def\aboveenvbreak{{%
 % =10000 instead of <10000 because of a special case in \itemzzz and
 % \sectionheading, q.v.
 \ifnum \lastpenalty=10000 \else
   \advance\envskipamount by \parskip
   \endgraf
   \ifdim\lastskip<\envskipamount
     \removelastskip
     % it's not a good place to break if the last penalty was \nobreak
     % or better ...
     \ifnum\lastpenalty<10000 \penalty-50 \fi
     \vskip\envskipamount
   \fi
 \fi
}}

\let\afterenvbreak = \aboveenvbreak

% \nonarrowing is a flag.  If "set", @lisp etc don't narrow margins; it will
% also clear it, so that its embedded environments do the narrowing again.
\let\nonarrowing=\relax

% @cartouche ... @end cartouche: draw rectangle w/rounded corners around
% environment contents.
\font\circle=lcircle10
```

```
\newdimen\circthick
\newdimen\cartouter\newdimen\cartinner
\newskip\normbskip\newskip\normpskip\newskip\normlskip
\circthick=\fontdimen8\circle
%
\def\ctl{{\circle\char'013\hskip -6pt}}% 6pt from pl file: 1/2charwidth
\def\ctr{{\hskip 6pt\circle\char'010}}
\def\cbl{{\circle\char'012\hskip -6pt}}
\def\cbr{{\hskip 6pt\circle\char'011}}
\def\carttop{\hbox to \cartouter{\hskip\lskip
      \ctl\leaders\hrule height\circthick\hfil\ctr
      \hskip\rskip}}
\def\cartbot{\hbox to \cartouter{\hskip\lskip
      \cbl\leaders\hrule height\circthick\hfil\cbr
      \hskip\rskip}}
%
\newskip\lskip\newskip\rskip

\envdef\cartouche{%
 \ifhmode\par\fi  % can't be in the midst of a paragraph.
 \startsavinginserts
 \lskip=\leftskip \rskip=\rightskip
 \leftskip=0pt\rightskip=0pt % we want these *outside*.
 \cartinner=\hsize \advance\cartinner by-\lskip
 \advance\cartinner by-\rskip
 \cartouter=\hsize
 \advance\cartouter by 18.4pt % allow for 3pt kerns on either
   % side, and for 6pt waste from
   % each corner char, and rule thickness
 \normbskip=\baselineskip \normpskip=\parskip \normlskip=\lineskip
 % Flag to tell @lisp, etc., not to narrow margin.
 \let\nonarrowing = t%
 %
 % If this cartouche directly follows a sectioning command, we need the
 % \parskip glue (backspaced over by default) or the cartouche can
 % collide with the section heading.
 \ifnum\lastpenalty>10000 \vskip\parskip \penalty\lastpenalty \fi
 %
 \vbox\bgroup
    \baselineskip=0pt\parskip=0pt\lineskip=0pt
    \carttop
    \hbox\bgroup
  \hskip\lskip
  \vrule\kern3pt
  \vbox\bgroup
      \kern3pt
      \hsize=\cartinner
      \baselineskip=\normbskip
```

```
      \lineskip=\normlskip
      \parskip=\normpskip
      \vskip -\parskip
      \comment % For explanation, see the end of def\group.
}
\def\Ecartouche{%
            \ifhmode\par\fi
      \kern3pt
  \egroup
  \kern3pt\vrule
  \hskip\rskip
    \egroup
    \cartbot
 \egroup
 \checkinserts
}


% This macro is called at the beginning of all the @example variants,
% inside a group.
\newdimen\nonfillparindent
\def\nonfillstart{%
 \aboveenvbreak
 \hfuzz = 12pt % Don't be fussy
 \sepspaces % Make spaces be word-separators rather than space tokens.
 \let\par = \lisppar % don't ignore blank lines
 \obeylines % each line of input is a line of output
 \parskip = 0pt
 % Turn off paragraph indentation but redefine \indent to emulate
 % the normal \indent.
 \nonfillparindent=\parindent
 \parindent = 0pt
 \let\indent\nonfillindent
 %
 \emergencystretch = 0pt % don't try to avoid overfull boxes
 \ifx\nonarrowing\relax
   \advance \leftskip by \lispnarrowing
   \exdentamount=\lispnarrowing
 \else
   \let\nonarrowing = \relax
 \fi
 \let\exdent=\nofillexdent
}

\begingroup
\obeyspaces
% We want to swallow spaces (but not other tokens) after the fake
% @indent in our nonfill-environments, where spaces are normally
```

```
% active and set to @tie, resulting in them not being ignored after
% @indent.
\gdef\nonfillindent{\futurelet\temp\nonfillindentcheck}%
\gdef\nonfillindentcheck{%
\ifx\temp %
\expandafter\nonfillindentgobble%
\else%
\leavevmode\nonfillindentbox%
\fi%
}%
\endgroup
\def\nonfillindentgobble#1{\nonfillindent}
\def\nonfillindentbox{\hbox to \nonfillparindent{\hss}}

% If you want all examples etc. small: @set dispenvsize small.
% If you want even small examples the full size: @set dispenvsize nosmall.
% This affects the following displayed environments:
%    @example, @display, @format, @lisp
%
\def\smallword{small}
\def\nosmallword{nosmall}
\let\SETdispenvsize\relax
\def\setnormaldispenv{%
 \ifx\SETdispenvsize\smallword
   % end paragraph for sake of leading, in case document has no blank
   % line.  This is redundant with what happens in \aboveenvbreak, but
   % we need to do it before changing the fonts, and it's inconvenient
   % to change the fonts afterward.
   \ifnum \lastpenalty=10000 \else \endgraf \fi
   \smallexamplefonts \rm
 \fi
}
\def\setsmalldispenv{%
 \ifx\SETdispenvsize\nosmallword
 \else
   \ifnum \lastpenalty=10000 \else \endgraf \fi
   \smallexamplefonts \rm
 \fi
}

% We often define two environments, @foo and @smallfoo.
% Let's do it in one command.  #1 is the env name, #2 the definition.
\def\makedispenvdef#1#2{%
 \expandafter\envdef\csname#1\endcsname {\setnormaldispenv #2}%
 \expandafter\envdef\csname small#1\endcsname {\setsmalldispenv #2}%
 \expandafter\let\csname E#1\endcsname \afterenvbreak
 \expandafter\let\csname Esmall#1\endcsname \afterenvbreak
}
```

```
% Define two environment synonyms (#1 and #2) for an environment.
\def\maketwodispenvdef#1#2#3{%
 \makedispenvdef{#1}{#3}%
 \makedispenvdef{#2}{#3}%
}
%
% @lisp: indented, narrowed, typewriter font;
% @example: same as @lisp.
%
% @smallexample and @smalllisp: use smaller fonts.
% Originally contributed by Pavel@xerox.
%
\maketwodispenvdef{lisp}{example}{%
 \nonfillstart
 \tt\setupmarkupstyle{example}%
 \let\kbdfont = \kbdexamplefont % Allow @kbd to do something special.
 \gobble % eat return
}
% @display/@smalldisplay: same as @lisp except keep current font.
%
\makedispenvdef{display}{%
 \nonfillstart
 \gobble
}

% @format/@smallformat: same as @display except don't narrow margins.
%
\makedispenvdef{format}{%
 \let\nonarrowing = t%
 \nonfillstart
 \gobble
}

% @flushleft: same as @format, but doesn't obey \SETdispenvsize.
\envdef\flushleft{%
 \let\nonarrowing = t%
 \nonfillstart
 \gobble
}
\let\Eflushleft = \afterenvbreak

% @flushright.
%
\envdef\flushright{%
 \let\nonarrowing = t%
 \nonfillstart
 \advance\leftskip by 0pt plus 1fill\relax
```

```
 \gobble
}
\let\Eflushright = \afterenvbreak


% @raggedright does more-or-less normal line breaking but no right
% justification.  From plain.tex.
\envdef\raggedright{%
 \rightskip0pt plus2em \spaceskip.3333em \xspaceskip.5em\relax
}
\let\Eraggedright\par

\envdef\raggedleft{%
 \parindent=0pt \leftskip0pt plus2em
 \spaceskip.3333em \xspaceskip.5em \parfillskip=0pt
 \hbadness=10000 % Last line will usually be underfull, so turn off
                 % badness reporting.
}
\let\Eraggedleft\par

\envdef\raggedcenter{%
 \parindent=0pt \rightskip0pt plus1em \leftskip0pt plus1em
 \spaceskip.3333em \xspaceskip.5em \parfillskip=0pt
 \hbadness=10000 % Last line will usually be underfull, so turn off
                 % badness reporting.
}
\let\Eraggedcenter\par


% @quotation does normal linebreaking (hence we can't use \nonfillstart)
% and narrows the margins.  We keep \parskip nonzero in general, since
% we're doing normal filling.  So, when using \aboveenvbreak and
% \afterenvbreak, temporarily make \parskip 0.
%
\makedispenvdef{quotation}{\quotationstart}
%
\def\quotationstart{%
 \indentedblockstart % same as \indentedblock, but increase right margin too.
 \ifx\nonarrowing\relax
   \advance\rightskip by \lispnarrowing
 \fi
 \parsearg\quotationlabel
}

% We have retained a nonzero parskip for the environment, since we're
% doing normal filling.
%
\def\Equotation{%
```

```
 \par
 \ifx\quotationauthor\thisisundefined\else
   % indent a bit.
   \leftline{\kern 2\leftskip \sl ---\quotationauthor}%
 \fi
 {\parskip=0pt \afterenvbreak}%
}
\def\Esmallquotation{\Equotation}

% If we're given an argument, typeset it in bold with a colon after.
\def\quotationlabel#1{%
 \def\temp{#1}%
 \ifx\temp\empty \else
   {\bf #1: }%
 \fi
}

% @indentedblock is like @quotation, but indents only on the left and
% has no optional argument.
%
\makedispenvdef{indentedblock}{\indentedblockstart}
%
\def\indentedblockstart{%
 {\parskip=0pt \aboveenvbreak}% because \aboveenvbreak inserts \parskip
 \parindent=0pt
 %
 % @cartouche defines \nonarrowing to inhibit narrowing at next level down.
 \ifx\nonarrowing\relax
   \advance\leftskip by \lispnarrowing
   \exdentamount = \lispnarrowing
 \else
   \let\nonarrowing = \relax
 \fi
}

% Keep a nonzero parskip for the environment, since we're doing normal filling.
%
\def\Eindentedblock{%
 \par
 {\parskip=0pt \afterenvbreak}%
}
\def\Esmallindentedblock{\Eindentedblock}


% LaTeX-like @verbatim...@end verbatim and @verb{<char>...<char>}
% If we want to allow any <char> as delimiter,
% we need the curly braces so that makeinfo sees the @verb command, eg:
% `@verbx...x' would look like the '@verbx' command.  --janneke@gnu.org
```

```
%
% [Knuth]: Donald Ervin Knuth, 1996.  The TeXbook.
%
% [Knuth] p.344; only we need to do the other characters Texinfo sets
% active too.  Otherwise, they get lost as the first character on a
% verbatim line.
\def\dospecials{%
 \do\ \do\\\do\{\do\}\do\$\do\&%
 \do\#\do\^\do\^^K\do\_\do\^^A\do\%\do\~%
 \do\<\do\>\do\|\do\@\do+\do\"%
 % Don't do the quotes -- if we do, @set txicodequoteundirected and
 % @set txicodequotebacktick will not have effect on @verb and
 % @verbatim, and ?` and !` ligatures won't get disabled.
 %\do\`\do\'%
}
%
% [Knuth] p. 380
\def\uncatcodespecials{%
 \def\do##1{\catcode`##1=\other}\dospecials}
%
% Setup for the @verb command.
%
% Eight spaces for a tab
\begingroup
 \catcode`\^^I=\active
 \gdef\tabeightspaces{\catcode`\^^I=\active\def^^I{\ \ \ \ \ \ \ }}
\endgroup
%
\def\setupverb{%
 \tt  % easiest (and conventionally used) font for verbatim
 \def\par{\leavevmode\endgraf}%
 \setupmarkupstyle{verb}%
 \tabeightspaces
 % Respect line breaks,
 % print special symbols as themselves, and
 % make each space count
 % must do in this order:
 \obeylines \uncatcodespecials \sepspaces
}

% Setup for the @verbatim environment
%
% Real tab expansion.
\newdimen\tabw \setbox0=\hbox{\tt\space} \tabw=8\wd0 % tab amount
%
% We typeset each line of the verbatim in an \hbox, so we can handle
% tabs.  The \global is in case the verbatim line starts with an accent,
% or some other command that starts with a begin-group.  Otherwise, the
```

```
% entire \verbbox would disappear at the corresponding end-group, before
% it is typeset.  Meanwhile, we can't have nested verbatim commands
% (can we?), so the \global won't be overwriting itself.
\newbox\verbbox
\def\starttabbox{\global\setbox\verbbox=\hbox\bgroup}
%
\begingroup
 \catcode`\^^I=\active
 \gdef\tabexpand{%
   \catcode`\^^I=\active
   \def^^I{\leavevmode\egroup
     \dimen\verbbox=\wd\verbbox % the width so far, or since the previous tab
     \divide\dimen\verbbox by\tabw
     \multiply\dimen\verbbox by\tabw % compute previous multiple of \tabw
     \advance\dimen\verbbox by\tabw  % advance to next multiple of \tabw
     \wd\verbbox=\dimen\verbbox \box\verbbox \starttabbox
   }%
 }
\endgroup

% start the verbatim environment.
\def\setupverbatim{%
 \let\nonarrowing = t%
 \nonfillstart
 \tt % easiest (and conventionally used) font for verbatim
 % The \leavevmode here is for blank lines.  Otherwise, we would
 % never \starttabox and the \egroup would end verbatim mode.
 \def\par{\leavevmode\egroup\box\verbbox\endgraf}%
 \tabexpand
 \setupmarkupstyle{verbatim}%
 % Respect line breaks,
 % print special symbols as themselves, and
 % make each space count.
 % Must do in this order:
 \obeylines \uncatcodespecials \sepspaces
 \everypar{\starttabbox}%
}

% Do the @verb magic: verbatim text is quoted by unique
% delimiter characters.  Before first delimiter expect a
% right brace, after last delimiter expect closing brace:
%
%    \def\doverb'{'<char>#1<char>'}'{#1}
%
% [Knuth] p. 382; only eat outer {}
\begingroup
 \catcode`[=1\catcode`]=2\catcode`\{=\other\catcode`\}=\other
 \gdef\doverb{#1[\def\next##1#1}[##1\endgroup]\next]
```

```
\endgroup
%
\def\verb{\begingroup\setupverb\doverb}
%
%
% Do the @verbatim magic: define the macro \doverbatim so that
% the (first) argument ends when '@end verbatim' is reached, ie:
%
%     \def\doverbatim#1@end verbatim{#1}
%
% For Texinfo it's a lot easier than for LaTeX,
% because texinfo's \verbatim doesn't stop at '\end{verbatim}':
% we need not redefine '\', '{' and '}'.
%
% Inspired by LaTeX's verbatim command set [latex.ltx]
%
\begingroup
 \catcode`\ =\active
 \obeylines %
 % ignore everything up to the first ^^M, that's the newline at the end
 % of the @verbatim input line itself.  Otherwise we get an extra blank
 % line in the output.
 \xdef\doverbatim#1^^M#2@end verbatim{#2\noexpand\end\gobble verbatim}%
 % We really want {...\end verbatim} in the body of the macro, but
 % without the active space; thus we have to use \xdef and \gobble.
\endgroup
%
\envdef\verbatim{%
   \setupverbatim\doverbatim
}
\let\Everbatim = \afterenvbreak


% @verbatiminclude FILE - insert text of file in verbatim environment.
%
\def\verbatiminclude{\parseargusing\filenamecatcodes\doverbatiminclude}
%
\def\doverbatiminclude#1{%
 {%
   \makevalueexpandable
   \setupverbatim
   \indexnofonts       % Allow `@@' and other weird things in file names.
   \wlog{texinfo.tex: doing @verbatiminclude of #1^^J}%
   \input #1
   \afterenvbreak
 }%
}
```

```
% @copying ... @end copying.
% Save the text away for @insertcopying later.
%
% We save the uninterpreted tokens, rather than creating a box.
% Saving the text in a box would be much easier, but then all the
% typesetting commands (@smallbook, font changes, etc.) have to be done
% beforehand -- and a) we want @copying to be done first in the source
% file; b) letting users define the frontmatter in as flexible order as
% possible is very desirable.
%
\def\copying{\checkenv{}\begingroup\scanargctxt\docopying}
\def\docopying#1@end copying{\endgroup\def\copyingtext{#1}}
%
\def\insertcopying{%
 \begingroup
   \parindent = 0pt  % paragraph indentation looks wrong on title page
   \scanexp\copyingtext
 \endgroup
}


\message{defuns,}
% @defun etc.

\newskip\defbodyindent \defbodyindent=.4in
\newskip\defargsindent \defargsindent=50pt
\newskip\deflastargmargin \deflastargmargin=18pt
\newcount\defunpenalty

% Start the processing of @deffn:
\def\startdefun{%
 \ifnum\lastpenalty<10000
   \medbreak
   \defunpenalty=10003 % Will keep this @deffn together with the
                       % following @def command, see below.
 \else
   % If there are two @def commands in a row, we'll have a \nobreak,
   % which is there to keep the function description together with its
   % header.  But if there's nothing but headers, we need to allow a
   % break somewhere.  Check specifically for penalty 10002, inserted
   % by \printdefunline, instead of 10000, since the sectioning
   % commands also insert a nobreak penalty, and we don't want to allow
   % a break between a section heading and a defun.
   %
   % As a further refinement, we avoid "club" headers by signalling
   % with penalty of 10003 after the very first @deffn in the
   % sequence (see above), and penalty of 10002 after any following
   % @def command.
```

```
   \ifnum\lastpenalty=10002 \penalty2000 \else \defunpenalty=10002 \fi
   %
   % Similarly, after a section heading, do not allow a break.
   % But do insert the glue.
   \medskip  % preceded by discardable penalty, so not a breakpoint
 \fi
 %
 \parindent=0in
 \advance\leftskip by \defbodyindent
 \exdentamount=\defbodyindent
}

\def\dodefunx#1{%
 % First, check whether we are in the right environment:
 \checkenv#1%
 %
 % As above, allow line break if we have multiple x headers in a row.
 % It's not a great place, though.
 \ifnum\lastpenalty=10002 \penalty3000 \else \defunpenalty=10002 \fi
 %
 % And now, it's time to reuse the body of the original defun:
 \expandafter\gobbledefun#1%
}
\def\gobbledefun#1\startdefun{}

% \printdefunline \deffnheader{text}
%
\def\printdefunline#1#2{%
 \begingroup
   % call \deffnheader:
   #1#2 \endheader
   % common ending:
   \interlinepenalty = 10000
   \advance\rightskip by 0pt plus 1fil\relax
   \endgraf
   \nobreak\vskip -\parskip
   \penalty\defunpenalty  % signal to \startdefun and \dodefunx
   % Some of the @defun-type tags do not enable magic parentheses,
   % rendering the following check redundant.  But we don't optimize.
   \checkparencounts
 \endgroup
}

\def\Edefun{\endgraf\medbreak}

% \makedefun{deffn} creates \deffn, \deffnx and \Edeffn;
% the only thing remaining is to define \deffnheader.
%
```

```
\def\makedefun#1{%
 \expandafter\let\csname E#1\endcsname = \Edefun
 \edef\temp{\noexpand\domakedefun
   \makecsname{#1}\makecsname{#1x}\makecsname{#1header}}%
 \temp
}

% \domakedefun \deffn \deffnx \deffnheader
%
% Define \deffn and \deffnx, without parameters.
% \deffnheader has to be defined explicitly.
%
\def\domakedefun#1#2#3{%
 \envdef#1{%
   \startdefun
   \doingtypefnfalse    % distinguish typed functions from all else
   \parseargusing\activeparens{\printdefunline#3}%
 }%
 \def#2{\dodefunx#1}%
 \def#3%
}

\newif\ifdoingtypefn       % doing typed function?
\newif\ifrettypeownline    % typeset return type on its own line?

% @deftypefnnewline on|off says whether the return type of typed functions
% are printed on their own line.  This affects @deftypefn, @deftypefun,
% @deftypeop, and @deftypemethod.
%
\parseargdef\deftypefnnewline{%
 \def\temp{#1}%
 \ifx\temp\onword
   \expandafter\let\csname SETtxideftypefnnl\endcsname
     = \empty
 \else\ifx\temp\offword
   \expandafter\let\csname SETtxideftypefnnl\endcsname
     = \relax
 \else
   \errhelp = \EMsimple
   \errmessage{Unknown @txideftypefnnl value `\temp',
               must be on|off}%
 \fi\fi
}

% Untyped functions:

% @deffn category name args
\makedefun{deffn}{\deffngeneral{}}
```

```
% @deffn category class name args
\makedefun{defop}#1 {\defopon{#1\ \putwordon}}

% \defopon {category on}class name args
\def\defopon#1#2 {\deffngeneral{\putwordon\ \code{#2}}{#1\ \code{#2}} }

% \deffngeneral {subind}category name args
%
\def\deffngeneral#1#2 #3 #4\endheader{%
 % Remember that \dosubind{fn}{foo}{} is equivalent to \doind{fn}{foo}.
 \dosubind{fn}{\code{#3}}{#1}%
 \defname{#2}{}{#3}\magicamp\defunargs{#4\unskip}%
}

% Typed functions:

% @deftypefn category type name args
\makedefun{deftypefn}{\deftypefngeneral{}}

% @deftypeop category class type name args
\makedefun{deftypeop}#1 {\deftypeopon{#1\ \putwordon}}

% \deftypeopon {category on}class type name args
\def\deftypeopon#1#2 {\deftypefngeneral{\putwordon\ \code{#2}}{#1\ \code{#2}} }

% \deftypefngeneral {subind}category type name args
%
\def\deftypefngeneral#1#2 #3 #4 #5\endheader{%
 \dosubind{fn}{\code{#4}}{#1}%
 \doingtypefntrue
 \defname{#2}{#3}{#4}\defunargs{#5\unskip}%
}

% Typed variables:

% @deftypevr category type var args
\makedefun{deftypevr}{\deftypecvgeneral{}}

% @deftypecv category class type var args
\makedefun{deftypecv}#1 {\deftypecvof{#1\ \putwordof}}

% \deftypecvof {category of}class type var args
\def\deftypecvof#1#2 {\deftypecvgeneral{\putwordof\ \code{#2}}{#1\ \code{#2}} }

% \deftypecvgeneral {subind}category type var args
%
\def\deftypecvgeneral#1#2 #3 #4 #5\endheader{%
```

```
 \dosubind{vr}{\code{#4}}{#1}%
 \defname{#2}{#3}{#4}\defunargs{#5\unskip}%
}

% Untyped variables:

% @defvr category var args
\makedefun{defvr}#1 {\deftypevrheader{#1} {} }

% @defcv category class var args
\makedefun{defcv}#1 {\defcvof{#1\ \putwordof}}

% \defcvof {category of}class var args
\def\defcvof#1#2 {\deftypecvof{#1}#2 {} }

% Types:

% @deftp category name args
\makedefun{deftp}#1 #2 #3\endheader{%
 \doind{tp}{\code{#2}}%
 \defname{#1}{}{#2}\defunargs{#3\unskip}%
}

% Remaining @defun-like shortcuts:
\makedefun{defun}{\deffnheader{\putwordDeffunc} }
\makedefun{defmac}{\deffnheader{\putwordDefmac} }
\makedefun{defspec}{\deffnheader{\putwordDefspec} }
\makedefun{deftypefun}{\deftypefnheader{\putwordDeffunc} }
\makedefun{defvar}{\defvrheader{\putwordDefvar} }
\makedefun{defopt}{\defvrheader{\putwordDefopt} }
\makedefun{deftypevar}{\deftypevrheader{\putwordDefvar} }
\makedefun{defmethod}{\defopon\putwordMethodon}
\makedefun{deftypemethod}{\deftypeopon\putwordMethodon}
\makedefun{defivar}{\defcvof\putwordInstanceVariableof}
\makedefun{deftypeivar}{\deftypecvof\putwordInstanceVariableof}

% \defname, which formats the name of the @def (not the args).
% #1 is the category, such as "Function".
% #2 is the return type, if any.
% #3 is the function name.
%
% We are followed by (but not passed) the arguments, if any.
%
\def\defname#1#2#3{%
 \par
 % Get the values of \leftskip and \rightskip as they were outside the @def...
 \advance\leftskip by -\defbodyindent
 %
```

```
% Determine if we are typesetting the return type of a typed function
% on a line by itself.
\rettypeownlinefalse
\ifdoingtypefn  % doing a typed function specifically?
  % then check user option for putting return type on its own line:
  \expandafter\ifx\csname SETtxideftypefnnl\endcsname\relax \else
    \rettypeownlinetrue
  \fi
\fi
%
% How we'll format the category name.  Putting it in brackets helps
% distinguish it from the body text that may end up on the next line
% just below it.
\def\temp{#1}%
\setbox0=\hbox{\kern\deflastargmargin \ifx\temp\empty\else [\rm\temp]\fi}
%
% Figure out line sizes for the paragraph shape.  We'll always have at
% least two.
\tempnum = 2
%
% The first line needs space for \box0; but if \rightskip is nonzero,
% we need only space for the part of \box0 which exceeds it:
\dimen0=\hsize  \advance\dimen0 by -\wd0  \advance\dimen0 by \rightskip
%
% If doing a return type on its own line, we'll have another line.
\ifrettypeownline
  \advance\tempnum by 1
  \def\maybeshapeline{0in \hsize}%
\else
  \def\maybeshapeline{}%
\fi
%
% The continuations:
\dimen2=\hsize  \advance\dimen2 by -\defargsindent
%
% The final paragraph shape:
\parshape \tempnum  0in \dimen0  \maybeshapeline  \defargsindent \dimen2
%
% Put the category name at the right margin.
\noindent
\hbox to 0pt{%
  \hfil\box0 \kern-\hsize
  % \hsize has to be shortened this way:
  \kern\leftskip
  % Intentionally do not respect \rightskip, since we need the space.
}%
%
% Allow all lines to be underfull without complaint:
```

