GNUish MSDOS

The GNUish MSDOS Project
January 20th, 1993 Edition

by Francois Pinard

You can retrieve a copy of this file by anonymous ftp from `prep.ai.mit.edu` [18.71.0.38] in directory `pub/gnu/MicrosPorts`, as file `MSDOS.texinfo` for the `Texinfo` source and file `MSDOS.info` for an already formatted `Info` version.

Please help the community by kindly reporting all errors or omissions in this document; for doing so, email to `pinard@iro.umontreal.ca`. You might also want to contact other authors or contributors: a list of email addresses is given elsewhere in this document (see Chapter 9 [Contributors Addresses], page 25).

GNUish MSDOS was first organized with small IBM PC's in mind, that is, 8088 and 80286 based systems. For 80386 or 80486 based systems, you should rather take a close look at DJ Delorie's works and derivatives; these ports have their own set of mailing lists and distribution points. See Section 6.2 [cc], page 13, for more information. For OS/2 ports, people should follow the works of Kai Uwe Rommel and Eberhard Mattes; I've also heard that many OS/2 ports could be easily made usable under MSDOS with a special link step on OS/2.

This document is the work of various people, collected by Francois Pinard. The FSF disclaimer (see Chapter 1 [Project Definition], page 3) is from Richard Stallman.

This document contains the following sections:

1 Project Definition

The Free Software Foundation (FSF) is not directly interested in integrating or maintaining ports of GNU software to MSDOS, because of limited resources. These activities take time away from finishing a complete standalone GNU, which FSF and many in the GNU Project considers much more important.

However, the organized distribution of such ports started, a few years ago, under the name *GNUish MSDOS project*. The overall idea is to provide a GNU like environment for MSDOS, easy to get, and easy to install, as far as possible. It contains both MSDOS ports of GNU software, as well as MSDOS replacements for non-ported GNU software.

The GNUish MSDOS project wants to consider itself as part of the GNU project, rather than a mere aggregation of binaries. The non-GNU replacements are expected to somewhat comply with the GNU spirit and standards. Ideally, all code should be under the GNU General Public License, should try conforming to the GNU coding standards, and also be fully ANSI. The programs should be such that MSDOS users can be convinced of the virtues of free software!

The GNU General Public License article 3a) requires that the complete source code be available where programs are distributed in object code or executable form. For convenience, ready-to-execute binaries are also provided for those who do not have the necessary compilers, or do not feel like using them.

When several ports of the same tool exist, one of them has been selected for inclusion in this documentation. This does not means that the selected port is the best possible, it means however that the port seems to be good. Nobody should feel offended by any selection. Questions regarding the GNUish MSDOS project should be directed to the mailing list:

`help-gnu-msdos@sun.soe.clarkson.edu`

See Chapter 7 [Project Mailing Lists], page 21, for how to subscribe.

The GNUish MSDOS project originated from Thorsten Ohl. It has been moderated by Thorsten from its beginning and for a long while. Thorsten originally thought than, giving the project a solid initial impulse, it would bring enough enthousiasm so other programmers will share the porting duties. It now seems that the enthousiasm was more on the users' side than the programmers' side. In these days, many parts of GNUish MSDOS are almost completely dormant, and most products are quite old relative to the current GNU versions. Notably alive, however, are Mike Brennan's mawk, then Len Reed and Stuart Phillips ports of Perl.

On the 80386/80486 side, DJ Delorie astonishing work on GNU C/C++ gave a new momentum for other MSDOS ports. Besides a variety of libraries, we should especially underline the Manabu Higashida and Hirano Satoshi port of GNU Emacs to MSDOS.

2 Legal Conditions

Some tools are possibly dangerous if you do not thoroughly understand their usage (v.g. '`rm -r *`'). You ought to know what you are doing. YOU USE THESE TOOLS AT YOUR OWN RISK. You *were* warned!

All these programs are free software; you can redistribute them and/or modify them under the terms of the GNU General Public License as published by the Free Software Foundation; either version 1, or (at your option) any later version.

These programs are distributed in the hope that they will be useful, BUT WITHOUT ANY WARRANTY WHATSOEVER, without even the implied warranties of merchantability or fitness for a particular purpose. See the GNU General Public License (the file `COPYING`) for more details.

