This file consists of Appendix E to **MacAnova User's Guide** by Gary W. Oehlert and Christopher Bingham, issued as part of a revision of Technical Report Number 617, School of Statistics, University of Minnesota, August 1998, describing Version 4.07 of MacAnova.

Fonts used in this manual are Palatino, Courier, and Symbol.

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Appendix E Unix™ version of MacAnova (non Motif)

E.1 **Introduction** This appendix summarizes the features and behavior of MacAnova as it runs or has run on several Unix computers at the University of Minnesota. These include Ultrix 4.2A on a DECStation 3100, EP/IX Version 1.4.3 on a CDC Epyx computer, Hewlett Packard 9000/700 series running HPUX and a SGI Origin 200 running IRIX. It has been compiled for other systems, including Linux. See Appendix F for information on the Motif version which also runs under Unix.

The current command line can be edited using the arrow keys and keyboard editor commands based on either the Emacs or Vi editor commands (Emacs and Vi are Unix editors). See Sec. E.5.4 below.

You can use `shell()` and command lines starting with "`!`" to execute Unix commands or programs. See. Sec. E.5.2 below.

Macro `edit` is predefined to allow easy editing of macros and data without exiting Macanova. See Sec. E.5.3 below.

To obtain high resolution graphs, Unix MacAnova must be run in in an environment that can simulate a Tektronix 4014 graphics terminal.

E.2 **Launching MacAnova** Launching MacAnova from the Unix prompt is essentially identical to launching a DOS version of MacAnova at the DOS prompt, as described in Sec. C.2.1 except that you type `macanova` rather than `macanobc` or `macanodj`.

This assumes that the directory where the installed version of MacAnova is located is in your search path. Typically, the executable file for MacAnova (or a link to it) will be `/usr/local/bin/macanova` but might be elsewhere.

E.3 **Graphics** To obtain high resolution plots, you must be running in an environment that emulates a Tektronix 4014 graphics terminal since MacAnova translates plots to Tektronix graphic codes. On a workstation, X-windows program `xterm` provides such an environment. When making a graph under `xterm`, MacAnova creates the Tektronix window if does not yet exists, draws the graphs, and then waits for a Return or Enter. When you press Return, keyboard "focus" is returned to the VT100 emulation window but the window may not be brought to the front. If you are running through a terminal emulation program on a micro computer such as Kermit on DOS or Versaterm on a Macintosh, it may be possible to provide a similar automatic switching of modes. Pre-defined macros `tek` and `vt` allow this with Versaterm. You can switch to Tektronix mode by typing `tek()` and back to VT100 mode by typing `vt()`. Macros `tek` and `vt` use function `putascii()` to send control codes. For more information about them, type `help(tek,vt)`. If `tek` and `vt` as provided do not do the trick for you, you may have to define new versions in your startup file (see Sec. 7.8.1).

If `file:fileName` is an argument on any plotting command, a PostScript™ representation of the plot is written to the named file. For example, after displaying a graph, typing

```
showplot(file:"myplot.ps")
```

will write a PostScript description of the graph on file `myplot.ps`. See Sec. 8.5.4. If the default printer is a PostScript printer, you may be able to get hard copy simply by typing `lpr myplot.ps` at the Unix prompt or entering command

```
Cmd> shell("lpr myplot.ps")
```

or the shell escaped line

```
Cmd> !lpr myplot.ps
```

Macro `psprint` in file `macanova.mac` combines `showplot()` and `shell()` providing direct hard copy of the most recently drawn graph:

```
Cmd> getmacros(psprint)
psprint              MACRO
) usage: psprint()  or  psprint(graphVar)
) prints the graph in GRAPH variable LASTPLOT or graphVar on a Unix
) system for which the default printer for lpr is a PostScript
) printer

Cmd> psprint() # hard copy of most recent graph.
```

If both `file:fileName` and `ps:F` are arguments to a plotting command, the Tektronix plotting codes are written to the file. This is a way to save a high resolution graph in a form in which it can be redisplayed.

E. 4 **Location of files** The location of files is installation dependent. Typically the executable program itself will be in directory `/usr/local/bin`. Standard help, macro and data files are usually elsewhere, but MacAnova will have been compiled with that information built in.

If you are running a version of MacAnova compiled on a different computer on which the standard auxiliary files are in a different directory from where they are on your computer, you can provide override the built in information in several ways.

If you have a startup file (see Sec. 7.8.1), it must be named `.macanova` (the leading dot is important) and be located in your home directory.

If you have a directory of your own macros, say `mymacros` in your home directory, you may find it convenient to create a startup file containing the following line

```
adddatapath("~/mymacros")
```

Files created by save(), asciisave() or spool() can be placed in any directory.