```
\tolerance=10000 \hbadness=10000
\exdentamount=\defbodyindent
{%
  % defun fonts. We use typewriter by default (used to be bold) because:
  % . we're printing identifiers, they should be in tt in principle.
  % . in languages with many accents, such as Czech or French, it's
  %   common to leave accents off identifiers.  The result looks ok in
  %   tt, but exceedingly strange in rm.
  % . we don't want -- and --- to be treated as ligatures.
  % . this still does not fix the ?` and !` ligatures, but so far no
  %   one has made identifiers using them :).
  \df \tt
  \def\temp{#2}% text of the return type
  \ifx\temp\empty\else
    \tclose{\temp}% typeset the return type
    \ifrettypeownline
      % put return type on its own line; prohibit line break following:
      \hfil\vadjust{\nobreak}\break
    \else
      \space  % type on same line, so just followed by a space
    \fi
  \fi          % no return type
  #3% output function name
}%
{\rm\enskip}% hskip 0.5 em of \tenrm
%
\boldbrax
% arguments will be output next, if any.
}

% Print arguments in slanted roman (not ttsl), inconsistently with using
% tt for the name.  This is because literal text is sometimes needed in
% the argument list (groff manual), and ttsl and tt are not very
% distinguishable.  Prevent hyphenation at `-' chars.
%
\def\defunargs#1{%
 % use sl by default (not ttsl),
 % tt for the names.
 \df \sl \hyphenchar\font=0
 %
 % On the other hand, if an argument has two dashes (for instance), we
 % want a way to get ttsl.  We used to recommend @var for that, so
 % leave the code in, but it's strange for @var to lead to typewriter.
 % Nowadays we recommend @code, since the difference between a ttsl hyphen
 % and a tt hyphen is pretty tiny.  @code also disables ?` !`.
 \def\var##1{{\setupmarkupstyle{var}\ttslanted{##1}}}%
 #1%
 \sl\hyphenchar\font=45
```

```
}

% We want ()&[] to print specially on the defun line.
%
\def\activeparens{%
 \catcode`\(=\active \catcode`\)=\active
 \catcode`\[=\active \catcode`\]=\active
 \catcode`\&=\active
}

% Make control sequences which act like normal parenthesis chars.
\let\lparen = ( \let\rparen = )

% Be sure that we always have a definition for `(', etc.  For example,
% if the fn name has parens in it, \boldbrax will not be in effect yet,
% so TeX would otherwise complain about undefined control sequence.
{
 \activeparens
 \global\let(=\lparen \global\let)=\rparen
 \global\let[=\lbrack \global\let]=\rbrack
 \global\let& = \&

 \gdef\boldbrax{\let(=\opnr\let)=\clnr\let[=\lbrb\let]=\rbrb}
 \gdef\magicamp{\let&=\amprm}
}

\newcount\parencount

% If we encounter &foo, then turn on ()-hacking afterwards
\newif\ifampseen
\def\amprm#1 {\ampseentrue{\bf\&#1 }}

\def\parenfont{%
 \ifampseen
   % At the first level, print parens in roman,
   % otherwise use the default font.
   \ifnum \parencount=1 \rm \fi
 \else
   % The \sf parens (in \boldbrax) actually are a little bolder than
   % the contained text.  This is especially needed for [ and ] .
   \sf
 \fi
}
\def\infirstlevel#1{%
 \ifampseen
   \ifnum\parencount=1
     #1%
   \fi
```

```
 \fi
}
\def\bfafterword#1 {#1 \bf}

\def\opnr{%
 \global\advance\parencount by 1
 {\parenfont(}%
 \infirstlevel \bfafterword
}
\def\clnr{%
 {\parenfont)}%
 \infirstlevel \sl
 \global\advance\parencount by -1
}

\newcount\brackcount
\def\lbrb{%
 \global\advance\brackcount by 1
 {\bf[}%
}
\def\rbrb{%
 {\bf]}%
 \global\advance\brackcount by -1
}

\def\checkparencounts{%
 \ifnum\parencount=0 \else \badparencount \fi
 \ifnum\brackcount=0 \else \badbrackcount \fi
}
% these should not use \errmessage; the glibc manual, at least, actually
% has such constructs (when documenting function pointers).
\def\badparencount{%
 \message{Warning: unbalanced parentheses in @def...}%
 \global\parencount=0
}
\def\badbrackcount{%
 \message{Warning: unbalanced square brackets in @def...}%
 \global\brackcount=0
}


\message{macros,}
% @macro.

% To do this right we need a feature of e-TeX, \scantokens,
% which we arrange to emulate with a temporary file in ordinary TeX.
\ifx\eTeXversion\thisisundefined
 \newwrite\macscribble
```

```
 \def\scantokens#1{%
   \toks0={#1}%
   \immediate\openout\macscribble=\jobname.tmp
   \immediate\write\macscribble{\the\toks0}%
   \immediate\closeout\macscribble
   \input \jobname.tmp
 }
\fi

\def\scanmacro#1{\begingroup
 \newlinechar`\^^M
 \let\xeatspaces\eatspaces
 %
 % Undo catcode changes of \startcontents and \doprintindex
 % When called from @insertcopying or (short)caption, we need active
 % backslash to get it printed correctly.  Previously, we had
 % \catcode`\\=\other instead.  We'll see whether a problem appears
 % with macro expansion.    --kasal, 19aug04
 \catcode`\@=0 \catcode`\\=\active \escapechar=`\@
 %
 % ... and for \example:
 \spaceisspace
 %
 % The \empty here causes a following catcode 5 newline to be eaten as
 % part of reading whitespace after a control sequence.  It does not
 % eat a catcode 13 newline.  There's no good way to handle the two
 % cases (untried: maybe e-TeX's \everyeof could help, though plain TeX
 % would then have different behavior).  See the Macro Details node in
 % the manual for the workaround we recommend for macros and
 % line-oriented commands.
 %
 \scantokens{#1\empty}%
\endgroup}

\def\scanexp#1{%
 \edef\temp{\noexpand\scanmacro{#1}}%
 \temp
 }

\newcount\paramno   % Count of parameters
\newtoks\macname    % Macro name
\newif\ifrecursive  % Is it recursive?

% List of all defined macros in the form
%    \definedummyword\macro1\definedummyword\macro2...
% Currently is also contains all @aliases; the list can be split
% if there is a need.
\def\macrolist{}
```

```
% Add the macro to \macrolist
\def\addtomacrolist#1{\expandafter \addtomacrolistxxx \csname#1\endcsname}
\def\addtomacrolistxxx#1{%
   \toks0 = \expandafter{\macrolist\definedummyword#1}%
   \xdef\macrolist{\the\toks0}%
}

% Utility routines.
% This does \let #1 = #2, with \csnames; that is,
%   \let \csname#1\endcsname = \csname#2\endcsname
% (except of course we have to play expansion games).
%
\def\cslet#1#2{%
 \expandafter\let
 \csname#1\expandafter\endcsname
 \csname#2\endcsname
}

% Trim leading and trailing spaces off a string.
% Concepts from aro-bend problem 15 (see CTAN).
{\catcode`\@=11
\gdef\eatspaces #1{\expandafter\trim@\expandafter{#1 }}
\gdef\trim@ #1{\trim@@ @#1 @ #1 @ @@}
\gdef\trim@@ #1@ #2@ #3@@{\trim@@@\empty #2 @}
\def\unbrace#1{#1}
\unbrace{\gdef\trim@@@ #1 } #2@{#1}
}

% Trim a single trailing ^^M off a string.
{\catcode`\^^M=\other \catcode`\Q=3%
\gdef\eatcr #1{\eatcra #1Q^^MQ}%
\gdef\eatcra#1^^MQ{\eatcrb#1Q}%
\gdef\eatcrb#1Q#2Q{#1}%
}

% Macro bodies are absorbed as an argument in a context where
% all characters are catcode 10, 11 or 12, except \ which is active
% (as in normal texinfo). It is necessary to change the definition of \
% to recognize macro arguments; this is the job of \mbodybackslash.
%
% Non-ASCII encodings make 8-bit characters active, so un-activate
% them to avoid their expansion.  Must do this non-globally, to
% confine the change to the current group.
%
% It's necessary to have hard CRs when the macro is executed. This is
% done by making ^^M (\endlinechar) catcode 12 when reading the macro
% body, and then making it the \newlinechar in \scanmacro.
```

```
%
\def\scanctxt{% used as subroutine
 \catcode`\"=\other
 \catcode`\+=\other
 \catcode`\<=\other
 \catcode`\>=\other
 \catcode`\@=\other
 \catcode`\^=\other
 \catcode`\_=\other
 \catcode`\|=\other
 \catcode`\~=\other
 \ifx\declaredencoding\ascii \else \setnonasciicharscatcodenonglobal\other \fi
}

\def\scanargctxt{% used for copying and captions, not macros.
 \scanctxt
 \catcode`\\=\other
 \catcode`\^^M=\other
}

\def\macrobodyctxt{% used for @macro definitions
 \scanctxt
 \catcode`\{=\other
 \catcode`\}=\other
 \catcode`\^^M=\other
 \usembodybackslash
}

\def\macroargctxt{% used when scanning invocations
 \scanctxt
 \catcode`\\=0
}
% why catcode 0 for \ in the above?  To recognize \\ \{ \} as "escapes"
% for the single characters \ { }.  Thus, we end up with the "commands"
% that would be written @\ @{ @} in a Texinfo document.
%
% We already have @{ and @}.  For @\, we define it here, and only for
% this purpose, to produce a typewriter backslash (so, the @\ that we
% define for @math can't be used with @macro calls):
%
\def\\{\normalbackslash}%
%
% We would like to do this for \, too, since that is what makeinfo does.
% But it is not possible, because Texinfo already has a command @, for a
% cedilla accent.  Documents must use @comma{} instead.
%
% \anythingelse will almost certainly be an error of some kind.
```

```
% \mbodybackslash is the definition of \ in @macro bodies.
% It maps \foo\ => \csname macarg.foo\endcsname => #N
% where N is the macro parameter number.
% We define \csname macarg.\endcsname to be \realbackslash, so
% \\ in macro replacement text gets you a backslash.
%
{\catcode`@=0 @catcode`@\=@active
@gdef@usembodybackslash{@let\=@mbodybackslash}
@gdef@mbodybackslash#1\{@csname macarg.#1@endcsname}
}
\expandafter\def\csname macarg.\endcsname{\realbackslash}

\def\margbackslash#1{\char`\#1 }

\def\macro{\recursivefalse\parsearg\macroxxx}
\def\rmacro{\recursivetrue\parsearg\macroxxx}

\def\macroxxx#1{%
 \getargs{#1}% now \macname is the macname and \argl the arglist
 \ifx\argl\empty       % no arguments
   \paramno=0\relax
 \else
   \expandafter\parsemargdef \argl;%
   \if\paramno>256\relax
     \ifx\eTeXversion\thisisundefined
       \errhelp = \EMsimple
       \errmessage{You need eTeX to compile a file with macros with more than 256 arguments}
     \fi
   \fi
 \fi
 \if1\csname ismacro.\the\macname\endcsname
   \message{Warning: redefining \the\macname}%
 \else
   \expandafter\ifx\csname \the\macname\endcsname \relax
   \else \errmessage{Macro name \the\macname\space already defined}\fi
   \global\cslet{macsave.\the\macname}{\the\macname}%
   \global\expandafter\let\csname ismacro.\the\macname\endcsname=1%
   \addtomacrolist{\the\macname}%
 \fi
 \begingroup \macrobodyctxt
 \ifrecursive \expandafter\parsermacbody
 \else \expandafter\parsemacbody
 \fi}

\parseargdef\unmacro{%
 \if1\csname ismacro.#1\endcsname
  \global\cslet{#1}{macsave.#1}%
```

```
  \global\expandafter\let \csname ismacro.#1\endcsname=0%
  % Remove the macro name from \macrolist:
  \begingroup
    \expandafter\let\csname#1\endcsname \relax
    \let\definedummyword\unmacrodo
    \xdef\macrolist{\macrolist}%
  \endgroup
 \else
  \errmessage{Macro #1 not defined}%
 \fi
}

% Called by \do from \dounmacro on each macro.  The idea is to omit any
% macro definitions that have been changed to \relax.
%
\def\unmacrodo#1{%
 \ifx #1\relax
  % remove this
 \else
  \noexpand\definedummyword \noexpand#1%
 \fi
}

% This makes use of the obscure feature that if the last token of a
% <parameter list> is #, then the preceding argument is delimited by
% an opening brace, and that opening brace is not consumed.
\def\getargs#1{\getargsxxx#1{}}
\def\getargsxxx#1#{\getmacname #1 \relax\getmacargs}
\def\getmacname#1 #2\relax{\macname={#1}}
\def\getmacargs#1{\def\argl{#1}}

% For macro processing make @ a letter so that we can make Texinfo private macro names.
\edef\texiatcatcode{\the\catcode`\@}
\catcode `@=11\relax

% Parse the optional {params} list.  Set up \paramno and \paramlist
% so \defmacro knows what to do.  Define \macarg.BLAH for each BLAH
% in the params list to some hook where the argument si to be expanded.  If
% there are less than 10 arguments that hook is to be replaced by ##N where N
% is the position in that list, that is to say the macro arguments are to be
% defined `a la TeX in the macro body.
%
% That gets used by \mbodybackslash (above).
%
% We need to get `macro parameter char #' into several definitions.
% The technique used is stolen from LaTeX: let \hash be something
% unexpandable, insert that wherever you need a #, and then redefine
% it to # just before using the token list produced.
```

```
%
% The same technique is used to protect \eatspaces till just before
% the macro is used.
%
% If there are 10 or more arguments, a different technique is used, where the
% hook remains in the body, and when macro is to be expanded the body is
% processed again to replace the arguments.
%
% In that case, the hook is \the\toks N-1, and we simply set \toks N-1 to the
% argument N value and then \edef  the body (nothing else will expand because of
% the catcode regime underwhich the body was input).
%
% If you compile with TeX (not eTeX), and you have macros with 10 or more
% arguments, you need that no macro has more than 256 arguments, otherwise an
% error is produced.
\def\parsemargdef#1;{%
 \paramno=0\def\paramlist{}%
 \let\hash\relax
 \let\xeatspaces\relax
 \parsemargdefxxx#1,;,%
 % In case that there are 10 or more arguments we parse again the arguments
 % list to set new definitions for the \macarg.BLAH macros corresponding to
 % each BLAH argument. It was anyhow needed to parse already once this list
 % in order to count the arguments, and as macros with at most 9 arguments
 % are by far more frequent than macro with 10 or more arguments, defining
 % twice the \macarg.BLAH macros does not cost too much processing power.
 \ifnum\paramno<10\relax\else
   \paramno0\relax
   \parsemmanyargdef@@#1,;,% 10 or more arguments
 \fi
}
\def\parsemargdefxxx#1,{%
 \if#1;\let\next=\relax
 \else \let\next=\parsemargdefxxx
   \advance\paramno by 1
   \expandafter\edef\csname macarg.\eatspaces{#1}\endcsname
       {\xeatspaces{\hash\the\paramno}}%
   \edef\paramlist{\paramlist\hash\the\paramno,}%
 \fi\next}

\def\parsemmanyargdef@@#1,{%
 \if#1;\let\next=\relax
 \else
   \let\next=\parsemmanyargdef@@
   \edef\tempb{\eatspaces{#1}}%
   \expandafter\def\expandafter\tempa
      \expandafter{\csname macarg.\tempb\endcsname}%
   % Note that we need some extra \noexpand\noexpand, this is because we
```

```
  % don't want \the  to be expanded in the \parsermacbody  as it uses an
  % \xdef .
  \expandafter\edef\tempa
    {\noexpand\noexpand\noexpand\the\toks\the\paramno}%
  \advance\paramno by 1\relax
 \fi\next}

% These two commands read recursive and nonrecursive macro bodies.
% (They're different since rec and nonrec macros end differently.)
%

\catcode `\@\texiatcatcode
\long\def\parsemacbody#1@end macro%
{\xdef\temp{\eatcr{#1}}\endgroup\defmacro}%
\long\def\parsermacbody#1@end rmacro%
{\xdef\temp{\eatcr{#1}}\endgroup\defmacro}%
\catcode `\@=11\relax

\let\endargs@\relax
\let\nil@\relax
\def\nilm@{\nil@}%
\long\def\nillm@{\nil@}%

% This macro is expanded during the Texinfo macro expansion, not during its
% definition.  It gets all the arguments values and assigns them to macros
% macarg.ARGNAME
%
% #1 is the macro name
% #2 is the list of argument names
% #3 is the list of argument values
\def\getargvals@#1#2#3{%
 \def\macargdeflist@{}%
 \def\saveparamlist@{#2}% Need to keep a copy for parameter expansion.
 \def\paramlist{#2,\nil@}%
 \def\macroname{#1}%
 \begingroup
 \macroargctxt
 \def\argvaluelist{#3,\nil@}%
 \def\@tempa{#3}%
 \ifx\@tempa\empty
   \setemptyargvalues@
 \else
   \getargvals@@
 \fi
}

%
\def\getargvals@@{%
```

```
 \ifx\paramlist\nilm@
    % Some sanity check needed here that \argvaluelist is also empty.
    \ifx\argvaluelist\nillm@
    \else
      \errhelp = \EMsimple
      \errmessage{Too many arguments in macro `\macroname'!}%
    \fi
    \let\next\macargexpandinbody@
 \else
  \ifx\argvaluelist\nillm@
     % No more arguments values passed to macro.  Set remaining named-arg
     % macros to empty.
     \let\next\setemptyargvalues@
  \else
    % pop current arg name into \@tempb
    \def\@tempa##1{\pop@{\@tempb}{\paramlist}##1\endargs@}%
    \expandafter\@tempa\expandafter{\paramlist}%
     % pop current argument value into \@tempc
    \def\@tempa##1{\longpop@{\@tempc}{\argvaluelist}##1\endargs@}%
    \expandafter\@tempa\expandafter{\argvaluelist}%
     % Here \@tempb is the current arg name and \@tempc is the current arg value.
     % First place the new argument macro definition into \@tempd
     \expandafter\macname\expandafter{\@tempc}%
     \expandafter\let\csname macarg.\@tempb\endcsname\relax
     \expandafter\def\expandafter\@tempe\expandafter{%
       \csname macarg.\@tempb\endcsname}%
     \edef\@tempd{\long\def\@tempe{\the\macname}}%
     \push@\@tempd\macargdeflist@
     \let\next\getargvals@@
  \fi
 \fi
 \next
}

\def\push@#1#2{%
 \expandafter\expandafter\expandafter\def
 \expandafter\expandafter\expandafter#2%
 \expandafter\expandafter\expandafter{%
 \expandafter#1#2}%
}

% Replace arguments by their values in the macro body, and place the result
% in macro \@tempa
\def\macvalstoargs@{%
 %  To do this we use the property that token registers that are \the'ed
 % within an \edef  expand only once. So we are going to place all argument
 % values into respective token registers.
 %
```

```
 % First we save the token context, and initialize argument numbering.
 \begingroup
   \paramno0\relax
   % Then, for each argument number #N, we place the corresponding argument
   % value into a new token list register \toks#N
   \expandafter\putargsintokens@\saveparamlist@,;,%
   % Then, we expand the body so that argument are replaced by their
   % values. The trick for values not to be expanded themselves is that they
   % are within tokens and that tokens expand only once in an \edef .
   \edef\@tempc{\csname mac.\macroname .body\endcsname}%
   % Now we restore the token stack pointer to free the token list registers
   % which we have used, but we make sure that expanded body is saved after
   % group.
   \expandafter
 \endgroup
 \expandafter\def\expandafter\@tempa\expandafter{\@tempc}%
 }

\def\macargexpandinbody@{%
 %% Define the named-macro outside of this group and then close this group.
 \expandafter
 \endgroup
 \macargdeflist@
 % First the replace in body the macro arguments by their values, the result
 % is in \@tempa .
 \macvalstoargs@
 % Then we point at the \norecurse or \gobble (for recursive) macro value
 % with \@tempb .
 \expandafter\let\expandafter\@tempb\csname mac.\macroname .recurse\endcsname
 % Depending on whether it is recursive or not, we need some tailing
 % \egroup .
 \ifx\@tempb\gobble
    \let\@tempc\relax
 \else
    \let\@tempc\egroup
 \fi
 % And now we do the real job:
 \edef\@tempd{\noexpand\@tempb{\macroname}\noexpand\scanmacro{\@tempa}\@tempc}%
 \@tempd
}

\def\putargsintokens@#1,{%
 \if#1;\let\next\relax
 \else
   \let\next\putargsintokens@
   % First we allocate the new token list register, and give it a temporary
   % alias \@tempb .
   \toksdef\@tempb\the\paramno
```

```
   % Then we place the argument value into that token list register.
   \expandafter\let\expandafter\@tempa\csname macarg.#1\endcsname
   \expandafter\@tempb\expandafter{\@tempa}%
   \advance\paramno by 1\relax
 \fi
 \next
}

% Save the token stack pointer into macro #1
\def\texisavetoksstackpoint#1{\edef#1{\the\@cclvi}}
% Restore the token stack pointer from number in macro #1
\def\texirestoretoksstackpoint#1{\expandafter\mathchardef\expandafter\@cclvi#1\relax}
% newtoks that can be used non \outer .
\def\texinonouternewtoks{\alloc@ 5\toks \toksdef \@cclvi}

% Tailing missing arguments are set to empty
\def\setemptyargvalues@{%
 \ifx\paramlist\nilm@
   \let\next\macargexpandinbody@
 \else
   \expandafter\setemptyargvaluesparser@\paramlist\endargs@
   \let\next\setemptyargvalues@
 \fi
 \next
}

\def\setemptyargvaluesparser@#1,#2\endargs@{%
 \expandafter\def\expandafter\@tempa\expandafter{%
   \expandafter\def\csname macarg.#1\endcsname{}}%
 \push@\@tempa\macargdeflist@
 \def\paramlist{#2}%
}

% #1 is the element target macro
% #2 is the list macro
% #3,#4\endargs@ is the list value
\def\pop@#1#2#3,#4\endargs@{%
  \def#1{#3}%
  \def#2{#4}%
}
\long\def\longpop@#1#2#3,#4\endargs@{%
  \long\def#1{#3}%
  \long\def#2{#4}%
}

% This defines a Texinfo @macro. There are eight cases: recursive and
% nonrecursive macros of zero, one, up to nine, and many arguments.
% Much magic with \expandafter here.
```

```
% \xdef is used so that macro definitions will survive the file
% they're defined in; @include reads the file inside a group.
%
\def\defmacro{%
 \let\hash=##% convert placeholders to macro parameter chars
 \ifrecursive
   \ifcase\paramno
   % 0
     \expandafter\xdef\csname\the\macname\endcsname{%
       \noexpand\scanmacro{\temp}}%
   \or % 1
     \expandafter\xdef\csname\the\macname\endcsname{%
        \bgroup\noexpand\macroargctxt
        \noexpand\braceorline
        \expandafter\noexpand\csname\the\macname xxx\endcsname}%
     \expandafter\xdef\csname\the\macname xxx\endcsname##1{%
        \egroup\noexpand\scanmacro{\temp}}%
   \else
     \ifnum\paramno<10\relax % at most 9
       \expandafter\xdef\csname\the\macname\endcsname{%
         \bgroup\noexpand\macroargctxt
         \noexpand\csname\the\macname xx\endcsname}%
       \expandafter\xdef\csname\the\macname xx\endcsname##1{%
          \expandafter\noexpand\csname\the\macname xxx\endcsname ##1,}%
       \expandafter\expandafter
       \expandafter\xdef
       \expandafter\expandafter
         \csname\the\macname xxx\endcsname
          \paramlist{\egroup\noexpand\scanmacro{\temp}}%
     \else % 10 or more
       \expandafter\xdef\csname\the\macname\endcsname{%
         \noexpand\getargvals@{\the\macname}{\argl}%
       }%
       \global\expandafter\let\csname mac.\the\macname .body\endcsname\temp
       \global\expandafter\let\csname mac.\the\macname .recurse\endcsname\gobble
     \fi
   \fi
 \else
   \ifcase\paramno
   % 0
     \expandafter\xdef\csname\the\macname\endcsname{%
       \noexpand\norecurse{\the\macname}%
       \noexpand\scanmacro{\temp}\egroup}%
   \or % 1
     \expandafter\xdef\csname\the\macname\endcsname{%
        \bgroup\noexpand\macroargctxt
        \noexpand\braceorline
        \expandafter\noexpand\csname\the\macname xxx\endcsname}%
```

```
    \expandafter\xdef\csname\the\macname xxx\endcsname##1{%
      \egroup
      \noexpand\norecurse{\the\macname}%
      \noexpand\scanmacro{\temp}\egroup}%
  \else % at most 9
    \ifnum\paramno<10\relax
      \expandafter\xdef\csname\the\macname\endcsname{%
        \bgroup\noexpand\macroargctxt
        \expandafter\noexpand\csname\the\macname xx\endcsname}%
      \expandafter\xdef\csname\the\macname xx\endcsname##1{%
         \expandafter\noexpand\csname\the\macname xxx\endcsname ##1,}%
      \expandafter\expandafter
      \expandafter\xdef
      \expandafter\expandafter
      \csname\the\macname xxx\endcsname
      \paramlist{%
         \egroup
         \noexpand\norecurse{\the\macname}%
         \noexpand\scanmacro{\temp}\egroup}%
    \else % 10 or more:
      \expandafter\xdef\csname\the\macname\endcsname{%
        \noexpand\getargvals@{\the\macname}{\argl}%
      }%
      \global\expandafter\let\csname mac.\the\macname .body\endcsname\temp
      \global\expandafter\let\csname mac.\the\macname .recurse\endcsname\norecurse
    \fi
  \fi
 \fi}

\catcode `\@\texiatcatcode\relax

\def\norecurse#1{\bgroup\cslet{#1}{macsave.#1}}

% \braceorline decides whether the next nonwhitespace character is a
% {.  If so it reads up to the closing }, if not, it reads the whole
% line.  Whatever was read is then fed to the next control sequence
% as an argument (by \parsebrace or \parsearg).
%
\def\braceorline#1{\let\macnamexxx=#1\futurelet\nchar\braceorlinexxx}
\def\braceorlinexxx{%
 \ifx\nchar\bgroup\else
   \expandafter\parsearg
 \fi \macnamexxx}


% @alias.
% We need some trickery to remove the optional spaces around the equal
% sign.  Make them active and then expand them all to nothing.
```

```
%
\def\alias{\parseargusing\obeyspaces\aliasxxx}
\def\aliasxxx #1{\aliasyyy#1\relax}
\def\aliasyyy #1=#2\relax{%
 {%
   \expandafter\let\obeyedspace=\empty
   \addtomacrolist{#1}%
   \xdef\next{\global\let\makecsname{#1}=\makecsname{#2}}%
 }%
 \next
}


\message{cross references,}

\newwrite\auxfile
\newif\ifhavexrefs    % True if xref values are known.
\newif\ifwarnedxrefs  % True if we warned once that they aren't known.

