```
Last login: Mon Mar 10 14:05:36 on ttys006
You have new mail.
/Users/felixnowman/.zprofile:7: command not found: rbenv
felixnowman@ec2-100-30-1-99 ~ % cd Desktop/course-3/Spring/SP
felixnowman@ec2-100-30-1-99 SP % ls
HM-1    LAB-1    LAB-2    LAB-5    LAB-6
felixnowman@ec2-100-30-1-99 SP % cd LAB-2
felixnowman@ec2-100-30-1-99 LAB-2 % ls -al | more
total 384
drwxr-xr-x  8 felixnowman  staff    256 Mar 10 14:43 .
drwxr-xr-x  8 felixnowman  staff    256 Mar  4 11:06 ..
-rw-r--r--@ 1 felixnowman  staff   8196 Mar 11 06:20 .DS_Store
drwxr-xr-x  6 felixnowman  staff    192 Mar 10 14:31 codes
-rw-r--r--@ 1 felixnowman  staff  25190 Feb  4 11:43 lab2_Task1.pdf
-rw-r--r--@ 1 felixnowman  staff  45603 Mar 10 14:07 lab2_Task2.pdf
-rw-r--r--@ 1 felixnowman  staff  40495 Mar 10 14:43 lab2_Task3.pdf
-rw-r--r--@ 1 felixnowman  staff  65493 Feb  4 10:15 labsysprog2.pdf
felixnowman@ec2-100-30-1-99 LAB-2 % man bash | col -b | lpr
Unknown locale, assuming C
lpr: Error - No default destination.
felixnowman@ec2-100-30-1-99 LAB-2 % man bash | col -b > man.txt
Unknown locale, assuming C
felixnowman@ec2-100-30-1-99 LAB-2 % cat man.txt
BASH(1)                    General Commands Manual                    BASH(1)

NAME
       bash - GNU Bourne-Again SHell

SYNOPSIS
       bash [options] [file]

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DESCRIPTION
       Bash is an sh-compatible command language interpreter that executes
       commands read from the standard input or from a file.  Bash also
       incorporates useful features from the Korn and C shells (ksh and csh).

       Bash is intended to be a conformant implementation of the Shell and
       Utilities portion of the IEEE POSIX specification (IEEE Standard
       1003.1).  Bash can be configured to be POSIX-conformant by default.

OPTIONS
       In addition to the single-character shell options documented in the
       description of the set builtin command, bash interprets the following
       options when it is invoked:

       -c string If the -c option is present, then commands are read from
                 string.  If there are arguments after the string, they are
                 assigned to the positional parameters, starting with $0.
       -i        If the -i option is present, the shell is interactive.
       -l        Make bash act as if it had been invoked as a login shell (see
                 INVOCATION below).
       -r        If the -r option is present, the shell becomes restricted
                 (see RESTRICTED SHELL below).
```

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-s        If the -s option is present, or if no arguments remain after
          option processing, then commands are read from the standard
          input.  This option allows the positional parameters to be
          set when invoking an interactive shell.
-D        A list of all double-quoted strings preceded by $ is printed
          on the standard output.  These are the strings that are
          subject to language translation when the current locale is
          not C or POSIX.  This implies the -n option; no commands will
          be executed.
[-+]O [shopt_option]
          shopt_option is one of the shell options accepted by the
          shopt builtin (see SHELL BUILTIN COMMANDS below).  If
          shopt_option is present, -O sets the value of that option; +O
          unsets it.  If shopt_option is not supplied, the names and
          values of the shell options accepted by shopt are printed on
          the standard output.  If the invocation option is +O, the
          output is displayed in a format that may be reused as input.
--        A -- signals the end of options and disables further option
          processing.  Any arguments after the -- are treated as
          filenames and arguments.  An argument of - is equivalent to
          --.

Bash also interprets a number of multi-character options.  These
options must appear on the command line before the single-character
options to be recognized.

--debugger
       Arrange for the debugger profile to be executed before the shell
       starts.  Turns on extended debugging mode (see the description
       of the extdebug option to the shopt builtin below) and shell
       function tracing (see the description of the -o functrace option
       to the set builtin below).
--dump-po-strings
       Equivalent to -D, but the output is in the GNU gettext po
       (portable object) file format.
--dump-strings
       Equivalent to -D.
--help Display a usage message on standard output and exit
       successfully.
--init-file file
--rcfile file
       Execute commands from file instead of the standard personal
       initialization file ~/.bashrc if the shell is interactive (see
       INVOCATION below).

--login
       Equivalent to -l.

--noediting
       Do not use the GNU readline library to read command lines when
       the shell is interactive.