You should have received a copy of the GNU General Public License along with GNUish MSDOS programs; if not, write to the Free Software Foundation, Inc., 675 Mass Ave, Cambridge, MA 02139, USA or e-mail to `gnu@prep.ai.mit.edu`.

3 Distribution on Diskettes

The FSF is now distributing some of the GNU software that has been ported to MS-DOS on 3.5 inch, 1.44MB diskettes. The disks contain both source and executables.

Of course, there are deep differences between GNU and MSDOS, so some of these utilities are necessarily missing features on MSDOS.

For the 80386 and 80486 only, there are ports of GNU Emacs (see Section 6.7 [emacs], page 14) and GNU C/C++ (see Section 6.2 [cc], page 13). The following software will run on 8086 and 80286–based machines; it does not require an 80386. Bison (see Section 6.28 [yacc], page 18), RCS (see Section 6.20 [rcs], page 17), `flex` (see Section 6.14 [lex], page 16), GAWK (see Section 6.1 [awk], page 13), `cpio` (see Section 6.4 [cpio], page 13), `diff` (see Section 6.6 [diff], page 14), MicroEmacs (see Section 6.7 [emacs], page 14), `find` (see Section 6.8 [find], page 15), some file utilities (see Section 6.27 [utilities], page 18), `gdbm` (see Section 6.30 [dbm_3], page 19), `grep` (see Section 6.10 [grep], page 15), `libc` (see Section 6.31 [libc_3], page 19), `ptx` (see Section 6.19 [ptx], page 16), `indent` (see Section 6.12 [indent], page 15), `less` (see Section 6.13 [less], page 15), `m4` (see Section 6.15 [m4], page 16), `make` (see Section 6.16 [make], page 16), `sed` (see Section 6.21 [sed], page 17), `shar` (see Section 6.23 [shar], page 17), `sort` (see Section 6.24 [sort], page 17), and Texinfo (see Section 6.26 [texinfo], page 17).

4 Archiving Formats

Traditionally, GNUish MSDOS archives are made using Rahul Dhesi's `zoo` archiver. This archive format is popular and portable, used in many places, notably for the Usenet `comp.binaries.ibm.pc` exchange group. The GNUish MSDOS project selected it because it works both on MSDOS and UNIX, and all the sources are freely available. Moreover, it offers a nice user interface and is dependable.

Some people wanted GNUish MSDOS to use `zip` for its better compression, but `zip` was proprietary software at that time. A new version of `zoo` (version 2.1) offers a higher compression rate, comparable to what `zip` can achieve. About at the same time, the `Info-ZIP` group produced a `zip` program available in source form, and which work both on MSDOS and UNIX. There are no more big reasons for using one instead of another.

Also, some sites converted all of GNUish MSDOS to `ARC` or `LHarc` format. Instead of feeding an archivers war, let us simply hope that each archive site will follow the GNU spirit and at least offer the free archiver they use, both in executable and complete source form.

Most packages consists of two archives, one for the complete source and documentation, the other for the executable and data files; however, it happens that the documentation is sometimes provided with the executables. The filename for a package archive is often selected according to the following pattern:

program version edition sequence.extension

In this syntax, *program* is a short string to identify the product, e.g. '`futi`' indicates GNU file utilities; while *version* is a decimal integer naming the version, without any decimal point, v.g. '`14`' for 1.4, '`358`' for 3.58; *edition* is '`a`' for the first release in GNUish MSDOS, then '`b`', '`c`', etc. for subsequent editions. The value of *sequence* is the letter '`s`' for the source and documentation, or '`x`' for executable and data files. When *extension* is '`zoo`', this usually refers to Zoo version 2.1.

5 FTP Archive Sites

The official GNU home is `prep.ai.mit.edu` [18.71.0.38] (problems with `prep` should be reported to `gnu@prep.ai.mit.edu`). There is currently no room on `prep.ai.mit.edu` to put GNUish MSDOS files up for ftp. If `prep` get more disk space, they might become available. The collection of programs known as the GNUish MSDOS project is still available for ftp at the following addresses. Different archiving sites might use different archivers. The actual extension of any given archive should give you a clue about which archiver to use. [Upload directories are listed for the moderator's convenience only].

The expression *from the usual places*, later in this document, refers to the three first sites of this list.

- `ftp.iro.umontreal.ca` [132.204.32.22], in `pub/Internet/gnuish`.

  Archives are uploaded there first.