% @inforef is relatively simple.
\def\inforef #1{\inforefzzz #1,,,,**}
\def\inforefzzz #1,#2,#3,#4**{%
 \putwordSee{} \putwordInfo{} \putwordfile{} \file{\ignorespaces #3{}},
 node \samp{\ignorespaces#1{}}}

% @node's only job in TeX is to define \lastnode, which is used in
% cross-references.  The @node line might or might not have commas, and
% might or might not have spaces before the first comma, like:
% @node foo , bar , ...
% We don't want such trailing spaces in the node name.
%
\parseargdef\node{\checkenv{}\donode #1 ,\finishnodeparse}
%
% also remove a trailing comma, in case of something like this:
% @node Help-Cross,  ,  , Cross-refs
\def\donode#1 ,#2\finishnodeparse{\dodonode #1,\finishnodeparse}
\def\dodonode#1,#2\finishnodeparse{\gdef\lastnode{#1}}

\let\nwnode=\node
\let\lastnode=\empty

% Write a cross-reference definition for the current node.  #1 is the
% type (Ynumbered, Yappendix, Ynothing).
%
\def\donoderef#1{%
 \ifx\lastnode\empty\else
   \setref{\lastnode}{#1}%
   \global\let\lastnode=\empty
```

```
 \fi
}

% @anchor{NAME} -- define xref target at arbitrary point.
%
\newcount\savesfregister
%
\def\savesf{\relax \ifhmode \savesfregister=\spacefactor \fi}
\def\restoresf{\relax \ifhmode \spacefactor=\savesfregister \fi}
\def\anchor#1{\savesf \setref{#1}{Ynothing}\restoresf \ignorespaces}

% \setref{NAME}{SNT} defines a cross-reference point NAME (a node or an
% anchor), which consists of three parts:
% 1) NAME-title - the current sectioning name taken from \lastsection,
%                 or the anchor name.
% 2) NAME-snt   - section number and type, passed as the SNT arg, or
%                 empty for anchors.
% 3) NAME-pg    - the page number.
%
% This is called from \donoderef, \anchor, and \dofloat.  In the case of
% floats, there is an additional part, which is not written here:
% 4) NAME-lof   - the text as it should appear in a @listoffloats.
%
\def\setref#1#2{%
 \pdfmkdest{#1}%
 \iflinks
   {%
     \atdummies  % preserve commands, but don't expand them
     \edef\writexrdef##1##2{%
 \write\auxfile{@xrdef{#1-% #1 of \setref, expanded by the \edef
   ##1}{##2}}% these are parameters of \writexrdef
     }%
     \toks0 = \expandafter{\lastsection}%
     \immediate \writexrdef{title}{\the\toks0 }%
     \immediate \writexrdef{snt}{\csname #2\endcsname}% \Ynumbered etc.
     \safewhatsit{\writexrdef{pg}{\folio}}% will be written later, at \shipout
   }%
 \fi
}

% @xrefautosectiontitle on|off says whether @section(ing) names are used
% automatically in xrefs, if the third arg is not explicitly specified.
% This was provided as a "secret" @set xref-automatic-section-title
% variable, now it's official.
%
\parseargdef\xrefautomaticsectiontitle{%
 \def\temp{#1}%
 \ifx\temp\onword
```

```
  \expandafter\let\csname SETxref-automatic-section-title\endcsname
    = \empty
 \else\ifx\temp\offword
  \expandafter\let\csname SETxref-automatic-section-title\endcsname
    = \relax
 \else
  \errhelp = \EMsimple
  \errmessage{Unknown @xrefautomaticsectiontitle value `\temp',
              must be on|off}%
 \fi\fi
}

%
% @xref, @pxref, and @ref generate cross-references.  For \xrefX, #1 is
% the node name, #2 the name of the Info cross-reference, #3 the printed
% node name, #4 the name of the Info file, #5 the name of the printed
% manual.  All but the node name can be omitted.
%
\def\pxref#1{\putwordsee{} \xrefX[#1,,,,,,,]}
\def\xref#1{\putwordSee{} \xrefX[#1,,,,,,,]}
\def\ref#1{\xrefX[#1,,,,,,,]}
%
\newbox\toprefbox
\newbox\printedrefnamebox
\newbox\infofilenamebox
\newbox\printedmanualbox
%
\def\xrefX[#1,#2,#3,#4,#5,#6]{\begingroup
 \unsepspaces
 %
 % Get args without leading/trailing spaces.
 \def\printedrefname{\ignorespaces #3}%
 \setbox\printedrefnamebox = \hbox{\printedrefname\unskip}%
 %
 \def\infofilename{\ignorespaces #4}%
 \setbox\infofilenamebox = \hbox{\infofilename\unskip}%
 %
 \def\printedmanual{\ignorespaces #5}%
 \setbox\printedmanualbox  = \hbox{\printedmanual\unskip}%
 %
 % If the printed reference name (arg #3) was not explicitly given in
 % the @xref, figure out what we want to use.
 \ifdim \wd\printedrefnamebox = 0pt
  % No printed node name was explicitly given.
  \expandafter\ifx\csname SETxref-automatic-section-title\endcsname \relax
    % Not auto section-title: use node name inside the square brackets.
    \def\printedrefname{\ignorespaces #1}%
  \else
```

```
    % Auto section-title: use chapter/section title inside
    % the square brackets if we have it.
    \ifdim \wd\printedmanualbox > 0pt
      % It is in another manual, so we don't have it; use node name.
      \def\printedrefname{\ignorespaces #1}%
    \else
      \ifhavexrefs
        % We (should) know the real title if we have the xref values.
        \def\printedrefname{\refx{#1-title}{}}%
      \else
        % Otherwise just copy the Info node name.
        \def\printedrefname{\ignorespaces #1}%
      \fi%
    \fi
  \fi
\fi
%
% Make link in pdf output.
\ifpdf
  {\indexnofonts
   \turnoffactive
   \makevalueexpandable
   % This expands tokens, so do it after making catcode changes, so _
   % etc. don't get their TeX definitions.  This ignores all spaces in
   % #4, including (wrongly) those in the middle of the filename.
   \getfilename{#4}%
   %
   % This (wrongly) does not take account of leading or trailing
   % spaces in #1, which should be ignored.
   \edef\pdfxrefdest{#1}%
   \ifx\pdfxrefdest\empty
     \def\pdfxrefdest{Top}% no empty targets
   \else
     \txiescapepdf\pdfxrefdest  % escape PDF special chars
   \fi
   %
   \leavevmode
   \startlink attr{/Border [0 0 0]}%
   \ifnum\filenamelength>0
     goto file{\the\filename.pdf} name{\pdfxrefdest}%
   \else
     goto name{\pdfmkpgn{\pdfxrefdest}}%
   \fi
  }%
  \setcolor{\linkcolor}%
\fi
%
% Float references are printed completely differently: "Figure 1.2"
```

```
% instead of "[somenode], p.3".  We distinguish them by the
% LABEL-title being set to a magic string.
{%
  % Have to otherify everything special to allow the \csname to
  % include an _ in the xref name, etc.
  \indexnofonts
  \turnoffactive
  \expandafter\global\expandafter\let\expandafter\Xthisreftitle
    \csname XR#1-title\endcsname
}%
\iffloat\Xthisreftitle
  % If the user specified the print name (third arg) to the ref,
  % print it instead of our usual "Figure 1.2".
  \ifdim\wd\printedrefnamebox = 0pt
    \refx{#1-snt}{}%
  \else
    \printedrefname
  \fi
  %
  % If the user also gave the printed manual name (fifth arg), append
  % "in MANUALNAME".
  \ifdim \wd\printedmanualbox > 0pt
    \space \putwordin{} \cite{\printedmanual}%
  \fi
\else
  % node/anchor (non-float) references.
  %
  % If we use \unhbox to print the node names, TeX does not insert
  % empty discretionaries after hyphens, which means that it will not
  % find a line break at a hyphen in a node names.  Since some manuals
  % are best written with fairly long node names, containing hyphens,
  % this is a loss.  Therefore, we give the text of the node name
  % again, so it is as if TeX is seeing it for the first time.
  %
  \ifdim \wd\printedmanualbox > 0pt
    % Cross-manual reference with a printed manual name.
    %
    \crossmanualxref{\cite{\printedmanual\unskip}}%
  %
  \else\ifdim \wd\infofilenamebox > 0pt
    % Cross-manual reference with only an info filename (arg 4), no
    % printed manual name (arg 5).  This is essentially the same as
    % the case above; we output the filename, since we have nothing else.
    %
    \crossmanualxref{\code{\infofilename\unskip}}%
  %
  \else
    % Reference within this manual.
```

```
    %
    % _ (for example) has to be the character _ for the purposes of the
    % control sequence corresponding to the node, but it has to expand
    % into the usual \leavevmode...\vrule stuff for purposes of
    % printing. So we \turnoffactive for the \refx-snt, back on for the
    % printing, back off for the \refx-pg.
    {\turnoffactive
     % Only output a following space if the -snt ref is nonempty; for
     % @unnumbered and @anchor, it won't be.
     \setbox2 = \hbox{\ignorespaces \refx{#1-snt}{}}%
     \ifdim \wd2 > 0pt \refx{#1-snt}\space\fi
    }%
    % output the `[mynode]' via the macro below so it can be overridden.
    \xrefprintnodename\printedrefname
    %
    % But we always want a comma and a space:
    ,\space
    %
    % output the `page 3'.
    \turnoffactive \putwordpage\tie\refx{#1-pg}{}%
  \fi\fi
 \fi
 \endlink
\endgroup}

% Output a cross-manual xref to #1.  Used just above (twice).
%
% Only include the text "Section ``foo'' in" if the foo is neither
% missing or Top.  Thus, @xref{,,,foo,The Foo Manual} outputs simply
% "see The Foo Manual", the idea being to refer to the whole manual.
%
% But, this being TeX, we can't easily compare our node name against the
% string "Top" while ignoring the possible spaces before and after in
% the input.  By adding the arbitrary 7sp below, we make it much less
% likely that a real node name would have the same width as "Top" (e.g.,
% in a monospaced font).  Hopefully it will never happen in practice.
%
% For the same basic reason, we retypeset the "Top" at every
% reference, since the current font is indeterminate.
%
\def\crossmanualxref#1{%
 \setbox\toprefbox = \hbox{Top\kern7sp}%
 \setbox2 = \hbox{\ignorespaces \printedrefname \unskip \kern7sp}%
 \ifdim \wd2 > 7sp  % nonempty?
   \ifdim \wd2 = \wd\toprefbox \else  % same as Top?
     \putwordSection{} ``\printedrefname'' \putwordin{}\space
   \fi
 \fi
```

```
 #1%
}

% This macro is called from \xrefX for the `[nodename]' part of xref
% output.  It's a separate macro only so it can be changed more easily,
% since square brackets don't work well in some documents.  Particularly
% one that Bob is working on :).
%
\def\xrefprintnodename#1{[#1]}

% Things referred to by \setref.
%
\def\Ynothing{}
\def\Yomitfromtoc{}
\def\Ynumbered{%
 \ifnum\secno=0
   \putwordChapter@tie \the\chapno
 \else \ifnum\subsecno=0
   \putwordSection@tie \the\chapno.\the\secno
 \else \ifnum\subsubsecno=0
   \putwordSection@tie \the\chapno.\the\secno.\the\subsecno
 \else
   \putwordSection@tie \the\chapno.\the\secno.\the\subsecno.\the\subsubsecno
 \fi\fi\fi
}
\def\Yappendix{%
 \ifnum\secno=0
    \putwordAppendix@tie @char\the\appendixno{}%
 \else \ifnum\subsecno=0
    \putwordSection@tie @char\the\appendixno.\the\secno
 \else \ifnum\subsubsecno=0
   \putwordSection@tie @char\the\appendixno.\the\secno.\the\subsecno
 \else
   \putwordSection@tie
     @char\the\appendixno.\the\secno.\the\subsecno.\the\subsubsecno
 \fi\fi\fi
}

% Define \refx{NAME}{SUFFIX} to reference a cross-reference string named NAME.
% If its value is nonempty, SUFFIX is output afterward.
%
\def\refx#1#2{%
 {%
   \indexnofonts
   \otherbackslash
   \expandafter\global\expandafter\let\expandafter\thisrefX
     \csname XR#1\endcsname
 }%
```

```
\ifx\thisrefX\relax
  % If not defined, say something at least.
  \angleleft un\-de\-fined\angleright
  \iflinks
    \ifhavexrefs
      {\toks0 = {#1}% avoid expansion of possibly-complex value
       \message{\linenumber Undefined cross reference `\the\toks0'.}}%
    \else
      \ifwarnedxrefs\else
        \global\warnedxrefstrue
        \message{Cross reference values unknown; you must run TeX again.}%
      \fi
    \fi
  \fi
\else
  % It's defined, so just use it.
  \thisrefX
\fi
#2% Output the suffix in any case.
}

% This is the macro invoked by entries in the aux file.  Usually it's
% just a \def (we prepend XR to the control sequence name to avoid
% collisions).  But if this is a float type, we have more work to do.
%
\def\xrdef#1#2{%
 {% The node name might contain 8-bit characters, which in our current
  % implementation are changed to commands like @'e.  Don't let these
  % mess up the control sequence name.
  \indexnofonts
  \turnoffactive
  \xdef\safexrefname{#1}%
 }%
 %
 \expandafter\gdef\csname XR\safexrefname\endcsname{#2}% remember this xref
 %
 % Was that xref control sequence that we just defined for a float?
 \expandafter\iffloat\csname XR\safexrefname\endcsname
   % it was a float, and we have the (safe) float type in \iffloattype.
   \expandafter\let\expandafter\floatlist
     \csname floatlist\iffloattype\endcsname
   %
   % Is this the first time we've seen this float type?
   \expandafter\ifx\floatlist\relax
     \toks0 = {\do}% yes, so just \do
   \else
     % had it before, so preserve previous elements in list.
     \toks0 = \expandafter{\floatlist\do}%
```

```
  \fi
  %
  % Remember this xref in the control sequence \floatlistFLOATTYPE,
  % for later use in \listoffloats.
  \expandafter\xdef\csname floatlist\iffloattype\endcsname{\the\toks0
    {\safexrefname}}%
 \fi
}

% Read the last existing aux file, if any.  No error if none exists.
%
\def\tryauxfile{%
 \openin 1 \jobname.aux
 \ifeof 1 \else
  \readdatafile{aux}%
  \global\havexrefstrue
 \fi
 \closein 1
}

\def\setupdatafile{%
 \catcode`\^^@=\other
 \catcode`\^^A=\other
 \catcode`\^^B=\other
 \catcode`\^^C=\other
 \catcode`\^^D=\other
 \catcode`\^^E=\other
 \catcode`\^^F=\other
 \catcode`\^^G=\other
 \catcode`\^^H=\other
 \catcode`\^^K=\other
 \catcode`\^^L=\other
 \catcode`\^^N=\other
 \catcode`\^^P=\other
 \catcode`\^^Q=\other
 \catcode`\^^R=\other
 \catcode`\^^S=\other
 \catcode`\^^T=\other
 \catcode`\^^U=\other
 \catcode`\^^V=\other
 \catcode`\^^W=\other
 \catcode`\^^X=\other
 \catcode`\^^Z=\other
 \catcode`\^^[=\other
 \catcode`\^^\=\other
 \catcode`\^^]=\other
 \catcode`\^^^=\other
 \catcode`\^^_=\other
```

```
% It was suggested to set the catcode of ^ to 7, which would allow ^^e4 etc.
% in xref tags, i.e., node names.  But since ^^e4 notation isn't
% supported in the main text, it doesn't seem desirable.  Furthermore,
% that is not enough: for node names that actually contain a ^
% character, we would end up writing a line like this: 'xrdef {'hat
% b-title}{'hat b} and \xrdef does a \csname...\endcsname on the first
% argument, and \hat is not an expandable control sequence.  It could
% all be worked out, but why?  Either we support ^^ or we don't.
%
% The other change necessary for this was to define \auxhat:
% \def\auxhat{\def^{'hat }}% extra space so ok if followed by letter
% and then to call \auxhat in \setq.
%
\catcode`\^=\other
%
% Special characters.  Should be turned off anyway, but...
\catcode`\~=\other
\catcode`\[=\other
\catcode`\]=\other
\catcode`\"=\other
\catcode`\_=\other
\catcode`\|=\other
\catcode`\<=\other
\catcode`\>=\other
\catcode`\$=\other
\catcode`\#=\other
\catcode`\&=\other
\catcode`\%=\other
\catcode`+=\other % avoid \+ for paranoia even though we've turned it off
%
% This is to support \ in node names and titles, since the \
% characters end up in a \csname.  It's easier than
% leaving it active and making its active definition an actual \
% character.  What I don't understand is why it works in the *value*
% of the xrdef.  Seems like it should be a catcode12 \, and that
% should not typeset properly.  But it works, so I'm moving on for
% now.  --karl, 15jan04.
\catcode`\\=\other
%
% Make the characters 128-255 be printing characters.
{%
  \count1=128
  \def\loop{%
    \catcode\count1=\other
    \advance\count1 by 1
    \ifnum \count1<256 \loop \fi
  }%
}%
```

```
 %
 % @ is our escape character in .aux files, and we need braces.
 \catcode`\{=1
 \catcode`\}=2
 \catcode`\@=0
}

\def\readdatafile#1{%
\begingroup
 \setupdatafile
 \input\jobname.#1
\endgroup}


\message{insertions,}
% including footnotes.

\newcount \footnoteno

% The trailing space in the following definition for supereject is
% vital for proper filling; pages come out unaligned when you do a
% pagealignmacro call if that space before the closing brace is
% removed. (Generally, numeric constants should always be followed by a
% space to prevent strange expansion errors.)
\def\supereject{\par\penalty -20000\footnoteno =0 }

% @footnotestyle is meaningful for Info output only.
\let\footnotestyle=\comment

{\catcode `\@=11
%
% Auto-number footnotes.  Otherwise like plain.
\gdef\footnote{%
 \let\indent=\ptexindent
 \let\noindent=\ptexnoindent
 \global\advance\footnoteno by \@ne
 \edef\thisfootno{$^{\the\footnoteno}$}%
 %
 % In case the footnote comes at the end of a sentence, preserve the
 % extra spacing after we do the footnote number.
 \let\@sf\empty
 \ifhmode\edef\@sf{\spacefactor\the\spacefactor}\ptexslash\fi
 %
 % Remove inadvertent blank space before typesetting the footnote number.
 \unskip
 \thisfootno\@sf
 \dofootnote
}%
```

```
% Don't bother with the trickery in plain.tex to not require the
% footnote text as a parameter.  Our footnotes don't need to be so general.
%
% Oh yes, they do; otherwise, @ifset (and anything else that uses
% \parseargline) fails inside footnotes because the tokens are fixed when
% the footnote is read.  --karl, 16nov96.
%
\gdef\dofootnote{%
 \insert\footins\bgroup
 % We want to typeset this text as a normal paragraph, even if the
 % footnote reference occurs in (for example) a display environment.
 % So reset some parameters.
 \hsize=\pagewidth
 \interlinepenalty\interfootnotelinepenalty
 \splittopskip\ht\strutbox % top baseline for broken footnotes
 \splitmaxdepth\dp\strutbox
 \floatingpenalty\@MM
 \leftskip\z@skip
 \rightskip\z@skip
 \spaceskip\z@skip
 \xspaceskip\z@skip
 \parindent\defaultparindent
 %
 \smallfonts \rm
 %
 % Because we use hanging indentation in footnotes, a @noindent appears
 % to exdent this text, so make it be a no-op.  makeinfo does not use
 % hanging indentation so @noindent can still be needed within footnote
 % text after an @example or the like (not that this is good style).
 \let\noindent = \relax
 %
 % Hang the footnote text off the number.  Use \everypar in case the
 % footnote extends for more than one paragraph.
 \everypar = {\hang}%
 \textindent{\thisfootno}%
 %
 % Don't crash into the line above the footnote text.  Since this
 % expands into a box, it must come within the paragraph, lest it
 % provide a place where TeX can split the footnote.
 \footstrut
 %
 % Invoke rest of plain TeX footnote routine.
 \futurelet\next\fo@t
}
}%end \catcode `\@=11

% In case a @footnote appears in a vbox, save the footnote text and create
```

```
% the real \insert just after the vbox finished.  Otherwise, the insertion
% would be lost.
% Similarly, if a @footnote appears inside an alignment, save the footnote
% text to a box and make the \insert when a row of the table is finished.
% And the same can be done for other insert classes.  --kasal, 16nov03.

% Replace the \insert primitive by a cheating macro.
% Deeper inside, just make sure that the saved insertions are not spilled
% out prematurely.
%
\def\startsavinginserts{%
 \ifx \insert\ptexinsert
   \let\insert\saveinsert
 \else
   \let\checkinserts\relax
 \fi
}

% This \insert replacement works for both \insert\footins{foo} and
% \insert\footins\bgroup foo\egroup, but it doesn't work for \insert27{foo}.
%
\def\saveinsert#1{%
 \edef\next{\noexpand\savetobox \makeSAVEname#1}%
 \afterassignment\next
 % swallow the left brace
 \let\temp =
}
\def\makeSAVEname#1{\makecsname{SAVE\expandafter\gobble\string#1}}
\def\savetobox#1{\global\setbox#1 = \vbox\bgroup \unvbox#1}

\def\checksaveins#1{\ifvoid#1\else \placesaveins#1\fi}

\def\placesaveins#1{%
 \ptexinsert \csname\expandafter\gobblesave\string#1\endcsname
   {\box#1}%
}

% eat @SAVE -- beware, all of them have catcode \other:
{
 \def\dospecials{\do S\do A\do V\do E} \uncatcodespecials  %  ;-)
 \gdef\gobblesave @SAVE{}
}

% initialization:
\def\newsaveins #1{%
 \edef\next{\noexpand\newsaveinsX \makeSAVEname#1}%
 \next
}
```

```
\def\newsaveinsX #1{%
 \csname newbox\endcsname #1%
 \expandafter\def\expandafter\checkinserts\expandafter{\checkinserts
   \checksaveins #1}%
}

% initialize:
\let\checkinserts\empty
\newsaveins\footins
\newsaveins\margin


% @image.  We use the macros from epsf.tex to support this.
% If epsf.tex is not installed and @image is used, we complain.
%
% Check for and read epsf.tex up front.  If we read it only at @image
% time, we might be inside a group, and then its definitions would get
% undone and the next image would fail.
\openin 1 = epsf.tex
\ifeof 1 \else
 % Do not bother showing banner with epsf.tex v2.7k (available in
 % doc/epsf.tex and on ctan).
 \def\epsfannounce{\toks0 = }%
 \input epsf.tex
\fi
\closein 1
%
% We will only complain once about lack of epsf.tex.
\newif\ifwarnednoepsf
\newhelp\noepsfhelp{epsf.tex must be installed for images to
 work.  It is also included in the Texinfo distribution, or you can get
 it from ftp://tug.org/tex/epsf.tex.}
%
\def\image#1{%
 \ifx\epsfbox\thisisundefined
   \ifwarnednoepsf \else
     \errhelp = \noepsfhelp
     \errmessage{epsf.tex not found, images will be ignored}%
     \global\warnednoepsftrue
   \fi
 \else
   \imagexxx #1,,,,,\finish
 \fi
}
%
% Arguments to @image:
% #1 is (mandatory) image filename; we tack on .eps extension.
% #2 is (optional) width, #3 is (optional) height.
```

```
% #4 is (ignored optional) html alt text.
% #5 is (ignored optional) extension.
% #6 is just the usual extra ignored arg for parsing stuff.
\newif\ifimagevmode
\def\imagexxx#1,#2,#3,#4,#5,#6\finish{\begingroup
 \catcode`\^^M = 5     % in case we're inside an example
 \normalturnoffactive  % allow _ et al. in names
 % If the image is by itself, center it.
 \ifvmode
   \imagevmodetrue
 \else \ifx\centersub\centerV
   % for @center @image, we need a vbox so we can have our vertical space
   \imagevmodetrue
   \vbox\bgroup % vbox has better behavior than vtop herev
 \fi\fi
 %
 \ifimagevmode
   \nobreak\medskip
   % Usually we'll have text after the image which will insert
   % \parskip glue, so insert it here too to equalize the space
   % above and below.
   \nobreak\vskip\parskip
   \nobreak
 \fi
 %
 % Leave vertical mode so that indentation from an enclosing
 %  environment such as @quotation is respected.
 % However, if we're at the top level, we don't want the
 %  normal paragraph indentation.
 % On the other hand, if we are in the case of @center @image, we don't
 %  want to start a paragraph, which will create a hsize-width box and
 %  eradicate the centering.
 \ifx\centersub\centerV\else \noindent \fi
 %
 % Output the image.
 \ifpdf
   \dopdfimage{#1}{#2}{#3}%
 \else
   % \epsfbox itself resets \epsf?size at each figure.
   \setbox0 = \hbox{\ignorespaces #2}\ifdim\wd0 > 0pt \epsfxsize=#2\relax \fi
   \setbox0 = \hbox{\ignorespaces #3}\ifdim\wd0 > 0pt \epsfysize=#3\relax \fi
   \epsfbox{#1.eps}%
 \fi
 %
 \ifimagevmode
   \medskip  % space after a standalone image
 \fi
 \ifx\centersub\centerV \egroup \fi
```

```
\endgroup}


% @float FLOATTYPE,LABEL,LOC ... @end float for displayed figures, tables,
% etc.  We don't actually implement floating yet, we always include the
% float "here".  But it seemed the best name for the future.
%
\envparseargdef\float{\eatcommaspace\eatcommaspace\dofloat#1, , ,\finish}