E. 4.1 **Changing the default file locations** If you are running a copy of MacAnova that was compiled on a different computer, the locations where it expects to find the standard help, macro and data files may not match where they are on your computer. You can override the built in information in at least two ways.

You can always start MacAnova using command line options -h helpFile, -mpath macroPath and -dpath dataPath, where helpFile is the complete path name (file name with fully specified directory name) of the help file macanova.hlp, and macroPath and dataPath are the fully specifed names of the directories where the macro and data files are located. See Sec. C.6.2.

Alternatively, you can define environmental variable MACANOVA (Sec. 7.8.2) so that it has these options as its value.

E.5 **Other features**

E.5.1 **Interrupting MacAnova** You can interrupt MacAnova by pressing the standard key for Unix interrupts. Usually this is Ctrl+C but might be something else. This terminates the current command, prints

```
*** INTERRUPT ***
```

and returns to the prompt level.

E.5.2 **Running other programs while in MacAnova** Under many Unix "shells", not including the classic Bourne shell, you can suspend MacAnova by pressing a standard key, usually Ctrl+Z. You can then run another program. When it is done, you can restart MacAnova by typing fg (if there is more than one program suspended it may be more complicated than that).

When running on a work station with multiple windows, you can usually start up programs in other windows while you are in MacAnova. Such a program runs "in parallel" with MacAnova and has no effect on the running of MacAnova.

shell() and shell escapes (lines starting with "!") work as described in Sec. 8.7. Keyword phrases interact:T and keep:T are both implemented. These allow you to run another program in the same window without suspending or quitting MacAnova.

E.5.3 **Editing Macros** As is true with any version, one way to edit a macro you are writing is to do it in an editor such as vi or emacs running independently of MacAnova (see Sec. E.5.2). In the editor write the macro in a format that is readable by macroread() (see Sec. 7.5.1), save it and then, after returning to MacAnova, read it in using macroread(). When a change is needed, suspend MacAnova, make the change using the editor, save the file again, return to MacAnova and reread it.

Alternatively, Unix MacAnova has pre-defined macro edit as described for the extended memory DOS version in Sec. C.5.3. This writes a macro to be edited to a temporary file, then uses shell() to run an editor (default is vi), and then reads the

edited temporary file back in.

E.5.4 **Editing the current command line** You can edit the current command line as described for the extended memory DOS version in Sec. C.5.4. The special file for customizing keymaps must be `.inputrc` in your home directory.

E.5.5 **Recalling and editing previous commands** You can recall previous commands for editing and re-execution using arrow keys exactly as described for the extended memory DOS version in Sec. C.5.5. See also Sec. 8.8.2.

E.5.6 **"Console" input in Unix MacAnova** This is done the same as described for the extended memory DOS version in Sec. C.5.6.

E.5.7 **Viewing data and macros** The Unix version of MacAnova has predefined macro `more` to make it easier to view large data sets or macros. It it writes the data or macro to a temporary file and then uses Unix program `more` (started up by `shell()` (Sec. 8.7.1, 8.7.2)) to view the file. You can use another viewing program if you prefer:

```
Cmd> PAGER <- "less" # or whatever program you want
```

sets the program used by macro `more` to be Unix program `less`.

E.6 **Command line arguments** There are several command line arguments you can use to customize a particular run. To use these at the Unix prompt, you would type

```
macanova options
```

where `options` consists one or more of `-q`, various file options, various path options or other options. See Sec. C.6.1, C.6.2 and C.6.3 for details.

E.7 **Non-interactive mode** At the Unix prompt, when `commands.txt` is a text file containing MacAnova commands as they might be typed,

```
macanova options < commands.txt > output.txt
```

`runs` MacAnova in non-interactive mode. Input will be taken from `commands.txt` and output will be written to file `output.txt`, just as it would have appeared on the screen. There should be no plotting commands unless keyword phrase `dumb:T` is used (see Sec. 2.15.7). Optional command line arguments `options` are described in Sec. C.6.1, C.6.2 and C.6.3.

E.8 **Miscellaneous information**

E.8.1 **Compilers** MacAnova has been compiled on several platforms using both the standard compiler `cc` and the GNU compiler `gcc`.

E.8.2 **Distribution of Unix versions of MacAnova** Complete source for all versions of MacAnova is available for downloading over the World Wide Web or using ftp. The WWW URL of the MacAnova home page is

http://www.stat.umn.edu/~gary/macanova/macanova.home.html.

To find the source, click on *Download* and then on *Source files for compiling on Unix and other platforms*. If you prefer to use ftp, the source files are in

ftp://ftp.stat.umn.edu/pub/macanova/src.