- `vulcan.phyast.pitt.edu` [130.49.33.16], in `pub/gnuish`.

  Archives are uploaded in [`incoming`] from the `iros1` copy, then Roberto move them to their proper place.

- `wuarchive.wustl.edu` [128.252.135.4], in `systems/msdos/gnuish`.

  Archives are uploaded in place directly from the `iros1` copy.

- `wsmr-simtel20.army.mil` [192.88.110.20], in `pd1:<msdos.gnuish>`.

  David repacks from `.zoo` to `.arc` before uploading, because SIMTEL20 (which uses TOPS20) does not support `.zoo` files.

- `funic.funet.fi` [128.214.6.100], in `pub/msdos/utilities/gnuish`.

  Petri automatically gets new products from SIMTEL20, and repacks files from `.arc` to `.lzh`. [`pub/msdos/incoming`]

The organization and maintainance of the archive sites is the work of Francois Pinard, Roberto Gomez, Petri Hartoma, David Camp, Keith Petersen, Chris Myers, Dave Curry and Russ Nelson.

6 GNUish Msdos Contents

The following contents for GNUish MSDOS is loosely organized along the lines of related UNIX man pages.

6.1 awk

GNU `awk` current GNU version is 2.14. There is a faster `awk`, also distributed under the GNU General Public License, written by Mike Brennan. For the original distribution, fetch executables in `mawk1.zip` and sources in `mawk1.1.tar.Z` from `oxy.edu`, in `public`. Or fetch executables and documentation in `mawk11ax.zoo` and sources in `mawk11as.zoo` from the usual places.

6.2 cc

GNU C current GNU version is 2.3.3. There is no port of GNU C available for 8088 and 80286 systems, and it is very unlikely that there would ever be one. So, GNUish MSDOS is still relying on proprietary compilers for its existence. Currently, ports have been done using Microsoft C compilers or Borland Turbo C/C++; it seems so far that Microsoft C generates faster code, works better with huge pointers, and offers a working `alloca()`; but promoting proprietary software is against the GNU goals, any step in the direction of compiler independence would be beneficial for the community.

GNU C had indeed been ported to 80386 MSDOS, under the name `djgpp`, by DJ Delorie. This opens wide doors for porting further GNU software for 80386 systems under MSDOS, for those many GNU programs requiring a fair amount of addressing space. However, beware that `djgpp` based ports always require a 80386 machine.

DJ Delorie made 32-bit 80386 MSDOS extender with symbolic debugger, and using it, a complete port of GNU C/C++ compiler with utilities, development libraries, and source code. It generates full 32-bit programs and supports full virtual memory with paging to disk. It requires at least 5MB of hard disk space to install, and 512K of RAM to use. It is compatible with XMS memory managers and VCPI, but not with Microsoft Windows extended mode or other DPMI managers. It cannot emulate multitasking (e.g. `fork(2)`) or signals.

All this can be anonymously ftp'ed from `barnacle.erc.clarkson.edu` [128.153.28.12] in `pub/msdos/djgpp`. First fetch and carefully read the three files `readme.1st`, `readme` and `faq` from that directory; or else the cumulative file `MSDOS.gcc` from `prep.ai.mit.edu` [18.71.0.38], in `pub/gnu/MicrosPorts`. File `README.gcc` should also be available from the usual places.

6.3 compress

`compress` current GNU version is 4.0.1. GNUish MSDOS has not selected any current port yet, but many are available.

6.4 cpio

GNU `cpio` current GNU version is 2.2. Version 1.1 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `cpio11ax.zoo` and sources and documentation (inside `readme`)

in `cpio11as.zoo` from the usual places. You also need Thorsten Ohl's `gnulib` to compile it.

Working on GNU cpio port:

`92-02-24 Matthew J. D'Errico <doc@magna.com>`

6.5 ctags

GNU `[ce]tags` current GNU version comes from GNU Emacs distribution, currently 18.59. Russ Nelson made a version for Freemacs. For the original distribution, fetch `etags.zip` from `grape.ecs.clarkson.edu` [128.153.28.129], in `pub/msdos/freemacs`. Or fetch the executables, sources and documentation as `etags.zoo` from the usual places.

6.6 diff

GNU `diff` current GNU version is 2.0. Version 1.15 has been ported to MSDOS by Thorsten Ohl, using Microsoft C v5.1 or v6.0. Fetch executables in `dif115ax.zoo` and sources in `dif115as.zoo` from the usual places. There is no documentation.