% There may be a space before second and/or third parameter; delete it.
\def\eatcommaspace#1, {#1,}

% #1 is the optional FLOATTYPE, the text label for this float, typically
% "Figure", "Table", "Example", etc.  Can't contain commas.  If omitted,
% this float will not be numbered and cannot be referred to.
%
% #2 is the optional xref label.  Also must be present for the float to
% be referable.
%
% #3 is the optional positioning argument; for now, it is ignored.  It
% will somehow specify the positions allowed to float to (here, top, bottom).
%
% We keep a separate counter for each FLOATTYPE, which we reset at each
% chapter-level command.
\let\resetallfloatnos=\empty
%
\def\dofloat#1,#2,#3,#4\finish{%
 \let\thiscaption=\empty
 \let\thisshortcaption=\empty
 %
 % don't lose footnotes inside @float.
 %
 % BEWARE: when the floats start float, we have to issue warning whenever an
 % insert appears inside a float which could possibly float. --kasal, 26may04
 %
 \startsavinginserts
 %
 % We can't be used inside a paragraph.
 \par
 %
 \vtop\bgroup
   \def\floattype{#1}%
   \def\floatlabel{#2}%
   \def\floatloc{#3}% we do nothing with this yet.
   %
   \ifx\floattype\empty
     \let\safefloattype=\empty
   \else
```

```
    {%
      % the floattype might have accents or other special characters,
      % but we need to use it in a control sequence name.
      \indexnofonts
      \turnoffactive
      \xdef\safefloattype{\floattype}%
    }%
  \fi
  %
  % If label is given but no type, we handle that as the empty type.
  \ifx\floatlabel\empty \else
    % We want each FLOATTYPE to be numbered separately (Figure 1,
    % Table 1, Figure 2, ...).  (And if no label, no number.)
    %
    \expandafter\getfloatno\csname\safefloattype floatno\endcsname
    \global\advance\floatno by 1
    %
    {%
      % This magic value for \lastsection is output by \setref as the
      % XREFLABEL-title value.  \xrefX uses it to distinguish float
      % labels (which have a completely different output format) from
      % node and anchor labels.  And \xrdef uses it to construct the
      % lists of floats.
      %
      \edef\lastsection{\floatmagic=\safefloattype}%
      \setref{\floatlabel}{Yfloat}%
    }%
  \fi
  %
  % start with \parskip glue, I guess.
  \vskip\parskip
  %
  % Don't suppress indentation if a float happens to start a section.
  \restorefirstparagraphindent
}

% we have these possibilities:
% @float Foo,lbl & @caption{Cap}: Foo 1.1: Cap
% @float Foo,lbl & no caption:    Foo 1.1
% @float Foo & @caption{Cap}:     Foo: Cap
% @float Foo & no caption:        Foo
% @float ,lbl & Caption{Cap}:     1.1: Cap
% @float ,lbl & no caption:       1.1
% @float & @caption{Cap}:         Cap
% @float & no caption:
%
\def\Efloat{%
  \let\floatident = \empty
```

```
  %
  % In all cases, if we have a float type, it comes first.
  \ifx\floattype\empty \else \def\floatident{\floattype}\fi
  %
  % If we have an xref label, the number comes next.
  \ifx\floatlabel\empty \else
    \ifx\floattype\empty \else % if also had float type, need tie first.
      \appendtomacro\floatident{\tie}%
    \fi
    % the number.
    \appendtomacro\floatident{\chaplevelprefix\the\floatno}%
  \fi
  %
  % Start the printed caption with what we've constructed in
  % \floatident, but keep it separate; we need \floatident again.
  \let\captionline = \floatident
  %
  \ifx\thiscaption\empty \else
    \ifx\floatident\empty \else
\appendtomacro\captionline{: }% had ident, so need a colon between
    \fi
    %
    % caption text.
    \appendtomacro\captionline{\scanexp\thiscaption}%
  \fi
  %
  % If we have anything to print, print it, with space before.
  % Eventually this needs to become an \insert.
  \ifx\captionline\empty \else
    \vskip.5\parskip
    \captionline
    %
    % Space below caption.
    \vskip\parskip
  \fi
  %
  % If have an xref label, write the list of floats info.  Do this
  % after the caption, to avoid chance of it being a breakpoint.
  \ifx\floatlabel\empty \else
    % Write the text that goes in the lof to the aux file as
    % \floatlabel-lof.  Besides \floatident, we include the short
    % caption if specified, else the full caption if specified, else nothing.
    {%
      \atdummies
      %
      % since we read the caption text in the macro world, where ^^M
      % is turned into a normal character, we have to scan it back, so
      % we don't write the literal three characters "^^M" into the aux file.
```

```
\scanexp{%
  \xdef\noexpand\gtemp{%
    \ifx\thisshortcaption\empty
      \thiscaption
    \else
      \thisshortcaption
    \fi
  }%
}%
      \immediate\write\auxfile{@xrdef{\floatlabel-lof}{\floatident
  \ifx\gtemp\empty \else : \gtemp \fi}}%
    }%
  \fi
\egroup  % end of \vtop
%
% place the captured inserts
%
% BEWARE: when the floats start floating, we have to issue warning
% whenever an insert appears inside a float which could possibly
% float. --kasal, 26may04
%
\checkinserts
}

% Append the tokens #2 to the definition of macro #1, not expanding either.
%
\def\appendtomacro#1#2{%
 \expandafter\def\expandafter#1\expandafter{#1#2}%
}

% @caption, @shortcaption
%
\def\caption{\docaption\thiscaption}
\def\shortcaption{\docaption\thisshortcaption}
\def\docaption{\checkenv\float \bgroup\scanargctxt\defcaption}
\def\defcaption#1#2{\egroup \def#1{#2}}

% The parameter is the control sequence identifying the counter we are
% going to use.  Create it if it doesn't exist and assign it to \floatno.
\def\getfloatno#1{%
 \ifx#1\relax
    % Haven't seen this figure type before.
    \csname newcount\endcsname #1%
    %
    % Remember to reset this floatno at the next chap.
    \expandafter\gdef\expandafter\resetallfloatnos
      \expandafter{\resetallfloatnos #1=0 }%
 \fi
```

```
 \let\floatno#1%
}

% \setref calls this to get the XREFLABEL-snt value.  We want an @xref
% to the FLOATLABEL to expand to "Figure 3.1".  We call \setref when we
% first read the @float command.
%
\def\Yfloat{\floattype@tie \chaplevelprefix\the\floatno}%

% Magic string used for the XREFLABEL-title value, so \xrefX can
% distinguish floats from other xref types.
\def\floatmagic{!!float!!}

% #1 is the control sequence we are passed; we expand into a conditional
% which is true if #1 represents a float ref.  That is, the magic
% \lastsection value which we \setref above.
%
\def\iffloat#1{\expandafter\doiffloat#1==\finish}
%
% #1 is (maybe) the \floatmagic string.  If so, #2 will be the
% (safe) float type for this float.  We set \iffloattype to #2.
%
\def\doiffloat#1=#2=#3\finish{%
 \def\temp{#1}%
 \def\iffloattype{#2}%
 \ifx\temp\floatmagic
}

% @listoffloats FLOATTYPE - print a list of floats like a table of contents.
%
\parseargdef\listoffloats{%
 \def\floattype{#1}% floattype
 {%
   % the floattype might have accents or other special characters,
   % but we need to use it in a control sequence name.
   \indexnofonts
   \turnoffactive
   \xdef\safefloattype{\floattype}%
 }%
 %
 % \xrdef saves the floats as a \do-list in \floatlistSAFEFLOATTYPE.
 \expandafter\ifx\csname floatlist\safefloattype\endcsname \relax
   \ifhavexrefs
     % if the user said @listoffloats foo but never @float foo.
     \message{\linenumber No `\safefloattype' floats to list.}%
   \fi
 \else
   \begingroup
```

```
    \leftskip=\tocindent  % indent these entries like a toc
    \let\do=\listoffloatsdo
    \csname floatlist\safefloattype\endcsname
  \endgroup
 \fi
}

% This is called on each entry in a list of floats.  We're passed the
% xref label, in the form LABEL-title, which is how we save it in the
% aux file.  We strip off the -title and look up \XRLABEL-lof, which
% has the text we're supposed to typeset here.
%
% Figures without xref labels will not be included in the list (since
% they won't appear in the aux file).
%
\def\listoffloatsdo#1{\listoffloatsdoentry#1\finish}
\def\listoffloatsdoentry#1-title\finish{{%
 % Can't fully expand XR#1-lof because it can contain anything.  Just
 % pass the control sequence.  On the other hand, XR#1-pg is just the
 % page number, and we want to fully expand that so we can get a link
 % in pdf output.
 \toksA = \expandafter{\csname XR#1-lof\endcsname}%
 %
 % use the same \entry macro we use to generate the TOC and index.
 \edef\writeentry{\noexpand\entry{\the\toksA}{\csname XR#1-pg\endcsname}}%
 \writeentry
}}


\message{localization,}

% For single-language documents, @documentlanguage is usually given very
% early, just after @documentencoding.  Single argument is the language
% (de) or locale (de_DE) abbreviation.
%
{
 \catcode`\_ = \active
 \globaldefs=1
\parseargdef\documentlanguage{\begingroup
 \let_=\normalunderscore  % normal _ character for filenames
 \tex % read txi-??.tex file in plain TeX.
   % Read the file by the name they passed if it exists.
   \openin 1 txi-#1.tex
   \ifeof 1
     \documentlanguagetrywithoutunderscore{#1_\finish}%
   \else
     \globaldefs = 1  % everything in the txi-LL files needs to persist
     \input txi-#1.tex
```

```
  \fi
  \closein 1
 \endgroup % end raw TeX
\endgroup}
%
% If they passed de_DE, and txi-de_DE.tex doesn't exist,
% try txi-de.tex.
%
\gdef\documentlanguagetrywithoutunderscore#1_#2\finish{%
 \openin 1 txi-#1.tex
 \ifeof 1
  \errhelp = \nolanghelp
  \errmessage{Cannot read language file txi-#1.tex}%
 \else
  \globaldefs = 1  % everything in the txi-LL files needs to persist
  \input txi-#1.tex
 \fi
 \closein 1
}
}% end of special _ catcode
%
\newhelp\nolanghelp{The given language definition file cannot be found or
is empty.  Maybe you need to install it?  Putting it in the current
directory should work if nowhere else does.}

% This macro is called from txi-??.tex files; the first argument is the
% \language name to set (without the "\lang@" prefix), the second and
% third args are \{left,right}hyphenmin.
%
% The language names to pass are determined when the format is built.
% See the etex.log file created at that time, e.g.,
% /usr/local/texlive/2008/texmf-var/web2c/pdftex/etex.log.
%
% With TeX Live 2008, etex now includes hyphenation patterns for all
% available languages.  This means we can support hyphenation in
% Texinfo, at least to some extent.  (This still doesn't solve the
% accented characters problem.)
%
\catcode`@=11
\def\txisetlanguage#1#2#3{%
 % do not set the language if the name is undefined in the current TeX.
 \expandafter\ifx\csname lang@#1\endcsname \relax
  \message{no patterns for #1}%
 \else
  \global\language = \csname lang@#1\endcsname
 \fi
 % but there is no harm in adjusting the hyphenmin values regardless.
 \global\lefthyphenmin = #2\relax
```

```
 \global\righthyphenmin = #3\relax
}

% Helpers for encodings.
% Set the catcode of characters 128 through 255 to the specified number.
%
\def\setnonasciicharscatcode#1{%
  \count255=128
  \loop\ifnum\count255<256
     \global\catcode\count255=#1\relax
     \advance\count255 by 1
  \repeat
}

\def\setnonasciicharscatcodenonglobal#1{%
  \count255=128
  \loop\ifnum\count255<256
     \catcode\count255=#1\relax
     \advance\count255 by 1
  \repeat
}

% @documentencoding sets the definition of non-ASCII characters
% according to the specified encoding.
%
\parseargdef\documentencoding{%
 % Encoding being declared for the document.
 \def\declaredencoding{\csname #1.enc\endcsname}%
 %
 % Supported encodings: names converted to tokens in order to be able
 % to compare them with \ifx.
 \def\ascii{\csname US-ASCII.enc\endcsname}%
 \def\latnine{\csname ISO-8859-15.enc\endcsname}%
 \def\latone{\csname ISO-8859-1.enc\endcsname}%
 \def\lattwo{\csname ISO-8859-2.enc\endcsname}%
 \def\utfeight{\csname UTF-8.enc\endcsname}%
 %
 \ifx \declaredencoding \ascii
    \asciichardefs
 %
 \else \ifx \declaredencoding \lattwo
    \setnonasciicharscatcode\active
    \lattwochardefs
 %
 \else \ifx \declaredencoding \latone
    \setnonasciicharscatcode\active
    \latonechardefs
 %
```

```
\else \ifx \declaredencoding \latnine
   \setnonasciicharscatcode\active
   \latninechardefs
%
\else \ifx \declaredencoding \utfeight
   \setnonasciicharscatcode\active
   \utfeightchardefs
%
\else
  \message{Unknown document encoding #1, ignoring.}%
%
\fi % utfeight
\fi % latnine
\fi % latone
\fi % lattwo
\fi % ascii
}

% A message to be logged when using a character that isn't available
% the default font encoding (OT1).
%
\def\missingcharmsg#1{\message{Character missing in OT1 encoding: #1.}}

% Take account of \c (plain) vs. \, (Texinfo) difference.
\def\cedilla#1{\ifx\c\ptexc\c{#1}\else\,{#1}\fi}

% First, make active non-ASCII characters in order for them to be
% correctly categorized when TeX reads the replacement text of
% macros containing the character definitions.
\setnonasciicharscatcode\active
%
% Latin1 (ISO-8859-1) character definitions.
\def\latonechardefs{%
 \gdef^^a0{\tie}
 \gdef^^a1{\exclamdown}
 \gdef^^a2{\missingcharmsg{CENT SIGN}}
 \gdef^^a3{{\pounds}}
 \gdef^^a4{\missingcharmsg{CURRENCY SIGN}}
 \gdef^^a5{\missingcharmsg{YEN SIGN}}
 \gdef^^a6{\missingcharmsg{BROKEN BAR}}
 \gdef^^a7{\S}
 \gdef^^a8{\"{}}
 \gdef^^a9{\copyright}
 \gdef^^aa{\ordf}
 \gdef^^ab{\guillemetleft}
 \gdef^^ac{$\lnot$}
 \gdef^^ad{\-}
 \gdef^^ae{\registeredsymbol}
```

```
\gdef^^af{\={}}
%
\gdef^^b0{\textdegree}
\gdef^^b1{$\pm$}
\gdef^^b2{$^2$}
\gdef^^b3{$^3$}
\gdef^^b4{\'{}}
\gdef^^b5{$\mu$}
\gdef^^b6{\P}
%
\gdef^^b7{$^.$}
\gdef^^b8{\cedilla\ }
\gdef^^b9{$^1$}
\gdef^^ba{\ordm}
%
\gdef^^bb{\guillemetright}
\gdef^^bc{$1\over4$}
\gdef^^bd{$1\over2$}
\gdef^^be{$3\over4$}
\gdef^^bf{\questiondown}
%
\gdef^^c0{\`A}
\gdef^^c1{\'A}
\gdef^^c2{\^A}
\gdef^^c3{\~A}
\gdef^^c4{\"A}
\gdef^^c5{\ringaccent A}
\gdef^^c6{\AE}
\gdef^^c7{\cedilla C}
\gdef^^c8{\`E}
\gdef^^c9{\'E}
\gdef^^ca{\^E}
\gdef^^cb{\"E}
\gdef^^cc{\`I}
\gdef^^cd{\'I}
\gdef^^ce{\^I}
\gdef^^cf{\"I}
%
\gdef^^d0{\DH}
\gdef^^d1{\~N}
\gdef^^d2{\`O}
\gdef^^d3{\'O}
\gdef^^d4{\^O}
\gdef^^d5{\~O}
\gdef^^d6{\"O}
\gdef^^d7{$\times$}
\gdef^^d8{\O}
\gdef^^d9{\`U}
```

```
 \gdef^^da{\'U}
 \gdef^^db{\^U}
 \gdef^^dc{\"U}
 \gdef^^dd{\'Y}
 \gdef^^de{\TH}
 \gdef^^df{\ss}
 %
 \gdef^^e0{\`a}
 \gdef^^e1{\'a}
 \gdef^^e2{\^a}
 \gdef^^e3{\~a}
 \gdef^^e4{\"a}
 \gdef^^e5{\ringaccent a}
 \gdef^^e6{\ae}
 \gdef^^e7{\cedilla c}
 \gdef^^e8{\`e}
 \gdef^^e9{\'e}
 \gdef^^ea{\^e}
 \gdef^^eb{\"e}
 \gdef^^ec{\`{\dotless i}}
 \gdef^^ed{\'{\dotless i}}
 \gdef^^ee{\^{\dotless i}}
 \gdef^^ef{\"{\dotless i}}
 %
 \gdef^^f0{\dh}
 \gdef^^f1{\~n}
 \gdef^^f2{\`o}
 \gdef^^f3{\'o}
 \gdef^^f4{\^o}
 \gdef^^f5{\~o}
 \gdef^^f6{\"o}
 \gdef^^f7{$\div$}
 \gdef^^f8{\o}
 \gdef^^f9{\`u}
 \gdef^^fa{\'u}
 \gdef^^fb{\^u}
 \gdef^^fc{\"u}
 \gdef^^fd{\'y}
 \gdef^^fe{\th}
 \gdef^^ff{\"y}
}

% Latin9 (ISO-8859-15) encoding character definitions.
\def\latninechardefs{%
 % Encoding is almost identical to Latin1.
 \latonechardefs
 %
 \gdef^^a4{\euro}
```

```
 \gdef^^a6{\v S}
 \gdef^^a8{\v s}
 \gdef^^b4{\v Z}
 \gdef^^b8{\v z}
 \gdef^^bc{\OE}
 \gdef^^bd{\oe}
 \gdef^^be{\"Y}
}

% Latin2 (ISO-8859-2) character definitions.
\def\lattwochardefs{%
 \gdef^^a0{\tie}
 \gdef^^a1{\ogonek{A}}
 \gdef^^a2{\u{}}
 \gdef^^a3{\L}
 \gdef^^a4{\missingcharmsg{CURRENCY SIGN}}
 \gdef^^a5{\v L}
 \gdef^^a6{\'S}
 \gdef^^a7{\S}
 \gdef^^a8{\"{}}
 \gdef^^a9{\v S}
 \gdef^^aa{\cedilla S}
 \gdef^^ab{\v T}
 \gdef^^ac{\'Z}
 \gdef^^ad{\-}
 \gdef^^ae{\v Z}
 \gdef^^af{\dotaccent Z}
 %
 \gdef^^b0{\textdegree}
 \gdef^^b1{\ogonek{a}}
 \gdef^^b2{\ogonek{ }}
 \gdef^^b3{\l}
 \gdef^^b4{\'{}}
 \gdef^^b5{\v l}
 \gdef^^b6{\'s}
 \gdef^^b7{\v{}}
 \gdef^^b8{\cedilla\ }
 \gdef^^b9{\v s}
 \gdef^^ba{\cedilla s}
 \gdef^^bb{\v t}
 \gdef^^bc{\'z}
 \gdef^^bd{\H{}}
 \gdef^^be{\v z}
 \gdef^^bf{\dotaccent z}
 %
 \gdef^^c0{\'R}
 \gdef^^c1{\'A}
 \gdef^^c2{\^A}
```

```
\gdef^^c3{\u A}
\gdef^^c4{\"A}
\gdef^^c5{\'L}
\gdef^^c6{\'C}
\gdef^^c7{\cedilla C}
\gdef^^c8{\v C}
\gdef^^c9{\'E}
\gdef^^ca{\ogonek{E}}
\gdef^^cb{\"E}
\gdef^^cc{\v E}
\gdef^^cd{\'I}
\gdef^^ce{\^I}
\gdef^^cf{\v D}
%
\gdef^^d0{\DH}
\gdef^^d1{\'N}
\gdef^^d2{\v N}
\gdef^^d3{\'O}
\gdef^^d4{\^O}
\gdef^^d5{\H O}
\gdef^^d6{\"O}
\gdef^^d7{$\times$}
\gdef^^d8{\v R}
\gdef^^d9{\ringaccent U}
\gdef^^da{\'U}
\gdef^^db{\H U}
\gdef^^dc{\"U}
\gdef^^dd{\'Y}
\gdef^^de{\cedilla T}
\gdef^^df{\ss}
%
\gdef^^e0{\'r}
\gdef^^e1{\'a}
\gdef^^e2{\^a}
\gdef^^e3{\u a}
\gdef^^e4{\"a}
\gdef^^e5{\'l}
\gdef^^e6{\'c}
\gdef^^e7{\cedilla c}
\gdef^^e8{\v c}
\gdef^^e9{\'e}
\gdef^^ea{\ogonek{e}}
\gdef^^eb{\"e}
\gdef^^ec{\v e}
\gdef^^ed{\'{\dotless{i}}}
\gdef^^ee{\^{\dotless{i}}}
\gdef^^ef{\v d}
%
```

```
 \gdef^^f0{\dh}
 \gdef^^f1{\'n}
 \gdef^^f2{\v n}
 \gdef^^f3{\'o}
 \gdef^^f4{\^o}
 \gdef^^f5{\H o}
 \gdef^^f6{\"o}
 \gdef^^f7{$\div$}
 \gdef^^f8{\v r}
 \gdef^^f9{\ringaccent u}
 \gdef^^fa{\'u}
 \gdef^^fb{\H u}
 \gdef^^fc{\"u}
 \gdef^^fd{\'y}
 \gdef^^fe{\cedilla t}
 \gdef^^ff{\dotaccent{}}
}

% UTF-8 character definitions.
%
% This code to support UTF-8 is based on LaTeX's utf8.def, with some
% changes for Texinfo conventions.  It is included here under the GPL by
% permission from Frank Mittelbach and the LaTeX team.
%
\newcount\countUTFx
\newcount\countUTFy
\newcount\countUTFz

\gdef\UTFviiiTwoOctets#1#2{\expandafter
  \UTFviiiDefined\csname u8:#1\string #2\endcsname}
%
\gdef\UTFviiiThreeOctets#1#2#3{\expandafter
  \UTFviiiDefined\csname u8:#1\string #2\string #3\endcsname}
%
\gdef\UTFviiiFourOctets#1#2#3#4{\expandafter
  \UTFviiiDefined\csname u8:#1\string #2\string #3\string #4\endcsname}

\gdef\UTFviiiDefined#1{%
 \ifx #1\relax
   \message{\linenumber Unicode char \string #1 not defined for Texinfo}%
 \else
   \expandafter #1%
 \fi
}

\begingroup
 \catcode`\~13
 \catcode`\"12
```

```
 \def\UTFviiiLoop{%
   \global\catcode\countUTFx\active
   \uccode`\~\countUTFx
   \uppercase\expandafter{\UTFviiiTmp}%
   \advance\countUTFx by 1
   \ifnum\countUTFx < \countUTFy
     \expandafter\UTFviiiLoop
   \fi}

 \countUTFx = "C2
 \countUTFy = "E0
 \def\UTFviiiTmp{%
   \xdef~{\noexpand\UTFviiiTwoOctets\string~}}
 \UTFviiiLoop

 \countUTFx = "E0
 \countUTFy = "F0
 \def\UTFviiiTmp{%
   \xdef~{\noexpand\UTFviiiThreeOctets\string~}}
 \UTFviiiLoop

 \countUTFx = "F0
 \countUTFy = "F4
 \def\UTFviiiTmp{%
   \xdef~{\noexpand\UTFviiiFourOctets\string~}}
 \UTFviiiLoop
\endgroup

\begingroup
 \catcode`\"=12
 \catcode`\<=12
 \catcode`\.=12
 \catcode`\,=12
 \catcode`\;=12
 \catcode`\!=12
 \catcode`\~=13

 \gdef\DeclareUnicodeCharacter#1#2{%
   \countUTFz = "#1\relax
   %\wlog{\space\space defining Unicode char U+#1 (decimal \the\countUTFz)}%
   \begingroup
     \parseXMLCharref
     \def\UTFviiiTwoOctets##1##2{%
       \csname u8:##1\string ##2\endcsname}%
     \def\UTFviiiThreeOctets##1##2##3{%
       \csname u8:##1\string ##2\string ##3\endcsname}%
     \def\UTFviiiFourOctets##1##2##3##4{%
```

```
      \csname u8:##1\string ##2\string ##3\string ##4\endcsname}%
     \expandafter\expandafter\expandafter\expandafter
      \expandafter\expandafter\expandafter
      \gdef\UTFviiiTmp{#2}%
   \endgroup}

  \gdef\parseXMLCharref{%
   \ifnum\countUTFz < "A0\relax
    \errhelp = \EMsimple
    \errmessage{Cannot define Unicode char value < 00A0}%
   \else\ifnum\countUTFz < "800\relax
    \parseUTFviiiA,%
    \parseUTFviiiB C\UTFviiiTwoOctets.,%
   \else\ifnum\countUTFz < "10000\relax
    \parseUTFviiiA;%
    \parseUTFviiiA,%
    \parseUTFviiiB E\UTFviiiThreeOctets.{,;}%
   \else
    \parseUTFviiiA;%
    \parseUTFviiiA,%
    \parseUTFviiiA!%
    \parseUTFviiiB F\UTFviiiFourOctets.{!,;}%
   \fi\fi\fi
  }

  \gdef\parseUTFviiiA#1{%
   \countUTFx = \countUTFz
   \divide\countUTFz by 64
   \countUTFy = \countUTFz
   \multiply\countUTFz by 64
   \advance\countUTFx by -\countUTFz
   \advance\countUTFx by 128
   \uccode `#1\countUTFx
   \countUTFz = \countUTFy}

  \gdef\parseUTFviiiB#1#2#3#4{%
   \advance\countUTFz by "#10\relax
   \uccode `#3\countUTFz
   \uppercase{\gdef\UTFviiiTmp{#2#3#4}}}
 \endgroup

 \def\utfeightchardefs{%
  \DeclareUnicodeCharacter{00A0}{\tie}
  \DeclareUnicodeCharacter{00A1}{\exclamdown}
  \DeclareUnicodeCharacter{00A3}{\pounds}
  \DeclareUnicodeCharacter{00A8}{\"{ }}
  \DeclareUnicodeCharacter{00A9}{\copyright}
  \DeclareUnicodeCharacter{00AA}{\ordf}
```

```
\DeclareUnicodeCharacter{00AB}{\guillemetleft}
\DeclareUnicodeCharacter{00AD}{\-}
\DeclareUnicodeCharacter{00AE}{\registeredsymbol}
\DeclareUnicodeCharacter{00AF}{\={ }}

\DeclareUnicodeCharacter{00B0}{\ringaccent{ }}
\DeclareUnicodeCharacter{00B4}{\'{ }}
\DeclareUnicodeCharacter{00B8}{\cedilla{ }}
\DeclareUnicodeCharacter{00BA}{\ordm}
\DeclareUnicodeCharacter{00BB}{\guillemetright}
\DeclareUnicodeCharacter{00BF}{\questiondown}

\DeclareUnicodeCharacter{00C0}{\`A}
\DeclareUnicodeCharacter{00C1}{\'A}
\DeclareUnicodeCharacter{00C2}{\^A}
\DeclareUnicodeCharacter{00C3}{\~A}
\DeclareUnicodeCharacter{00C4}{\"A}
\DeclareUnicodeCharacter{00C5}{\AA}
\DeclareUnicodeCharacter{00C6}{\AE}
\DeclareUnicodeCharacter{00C7}{\cedilla{C}}
\DeclareUnicodeCharacter{00C8}{\`E}
\DeclareUnicodeCharacter{00C9}{\'E}
\DeclareUnicodeCharacter{00CA}{\^E}
\DeclareUnicodeCharacter{00CB}{\"E}
\DeclareUnicodeCharacter{00CC}{\`I}
\DeclareUnicodeCharacter{00CD}{\'I}
\DeclareUnicodeCharacter{00CE}{\^I}
\DeclareUnicodeCharacter{00CF}{\"I}

\DeclareUnicodeCharacter{00D0}{\DH}
\DeclareUnicodeCharacter{00D1}{\~N}
\DeclareUnicodeCharacter{00D2}{\`O}
\DeclareUnicodeCharacter{00D3}{\'O}
\DeclareUnicodeCharacter{00D4}{\^O}
\DeclareUnicodeCharacter{00D5}{\~O}
\DeclareUnicodeCharacter{00D6}{\"O}
\DeclareUnicodeCharacter{00D8}{\O}
\DeclareUnicodeCharacter{00D9}{\`U}
\DeclareUnicodeCharacter{00DA}{\'U}
\DeclareUnicodeCharacter{00DB}{\^U}
\DeclareUnicodeCharacter{00DC}{\"U}
\DeclareUnicodeCharacter{00DD}{\'Y}
\DeclareUnicodeCharacter{00DE}{\TH}
\DeclareUnicodeCharacter{00DF}{\ss}

\DeclareUnicodeCharacter{00E0}{\`a}
\DeclareUnicodeCharacter{00E1}{\'a}
\DeclareUnicodeCharacter{00E2}{\^a}
```

```
\DeclareUnicodeCharacter{00E3}{\~a}
\DeclareUnicodeCharacter{00E4}{\"a}
\DeclareUnicodeCharacter{00E5}{\aa}
\DeclareUnicodeCharacter{00E6}{\ae}
\DeclareUnicodeCharacter{00E7}{\cedilla{c}}
\DeclareUnicodeCharacter{00E8}{\`e}
\DeclareUnicodeCharacter{00E9}{\'e}
\DeclareUnicodeCharacter{00EA}{\^e}
\DeclareUnicodeCharacter{00EB}{\"e}
\DeclareUnicodeCharacter{00EC}{\`{\dotless{i}}}
\DeclareUnicodeCharacter{00ED}{\'{\dotless{i}}}
\DeclareUnicodeCharacter{00EE}{\^{\dotless{i}}}
\DeclareUnicodeCharacter{00EF}{\"{\dotless{i}}}

\DeclareUnicodeCharacter{00F0}{\dh}
\DeclareUnicodeCharacter{00F1}{\~n}
\DeclareUnicodeCharacter{00F2}{\`o}
\DeclareUnicodeCharacter{00F3}{\'o}
\DeclareUnicodeCharacter{00F4}{\^o}
\DeclareUnicodeCharacter{00F5}{\~o}
\DeclareUnicodeCharacter{00F6}{\"o}
\DeclareUnicodeCharacter{00F8}{\o}
\DeclareUnicodeCharacter{00F9}{\`u}
\DeclareUnicodeCharacter{00FA}{\'u}
\DeclareUnicodeCharacter{00FB}{\^u}
\DeclareUnicodeCharacter{00FC}{\"u}
\DeclareUnicodeCharacter{00FD}{\'y}
\DeclareUnicodeCharacter{00FE}{\th}
\DeclareUnicodeCharacter{00FF}{\"y}

\DeclareUnicodeCharacter{0100}{\=A}
\DeclareUnicodeCharacter{0101}{\=a}
\DeclareUnicodeCharacter{0102}{\u{A}}
\DeclareUnicodeCharacter{0103}{\u{a}}
\DeclareUnicodeCharacter{0104}{\ogonek{A}}
\DeclareUnicodeCharacter{0105}{\ogonek{a}}
\DeclareUnicodeCharacter{0106}{\'C}
\DeclareUnicodeCharacter{0107}{\'c}
\DeclareUnicodeCharacter{0108}{\^C}
\DeclareUnicodeCharacter{0109}{\^c}
\DeclareUnicodeCharacter{0118}{\ogonek{E}}
\DeclareUnicodeCharacter{0119}{\ogonek{e}}
\DeclareUnicodeCharacter{010A}{\dotaccent{C}}
\DeclareUnicodeCharacter{010B}{\dotaccent{c}}
\DeclareUnicodeCharacter{010C}{\v{C}}
\DeclareUnicodeCharacter{010D}{\v{c}}
\DeclareUnicodeCharacter{010E}{\v{D}}
```

```
\DeclareUnicodeCharacter{0112}{\=E}
\DeclareUnicodeCharacter{0113}{\=e}
\DeclareUnicodeCharacter{0114}{\u{E}}
\DeclareUnicodeCharacter{0115}{\u{e}}
\DeclareUnicodeCharacter{0116}{\dotaccent{E}}
\DeclareUnicodeCharacter{0117}{\dotaccent{e}}
\DeclareUnicodeCharacter{011A}{\v{E}}
\DeclareUnicodeCharacter{011B}{\v{e}}
\DeclareUnicodeCharacter{011C}{\^G}
\DeclareUnicodeCharacter{011D}{\^g}
\DeclareUnicodeCharacter{011E}{\u{G}}
\DeclareUnicodeCharacter{011F}{\u{g}}

\DeclareUnicodeCharacter{0120}{\dotaccent{G}}
\DeclareUnicodeCharacter{0121}{\dotaccent{g}}
\DeclareUnicodeCharacter{0124}{\^H}
\DeclareUnicodeCharacter{0125}{\^h}
\DeclareUnicodeCharacter{0128}{\~I}
\DeclareUnicodeCharacter{0129}{\~{\dotless{i}}}
\DeclareUnicodeCharacter{012A}{\=I}
\DeclareUnicodeCharacter{012B}{\={\dotless{i}}}
\DeclareUnicodeCharacter{012C}{\u{I}}
\DeclareUnicodeCharacter{012D}{\u{\dotless{i}}}

\DeclareUnicodeCharacter{0130}{\dotaccent{I}}
\DeclareUnicodeCharacter{0131}{\dotless{i}}
\DeclareUnicodeCharacter{0132}{IJ}
\DeclareUnicodeCharacter{0133}{ij}
\DeclareUnicodeCharacter{0134}{\^J}
\DeclareUnicodeCharacter{0135}{\^{\dotless{j}}}
\DeclareUnicodeCharacter{0139}{\'L}
\DeclareUnicodeCharacter{013A}{\'l}

\DeclareUnicodeCharacter{0141}{\L}
\DeclareUnicodeCharacter{0142}{\l}
\DeclareUnicodeCharacter{0143}{\'N}
\DeclareUnicodeCharacter{0144}{\'n}
\DeclareUnicodeCharacter{0147}{\v{N}}
\DeclareUnicodeCharacter{0148}{\v{n}}
\DeclareUnicodeCharacter{014C}{\=O}
\DeclareUnicodeCharacter{014D}{\=o}
\DeclareUnicodeCharacter{014E}{\u{O}}
\DeclareUnicodeCharacter{014F}{\u{o}}

\DeclareUnicodeCharacter{0150}{\H{O}}
\DeclareUnicodeCharacter{0151}{\H{o}}
\DeclareUnicodeCharacter{0152}{\OE}
\DeclareUnicodeCharacter{0153}{\oe}
```

```
\DeclareUnicodeCharacter{0154}{\'R}
\DeclareUnicodeCharacter{0155}{\'r}
\DeclareUnicodeCharacter{0158}{\v{R}}
\DeclareUnicodeCharacter{0159}{\v{r}}
\DeclareUnicodeCharacter{015A}{\'S}
\DeclareUnicodeCharacter{015B}{\'s}
\DeclareUnicodeCharacter{015C}{\^S}
\DeclareUnicodeCharacter{015D}{\^s}
\DeclareUnicodeCharacter{015E}{\cedilla{S}}
\DeclareUnicodeCharacter{015F}{\cedilla{s}}

\DeclareUnicodeCharacter{0160}{\v{S}}
\DeclareUnicodeCharacter{0161}{\v{s}}
\DeclareUnicodeCharacter{0162}{\cedilla{t}}
\DeclareUnicodeCharacter{0163}{\cedilla{T}}
\DeclareUnicodeCharacter{0164}{\v{T}}

\DeclareUnicodeCharacter{0168}{\~U}
\DeclareUnicodeCharacter{0169}{\~u}
\DeclareUnicodeCharacter{016A}{\=U}
\DeclareUnicodeCharacter{016B}{\=u}
\DeclareUnicodeCharacter{016C}{\u{U}}
\DeclareUnicodeCharacter{016D}{\u{u}}
\DeclareUnicodeCharacter{016E}{\ringaccent{U}}
\DeclareUnicodeCharacter{016F}{\ringaccent{u}}

\DeclareUnicodeCharacter{0170}{\H{U}}
\DeclareUnicodeCharacter{0171}{\H{u}}
\DeclareUnicodeCharacter{0174}{\^W}
\DeclareUnicodeCharacter{0175}{\^w}
\DeclareUnicodeCharacter{0176}{\^Y}
\DeclareUnicodeCharacter{0177}{\^y}
\DeclareUnicodeCharacter{0178}{\"Y}
\DeclareUnicodeCharacter{0179}{\'Z}
\DeclareUnicodeCharacter{017A}{\'z}
\DeclareUnicodeCharacter{017B}{\dotaccent{Z}}
\DeclareUnicodeCharacter{017C}{\dotaccent{z}}
\DeclareUnicodeCharacter{017D}{\v{Z}}
\DeclareUnicodeCharacter{017E}{\v{z}}

\DeclareUnicodeCharacter{01C4}{D\v{Z}}
\DeclareUnicodeCharacter{01C5}{D\v{z}}
\DeclareUnicodeCharacter{01C6}{d\v{z}}
\DeclareUnicodeCharacter{01C7}{LJ}
\DeclareUnicodeCharacter{01C8}{Lj}
\DeclareUnicodeCharacter{01C9}{lj}
\DeclareUnicodeCharacter{01CA}{NJ}
\DeclareUnicodeCharacter{01CB}{Nj}
```

```
\DeclareUnicodeCharacter{01CC}{nj}
\DeclareUnicodeCharacter{01CD}{\v{A}}
\DeclareUnicodeCharacter{01CE}{\v{a}}
\DeclareUnicodeCharacter{01CF}{\v{I}}

\DeclareUnicodeCharacter{01D0}{\v{\dotless{i}}}
\DeclareUnicodeCharacter{01D1}{\v{O}}
\DeclareUnicodeCharacter{01D2}{\v{o}}
\DeclareUnicodeCharacter{01D3}{\v{U}}
\DeclareUnicodeCharacter{01D4}{\v{u}}

\DeclareUnicodeCharacter{01E2}{\={\AE}}
\DeclareUnicodeCharacter{01E3}{\={\ae}}
\DeclareUnicodeCharacter{01E6}{\v{G}}
\DeclareUnicodeCharacter{01E7}{\v{g}}
\DeclareUnicodeCharacter{01E8}{\v{K}}
\DeclareUnicodeCharacter{01E9}{\v{k}}

\DeclareUnicodeCharacter{01F0}{\v{\dotless{j}}}
\DeclareUnicodeCharacter{01F1}{DZ}
\DeclareUnicodeCharacter{01F2}{Dz}
\DeclareUnicodeCharacter{01F3}{dz}
\DeclareUnicodeCharacter{01F4}{\'G}
\DeclareUnicodeCharacter{01F5}{\'g}
\DeclareUnicodeCharacter{01F8}{\`N}
\DeclareUnicodeCharacter{01F9}{\`n}
\DeclareUnicodeCharacter{01FC}{\'{\AE}}
\DeclareUnicodeCharacter{01FD}{\'{\ae}}
\DeclareUnicodeCharacter{01FE}{\'{\O}}
\DeclareUnicodeCharacter{01FF}{\'{\o}}

\DeclareUnicodeCharacter{021E}{\v{H}}
\DeclareUnicodeCharacter{021F}{\v{h}}

\DeclareUnicodeCharacter{0226}{\dotaccent{A}}
\DeclareUnicodeCharacter{0227}{\dotaccent{a}}
\DeclareUnicodeCharacter{0228}{\cedilla{E}}
\DeclareUnicodeCharacter{0229}{\cedilla{e}}
\DeclareUnicodeCharacter{022E}{\dotaccent{O}}
\DeclareUnicodeCharacter{022F}{\dotaccent{o}}

\DeclareUnicodeCharacter{0232}{\=Y}
\DeclareUnicodeCharacter{0233}{\=y}
\DeclareUnicodeCharacter{0237}{\dotless{j}}

\DeclareUnicodeCharacter{02DB}{\ogonek{ }}

\DeclareUnicodeCharacter{1E02}{\dotaccent{B}}
```

```
\DeclareUnicodeCharacter{1E03}{\dotaccent{b}}
\DeclareUnicodeCharacter{1E04}{\udotaccent{B}}
\DeclareUnicodeCharacter{1E05}{\udotaccent{b}}
\DeclareUnicodeCharacter{1E06}{\ubaraccent{B}}
\DeclareUnicodeCharacter{1E07}{\ubaraccent{b}}
\DeclareUnicodeCharacter{1E0A}{\dotaccent{D}}
\DeclareUnicodeCharacter{1E0B}{\dotaccent{d}}
\DeclareUnicodeCharacter{1E0C}{\udotaccent{D}}
\DeclareUnicodeCharacter{1E0D}{\udotaccent{d}}
\DeclareUnicodeCharacter{1E0E}{\ubaraccent{D}}
\DeclareUnicodeCharacter{1E0F}{\ubaraccent{d}}

\DeclareUnicodeCharacter{1E1E}{\dotaccent{F}}
\DeclareUnicodeCharacter{1E1F}{\dotaccent{f}}

\DeclareUnicodeCharacter{1E20}{\=G}
\DeclareUnicodeCharacter{1E21}{\=g}
\DeclareUnicodeCharacter{1E22}{\dotaccent{H}}
\DeclareUnicodeCharacter{1E23}{\dotaccent{h}}
\DeclareUnicodeCharacter{1E24}{\udotaccent{H}}
\DeclareUnicodeCharacter{1E25}{\udotaccent{h}}
\DeclareUnicodeCharacter{1E26}{\"H}
\DeclareUnicodeCharacter{1E27}{\"h}

\DeclareUnicodeCharacter{1E30}{\'K}
\DeclareUnicodeCharacter{1E31}{\'k}
\DeclareUnicodeCharacter{1E32}{\udotaccent{K}}
\DeclareUnicodeCharacter{1E33}{\udotaccent{k}}
\DeclareUnicodeCharacter{1E34}{\ubaraccent{K}}
\DeclareUnicodeCharacter{1E35}{\ubaraccent{k}}
\DeclareUnicodeCharacter{1E36}{\udotaccent{L}}
\DeclareUnicodeCharacter{1E37}{\udotaccent{l}}
\DeclareUnicodeCharacter{1E3A}{\ubaraccent{L}}
\DeclareUnicodeCharacter{1E3B}{\ubaraccent{l}}
\DeclareUnicodeCharacter{1E3E}{\'M}
\DeclareUnicodeCharacter{1E3F}{\'m}

\DeclareUnicodeCharacter{1E40}{\dotaccent{M}}
\DeclareUnicodeCharacter{1E41}{\dotaccent{m}}
\DeclareUnicodeCharacter{1E42}{\udotaccent{M}}
\DeclareUnicodeCharacter{1E43}{\udotaccent{m}}
\DeclareUnicodeCharacter{1E44}{\dotaccent{N}}
\DeclareUnicodeCharacter{1E45}{\dotaccent{n}}
\DeclareUnicodeCharacter{1E46}{\udotaccent{N}}
\DeclareUnicodeCharacter{1E47}{\udotaccent{n}}
\DeclareUnicodeCharacter{1E48}{\ubaraccent{N}}
\DeclareUnicodeCharacter{1E49}{\ubaraccent{n}}
```

```
\DeclareUnicodeCharacter{1E54}{\'P}
\DeclareUnicodeCharacter{1E55}{\'p}
\DeclareUnicodeCharacter{1E56}{\dotaccent{P}}
\DeclareUnicodeCharacter{1E57}{\dotaccent{p}}
\DeclareUnicodeCharacter{1E58}{\dotaccent{R}}
\DeclareUnicodeCharacter{1E59}{\dotaccent{r}}
\DeclareUnicodeCharacter{1E5A}{\udotaccent{R}}
\DeclareUnicodeCharacter{1E5B}{\udotaccent{r}}
\DeclareUnicodeCharacter{1E5E}{\ubaraccent{R}}
\DeclareUnicodeCharacter{1E5F}{\ubaraccent{r}}

\DeclareUnicodeCharacter{1E60}{\dotaccent{S}}
\DeclareUnicodeCharacter{1E61}{\dotaccent{s}}
\DeclareUnicodeCharacter{1E62}{\udotaccent{S}}
\DeclareUnicodeCharacter{1E63}{\udotaccent{s}}
\DeclareUnicodeCharacter{1E6A}{\dotaccent{T}}
\DeclareUnicodeCharacter{1E6B}{\dotaccent{t}}
\DeclareUnicodeCharacter{1E6C}{\udotaccent{T}}
\DeclareUnicodeCharacter{1E6D}{\udotaccent{t}}
\DeclareUnicodeCharacter{1E6E}{\ubaraccent{T}}
\DeclareUnicodeCharacter{1E6F}{\ubaraccent{t}}

\DeclareUnicodeCharacter{1E7C}{\~V}
\DeclareUnicodeCharacter{1E7D}{\~v}
\DeclareUnicodeCharacter{1E7E}{\udotaccent{V}}
\DeclareUnicodeCharacter{1E7F}{\udotaccent{v}}

\DeclareUnicodeCharacter{1E80}{\`W}
\DeclareUnicodeCharacter{1E81}{\`w}
\DeclareUnicodeCharacter{1E82}{\'W}
\DeclareUnicodeCharacter{1E83}{\'w}
\DeclareUnicodeCharacter{1E84}{\"W}
\DeclareUnicodeCharacter{1E85}{\"w}
\DeclareUnicodeCharacter{1E86}{\dotaccent{W}}
\DeclareUnicodeCharacter{1E87}{\dotaccent{w}}
\DeclareUnicodeCharacter{1E88}{\udotaccent{W}}
\DeclareUnicodeCharacter{1E89}{\udotaccent{w}}
\DeclareUnicodeCharacter{1E8A}{\dotaccent{X}}
\DeclareUnicodeCharacter{1E8B}{\dotaccent{x}}
\DeclareUnicodeCharacter{1E8C}{\"X}
\DeclareUnicodeCharacter{1E8D}{\"x}
\DeclareUnicodeCharacter{1E8E}{\dotaccent{Y}}
\DeclareUnicodeCharacter{1E8F}{\dotaccent{y}}

\DeclareUnicodeCharacter{1E90}{\^Z}
\DeclareUnicodeCharacter{1E91}{\^z}
\DeclareUnicodeCharacter{1E92}{\udotaccent{Z}}
\DeclareUnicodeCharacter{1E93}{\udotaccent{z}}
```

```
\DeclareUnicodeCharacter{1E94}{\ubaraccent{Z}}
\DeclareUnicodeCharacter{1E95}{\ubaraccent{z}}
\DeclareUnicodeCharacter{1E96}{\ubaraccent{h}}
\DeclareUnicodeCharacter{1E97}{\"t}
\DeclareUnicodeCharacter{1E98}{\ringaccent{w}}
\DeclareUnicodeCharacter{1E99}{\ringaccent{y}}

\DeclareUnicodeCharacter{1EA0}{\udotaccent{A}}
\DeclareUnicodeCharacter{1EA1}{\udotaccent{a}}

\DeclareUnicodeCharacter{1EB8}{\udotaccent{E}}
\DeclareUnicodeCharacter{1EB9}{\udotaccent{e}}
\DeclareUnicodeCharacter{1EBC}{\~E}
\DeclareUnicodeCharacter{1EBD}{\~e}

\DeclareUnicodeCharacter{1ECA}{\udotaccent{I}}
\DeclareUnicodeCharacter{1ECB}{\udotaccent{i}}
\DeclareUnicodeCharacter{1ECC}{\udotaccent{O}}
\DeclareUnicodeCharacter{1ECD}{\udotaccent{o}}

\DeclareUnicodeCharacter{1EE4}{\udotaccent{U}}
\DeclareUnicodeCharacter{1EE5}{\udotaccent{u}}

\DeclareUnicodeCharacter{1EF2}{\`Y}
\DeclareUnicodeCharacter{1EF3}{\`y}
\DeclareUnicodeCharacter{1EF4}{\udotaccent{Y}}

\DeclareUnicodeCharacter{1EF8}{\~Y}
\DeclareUnicodeCharacter{1EF9}{\~y}

\DeclareUnicodeCharacter{2013}{--}
\DeclareUnicodeCharacter{2014}{---}
\DeclareUnicodeCharacter{2018}{\quoteleft}
\DeclareUnicodeCharacter{2019}{\quoteright}
\DeclareUnicodeCharacter{201A}{\quotesinglbase}
\DeclareUnicodeCharacter{201C}{\quotedblleft}
\DeclareUnicodeCharacter{201D}{\quotedblright}
\DeclareUnicodeCharacter{201E}{\quotedblbase}
\DeclareUnicodeCharacter{2022}{\bullet}
\DeclareUnicodeCharacter{2026}{\dots}
\DeclareUnicodeCharacter{2039}{\guilsinglleft}
\DeclareUnicodeCharacter{203A}{\guilsinglright}
\DeclareUnicodeCharacter{20AC}{\euro}

\DeclareUnicodeCharacter{2192}{\expansion}
\DeclareUnicodeCharacter{21D2}{\result}

\DeclareUnicodeCharacter{2212}{\minus}
```

```
 \DeclareUnicodeCharacter{2217}{\point}
 \DeclareUnicodeCharacter{2261}{\equiv}
}% end of \utfeightchardefs


% US-ASCII character definitions.
\def\asciichardefs{% nothing need be done
  \relax
}

% Make non-ASCII characters printable again for compatibility with
% existing Texinfo documents that may use them, even without declaring a
% document encoding.
%
\setnonasciicharscatcode \other


\message{formatting,}

\newdimen\defaultparindent \defaultparindent = 15pt

\chapheadingskip = 15pt plus 4pt minus 2pt
\secheadingskip = 12pt plus 3pt minus 2pt
\subsecheadingskip = 9pt plus 2pt minus 2pt

% Prevent underfull vbox error messages.
\vbadness = 10000

% Don't be very finicky about underfull hboxes, either.
\hbadness = 6666

% Following George Bush, get rid of widows and orphans.
\widowpenalty=10000
\clubpenalty=10000

% Use TeX 3.0's \emergencystretch to help line breaking, but if we're
% using an old version of TeX, don't do anything.  We want the amount of
% stretch added to depend on the line length, hence the dependence on
% \hsize.  We call this whenever the paper size is set.
%
\def\setemergencystretch{%
 \ifx\emergencystretch\thisisundefined
   % Allow us to assign to \emergencystretch anyway.
   \def\emergencystretch{\dimen0}%
 \else
   \emergencystretch = .15\hsize
 \fi
}
```

```
% Parameters in order: 1) textheight; 2) textwidth;
% 3) voffset; 4) hoffset; 5) binding offset; 6) topskip;
% 7) physical page height; 8) physical page width.
%
% We also call \setleading{\textleading}, so the caller should define
% \textleading.  The caller should also set \parskip.
%
\def\internalpagesizes#1#2#3#4#5#6#7#8{%
 \voffset = #3\relax
 \topskip = #6\relax
 \splittopskip = \topskip
 %
 \vsize = #1\relax
 \advance\vsize by \topskip
 \outervsize = \vsize
 \advance\outervsize by 2\topandbottommargin
 \pageheight = \vsize
 %
 \hsize = #2\relax
 \outerhsize = \hsize
 \advance\outerhsize by 0.5in
 \pagewidth = \hsize
 %
 \normaloffset = #4\relax
 \bindingoffset = #5\relax
 %
 \ifpdf
   \pdfpageheight #7\relax
   \pdfpagewidth #8\relax
   % if we don't reset these, they will remain at "1 true in" of
   % whatever layout pdftex was dumped with.
   \pdfhorigin = 1 true in
   \pdfvorigin = 1 true in
 \fi
 %
 \setleading{\textleading}
 %
 \parindent = \defaultparindent
 \setemergencystretch
}

% @letterpaper (the default).
\def\letterpaper{{\globaldefs = 1
 \parskip = 3pt plus 2pt minus 1pt
 \textleading = 13.2pt
 %
 % If page is nothing but text, make it come out even.
```

```
 \internalpagesizes{607.2pt}{6in}% that's 46 lines
                {\voffset}{.25in}%
                {\bindingoffset}{36pt}%
                {11in}{8.5in}%
}}