There is a 386/468 port of GNU diff 1.15 in the djgpp package.

6.7 emacs

GNU Emacs current GNU version is 18.59. There is no port of GNU `emacs` available for 8088 and 80286 systems, and it is very unlikely that there would ever be one. Any Emacs for small MSDOS systems only implements a tiny subset of the true thing.

Russ Nelson's Freemacs is closest in spirit to the real thing, by providing a full extension language. Version 1.6a can be gotten from various places (`clarkson`, `wustl`, `simtel`, ...). It is made of a `MINT` interpreter written in 8088 assembler, and of several `MINT` code application files to drive `emacs` modes. `MINT` has no relation to GNU Emacs LISP and limits itself to 64k per file. For the original distribution, fetch all from `grape.ecs.clarkson.edu` [128.153.28.129], in `pub/msdos/freemacs`. Or fetch the executables code as `emacs16a.zoo` (plus `emacs100.zoo` for a Zenith Z-100) and the sources as `emac16as.zoo`, from the usual places; also fetch some EGA utilities as `emacsega.zoo` and a spelling checker as `emacspel.zoo`. You might want to fetch `emacspat.zoo` too for a few patches, applied by Freemacs itself.

Jonathan Payne's Jove, on the other side, is not extendable, but can handle surprisingly big files on MSDOS. It is well featured and reasonably fast. It can be made almost comfortable to GNU Emacs users, given a proper `jove.rc`.

GNU Emacs has indeed been ported to 80386 MSDOS by Manabu Higashida and Hirano Satoshi, under the name Demacs, using DJ Delorie port of GNU C. The current version is 1.2.0, 91-12-12, and corresponds to Emacs 18.55 with some changes from Emacs 18.57. One version handles 8-bit characters sets, the other, based on Nemacs, handles 16-bit character sets, including Kanji. It is compatible with XMS memory managers and VCPI, but not with Microsoft Windows extended mode or other DPMI managers. Fetch binaries and diffs from `utsun.s.u-tokyo.ac.jp`, in `GNU/demacs`. First fetch and carefully read the file `README` from that directory; or else the file `MSDOS.emacs` from `prep.ai.mit.edu` [18.71.0.38], in `pub/gnu/MicrosPorts`. File `README.emacs` should also be available from the usual places.

Craig Finseth maintains a list of Emacs Implementations and Literature; fetch `emacs` from `mail.unet.umn.edu` [128.101.101.103], in `import/fin`.

Eberhard Mattes writes that GNU Emacs for OS/2 2.0 is available on `ftp-os2.nmsu.edu` and on `ftp.uni-stuttgart.de` in `soft/os2` as `emacs-18.58.3`.

6.8 find

GNU `find` current GNU version is 3.7, comprising: `find`, `locate` and `xargs`. Version 1.2 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `find12ax.zoo` and sources and some documentation (inside `readme`) in `find12as.zoo` from the usual places. You also need Thorsten Ohl's `gnulib` to compile it. Fetch `find12.zoo` from the usual places.

6.9 ghostscript

Get executables in `ghostscript-2.5.2msdos.exe` and sources in `ghostscript-2.5.2.tar.Z` from `prep.ai.mit.edu` [18.71.0.38], in `pub/gnu`. You might need `ghostscript-fonts-2.5.2.tar.Z` from the same place.

6.10 grep

GNU `fgrep` current GNU version is 1.1. Version 1.1 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `fgre11ax.zoo` and sources in `fgre11as.zoo` from the usual places. There is no documentation.

GNU `grep` current GNU version is 1.6 (+patch), comprising: `grep` and `egrep`. Version 1.5 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `grep15ax.zoo` and sources in `grep15as.zoo` from the usual places. There is no documentation.

6.11 gzip

GNU `gzip` current GNU version is 0.7. Version 0.7 has been ported to MSDOS by Jean-loup Gailly, the `gzip` author. Fetch executables and documentation in `gzip07ax.zoo` and sources in `gzip07as.zoo` from the usual places.

6.12 indent

GNU `indent` current GNU version is 1.6. Version 1.1 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `inde11ax.zoo` and sources and Texinfo unformatted documentation in `inde11as.zoo` from the usual places.