% Use @smallbook to reset parameters for 7x9.25 trim size.
\def\smallbook{{\globaldefs = 1
 \parskip = 2pt plus 1pt
 \textleading = 12pt
 %
 \internalpagesizes{7.5in}{5in}%
                {-.2in}{0in}%
                {\bindingoffset}{16pt}%
                {9.25in}{7in}%
 %
 \lispnarrowing = 0.3in
 \tolerance = 700
 \hfuzz = 1pt
 \contentsrightmargin = 0pt
 \defbodyindent = .5cm
}}

% Use @smallerbook to reset parameters for 6x9 trim size.
% (Just testing, parameters still in flux.)
\def\smallerbook{{\globaldefs = 1
 \parskip = 1.5pt plus 1pt
 \textleading = 12pt
 %
 \internalpagesizes{7.4in}{4.8in}%
                {-.2in}{-.4in}%
                {0pt}{14pt}%
                {9in}{6in}%
 %
 \lispnarrowing = 0.25in
 \tolerance = 700
 \hfuzz = 1pt
 \contentsrightmargin = 0pt
 \defbodyindent = .4cm
}}

% Use @afourpaper to print on European A4 paper.
\def\afourpaper{{\globaldefs = 1
 \parskip = 3pt plus 2pt minus 1pt
 \textleading = 13.2pt
 %
 % Double-side printing via postscript on Laserjet 4050
 % prints double-sided nicely when \bindingoffset=10mm and \hoffset=-6mm.
```

```
 % To change the settings for a different printer or situation, adjust
 % \normaloffset until the front-side and back-side texts align.  Then
 % do the same for \bindingoffset.  You can set these for testing in
 % your texinfo source file like this:
 % @tex
 % \global\normaloffset = -6mm
 % \global\bindingoffset = 10mm
 % @end tex
 \internalpagesizes{673.2pt}{160mm}% that's 51 lines
                {\voffset}{\hoffset}%
                {\bindingoffset}{44pt}%
                {297mm}{210mm}%
 %
 \tolerance = 700
 \hfuzz = 1pt
 \contentsrightmargin = 0pt
 \defbodyindent = 5mm
}}

% Use @afivepaper to print on European A5 paper.
% From romildo@urano.iceb.ufop.br, 2 July 2000.
% He also recommends making @example and @lisp be small.
\def\afivepaper{{\globaldefs = 1
 \parskip = 2pt plus 1pt minus 0.1pt
 \textleading = 12.5pt
 %
 \internalpagesizes{160mm}{120mm}%
                {\voffset}{\hoffset}%
                {\bindingoffset}{8pt}%
                {210mm}{148mm}%
 %
 \lispnarrowing = 0.2in
 \tolerance = 800
 \hfuzz = 1.2pt
 \contentsrightmargin = 0pt
 \defbodyindent = 2mm
 \tableindent = 12mm
}}

% A specific text layout, 24x15cm overall, intended for A4 paper.
\def\afourlatex{{\globaldefs = 1
 \afourpaper
 \internalpagesizes{237mm}{150mm}%
                {\voffset}{4.6mm}%
                {\bindingoffset}{7mm}%
                {297mm}{210mm}%
 %
 % Must explicitly reset to 0 because we call \afourpaper.
```

```
 \globaldefs = 0
}}

% Use @afourwide to print on A4 paper in landscape format.
\def\afourwide{{\globaldefs = 1
 \afourpaper
 \internalpagesizes{241mm}{165mm}%
                {\voffset}{-2.95mm}%
                {\bindingoffset}{7mm}%
                {297mm}{210mm}%
 \globaldefs = 0
}}

% @pagesizes TEXTHEIGHT[,TEXTWIDTH]
% Perhaps we should allow setting the margins, \topskip, \parskip,
% and/or leading, also. Or perhaps we should compute them somehow.
%
\parseargdef\pagesizes{\pagesizesyyy #1,,\finish}
\def\pagesizesyyy#1,#2,#3\finish{{%
 \setbox0 = \hbox{\ignorespaces #2}\ifdim\wd0 > 0pt \hsize=#2\relax \fi
 \globaldefs = 1
 %
 \parskip = 3pt plus 2pt minus 1pt
 \setleading{\textleading}%
 %
 \dimen0 = #1\relax
 \advance\dimen0 by \voffset
 %
 \dimen2 = \hsize
 \advance\dimen2 by \normaloffset
 %
 \internalpagesizes{#1}{\hsize}%
                {\voffset}{\normaloffset}%
                {\bindingoffset}{44pt}%
                {\dimen0}{\dimen2}%
}}

% Set default to letter.
%
\letterpaper


\message{and turning on texinfo input format.}

\def^^L{\par} % remove \outer, so ^L can appear in an @comment

% DEL is a comment character, in case @c does not suffice.
\catcode`\^^? = 14
```

```
% Define macros to output various characters with catcode for normal text.
\catcode`\"=\other \def\normaldoublequote{"}
\catcode`\$=\other \def\normaldollar{$}%$ font-lock fix
\catcode`\+=\other \def\normalplus{+}
\catcode`\<=\other \def\normalless{<}
\catcode`\>=\other \def\normalgreater{>}
\catcode`\^=\other \def\normalcaret{^}
\catcode`\_=\other \def\normalunderscore{_}
\catcode`\|=\other \def\normalverticalbar{|}
\catcode`\~=\other \def\normaltilde{~}

% This macro is used to make a character print one way in \tt
% (where it can probably be output as-is), and another way in other fonts,
% where something hairier probably needs to be done.
%
% #1 is what to print if we are indeed using \tt; #2 is what to print
% otherwise.  Since all the Computer Modern typewriter fonts have zero
% interword stretch (and shrink), and it is reasonable to expect all
% typewriter fonts to have this, we can check that font parameter.
%
\def\ifusingtt#1#2{\ifdim \fontdimen3\font=0pt #1\else #2\fi}

% Same as above, but check for italic font.  Actually this also catches
% non-italic slanted fonts since it is impossible to distinguish them from
% italic fonts.  But since this is only used by $ and it uses \sl anyway
% this is not a problem.
\def\ifusingit#1#2{\ifdim \fontdimen1\font>0pt #1\else #2\fi}

% Turn off all special characters except @
% (and those which the user can use as if they were ordinary).
% Most of these we simply print from the \tt font, but for some, we can
% use math or other variants that look better in normal text.

\catcode`\"=\active
\def\activedoublequote{{\tt\char34}}
\let"=\activedoublequote
\catcode`\~=\active
\def~{{\tt\char126}}
\chardef\hat=`\^
\catcode`\^=\active
\def^{{\tt \hat}}

\catcode`\_=\active
\def_{\ifusingtt\normalunderscore\_}
\let\realunder=_
% Subroutine for the previous macro.
\def\_{\leavevmode \kern.07em \vbox{\hrule width.3em height.1ex}\kern .07em }
```

```
\catcode`\|=\active
\def|{{\tt\char124}}
\chardef \less=`\<
\catcode`\<=\active
\def<{{\tt \less}}
\chardef \gtr=`\>
\catcode`\>=\active
\def>{{\tt \gtr}}
\catcode`\+=\active
\def+{{\tt \char 43}}
\catcode`\$=\active
\def${\ifusingit{{\sl\$}}\normaldollar}%$ font-lock fix

% If a .fmt file is being used, characters that might appear in a file
% name cannot be active until we have parsed the command line.
% So turn them off again, and have \everyjob (or @setfilename) turn them on.
% \otherifyactive is called near the end of this file.
\def\otherifyactive{\catcode`+=\other \catcode`\_=\other}

% Used sometimes to turn off (effectively) the active characters even after
% parsing them.
\def\turnoffactive{%
 \normalturnoffactive
 \otherbackslash
}

\catcode`\@=0

% \backslashcurfont outputs one backslash character in current font,
% as in \char`\\.
\global\chardef\backslashcurfont=`\\
\global\let\rawbackslashxx=\backslashcurfont  % let existing .??s files work

% \realbackslash is an actual character `\' with catcode other, and
% \doublebackslash is two of them (for the pdf outlines).
{\catcode`\\=\other @gdef@realbackslash{\} @gdef@doublebackslash{\\}}

% In texinfo, backslash is an active character; it prints the backslash
% in fixed width font.
\catcode`\\=\active  % @ for escape char from now on.

% The story here is that in math mode, the \char of \backslashcurfont
% ends up printing the roman \ from the math symbol font (because \char
% in math mode uses the \mathcode, and plain.tex sets
% \mathcode`\\="026E).  It seems better for @backslashchar{} to always
% print a typewriter backslash, hence we use an explicit \mathchar,
% which is the decimal equivalent of "715c (class 7, e.g., use \fam;
```

```
% ignored family value; char position "5C).  We can't use " for the
% usual hex value because it has already been made active.
@def@normalbackslash{{@tt @ifmmode @mathchar29020 @else @backslashcurfont @fi}}
@let@backslashchar = @normalbackslash % @backslashchar{} is for user documents.

% On startup, @fixbackslash assigns:
%  @let \ = @normalbackslash
% \rawbackslash defines an active \ to do \backslashcurfont.
% \otherbackslash defines an active \ to be a literal `\' character with
% catcode other.  We switch back and forth between these.
@gdef@rawbackslash{@let\=@backslashcurfont}
@gdef@otherbackslash{@let\=@realbackslash}

% Same as @turnoffactive except outputs \ as {\tt\char`\\} instead of
% the literal character `\'.  Also revert - to its normal character, in
% case the active - from code has slipped in.
%
{@catcode`- = @active
@gdef@normalturnoffactive{%
  @let-=@normaldash
  @let"=@normaldoublequote
  @let$=@normaldollar %$ font-lock fix
  @let+=@normalplus
  @let<=@normalless
  @let>=@normalgreater
  @let\=@normalbackslash
  @let^=@normalcaret
  @let_=@normalunderscore
  @let|=@normalverticalbar
  @let~=@normaltilde
  @markupsetuplqdefault
  @markupsetuprqdefault
  @unsepspaces
}
}

% Make _ and + \other characters, temporarily.
% This is canceled by @fixbackslash.
@otherifyactive

% If a .fmt file is being used, we don't want the `\input texinfo' to show up.
% That is what \eatinput is for; after that, the `\' should revert to printing
% a backslash.
%
@gdef@eatinput input texinfo{@fixbackslash}
@global@let\ = @eatinput

% On the other hand, perhaps the file did not have a `\input texinfo'. Then
```

```
% the first `\' in the file would cause an error. This macro tries to fix
% that, assuming it is called before the first `\' could plausibly occur.
% Also turn back on active characters that might appear in the input
% file name, in case not using a pre-dumped format.
%
@gdef@fixbackslash{%
 @ifx\@eatinput @let\ = @normalbackslash @fi
 @catcode`+=@active
 @catcode`@_=@active
}

% Say @foo, not \foo, in error messages.
@escapechar = `@@

% These (along with & and #) are made active for url-breaking, so need
% active definitions as the normal characters.
@def@normaldot{.}
@def@normalquest{?}
@def@normalslash{/}

% These look ok in all fonts, so just make them not special.
% @hashchar{} gets its own user-level command, because of #line.
@catcode`@& = @other @def@normalamp{&}
@catcode`@# = @other @def@normalhash{#}
@catcode`@% = @other @def@normalpercent{%}

@let @hashchar = @normalhash

@c Finally, make ` and ' active, so that txicodequoteundirected and
@c txicodequotebacktick work right in, e.g., @w{@code{`foo'}}.  If we
@c don't make ` and ' active, @code will not get them as active chars.
@c Do this last of all since we use ` in the previous @catcode assignments.
@catcode`@'=@active
@catcode`@`=@active
@markupsetuplqdefault
@markupsetuprqdefault

@c Local variables:
@c eval: (add-hook 'write-file-hooks 'time-stamp)
@c page-delimiter: "^\\\\message"
@c time-stamp-start: "def\\\\texinfoversion{"
@c time-stamp-format: "%:y-%02m-%02d.%02H"
@c time-stamp-end: "}"
@c End:

@c vim:sw=2:

@ignore
```

arch-tag: e1b36e32-c96e-4135-a41a-0b2efa2ea115
@end ignore

1.75 libffi/msvcc.sh 3.2.1

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1.76 libgcrypt 1.8.2 :1.0

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1.80 libgpg-error 1.27 :0

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1.84 libpcap 1.8.1

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That's all there is to it!
This is an attempt to acknowledge early contributions to the garbage
collector. Later contributions should instead be mentioned in
README.changes.

HISTORY -

Early versions of this collector were developed as a part of research
projects supported in part by the National Science Foundation
and the Defense Advance Research Projects Agency.

The garbage collector originated as part of the run-time system for
the Russell programming language implementation. The first version of the
garbage collector was written primarily by Al Demers. It was then refined
and mostly rewritten, primarily by Hans-J. Boehm, at Cornell U.,
the University of Washington, Rice University (where it was first used for
C and assembly code), Xerox PARC, SGI, and HP Labs. However, significant
contributions have also been made by many others.

Some other contributors:

More recent contributors are mentioned in the modification history in
README.changes. My apologies for any omissions.

The SPARC specific code was originally contributed by Mark Weiser.
The Encore Multimax modifications were supplied by
Kevin Kenny (kenny@m.cs.uiuc.edu). The adaptation to the IBM PC/RT is largely
due to Vernon Lee, on machines made available to Rice by IBM.
Much of the HP specific code and a number of good suggestions for improving the
generic code are due to Walter Underwood.
Robert Brazile (brazile@diamond.bbn.com) originally supplied the ULTRIX code.
Al Dosser (dosser@src.dec.com) and Regis Cridlig (Regis.Cridlig@cl.cam.ac.uk)
subsequently provided updates and information on variation between ULTRIX
systems. Parag Patel (parag@netcom.com) supplied the A/UX code.
Jesper Peterson(jep@mtiame.mtia.oz.au), Michel Schinz, and

Martin Tauchmann (martintauchmann@bigfoot.com) supplied the Amiga port.
Thomas Funke (thf@zelator.in-berlin.de(?)) and
Brian D.Carlstrom (bdc@clark.lcs.mit.edu) supplied the NeXT ports.
Douglas Steel (doug@wg.icl.co.uk) provided ICL DRS6000 code.
Bill Janssen (janssen@parc.xerox.com) supplied the SunOS dynamic loader
specific code. Manuel Serrano (serrano@cornas.inria.fr) supplied linux and
Sony News specific code. Al Dosser provided Alpha/OSF/1 code. He and
Dave Detlefs(detlefs@src.dec.com) also provided several generic bug fixes.
Alistair G. Crooks(agc@uts.amdahl.com) supplied the NetBSD and 386BSD ports.
Jeffrey Hsu (hsu@soda.berkeley.edu) provided the FreeBSD port.
Brent Benson (brent@jade.ssd.csd.harris.com) ported the collector to
a Motorola 88K processor running CX/UX (Harris NightHawk).
Ari Huttunen (Ari.Huttunen@hut.fi) generalized the OS/2 port to
nonIBM development environments (a nontrivial task).
Patrick Beard (beard@cs.ucdavis.edu) provided the initial MacOS port.
David Chase, then at Olivetti Research, suggested several improvements.
Scott Schwartz (schwartz@groucho.cse.psu.edu) supplied some of the
code to save and print call stacks for leak detection on a SPARC.
Jesse Hull and John Ellis supplied the C++ interface code.
Zhong Shao performed much of the experimentation that led to the
current typed allocation facility. (His dynamic type inference code hasn't
made it into the released version of the collector, yet.)
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# These lines make the symbols to get a @@GCC_4.6.0.

%exclude {
 __addtf3
 __copysigntf3
 __divtc3
 __divtf3
 __eqtf2
 __extenddftf2
 __extendsftf2
 __extendxftf2
 __fabstf2
 __fixtfdi
 __fixtfsi
 __fixtfti
 __fixunstfdi
 __fixunstfsi
 __fixunstfti
 __floatditf
 __floatsitf
 __floattitf
 __floatunditf
 __floatunsitf
 __floatuntitf
 __getf2
 __gttf2
 __letf2
 __lttf2
 __multc3
 __multf3
 __negtf2
 __netf2
```

```
 __powitf2
 __subtf3
 __trunctfdf2
 __trunctfsf2
 __trunctfxf2
 __unordtf2
}

GCC_4.6.0 {
 __addtf3
%ifndef __x86_64__
 __copysigntf3
%endif
 __divtc3
 __divtf3
 __eqtf2
 __extenddftf2
 __extendsftf2
 __extendxftf2
%ifndef __x86_64__
 __fabstf2
%endif
 __fixtfdi
 __fixtfsi
%ifdef __x86_64__
 __fixtfti
%endif
 __fixunstfdi
 __fixunstfsi
%ifdef __x86_64__
 __fixunstfti
%endif
 __floatditf
 __floatsitf
%ifdef __x86_64__
 __floattitf
%endif
 __floatunditf
 __floatunsitf
%ifdef __x86_64__
 __floatuntitf
%endif
 __getf2
 __gttf2
 __letf2
 __lttf2
 __multc3
 __multf3
```

__negtf2
__netf2
__powitf2
__subtf3
__trunctfdf2
__trunctfsf2
__trunctfxf2
__unordtf2
}
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@page
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possible use to the public, the best way to achieve this is to make it
free software which everyone can redistribute and change under these terms.

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to attach them to the start of each source file to most effectively
convey the exclusion of warranty; and each file should have at least
the ``copyright'' line and a pointer to where the full notice is found.

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@end smallexample

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when it starts in an interactive mode:

@smallexample
Gnomovision version 69, Copyright (C) @var{year} @var{name of author}
Gnomovision comes with ABSOLUTELY NO WARRANTY; for details
type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
@end smallexample

The hypothetical commands @samp{show w} and @samp{show c} should show
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commands you use may be called something other than @samp{show w} and
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@example
Yoyodyne, Inc., hereby disclaims all copyright interest in the program
`Gnomovision' (which makes passes at compilers) written by James Hacker.

@var{signature of Ty Coon}, 1 April 1989
Ty Coon, President of Vice
@end example

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Public License instead of this License.

@c man end
DRuntime: Runtime Library for the D Programming Language
==========

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Version 3, 29 June 2007

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</legalnotice>
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```

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 <qandaentry id="faq.what.copyright">
   <question><para>What are the copyrights?</para></question>

   <answer>
     <para>Please see <ulink url="https://cygwin.com/licensing.html"/>
     for more information about Cygwin copyright and licensing.</para>
   </answer>
 </qandaentry>
</qandadiv>
```

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Version 3.1, 31 March 2009

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/* Use the Sequent Symmetry assembler syntax.  */

/* Define the syntax of pseudo-ops, labels and comments.  */

/* Prefix for internally generated assembler labels.  If we aren't using
  underscores, we are using prefix `.'s to identify labels that should
  be ignored, as in `i386/gas.h' --karl@cs.umb.edu  */

#define LPREFIX "L"

/* Assembler pseudos to introduce constants of various size.  */

#define ASM_BYTE "\t.byte\t"
#define ASM_SHORT "\t.word\t"
#define ASM_LONG "\t.long\t"
#define ASM_QUAD "\t.quad\t"  /* Should not be used for 32bit compilation.  */

/* This was suggested, but it shouldn't be right for DBX output. -- RMS
  #define ASM_OUTPUT_SOURCE_FILENAME(FILE, NAME) */


/* Define the syntax of labels and symbol definitions/declarations.  */

/* This is how to output an assembler line
  that says to advance the location counter by SIZE bytes.  */

#define ASM_OUTPUT_SKIP(FILE,SIZE)  \
 fprintf (FILE, "\t.space " HOST_WIDE_INT_PRINT_UNSIGNED"\n", (SIZE))

/* Define the syntax of labels and symbol definitions/declarations.  */

/* This says how to output an assembler line
  to define a global common symbol.  */

#define ASM_OUTPUT_COMMON(FILE, NAME, SIZE, ROUNDED)  \
( fputs (".comm ", (FILE)),   \
 assemble_name ((FILE), (NAME)),  \
 fprintf ((FILE), ",%u\n", (int)(ROUNDED)))
```

```
/* This says how to output an assembler line
   to define a local common symbol.  */

#define ASM_OUTPUT_LOCAL(FILE, NAME, SIZE, ROUNDED)  \
( fputs (".lcomm ", (FILE)),   \
 assemble_name ((FILE), (NAME)),  \
 fprintf ((FILE), ",%u\n", (int)(ROUNDED)))

#ifdef HAVE_GAS_LCOMM_WITH_ALIGNMENT
#define ASM_OUTPUT_ALIGNED_LOCAL(FILE, NAME, SIZE, ALIGNMENT)  \
( fputs (".lcomm ", (FILE)),   \
 assemble_name ((FILE), (NAME)),  \
 fprintf ((FILE), ",%u,%u\n", (int)(SIZE), (int)(ALIGNMENT) / BITS_PER_UNIT))
#endif

/* This is how to output an assembler line
   that says to advance the location counter
   to a multiple of 2**LOG bytes.  */

#define ASM_OUTPUT_ALIGN(FILE,LOG) \
 if ((LOG)!=0) fprintf ((FILE), "\t.align %d\n", (LOG))

/* This is how to store into the string BUF
   the symbol_ref name of an internal numbered label where
   PREFIX is the class of label and NUM is the number within the class.
   This is suitable for output with `assemble_name'.  */

#define ASM_GENERATE_INTERNAL_LABEL(BUF,PREFIX,NUMBER) \
    sprintf ((BUF), "*%s%ld", (PREFIX), (long)(NUMBER))

/* The prefix to add to user-visible assembler symbols.  */

#define USER_LABEL_PREFIX "_"

/* Sequent has some changes in the format of DBX symbols.  */
#define DBX_NO_XREFS 1

/* Don't split DBX symbols into continuations.  */
#define DBX_CONTIN_LENGTH 0
.\" Automatically generated by Pod::Man 4.09 (Pod::Simple 3.35)
.\"
.\" Standard preamble:
.\" ========================================================================
.de Sp \" Vertical space (when we can't use .PP)
.if t .sp .5v
.if n .sp
..
.de Vb \" Begin verbatim text
```

```
.ft CW
.nf
.ne \\$1
..
.de Ve \" End verbatim text
.ft R
.fi
..
.\" Set up some character translations and predefined strings.  \*(-- will
.\" give an unbreakable dash, \*(PI will give pi, \*(L" will give a left
.\" double quote, and \*(R" will give a right double quote.  \*(C+ will
.\" give a nicer C++.  Capital omega is used to do unbreakable dashes and
.\" therefore won't be available.  \*(C` and \*(C' expand to `' in nroff,
.\" nothing in troff, for use with C<>.
.tr \(*W-
.ds C+ C\v'-.1v'\h'-1p'\s-2+\h'-1p'+\s0\v'.1v'\h'-1p'
.ie n \{\
.    ds -- \(*W-
.    ds PI pi
.    if (\n(.H=4u)&(1m=24u) .ds -- \(*W\h'-12u'\(*W\h'-12u'-\" diablo 10 pitch
.    if (\n(.H=4u)&(1m=20u) .ds -- \(*W\h'-12u'\(*W\h'-8u'-\"  diablo 12 pitch
.    ds L" ""
.    ds R" ""
.    ds C` ""
.    ds C' ""
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.el\{\
.    ds -- \|\(em\|
.    ds PI \(*p
.    ds L" ``
.    ds R" ''
.    ds C`
.    ds C'
'br\}
.\"
.\" Escape single quotes in literal strings from groff's Unicode transform.
.ie \n(.g .ds Aq \(aq
.el       .ds Aq '
.\"
.\" If the F register is >0, we'll generate index entries on stderr for
.\" titles (.TH), headers (.SH), subsections (.SS), items (.Ip), and index
.\" entries marked with X<> in POD.  Of course, you'll have to process the
.\" output yourself in some meaningful fashion.
.\"
.\" Avoid warning from groff about undefined register 'F'.
.de IX
..
.if !\nF .nr F 0
```

```
.if \nF>0 \{\
.    de IX
.    tm Index:\\$1\t\\n%\t"\\$2"
..
.    if !\nF==2 \{\
.        nr % 0
.        nr F 2
.    \}
.\}
.\"
.\" Accent mark definitions (@(#)ms.acc 1.5 88/02/08 SMI; from UCB 4.2).
.\" Fear.  Run.  Save yourself.  No user-serviceable parts.
.    \" fudge factors for nroff and troff
.if n \{\
.    ds #H 0
.    ds #V .8m
.    ds #F .3m
.    ds #[ \f1
.    ds #] \fP
.\}
.if t \{\
.    ds #H ((1u-(\\\\n(.fu%2u))*.13m)
.    ds #V .6m
.    ds #F 0
.    ds #[ \&
.    ds #] \&
.\}
.    \" simple accents for nroff and troff
.if n \{\
.    ds ' \&
.    ds ` \&
.    ds ^ \&
.    ds , \&
.    ds ~ ~
.    ds /
.\}
.if t \{\
.    ds ' \\k:\h'-(\\n(.wu*8/10-\*(#H)'\'\h'"|\\n:u"
.    ds ` \\k:\h'-(\\n(.wu*8/10-\*(#H)'\`\h'|\\n:u'
.    ds ^ \\k:\h'-(\\n(.wu*10/11-\*(#H)'^\h'|\\n:u'
.    ds , \\k:\h'-(\\n(.wu*8/10)',\h'|\\n:u'
.    ds ~ \\k:\h'-(\\n(.wu-\*(#H-.1m)'~\h'|\\n:u'
.    ds / \\k:\h'-(\\n(.wu*8/10-\*(#H)'\z\(sl\h'|\\n:u'
.\}
.    \" troff and (daisy-wheel) nroff accents
.ds : \\k:\h'-(\\n(.wu*8/10-\*(#H+.1m+\*(#F)'\v'-\*(#V'\z.\h'.2m+\*(#F'.\h'|\\n:u'\v'\*(#V'
.ds 8 \h'\*(#H'\(*b\h'-\*(#H'
.ds o \\k:\h'-(\\n(.wu+\w'\(de'u-\*(#H)/2u'\v'-.3n'\*(#[\z\(de\v'.3n'\h'|\\n:u'\*(#]
```

```
.ds d- \h'\*(#H'\(pd\h'-\w'~'u'\v'-.25m'\f2\(hy\fP\v'.25m'\h'-\*(#H'
.ds D- D\\k:\h'-\w'D'u'\v'-.11m'\z\(hy\v'.11m'\h'|\\n:u'
.ds th \*(#[\v'.3m'\s+1I\s-1\v'-.3m'\h'-(\w'I'u*2/3)'\s-1o\s+1\*(#]
.ds Th \*(#[\s+2I\s-2\h'-\w'I'u*3/5'\v'-.3m'o\v'.3m'\*(#]
.ds ae a\h'-(\w'a'u*4/10)'e
.ds Ae A\h'-(\w'A'u*4/10)'E
.    \" corrections for vroff
.if v .ds ~ \\k:\h'-(\\n(.wu*9/10-\*(#H)'\s-2\u~\d\s+2\h'|\\n:u'
.if v .ds ^ \\k:\h'-(\\n(.wu*10/11-\*(#H)'\v'-.4m'^\v'.4m'\h'|\\n:u'
.    \" for low resolution devices (crt and lpr)
.if \n(.H>23 .if \n(.V>19 \
\{\
.    ds : e
.    ds 8 ss
.    ds o a
.    ds d- d\h'-1'\(ga
.    ds D- D\h'-1'\(hy
.    ds th \o'bp'
.    ds Th \o'LP'
.    ds ae ae
.    ds Ae AE
.\}
.rm #[ #] #H #V #F C
.\" ========================================================================
.\"
.IX Title "GPL 7"
.TH GPL 7 "2018-07-26" "gcc-8.2.0" "GNU"
.\" For nroff, turn off justification.  Always turn off hyphenation; it makes
.\" way too many mistakes in technical documents.
.if n .ad l
.nh
.SH "NAME"
gpl \- GNU General Public License
.SH "DESCRIPTION"
.IX Header "DESCRIPTION"
.SS "\s-1GNU\s0 General Public License"
.IX Subsection "GNU General Public License"
.SS "Version 3, 29 June 2007"
.IX Subsection "Version 3, 29 June 2007"
.Vb 1
\&       Copyright (c) 2007 Free Software Foundation, Inc. <http://fsf.org/>
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.Ve
.SS "Preamble"
.IX Subsection "Preamble"
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```

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.PP
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.PP
Developers that use the \s-1GNU GPL\s0 protect your rights with two steps:
(1) assert copyright on the software, and (2) offer you this License
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.PP
For the developers' and authors' protection, the \s-1GPL\s0 clearly explains
that there is no warranty for this free software. For both users' and
authors' sake, the \s-1GPL\s0 requires that modified versions be marked as
changed, so that their problems will not be attributed erroneously to
authors of previous versions.
.PP
Some devices are designed to deny users access to install or run
modified versions of the software inside them, although the
manufacturer can do so. This is fundamentally incompatible with the
aim of protecting users' freedom to change the software. The
systematic pattern of such abuse occurs in the area of products for
individuals to use, which is precisely where it is most unacceptable.
Therefore, we have designed this version of the \s-1GPL\s0 to prohibit the
practice for those products. If such problems arise substantially in

other domains, we stand ready to extend this provision to those
domains in future versions of the \s-1GPL,\s0 as needed to protect the
freedom of users.
.PP
Finally, every program is threatened constantly by software patents.
States should not allow patents to restrict development and use of
software on general-purpose computers, but in those that do, we wish
to avoid the special danger that patents applied to a free program
could make it effectively proprietary. To prevent this, the \s-1GPL\s0
assures that patents cannot be used to render the program non-free.
.PP
The precise terms and conditions for copying, distribution and
modification follow.
.SS "\s-1TERMS AND CONDITIONS\s0"
.IX Subsection "TERMS AND CONDITIONS"
.IP "0. Definitions." 4
.IX Item "0. Definitions."
\&*(L"This License*(R" refers to version 3 of the \s-1GNU\s0 General Public License.
.Sp
\&*(L"Copyright*(R" also means copyright-like laws that apply to other kinds
of works, such as semiconductor masks.
.Sp
\&*(L"The Program*(R" refers to any copyrightable work licensed under this
License. Each licensee is addressed as *(L"you*(R". *(L"Licensees*(R" and
\&*(L"recipients*(R" may be individuals or organizations.
.Sp
To *(L"modify*(R" a work means to copy from or adapt all or part of the work
in a fashion requiring copyright permission, other than the making of
an exact copy. The resulting work is called a *(L"modified version*(R" of
the earlier work or a work *(L"based on*(R" the earlier work.
.Sp
A *(L"covered work*(R" means either the unmodified Program or a work based
on the Program.
.Sp
To *(L"propagate*(R" a work means to do anything with it that, without
permission, would make you directly or secondarily liable for
infringement under applicable copyright law, except executing it on a
computer or modifying a private copy. Propagation includes copying,
distribution (with or without modification), making available to the
public, and in some countries other activities as well.
.Sp
To *(L"convey*(R" a work means any kind of propagation that enables other
parties to make or receive copies. Mere interaction with a user
through a computer network, with no transfer of a copy, is not
conveying.
.Sp
An interactive user interface displays *(L"Appropriate Legal Notices*(R" to
the extent that it includes a convenient and prominently visible

feature that (1) displays an appropriate copyright notice, and (2)
tells the user that there is no warranty for the work (except to the
extent that warranties are provided), that licensees may convey the
work under this License, and how to view a copy of this License. If
the interface presents a list of user commands or options, such as a
menu, a prominent item in the list meets this criterion.
.IP "1. Source Code." 4
.IX Item "1. Source Code."
The *(L"source code*(R" for a work means the preferred form of the work for
making modifications to it. *(L"Object code*(R" means any non-source form
of a work.
.Sp
A *(L"Standard Interface*(R" means an interface that either is an official
standard defined by a recognized standards body, or, in the case of
interfaces specified for a particular programming language, one that
is widely used among developers working in that language.
.Sp
The *(L"System Libraries*(R" of an executable work include anything, other
than the work as a whole, that (a) is included in the normal form of
packaging a Major Component, but which is not part of that Major
Component, and (b) serves only to enable use of the work with that
Major Component, or to implement a Standard Interface for which an
implementation is available to the public in source code form. A
\&*(L"Major Component*(R", in this context, means a major essential component
(kernel, window system, and so on) of the specific operating system
(if any) on which the executable work runs, or a compiler used to
produce the work, or an object code interpreter used to run it.
.Sp
The *(L"Corresponding Source*(R" for a work in object code form means all
the source code needed to generate, install, and (for an executable
work) run the object code and to modify the work, including scripts to
control those activities. However, it does not include the work's
System Libraries, or general-purpose tools or generally available free
programs which are used unmodified in performing those activities but
which are not part of the work. For example, Corresponding Source
includes interface definition files associated with source files for
the work, and the source code for shared libraries and dynamically
linked subprograms that the work is specifically designed to require,
such as by intimate data communication or control flow between those
subprograms and other parts of the work.
.Sp
The Corresponding Source need not include anything that users can
regenerate automatically from other parts of the Corresponding Source.
.Sp
The Corresponding Source for a work in source code form is that same
work.
.IP "2. Basic Permissions." 4
.IX Item "2. Basic Permissions."

All rights granted under this License are granted for the term of
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facilities for running those works, provided that you comply with the
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you must do so exclusively on your behalf, under your direction and
control, on terms that prohibit them from making any copies of your
copyrighted material outside their relationship with you.
.Sp
Conveying under any other circumstances is permitted solely under the
conditions stated below. Sublicensing is not allowed; section 10
makes it unnecessary.
.IP "3. Protecting Users' Legal Rights From Anti-Circumvention Law." 4
.IX Item "3. Protecting Users' Legal Rights From Anti-Circumvention Law."
No covered work shall be deemed part of an effective technological
measure under any applicable law fulfilling obligations under article
11 of the \s-1WIPO\s0 copyright treaty adopted on 20 December 1996, or
similar laws prohibiting or restricting circumvention of such
measures.
.Sp
When you convey a covered work, you waive any legal power to forbid
circumvention of technological measures to the extent such
circumvention is effected by exercising rights under this License with
respect to the covered work, and you disclaim any intention to limit
operation or modification of the work as a means of enforcing, against
the work's users, your or third parties' legal rights to forbid
circumvention of technological measures.
.IP "4. Conveying Verbatim Copies." 4
.IX Item "4. Conveying Verbatim Copies."
You may convey verbatim copies of the Program's source code as you
receive it, in any medium, provided that you conspicuously and
appropriately publish on each copy an appropriate copyright notice;
keep intact all notices stating that this License and any
non-permissive terms added in accord with section 7 apply to the code;
keep intact all notices of the absence of any warranty; and give all
recipients a copy of this License along with the Program.
.Sp
You may charge any price or no price for each copy that you convey,

and you may offer support or warranty protection for a fee.
.IP "5. Conveying Modified Source Versions." 4
.IX Item "5. Conveying Modified Source Versions."
You may convey a work based on the Program, or the modifications to
produce it from the Program, in the form of source code under the
terms of section 4, provided that you also meet all of these
conditions:
.RS 4
.IP "a." 4
.IX Item "a."
The work must carry prominent notices stating that you modified it,
and giving a relevant date.
.IP "b." 4
.IX Item "b."
The work must carry prominent notices stating that it is released
under this License and any conditions added under section 7. This
requirement modifies the requirement in section 4 to *(L"keep intact all
notices*(R".
.IP "c." 4
.IX Item "c."
You must license the entire work, as a whole, under this License to
anyone who comes into possession of a copy. This License will
therefore apply, along with any applicable section 7 additional terms,
to the whole of the work, and all its parts, regardless of how they
are packaged. This License gives no permission to license the work in
any other way, but it does not invalidate such permission if you have
separately received it.
.IP "d." 4
.IX Item "d."
If the work has interactive user interfaces, each must display
Appropriate Legal Notices; however, if the Program has interactive
interfaces that do not display Appropriate Legal Notices, your work
need not make them do so.
.RE
.RS 4
.Sp
A compilation of a covered work with other separate and independent
works, which are not by their nature extensions of the covered work,
and which are not combined with it such as to form a larger program,
in or on a volume of a storage or distribution medium, is called an
\&*(L"aggregate*(R" if the compilation and its resulting copyright are not
used to limit the access or legal rights of the compilation's users
beyond what the individual works permit. Inclusion of a covered work
in an aggregate does not cause this License to apply to the other
parts of the aggregate.
.RE
.IP "6. Conveying Non-Source Forms." 4
.IX Item "6. Conveying Non-Source Forms."

You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:
.RS 4
.IP "a." 4
.IX Item "a."
Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.
.IP "b." 4
.IX Item "b."
Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.
.IP "c." 4
.IX Item "c."
Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.
.IP "d." 4
.IX Item "d."
Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.
.IP "e." 4
.IX Item "e."
Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of

the work are being offered to the general public at no charge under
subsection 6d.
.RE
.RS 4
.Sp
A separable portion of the object code, whose source code is excluded
from the Corresponding Source as a System Library, need not be
included in conveying the object code work.
.Sp
A *(L"User Product*(R" is either (1) a *(L"consumer product*(R", which means any
tangible personal property which is normally used for personal,
family, or household purposes, or (2) anything designed or sold for
incorporation into a dwelling. In determining whether a product is a
consumer product, doubtful cases shall be resolved in favor of
coverage. For a particular product received by a particular user,
\&*(L"normally used*(R" refers to a typical or common use of that class of
product, regardless of the status of the particular user or of the way
in which the particular user actually uses, or expects or is expected
to use, the product. A product is a consumer product regardless of
whether the product has substantial commercial, industrial or
non-consumer uses, unless such uses represent the only significant
mode of use of the product.
.Sp
\&*(L"Installation Information*(R" for a User Product means any methods,
procedures, authorization keys, or other information required to
install and execute modified versions of a covered work in that User
Product from a modified version of its Corresponding Source. The
information must suffice to ensure that the continued functioning of
the modified object code is in no case prevented or interfered with
solely because modification has been made.
.Sp
If you convey an object code work under this section in, or with, or
specifically for use in, a User Product, and the conveying occurs as
part of a transaction in which the right of possession and use of the
User Product is transferred to the recipient in perpetuity or for a
fixed term (regardless of how the transaction is characterized), the
Corresponding Source conveyed under this section must be accompanied
by the Installation Information. But this requirement does not apply
if neither you nor any third party retains the ability to install
modified object code on the User Product (for example, the work has
been installed in \s-1ROM\s0).
.Sp
The requirement to provide Installation Information does not include a
requirement to continue to provide support service, warranty, or
updates for a work that has been modified or installed by the
recipient, or for the User Product in which it has been modified or
installed. Access to a network may be denied when the modification
itself materially and adversely affects the operation of the network

or violates the rules and protocols for communication across the
network.
.Sp
Corresponding Source conveyed, and Installation Information provided,
in accord with this section must be in a format that is publicly
documented (and with an implementation available to the public in
source code form), and must require no special password or key for
unpacking, reading or copying.
.RE
.IP "7. Additional Terms." 4
.IX Item "7. Additional Terms."
\&*(L"Additional permissions*(R" are terms that supplement the terms of this
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.RE
.RS 4
.Sp
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Additional terms, permissive or non-permissive, may be stated in the
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.RE
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.IX Item "8. Termination."
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.IX Item "9. Acceptance Not Required for Having Copies."
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.Sp
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organization, or substantially all assets of one, or subdividing an
organization, or merging organizations. If propagation of a covered
work results from an entity transaction, each party to that
transaction who receives a copy of the work also receives whatever
licenses to the work the party's predecessor in interest had or could
give under the previous paragraph, plus a right to possession of the
Corresponding Source of the work from the predecessor in interest, if
the predecessor has it or can get it with reasonable efforts.
.Sp
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.IP "11. Patents." 4

.IX Item "11. Patents."
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@smallexample
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Copyright (C) @var{year} @var{name of author}

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@end smallexample

Also add information on how to contact you by electronic and paper mail.

If the program does terminal interaction, make it output a short
notice like this when it starts in an interactive mode:

@smallexample
@var{program} Copyright (C) @var{year} @var{name of author}
This program comes with ABSOLUTELY NO WARRANTY; for details type @samp{show w}.
This is free software, and you are welcome to redistribute it
under certain conditions; type @samp{show c} for details.
@end smallexample

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@c man end
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Julian Seward, jseward@bzip.org
bzip2/libbzip2 version 1.0.6 of 6 September 2010

```
#!/usr/bin/python
#
# Copyright (C) 2013-2018 Free Software Foundation, Inc.
#
# This script is free software; you can redistribute it and/or modify
# it under the terms of the GNU General Public License as published by
# the Free Software Foundation; either version 3, or (at your option)
# any later version.

# This script adjusts the copyright notices at the top of source files
# so that they have the form:
#
#   Copyright XXXX-YYYY Free Software Foundation, Inc.
#
# It doesn't change code that is known to be maintained elsewhere or
# that carries a non-FSF copyright.
#
# The script also doesn't change testsuite files, except those in
# libstdc++-v3.  This is because libstdc++-v3 has a conformance testsuite,
# while most tests in other directories are just things that failed at some
# point in the past.
#
# Pass --this-year to the script if you want it to add the current year
# to all applicable notices.  Pass --quilt if you are using quilt and
# want files to be added to the quilt before being changed.
#
# By default the script will update all directories for which the
# output has been vetted.  You can instead pass the names of individual
# directories, including those that haven't been approved.  So:
#
#    update-copyright.py --this-year
#
# is the command that would be used at the beginning of a year to update
# all copyright notices (and possibly at other times to check whether
# new files have been added with old years).  On the other hand:
#
#    update-copyright.py --this-year libitm
#
# would run the script on just libitm/.
#
# Note that things like --version output strings must be updated before
```

```
# this script is run.  There's already a separate procedure for that.

import os
import re
import sys
import time
import subprocess

class Errors:
  def __init__ (self):
    self.num_errors = 0

  def report (self, filename, string):
    if filename:
      string = filename + ': ' + string
    sys.stderr.write (string + '\n')
    self.num_errors += 1

  def ok (self):
    return self.num_errors == 0

class GenericFilter:
  def __init__ (self):
    self.skip_files = set()
    self.skip_dirs = set()
    self.skip_extensions = set()
    self.fossilised_files = set()
    self.own_files = set()

    self.skip_files |= set ([
        # Skip licence files.
        'COPYING',
        'COPYING.LIB',
        'COPYING3',
        'COPYING3.LIB',
        'LICENSE',
        'fdl.texi',
        'gpl_v3.texi',
        'fdl-1.3.xml',
        'gpl-3.0.xml',

        # Skip auto- and libtool-related files
        'aclocal.m4',
        'compile',
        'config.guess',
        'config.sub',
        'depcomp',
        'install-sh',
```

```
            'libtool.m4',
            'ltmain.sh',
            'ltoptions.m4',
            'ltsugar.m4',
            'ltversion.m4',
            'lt~obsolete.m4',
            'missing',
            'mkdep',
            'mkinstalldirs',
            'move-if-change',
            'shlibpath.m4',
            'symlink-tree',
            'ylwrap',

            # Skip FSF mission statement, etc.
            'gnu.texi',
            'funding.texi',
            'appendix_free.xml',

            # Skip imported texinfo files.
            'texinfo.tex',
            ])


def get_line_filter (self, dir, filename):
    if filename.startswith ('ChangeLog'):
        # Ignore references to copyright in changelog entries.
        return re.compile ('\t')

    return None

def skip_file (self, dir, filename):
    if filename in self.skip_files:
        return True

    (base, extension) = os.path.splitext (os.path.join (dir, filename))
    if extension in self.skip_extensions:
        return True

    if extension == '.in':
        # Skip .in files produced by automake.
        if os.path.exists (base + '.am'):
            return True

        # Skip files produced by autogen
        if (os.path.exists (base + '.def')
            and os.path.exists (base + '.tpl')):
            return True
```

```
        # Skip configure files produced by autoconf
        if filename == 'configure':
            if os.path.exists (base + '.ac'):
                return True
            if os.path.exists (base + '.in'):
                return True

        return False

    def skip_dir (self, dir, subdir):
        return subdir in self.skip_dirs

    def is_fossilised_file (self, dir, filename):
        if filename in self.fossilised_files:
            return True
        # Only touch current current ChangeLogs.
        if filename != 'ChangeLog' and filename.find ('ChangeLog') >= 0:
            return True
        return False

    def by_package_author (self, dir, filename):
        return filename in self.own_files

class Copyright:
    def __init__ (self, errors):
        self.errors = errors

        # Characters in a range of years.  Include '.' for typos.
        ranges = '[0-9](?:[-0-9.,\s]|\s+and\s+)*[0-9]'

        # Non-whitespace characters in a copyright holder's name.
        name = '[\w.,-]'

        # Matches one year.
        self.year_re = re.compile ('[0-9]+')

        # Matches part of a year or copyright holder.
        self.continuation_re = re.compile (ranges + '|' + name)

        # Matches a full copyright notice:
        self.copyright_re = re.compile (
            # 1: 'Copyright (C)', etc.
            '([Cc]opyright'
            '|[Cc]opyright\s+\([Cc]\)'
            '|[Cc]opyright\s+%s'
            '|[Cc]opyright\s+&copy;'
            '|[Cc]opyright\s+@copyright{}'
```

```
        '|copyright = u\"'
        '|@set\s+copyright[\w-]+)'

        # 2: the years.  Include the whitespace in the year, so that
        # we can remove any excess.
        '(\s*(?:' + ranges + ',?'
        '|@value\{[^{}]*\})\s*)'

        # 3: 'by ', if used
        '(by\s+)?'

        # 4: the copyright holder.  Don't allow multiple consecutive
        # spaces, so that right-margin gloss doesn't get caught
        # (e.g. gnat_ugn.texi).
        '(' + name + '(?:\s?' + name + ')*)?')

    # A regexp for notices that might have slipped by.  Just matching
    # 'copyright' is too noisy, and 'copyright.*[0-9]' falls foul of
    # HTML header markers, so check for 'copyright' and two digits.
    self.other_copyright_re = re.compile ('copyright.*[0-9][0-9]',
                                          re.IGNORECASE)
    self.comment_re = re.compile('#+|[*]+|;+|%+|//+|@c |dnl ')
    self.holders = { '@copying': '@copying' }
    self.holder_prefixes = set()

    # True to 'quilt add' files before changing them.
    self.use_quilt = False

    # If set, force all notices to include this year.
    self.max_year = None

    # Goes after the year(s).  Could be ', '.
    self.separator = ' '

def add_package_author (self, holder, canon_form = None):
    if not canon_form:
        canon_form = holder
    self.holders[holder] = canon_form
    index = holder.find (' ')
    while index >= 0:
        self.holder_prefixes.add (holder[:index])
        index = holder.find (' ', index + 1)

def add_external_author (self, holder):
    self.holders[holder] = None

class BadYear():
    def __init__ (self, year):
```

```
        self.year = year

    def __str__ (self):
        return 'unrecognised year: ' + self.year

def parse_year (self, string):
    year = int (string)
    if len (string) == 2:
        if year > 70:
            return year + 1900
    elif len (string) == 4:
        return year
    raise self.BadYear (string)

def year_range (self, years):
    year_list = [self.parse_year (year)
                 for year in self.year_re.findall (years)]
    assert len (year_list) > 0
    return (min (year_list), max (year_list))

def set_use_quilt (self, use_quilt):
    self.use_quilt = use_quilt

def include_year (self, year):
    assert not self.max_year
    self.max_year = year

def canonicalise_years (self, dir, filename, filter, years):
    # Leave texinfo variables alone.
    if years.startswith ('@value'):
        return years

    (min_year, max_year) = self.year_range (years)

    # Update the upper bound, if enabled.
    if self.max_year and not filter.is_fossilised_file (dir, filename):
        max_year = max (max_year, self.max_year)

    # Use a range.
    if min_year == max_year:
        return '%d' % min_year
    else:
        return '%d-%d' % (min_year, max_year)

def strip_continuation (self, line):
    line = line.lstrip()
    match = self.comment_re.match (line)
    if match:
```

```
        line = line[match.end():].lstrip()
    return line

def is_complete (self, match):
    holder = match.group (4)
    return (holder
            and (holder not in self.holder_prefixes
                 or holder in self.holders))

def update_copyright (self, dir, filename, filter, file, line, match):
    orig_line = line
    next_line = None
    pathname = os.path.join (dir, filename)

    intro = match.group (1)
    if intro.startswith ('@set'):
        # Texinfo year variables should always be on one line
        after_years = line[match.end (2):].strip()
        if after_years != '':
            self.errors.report (pathname,
                                'trailing characters in @set: '
                                + after_years)
            return (False, orig_line, next_line)
    else:
        # If it looks like the copyright is incomplete, add the next line.
        while not self.is_complete (match):
            try:
                next_line = file.next()
            except StopIteration:
                break

            # If the next line doesn't look like a proper continuation,
            # assume that what we've got is complete.
            continuation = self.strip_continuation (next_line)
            if not self.continuation_re.match (continuation):
                break

            # Merge the lines for matching purposes.
            orig_line += next_line
            line = line.rstrip() + ' ' + continuation
            next_line = None

            # Rematch with the longer line, at the original position.
            match = self.copyright_re.match (line, match.start())
            assert match

        holder = match.group (4)
```

```
    # Use the filter to test cases where markup is getting in the way.
    if filter.by_package_author (dir, filename):
        assert holder not in self.holders

    elif not holder:
        self.errors.report (pathname, 'missing copyright holder')
        return (False, orig_line, next_line)

    elif holder not in self.holders:
        self.errors.report (pathname,
                            'unrecognised copyright holder: ' + holder)
        return (False, orig_line, next_line)

    else:
        # See whether the copyright is associated with the package
        # author.
        canon_form = self.holders[holder]
        if not canon_form:
            return (False, orig_line, next_line)

        # Make sure the author is given in a consistent way.
        line = (line[:match.start (4)]
                + canon_form
                + line[match.end (4):])

        # Remove any 'by'
        line = line[:match.start (3)] + line[match.end (3):]

# Update the copyright years.
years = match.group (2).strip()
try:
    canon_form = self.canonicalise_years (dir, filename, filter, years)
except self.BadYear as e:
    self.errors.report (pathname, str (e))
    return (False, orig_line, next_line)

line = (line[:match.start (2)]
        + (" if intro.startswith ('copyright = ') else ' ')
        + canon_form + self.separator
        + line[match.end (2):])

# Use the standard (C) form.
if intro.endswith ('right'):
    intro += ' (C)'
elif intro.endswith ('(c)'):
    intro = intro[:-3] + '(C)'
line = line[:match.start (1)] + intro + line[match.end (1):]
```

```
        # Strip trailing whitespace
        line = line.rstrip() + '\n'

        return (line != orig_line, line, next_line)

    def process_file (self, dir, filename, filter):
        pathname = os.path.join (dir, filename)
        if filename.endswith ('.tmp'):
            # Looks like something we tried to create before.
            try:
                os.remove (pathname)
            except OSError:
                pass
            return

        lines = []
        changed = False
        line_filter = filter.get_line_filter (dir, filename)
        mode = None
        with open (pathname, 'r') as file:
            prev = None
            mode = os.fstat (file.fileno()).st_mode
            for line in file:
                while line:
                    next_line = None
                    # Leave filtered-out lines alone.
                    if not (line_filter and line_filter.match (line)):
                        match = self.copyright_re.search (line)
                        if match:
                            res = self.update_copyright (dir, filename, filter,
                                                         file, line, match)
                            (this_changed, line, next_line) = res
                            changed = changed or this_changed

                        # Check for copyright lines that might have slipped by.
                        elif self.other_copyright_re.search (line):
                            self.errors.report (pathname,
                                                'unrecognised copyright: %s'
                                                % line.strip())
                    lines.append (line)
                    line = next_line

        # If something changed, write the new file out.
        if changed and self.errors.ok():
            tmp_pathname = pathname + '.tmp'
            with open (tmp_pathname, 'w') as file:
                for line in lines:
                    file.write (line)
```

```
            os.fchmod (file.fileno(), mode)
        if self.use_quilt:
            subprocess.call (['quilt', 'add', pathname])
        os.rename (tmp_pathname, pathname)

    def process_tree (self, tree, filter):
        for (dir, subdirs, filenames) in os.walk (tree):
            # Don't recurse through directories that should be skipped.
            for i in xrange (len (subdirs) - 1, -1, -1):
                if filter.skip_dir (dir, subdirs[i]):
                    del subdirs[i]