6.13 less

`less` current GNU version is 177. Version 177 has been ported to MSDOS by Mark Lord, using Borland C. For the original distribution, fetch executables and sources in `less177e.zip` from `wuarchive.wustl.edu` in `mirrors/msdos/txtutl`. Or fetch executables in `les177ax.zoo` and sources in `les177as.zoo` from the usual places.

6.14 lex

Fast `lex` current GNU version is 2.3.7. Version 2.3.6 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `fle236ax.zoo` and sources and roff unformatted documentation in `fle236as.zoo` from the usual places. You also need Thorsten Ohl's `gnulib` to compile it.

6.15 m4

GNU `m4` current GNU version is 1.0.3. Version 0.5 (also called 0.50) has been ported to MSDOS by Thorsten Ohl. Fetch executables in `m4v05ax.zoo` and sources and Texinfo unformatted or DVI ready documentation in `m4v05as.zoo` from the usual places. You also need Thorsten Ohl's `gnulib` to compile it.

6.16 make

GNU `make` current GNU version is 3.62. Version 3.58 has been ported to MSDOS by Thorsten Ohl, using Microsoft C v6.0. Fetch executables in `mak358ax.zoo` and sources and Texinfo + roff unformatted documentation in `mak358as.zoo` from the usual places. You also need Thorsten Ohl's swapping library, fetch `swalibas.zoo` from the usual places. If you intend to recompile `make`, beware that one patch has been lost for the makefile in `make358as.zoo`, so the makefile might not work as is.

Working on GNU make port:

```
92-09-03 Pax Ken Holmberg <kenh@tfs.com>
```

6.17 patch

Larry Wall's `patch` current GNU version is 2.0.12g8. GNUish MSDOS has not selected any current port yet, but many are available.

6.18 perl

Larry Wall's `Perl` current GNU version is 4.035. Version 4.019 has been ported to by Stuart Phillips, using Borland C++ 3.0 and VROOM, it works faster with extended memory. For the original distribution, fetch executables in `bcv14_perl4-019E.zip` and sources in `bcv14_perl4-019.zip` plus `xspawn34.zip` from `tandem.com` [130.252.12.8], in `pub/perl`. Or fetch executables in `pl4019ax.zoo` and sources in `pl4019as.zoo` from the usual places. There is no documentation.

Also, version 4.000 has been ported to MSDOS by Len Reed. Fetch executables in `perl_exe.zoo` from `eeserv.ee.umanitoba.ca` [130.179.8.1] in `pub/msdos/perl`.

6.19 ptx

GNU `ptx` current GNU version is 0.2. Version 0.1 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `ptx01ax.zoo` and sources and documentation in `ptx01as.zoo` from the usual places.

6.20 rcs

GNU Revision Control System current GNU version is 5.6. Version 5.5 has been ported to MSDOS by Stuart Phillips. For the original distribution, fetch sources and executables in `rcs55.zip` from `wuarchive.wust.edu`, in `mirrors/msdos/pgmutil`. Or fetch executables in `rcs55ax.zoo` and sources and roff unformatted documentation in `rcs55as.zoo` from the usual places.

6.21 sed

GNU `sed` current GNU version is 1.13. Version 1.06 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `sed106ax.zoo` and sources in `sed106as.zoo` from the usual places. You also need Thorsten Ohl's `gnulib` to compile it. There is no documentation.

6.22 sh

GNU `bash` current GNU version is 1.12. There is no port of GNU `bash` available to 8088 and 80286 systems yet, but the techniques used in `perl` (see Section 6.18 [perl], page 16) and `make` (see Section 6.16 [make], page 16) make it in principle possible to run programs of this size under MSDOS.

Ian Stewartson ported the Charles Forsyth `sh` from MINIX to MSDOS, using Microsoft C v5.1. For the original distribution, fetch executables in `ms_sh164.zip` from `wuarchive.wustl.edu`, in `mirrors/msdos/sysutl`; fetch sources from `comp.sources.misc` in Volume 10 issues 053-059, Volume 12 issues 019-026, Volume 13 issues 079-080, Volume 14 Issues 065-066, Volume 16 Issues 078-079. Or fetch executables and documentation in `sh164ax.zoo` and sources in `sh164as.zoo` from the usual places.

6.23 shar

`shar` current version is 3.49. It has been distributed through `alt.sources` on 90-09-24. Version 3.49 has been ported to MSDOS by Thorsten Ohl. Fetch executables in `sha349ax.zoo` and sources and roff unformatted documentation in `sha349as.zoo` from the usual places.