            # Handle the files in this directory.
            for filename in filenames:
                if filter.skip_file (dir, filename):
                    sys.stdout.write ('Skipping %s\n'
                                      % os.path.join (dir, filename))
                else:
                    self.process_file (dir, filename, filter)

class CmdLine:
    def __init__ (self, copyright = Copyright):
        self.errors = Errors()
        self.copyright = copyright (self.errors)
        self.dirs = []
        self.default_dirs = []
        self.chosen_dirs = []
        self.option_handlers = dict()
        self.option_help = []

        self.add_option ('--help', 'Print this help', self.o_help)
        self.add_option ('--quilt', '"quilt add" files before changing them',
                         self.o_quilt)
        self.add_option ('--this-year', 'Add the current year to every notice',
                         self.o_this_year)

    def add_option (self, name, help, handler):
        self.option_help.append ((name, help))
        self.option_handlers[name] = handler

    def add_dir (self, dir, filter = GenericFilter()):
        self.dirs.append ((dir, filter))

    def o_help (self, option = None):
        sys.stdout.write ('Usage: %s [options] dir1 dir2...\n\n'
                          'Options:\n' % sys.argv[0])
        format = '%-15s %s\n'
        for (what, help) in self.option_help:
```

```
            sys.stdout.write (format % (what, help))
        sys.stdout.write ('\nDirectories:\n')

        format = '%-25s'
        i = 0
        for (dir, filter) in self.dirs:
            i += 1
            if i % 3 == 0 or i == len (self.dirs):
                sys.stdout.write (dir + '\n')
            else:
                sys.stdout.write (format % dir)
        sys.exit (0)

    def o_quilt (self, option):
        self.copyright.set_use_quilt (True)

    def o_this_year (self, option):
        self.copyright.include_year (time.localtime().tm_year)

    def main (self):
        for arg in sys.argv[1:]:
            if arg[:1] != '-':
                self.chosen_dirs.append (arg)
            elif arg in self.option_handlers:
                self.option_handlers[arg] (arg)
            else:
                self.errors.report (None, 'unrecognised option: ' + arg)
        if self.errors.ok():
            if len (self.chosen_dirs) == 0:
                self.chosen_dirs = self.default_dirs
            if len (self.chosen_dirs) == 0:
                self.o_help()
            else:
                for chosen_dir in self.chosen_dirs:
                    canon_dir = os.path.join (chosen_dir, '')
                    count = 0
                    for (dir, filter) in self.dirs:
                        if (dir + os.sep).startswith (canon_dir):
                            count += 1
                            self.copyright.process_tree (dir, filter)
                    if count == 0:
                        self.errors.report (None, 'unrecognised directory: '
                                            + chosen_dir)
        sys.exit (0 if self.errors.ok() else 1)

#-----------------------------------------------------------------------------

class TopLevelFilter (GenericFilter):
```

```
  def skip_dir (self, dir, subdir):
    return True

class ConfigFilter (GenericFilter):
  def __init__ (self):
    GenericFilter.__init__ (self)

  def skip_file (self, dir, filename):
    if filename.endswith ('.m4'):
      pathname = os.path.join (dir, filename)
      with open (pathname) as file:
        # Skip files imported from gettext.
        if file.readline().find ('gettext-') >= 0:
          return True
    return GenericFilter.skip_file (self, dir, filename)

class GCCFilter (GenericFilter):
  def __init__ (self):
    GenericFilter.__init__ (self)

    self.skip_files |= set ([
        # Not part of GCC
        'math-68881.h',
        ])

    self.skip_dirs |= set ([
        # Better not create a merge nightmare for the GNAT folks.
        'ada',

        # Handled separately.
        'testsuite',
        ])

    self.skip_extensions |= set ([
        # Maintained by the translation project.
        '.po',

        # Automatically-generated.
        '.pot',
        ])

    self.fossilised_files |= set ([
        # Old news won't be updated.
        'ONEWS',
        ])

class TestsuiteFilter (GenericFilter):
  def __init__ (self):
```

```
        GenericFilter.__init__ (self)

        self.skip_extensions |= set ([
                # Don't change the tests, which could be woend by anyone.
                '.c',
                '.C',
                '.cc',
                '.h',
                '.hs',
                '.f',
                '.f90',
                '.go',
                '.inc',
                '.java',
                ])

    def skip_file (self, dir, filename):
        # g++.niklas/README contains historical copyright information
        # and isn't updated.
        if filename == 'README' and os.path.basename (dir) == 'g++.niklas':
            return True
        # Similarly params/README.
        if filename == 'README' and os.path.basename (dir) == 'params':
            return True
        if filename == 'pdt_5.f03' and os.path.basename (dir) == 'gfortran.dg':
      return True
        return GenericFilter.skip_file (self, dir, filename)

class LibCppFilter (GenericFilter):
    def __init__ (self):
        GenericFilter.__init__ (self)

        self.skip_extensions |= set ([
                # Maintained by the translation project.
                '.po',

                # Automatically-generated.
                '.pot',
                ])

class LibGCCFilter (GenericFilter):
    def __init__ (self):
        GenericFilter.__init__ (self)

        self.skip_dirs |= set ([
                # Imported from GLIBC.
                'soft-fp',
                ])
```

```
class LibStdCxxFilter (GenericFilter):
  def __init__ (self):
    GenericFilter.__init__ (self)

    self.skip_files |= set ([
        # Contains no copyright of its own, but quotes the GPL.
        'intro.xml',
        ])

    self.skip_dirs |= set ([
        # Contains automatically-generated sources.
        'html',

        # The testsuite data files shouldn't be changed.
        'data',

        # Contains imported images
        'images',
        ])

    self.own_files |= set ([
        # Contains markup around the copyright owner.
        'spine.xml',
        ])

  def get_line_filter (self, dir, filename):
    if filename == 'boost_concept_check.h':
      return re.compile ('// \(C\) Copyright Jeremy Siek')
    return GenericFilter.get_line_filter (self, dir, filename)

class GCCCopyright (Copyright):
  def __init__ (self, errors):
    Copyright.__init__ (self, errors)

    canon_fsf = 'Free Software Foundation, Inc.'
    self.add_package_author ('Free Software Foundation', canon_fsf)
    self.add_package_author ('Free Software Foundation.', canon_fsf)
    self.add_package_author ('Free Software Foundation Inc.', canon_fsf)
    self.add_package_author ('Free Software Foundation, Inc', canon_fsf)
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    self.add_external_author ('ARM')
    self.add_external_author ('AdaCore')
    self.add_external_author ('Ami Tavory and Vladimir Dreizin, IBM-HRL.')
```

```
        self.add_external_author ('Cavium Networks.')
        self.add_external_author ('Faraday Technology Corp.')
        self.add_external_author ('Florida State University')
        self.add_external_author ('Greg Colvin and Beman Dawes.')
        self.add_external_author ('Hewlett-Packard Company')
        self.add_external_author ('Intel Corporation')
        self.add_external_author ('Information Technology Industry Council.')
        self.add_external_author ('James Theiler, Brian Gough')
        self.add_external_author ('Makoto Matsumoto and Takuji Nishimura,')
        self.add_external_author ('National Research Council of Canada.')
        self.add_external_author ('NVIDIA Corporation')
        self.add_external_author ('Peter Dimov and Multi Media Ltd.')
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        self.add_external_author ('Silicon Graphics Computer Systems, Inc.')
        self.add_external_author ('Silicon Graphics')
        self.add_external_author ('Stephen L. Moshier')
        self.add_external_author ('Sun Microsystems, Inc. All rights reserved.')
        self.add_external_author ('The Go Authors.  All rights reserved.')
        self.add_external_author ('The Go Authors. All rights reserved.')
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        self.add_external_author ('The Regents of the University of California.')
        self.add_external_author ('Unicode, Inc.')
        self.add_external_author ('University of Toronto.')

class GCCCmdLine (CmdLine):
    def __init__ (self):
        CmdLine.__init__ (self, GCCCopyright)

        self.add_dir ('.', TopLevelFilter())
        # boehm-gc is imported from upstream.
        self.add_dir ('config', ConfigFilter())
        # contrib isn't really part of GCC.
        self.add_dir ('fixincludes')
        self.add_dir ('gcc', GCCFilter())
        self.add_dir (os.path.join ('gcc', 'testsuite'), TestsuiteFilter())
        self.add_dir ('gnattools')
        self.add_dir ('gotools')
        self.add_dir ('include')
        # intl is imported from upstream.
        self.add_dir ('libada')
        self.add_dir ('libatomic')
        self.add_dir ('libbacktrace')
        self.add_dir ('libcc1')
        self.add_dir ('libcpp', LibCppFilter())
        self.add_dir ('libdecnumber')
        # libffi is imported from upstream.
```

```
        self.add_dir ('libgcc', LibGCCFilter())
        self.add_dir ('libgfortran')
        # libgo is imported from upstream.
        self.add_dir ('libgomp')
        self.add_dir ('libhsail-rt')
        self.add_dir ('libiberty')
        self.add_dir ('libitm')
        self.add_dir ('libobjc')
        # liboffloadmic is imported from upstream.
        self.add_dir ('libquadmath')
        # libsanitizer is imported from upstream.
        self.add_dir ('libssp')
        self.add_dir ('libstdc++-v3', LibStdCxxFilter())
        self.add_dir ('libvtv')
        self.add_dir ('lto-plugin')
        # maintainer-scripts maintainer-scripts
        # zlib is imported from upstream.

        self.default_dirs = [
            'gcc',
            'include',
            'libada',
            'libatomic',
            'libbacktrace',
            'libcc1',
            'libcpp',
            'libdecnumber',
            'libgcc',
            'libgfortran',
            'libgomp',
            'libhsail-rt',
            'libiberty',
            'libitm',
            'libobjc',
            'libssp',
            'libstdc++-v3',
            'libvtv',
            'lto-plugin',
            ]

GCCCmdLine().main()
```


```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"><html
xmlns="http://www.w3.org/1999/xhtml"><head><meta http-equiv="Content-Type" content="text/html;
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<simpara>
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</bridgehead>
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</para>
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</bridgehead>
<para>
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</para>
<para>
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</para>
<para>
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</para>
<para>
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</para>
<para>
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<para>
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  <listitem>
    <para>
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    </para>
  </listitem>
  <listitem>
    <para>
```

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</bridgehead>
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</para>
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<para>
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</para>
</listitem>
<listitem>
<para>
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</para>
</listitem>
<listitem>
<para>
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</para>
</listitem>
<listitem>
<para>
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</para>
</listitem>
<listitem>
<para>
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subsection 6d.
</para>
</listitem>
</orderedlist>
<para>
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</para>
<para>
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<para>
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<para>
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<para>
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</para>
<para>
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1.90 libuv 1.11.0 :1

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Files: getopt.c
===============

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*/

#ifndef UV_BSD_H
#define UV_BSD_H

#define UV_PLATFORM_FS_EVENT_FIELDS                                   \
 uv__io_t event_watcher;                                              \

#define UV_IO_PRIVATE_PLATFORM_FIELDS                                 \
 int rcount;                                                          \
 int wcount;                                                          \

#define UV_HAVE_KQUEUE 1

#endif /* UV_BSD_H */
```

1.91 libwebsockets 2.1.0

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1.94 libyaml 0.1.6

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1.105 ncurses 6.1+20180630

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1.107 net-tools 1.60-26

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1.108 netbase 5.4

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==Lua programming language==

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==OpenSSL SSL encryption library==

OpenSSL can optionally be used by Nmap Service Detection to
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Table of Contents

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  o Preamble
  o TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION
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Viraj Bais <vbais@mailman1.intel.com> and Clayton Kirkwood <kirkwood@striderfm.intel.com> port to WindowsNT 3.5
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Poul-Henning Kamp <phk@FreeBSD.ORG> Oncore driver (Original author)
Frank Kardel <kardel (at) ntp (dot) org> PARSE <GENERIC> (driver 14 reference clocks), STREAMS modules for PARSE, support scripts, syslog cleanup, dynamic interface handling
Johannes Maximilian Kuehn <kuehn@ntp.org> Rewrote <tt>sntp</tt> to comply with NTPv4 specification, <tt>ntpq saveconfig</tt>
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Dave Katz <dkatz@cisco.com> RS/6000 AIX port
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George Lindholm <lindholm@ucs.ubc.ca> SunOS 5.1 port
Louis A. Mamakos <louie@ni.umd.edu> MD5-based authentication
Lars H. Mathiesen <thorinn@diku.dk> adaptation of foundation code for Version 3 as specified in RFC-1305
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David L. Mills <mills@udel.edu> Version 4 foundation, precision kernel; clock drivers: 1, 3, 4, 6, 7, 11, 13, 18, 19, 22, 36
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Harlan Stenn <harlan@pfcs.com> GNU automake/autoconfigure makeover, various other bits (see the ChangeLog)
Kenneth Stone <ken@sdd.hp.com> HP-UX port
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3. [3]Bernd Altmeier <altmeier@atlsoft.de> hopf Elektronik serial line and PCI-bus devices
4. [4]Viraj Bais <vbais@mailman1.intel.com> and [5]Clayton Kirkwood <kirkwood@striderfm.intel.com> port to WindowsNT 3.5
5. [6]Michael Barone <michael,barone@lmco.com> GPSVME fixes
6. [7]Karl Berry <karl@owl.HQ.ileaf.com> syslog to file option
7. [8]Greg Brackley <greg.brackley@bigfoot.com> Major rework of WINNT port. Clean up recvbuf and iosignal code into separate modules.
8. [9]Marc Brett <Marc.Brett@westgeo.com> Magnavox GPS clock driver
9. [10]Piete Brooks <Piete.Brooks@cl.cam.ac.uk> MSF clock driver, Trimble PARSE support
10. [11]Nelson B Bolyard <nelson@bolyard.me> update and complete broadcast and crypto features in sntp
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14. [15]Casey Crellin <casey@csc.co.za> vxWorks (Tornado) port and help with target configuration
15. [16]Sven Dietrich <sven_dietrich@trimble.com> Palisade reference clock driver, NT adj. residuals, integrated Greg's Winnt port.
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28. [30]Frank Kardel [31]<kardel (at) ntp (dot) org> PARSE <GENERIC> (driver 14 reference clocks), STREAMS modules for PARSE, support scripts, syslog cleanup, dynamic interface handling
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45. [49]Dirce Richards <dirce@zk3.dec.com> Digital UNIX V4.0 port
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56. [60]Brian Utterback <brian.utterback@oracle.com> General codebase,

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57. [61]Loganaden Velvindron <loganaden@gmail.com> Sandboxing (libseccomp) support
58. [62]Paul A Vixie <vixie@vix.com> TrueTime GPS driver, generic TrueTime clock driver
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   date  = "1992-2017";
   owner = "The University of Delaware and Network Time Foundation";
   eaddr = "http://bugs.ntp.org, bugs@ntp.org";
   type  = ntp;
};

long-opts;
config-header  = config.h;
environrc;
no-misuse-usage;
version-proc = ntpOptionPrintVersion;

version        = `
eval VERSION=\`sed -e 's/.*,\\[//' -e 's/\\].*//' < ../sntp/m4/version.m4\`
[ -z "${VERSION}" ] && echo "Cannot determine VERSION" && kill -TERM $AG_pid
echo $VERSION`;
```

```
version-value = ''; /* Don't use -v as a shortcut for --version */

/*
* HMS: man pages already have this, and texi pages can use the
* values in sntp/include/version.texi .
*/
// doc-sub = {
//     sub-name = version;
//     sub-text = 's/#VERSION#/<<version>>/g';
// };
```

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1.112 oct-zip-drv 3.1.0-p5

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1.113 open-vm-tools 10.1.5

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>>> freebsd-1.72
>>> freebsd-base64-4.8
>>> icu4c-4.4.1
>>> unicode-5.0

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>>> libmspack-0.0.20040308alpha

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>>> freebsd-base64-4.8

base64.c -- routines to encode/decode base64 data
$OpenLDAP: pkg/ldap/libraries/liblutil/base64.c,v 1.15 2006/01/03 22:12:11 kurt Exp $ /
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>>> icu4c-4.4.1

ICU License - ICU 1.8.1 and later

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[OPENVMTOOLS1010HS090816]

1.114 openssh 7.6p1

1.114.1 Available under license :

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```

[Tatu continues]
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- DES is now external, in the OpenSSL library
- GMP is no longer used, and instead we call BN code from OpenSSL
- Zlib is now external, in a library
- The make-ssh-known-hosts script is no longer included
- TSS has been removed
- MD5 is now external, in the OpenSSL library
- RC4 support has been replaced with ARC4 support from OpenSSL
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[The licence continues]

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```
 * @version 3.0 (December 2000)
 *
 * Optimised ANSI C code for the Rijndael cipher (now AES)
 *
 * @author Vincent Rijmen <vincent.rijmen@esat.kuleuven.ac.be>
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*/

#ifndef HAVE_SETRESGID
int setresgid(gid_t, gid_t, gid_t);
#endif
#ifndef HAVE_SETRESUID
int setresuid(uid_t, uid_t, uid_t);
#endif
/* $OpenBSD: poll.h,v 1.11 2003/12/10 23:10:08 millert Exp $ */

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*/

/* OPENBSD ORIGINAL: sys/sys/poll.h */

#if !defined(HAVE_POLL) && !defined(HAVE_POLL_H)
#ifndef _COMPAT_POLL_H_
#define _COMPAT_POLL_H_

typedef struct pollfd {
 int  fd;
 short events;
 short revents;
} pollfd_t;

typedef unsigned int nfds_t;

#define POLLIN  0x0001
#define POLLOUT  0x0004
#define POLLERR  0x0008
#define POLLHUP  0x0010
#define POLLNVAL 0x0020
#if 0
/* the following are currently not implemented */
#define POLLPRI  0x0002
#define POLLRDNORM 0x0040
#define POLLNORM POLLRDNORM
#define POLLWRNORM      POLLOUT
#define POLLRDBAND 0x0080
#define POLLWRBAND 0x0100
#endif

#define INFTIM  (-1) /* not standard */

int   poll(struct pollfd *, nfds_t, int);
#endif /* !_COMPAT_POLL_H_ */
#endif /* !HAVE_POLL_H */
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*
*/

#ifndef _BSD_WAITPID_H
#define _BSD_WAITPID_H

#ifndef HAVE_WAITPID
/* Clean out any potental issues */
#undef WIFEXITED
#undef WIFSTOPPED
#undef WIFSIGNALED

/* Define required functions to mimic a POSIX look and feel */
#define _W_INT(w) (*(int*)&(w)) /* convert union wait to int */
#define WIFEXITED(w) (!((_W_INT(w)) & 0377))
#define WIFSTOPPED(w) ((_W_INT(w)) & 0100)
#define WIFSIGNALED(w) (!WIFEXITED(w) && !WIFSTOPPED(w))
#define WEXITSTATUS(w) (int)(WIFEXITED(w) ? ((_W_INT(w) >> 8) & 0377) : -1)
#define WTERMSIG(w) (int)(WIFSIGNALED(w) ? (_W_INT(w) & 0177) : -1)
#define WCOREFLAG 0x80
#define WCOREDUMP(w)  ((_W_INT(w)) & WCOREFLAG)

/* Prototype */
pid_t waitpid(int, int *, int);

#endif /* !HAVE_WAITPID */
#endif /* _BSD_WAITPID_H */
```

1.115 opkg-utils 0.3.6

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1.119 paramiko 1.15.2

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Version 3, 29 June 2007

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PCRE JUST-IN-TIME COMPILATION SUPPORT

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The End

#!perl

=head1 NAME

```
copyright.t

=head1 DESCRIPTION

Tests that the latest copyright years in the top-level README file and the
C<perl -v> output match each other.

If the test fails, update at least one of README and perl.c so that they match
reality.

Optionally you can pass the C<--now> option to check they are at the current
year. This isn't checked by default, so that it doesn't fail for people
working on older releases. It should be run before making a new release.

=cut


use TestInit;
use strict;
use Config;
BEGIN { require 'test.pl' }

if ( $Config{usecrosscompile} ) {
 skip_all( "Not all files are available during cross-compilation" );
}

my ($opt) = @ARGV;

my $readme_year = readme_year();
my $v_year = v_year();

# Check that both copyright dates are up-to-date, but only if requested, so
# that tests still pass for people intentionally working on older versions:
if ($opt eq '--now')
{
 my $current_year = (gmtime)[5] + 1900;
 is $v_year, $current_year, 'perl -v copyright includes current year';
 is $readme_year, $current_year, 'README copyright includes current year';
}

# Otherwise simply check that the two copyright dates match each other:
else
{
 is $readme_year, $v_year, 'README and perl -v copyright dates match';
}

done_testing;
```

```
sub readme_year
# returns the latest copyright year from the top-level README file
{

 open my $readme, '<', '../README' or die "Opening README failed: $!";

 # The copyright message is the first paragraph:
 local $/ = '';
 my $copyright_msg = <$readme>;

 my ($year) = $copyright_msg =~ /.*\b(\d{4,})/s
     or die "Year not found in README copyright message '$copyright_msg'";

 $year;
}


sub v_year
# returns the latest copyright year shown in perl -v
{

 my $output = runperl switches => ['-v'];
 my ($year) = $output =~ /copyright 1987.*\b(\d{4,})/i
     or die "Copyright statement not found in perl -v output '$output'";

 $year;
}
---
abstract: 'Build and install Perl modules'
author:
 - 'Ken Williams <kwilliams@cpan.org>'
 - "Development questions, bug reports, and patches should be sent to the\nModule-Build mailing list at <module-
build@perl.org>."
build_requires:
 File::Temp: 0.15
 Test::Harness: 3.16
 Test::More: 0.49
generated_by: 'Module::Build version 0.3608'
license: gpl
meta-spec:
 url: http://module-build.sourceforge.net/META-spec-v1.4.html
 version: 1.4
name: Module-Build
resources:
 MailingList: mailto:module-build@perl.org
 license: http://dev.perl.org/licenses/
 repository: http://github.com/dagolden/module-build/
```

version: 3

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Julian Seward, jseward@bzip.org
bzip2/libbzip2 version 1.0.6 of 6 September 2010

1.124 popt 1.16

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1.125 ppp 2.4.7 :r0

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1.126 PPPoE 3.11

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1.127 pps-tools 1.0.2

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1.130 protobuf-c 1.3.0

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1.131 pyasn1 0.4.2

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1.132 pycparser 2.18

1.133 pycrypto 2.6.1

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~~~~~~

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Additionally, some files within PyCrypto had specified their own licenses that differed from the PyCrypto license itself. For example, the original RIPEMD.c module simply had a copyright statement and warranty disclaimer, without clearly specifying any license terms. (An updated version on the author's website came with a license that contained a GPL-incompatible advertising clause.)

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~~~~~~

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1.134 python 2.7.14

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==========

Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see http://www.cwi.nl) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see http://www.cnri.reston.va.us) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see https://www.python.org/psf/) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

All Python releases are Open Source (see http://www.opensource.org for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

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History of the software
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see https://www.cwi.nl/) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see https://www.cnri.reston.va.us/) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation; see http://www.zope.com/). In 2001, the Python Software Foundation (PSF, see https://www.python.org/psf/) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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2.1	2.0+1.6.1	2001	PSF	no
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2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
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Mersenne Twister

The :mod:`_random` module includes code based on a download from
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the verbatim comments from the original code::

A C-program for MT19937, with initialization improved 2002/1/26.
Coded by Takuji Nishimura and Makoto Matsumoto.

Before using, initialize the state by using init_genrand(seed)
or init_by_array(init_key, key_length).

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Sockets

The :mod:`socket` module uses the functions, :func:`getaddrinfo`, and
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MD5 message digest algorithm

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L. Peter Deutsch
ghost@aladdin.com

Independent implementation of MD5 (RFC 1321).

This code implements the MD5 Algorithm defined in RFC 1321, whose
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The original and principal author of md5.h is L. Peter Deutsch
<ghost@aladdin.com>. Other authors are noted in the change history
that follows (in reverse chronological order):

2002-04-13 lpd Removed support for non-ANSI compilers; removed
    references to Ghostscript; clarified derivation from RFC 1321;
    now handles byte order either statically or dynamically.
1999-11-04 lpd Edited comments slightly for automatic TOC extraction.
1999-10-18 lpd Fixed typo in header comment (ansi2knr rather than md5);

added conditionalization for C++ compilation from Martin
Purschke <purschke@bnl.gov>.
1999-05-03 lpd Original version.

Asynchronous socket services

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Modified by Jack Jansen, CWI, July 1995:
- Use binascii module to do the actual line-by-line conversion
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- Arguments more compliant with Python standard
```

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1.135 python-cffi 1.11.5

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1.137 python-idna 2.6

1.138 python-jsonpatch 1.23

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1.139 python-jsonpointer 2.0

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1.140 python-ndg-httpsclient 0.4.4

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1.141 python-pbr 3.1.1 :2.el7ost

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1.142 python-pip 9.0.3

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1.143 python-ply 3.11 :1.0

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1.144 python-pyopenssl 17.5.0

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1.145 python-pysocks 1.6.8 :5.el7

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1.146 python-six 1.11.0

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1.147 PyYAML 3.12

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1.148 quagga 0.99.23

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1.149 quickassist 2.6.0

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If you have Invariant Sections, Front-Cover Texts and Back-Cover Texts,
replace the ``with@dots{}Texts." line with this:

```
@smallexample
@group
   with the Invariant Sections being @var{list their titles}, with
   the Front-Cover Texts being @var{list}, and with the Back-Cover Texts
   being @var{list}.
@end group
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```

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```
@c Local Variables:
@c ispell-local-pdict: "ispell-dict"
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```

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1.152 requests 2.18.4

1.153 run-postinsts 1.0

1.153.1 Available under license :

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1.154 sbsigntool 0.6-951ee95a301674c046f55330cd7460e1314deff2:0ubuntu4~12.04.1

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1.157 shadow-securetty 4.6

1.158 shared-mime-info 1.9 :2

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1.165 syslinux 6.03

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1.167 tcpdump 4.9.2

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1.168 tpm-quote-tools 1.0.1

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1.169 tpm-tools 1.3.8 :6.el7

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1.170 traceroute 2.0.21

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1.171 trousers 0.3.13

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1.172 tzdata 2018d :1

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1.173 u-boot 2013.07

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1.182 zlib 1.2.11

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