6.24 sort

GNU `sort` current GNU version is found within GNU Text Utilities version 1.3. A prerelease of version 0.3 has been ported to MSDOS by Thorsten Ohl. Fetch executables and documentation in `sort03ax.zoo` and sources in `sort03as.zoo` from the usual places.

6.25 tar

GNU `tar` current GNU version is 1.11.1. GNUish MSDOS has not selected any current port yet, but many are available.

6.26 texinfo

GNU `texinfo` current GNU version is 2.16, comprising: `info`, `makeinfo`, `texi2dvi`, `texindex` and extensive related code written in GNU Emacs LISP. Prereleased versions of `info` and `makeinfo` have been ported to MSDOS by Thorsten Ohl. Fetch executables

in `texi10ax.zoo` and sources in `texi10as.zoo` from the usual places. There is no documentation.

6.27 file/text utilities

GNU File Utilities current GNU version is 3.4, comprising: `chgrp`, `chmod`, `chown`, `cp`, `dd`, `df`, `dir`, `du`, `install`, `ln`, `ls`, `mkdir`, `mkfifo`, `mknod`, `mv`, `rm`, `rmdir`, `touch` and `vdir`. GNU Text Utilities current GNU version is 1.3, comprising: `cat`, `cmp`, `comm`, `csplit`, `cut`, `expand`, `fold`, `head`, `join`, `nl`, `paste`, `pr`, `sort`, `split`, `sum`, `tac`, `tail`, `tr`, `unexpand`, `uniq` and `wc`.

GNU Text Utilities historically emerged from GNU File Utilities; and version 1.4 have been ported to MSDOS by Thorsten Ohl before this split has been done. The ported programs are: `cat`, `chmod`, `cmp`, `cp`, `cut`, `dd`, `dir`, `head`, `ls`, `mkdir`, `mv`, `paste`, `rmdir`, `tac`, `tail`, `touch`, `vdir` and `rm`. Fetch executables and roff unformatted (or Texinfo, through a Perl script) documentation in `futi14ax.zoo` and sources in `futi14as.zoo` from the usual places.

The GNU `sort` program is documented elsewhere (see Section 6.24 [sort], page 17).

6.28 yacc

GNU `bison` current GNU version is 1.19. This version compiles without changes on MSDOS. Fetch sources in `bison-1.19.tar.Z` from `prep.ai.mit.edu` [18.71.0.38], in `pub/gnu`.

Since `bison` is used to produce C source which will further be compiled, it is assumed that a `bison` user has a C compiler, thus s/he can compile bison itself from sources. This why bison executables are not generally available for MSDOS. The following patch is reported:

```
*** files.c~ Thu Nov 19 15:12:52 1992
--- files.c Thu Nov 19 15:15:12 1992
***************
*** 389,394 ****
--- 389,395 ----
    if (actfile) unlink(actfile);
    if (tmpattrsfile) unlink(tmpattrsfile);
    if (tmptabfile) unlink(tmptabfile);
+   if (tmpdefsfile) unlink(tmpdefsfile);
  #endif /* MSDOS */
    exit(k);
  #endif /* not VMS */
```

6.29 zoo

Rahul Dhesi's barebone Zoo extractor version 2.0 has been distributed through `comp.binaries.ibm.pc` (1 part: `v13i001`). Fetch `booz.exe` and `booz20.zoo` from the usual places. Use `booz.exe` under MSDOS to unpack the sources and documentation in `booz20.zoo`.

Rahul Dhesi's full Zoo current version is 2.1 (also called 2.10). Executables have been distributed in `comp.binaries.ibm.pc` (3 parts: v13i002-004), sources has been distributed through `alt.sources` on 91-07-10 (14 parts). Fetch the executables in `zoo210.exe` and sources in `zoo210s.zoo` from the usual places. Execute the self extracting `zoo210.exe`

under MSDOS to unpack the zoo executables and documentation. Unpack the sources with the obtained `zoo.exe`.

6.30 dbm_3

GNU `dbm` current GNU version is 1.5. Version 1.4 has been ported to MSDOS by Thorsten Ohl. Fetch sources in `gdbm14as.zoo` from the usual places. There is no executables archive associated with GNU dbm. There is no documentation.

6.31 libc_3

Many library routines frequently occurring in various GNU products have been ported to MSDOS by Thorsten Ohl, to help other ports. Fetch sources in `gnulibas.zoo` from the usual places. There is no executables archive associated with Thorsten Ohl's `gnulib`. There is no documentation.

A swapping library has been developped by Thorsten Ohl, using Microsoft C v6.0, to be used by some of his other GNU ports. Fetch sources and (TEX unformatted?) documentation in `swalibas.zoo` from the usual places. There is no executables archive associated with Thorsten Ohl's `swaplib`.

Note that this is not a complete `libc(3)`, but rather a small collection of GNU specific routines.

6.32 chess_6

GNU `chess` current GNU version is 4.0.60. This version should compile without changes on MSDOS, please someone give me a pointer to an already prepared executable. Fetch sources in `gnuchess-4.0.pl60.tar.Z` from `prep.ai.mit.edu` [18.71.0.38], in `pub/gnu`.

7 Project Mailing Lists

There are some mailing lists to discuss MSDOS ports of GNU software. They include:

```
bug-gnu-msdos@sun.soe.clarkson.edu     bug reports, enhancements
help-gnu-msdos@sun.soe.clarkson.edu    questions and answers
info-gnu-msdos@sun.soe.clarkson.edu    announcements, moderated
djgpp@sun.soe.clarkson.edu             80386 djgpp discussions
```

To get on or off one of these lists, send a request to:

```
listserv@sun.soe.clarkson.edu
```

or, if you don't get a reply, to:

```
bug-gnu-msdos-request@sun.soe.clarkson.edu
help-gnu-msdos-request@sun.soe.clarkson.edu
info-gnu-msdos-request@sun.soe.clarkson.edu
djgpp-request@sun.soe.clarkson.edu
```

Note: do *not* send requests to the lists, only the '`listserv`'!

For example, to become subscribed to the list '`info-gnu-msdos`', send a message whose contents (not the `Subject`) is:

```
add info-gnu-msdos
```

If you don't know how to use a '`listserv`', send it a request for help. Do this by sending it a mail message consisting of the word '`help`', without quotes, of course. If you don't get a reply, include an Internet return address with the command '`path user@host.dom.ain`', replacing '`user@host.dom.ain`' with your Internet email address.

The lists are not currently digestified, and are open to subscription by anyone. The '`info-gnu-msdos`' mailing list is moderated by Russell Nelson, solely to ensure that only announcements get sent to the list (and not requests!). Problems with the mailing lists should be directed to the appropriate '`-request`' list. For the newcomers: an Internet standard for mailing lists is to provide a mail alias that has the same name as the list, with '`-request`' appended, e.g. '`info-gnu-msdos-request`'.

Also, please consider these lists as GNU project subsidiary mailing lists. They were made up after the GNUish MSDOS project, not before, and their intent is to help to keep to project moving, *not* to change its definition or meaning. There are several lists already and other means to discuss non-GNUish software for MSDOS; there are other lists to discuss the pros and cons of the GNU project itself. You can nask `gnu@prep.ai.mit.edu` for a description of these other lists.

The mailing lists were organized by David Camp, Len Tower, Russ Nelson and DJ Delorie.

8 Historical Notes

Thorsten Ohl started his ports in November 1989, in Germany, while the Berlin Wall was falling. He subscribed at some GNU mailing lists and, for correspondants wanting his MSDOS ports, organized a distribution list based on email and still located in Germany. In 1990, around spring, the unusual quality of Thorsten ports was being recognized, and a few FTP sites organized to hold them (`vulcan`, `simtel`, `wuarchive`, `ocf`, `funic`); during the summer, the mailing lists were created. Thorsten stopped actively porting GNU products to MSDOS in September 1990, to finish his PhD and continue his research in theoretical high energy physics. He has now joined the endless list of people who support GNU by using GNU software on their UNIX workstations and contribute bug reports and (occasionally) fixes.

At this point, the mailing lists, after an initial burst of intense activity and many debates, became very quiet, and nothing really new got added to the GNUish MSDOS archives. DJ Delorie released his 80386 port of GNU C/C++, and GNU Emacs itself was ported to 80386 under the name Demacs.

In February 1992, the archives were reorganized to better comply with the GPL, which requires the sources to be fully available at the distribution points. Ports from Russell Nelson and Stuart Phillips were integrated in the project.

9 Contributors Addresses

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