--noprofile
       Do not read either the system-wide startup file /etc/profile or
       any of the personal initialization files ~/.bash_profile,
       ~/.bash_login, or ~/.profile.  By default, bash reads these
```

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BUG REPORTS

If you find a bug in bash, you should report it. But first, you should
make sure that it really is a bug, and that it appears in the latest
version of bash. The latest version is always available from
ftp://ftp.gnu.org/pub/bash/.

Once you have determined that a bug actually exists, use the bashbug
command to submit a bug report. If you have a fix, you are encouraged
to mail that as well! Suggestions and `philosophical' bug reports may
be mailed to bug-bash@gnu.org or posted to the Usenet newsgroup
gnu.bash.bug.

ALL bug reports should include:

The version number of bash
The hardware and operating system
The compiler used to compile
A description of the bug behaviour
A short script or `recipe' which exercises the bug

bashbug inserts the first three items automatically into the template
it provides for filing a bug report.

Comments and bug reports concerning this manual page should be directed
to chet@po.cwru.edu.

BUGS

It's too big and too slow.

There are some subtle differences between bash and traditional versions
of sh, mostly because of the POSIX specification.

Aliases are confusing in some uses.

Shell builtin commands and functions are not stoppable/restartable.

Compound commands and command sequences of the form `a ; b ; c' are not
handled gracefully when process suspension is attempted. When a
process is stopped, the shell immediately executes the next command in
the sequence. It suffices to place the sequence of commands between
parentheses to force it into a subshell, which may be stopped as a
unit.

Commands inside of $(...) command substitution are not parsed until
substitution is attempted. This will delay error reporting until some
time after the command is entered. For example, unmatched parentheses,
even inside shell comments, will result in error messages while the
construct is being read.

```
            Array variables may not (yet) be exported.

GNU Bash-3.2                    2006 September 28                    BASH(1)
felixnowman@ec2-100-30-1-99 LAB-2 % mv man.txt man_Task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % ls
codes            lab2_Task2.pdf  labsysprog2.pdf
lab2_Task1.pdf   lab2_Task3.pdf  man_Task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % bash --version
GNU bash, version 3.2.57(1)-release (arm64-apple-darwin24)
Copyright (C) 2007 Free Software Foundation, Inc.
felixnowman@ec2-100-30-1-99 LAB-2 % /bin/bash/ --version
zsh: not a directory: /bin/bash/
felixnowman@ec2-100-30-1-99 LAB-2 % ls -l > lsOutput_task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % cat lsOutput_task4.txt
total 856
drwxr-xr-x  6 felixnowman   staff     192 Mar 10 14:31 codes
-rw-r--r--@ 1 felixnowman   staff   25190 Feb  4 11:43 lab2_Task1.pdf
-rw-r--r--@ 1 felixnowman   staff   45603 Mar 10 14:07 lab2_Task2.pdf
-rw-r--r--@ 1 felixnowman   staff   40495 Mar 10 14:43 lab2_Task3.pdf
-rw-r--r--@ 1 felixnowman   staff   65493 Feb  4 10:15 labsysprog2.pdf
-rw-r--r--@ 1 felixnowman   staff       0 Mar 11 09:55 lsOutput_task4.txt
-rw-r--r--@ 1 felixnowman   staff  252451 Mar 11 09:53 man_Task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % ps >> lsOutput_task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % cat lsOutput_task4.txt
total 856
drwxr-xr-x  6 felixnowman   staff     192 Mar 10 14:31 codes
-rw-r--r--@ 1 felixnowman   staff   25190 Feb  4 11:43 lab2_Task1.pdf
-rw-r--r--@ 1 felixnowman   staff   45603 Mar 10 14:07 lab2_Task2.pdf
-rw-r--r--@ 1 felixnowman   staff   40495 Mar 10 14:43 lab2_Task3.pdf
-rw-r--r--@ 1 felixnowman   staff   65493 Feb  4 10:15 labsysprog2.pdf
-rw-r--r--@ 1 felixnowman   staff       0 Mar 11 09:55 lsOutput_task4.txt
-rw-r--r--@ 1 felixnowman   staff  252451 Mar 11 09:53 man_Task4.txt
  PID TTY           TIME CMD
30464 ttys006    0:00.17 -zsh
 3106 ttys008    0:00.27 /bin/zsh -il
felixnowman@ec2-100-30-1-99 LAB-2 % kill -HUP 1234 > killout.txt 2>killerr.txt
felixnowman@ec2-100-30-1-99 LAB-2 % ls
codes                  lab2_Task1.pdf         labsysprog2.pdf
killerr.txt            lab2_Task2.pdf         lsOutput_task4.txt
killout.txt            lab2_Task3.pdf         man_Task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % car killerr.txt killout.txt
zsh: command not found: car
felixnowman@ec2-100-30-1-99 LAB-2 % cat killerr.txt killout.txt
kill: kill 1234 failed: no such process
felixnowman@ec2-100-30-1-99 LAB-2 % kill -1 1234 > killouterr.txt 2
kill: kill 1234 failed: no such process
kill: kill 2 failed: no such process
felixnowman@ec2-100-30-1-99 LAB-2 % kill -1 1234 > killouterr.txt 2>&1
felixnowman@ec2-100-30-1-99 LAB-2 % cat killouterr.txt
kill: kill 1234 failed: no such process
felixnowman@ec2-100-30-1-99 LAB-2 % kill -1 1234 > /dev/null 2>&1
felixnowman@ec2-100-30-1-99 LAB-2 % more < lsOutput_task4.txt
total 856
drwxr-xr-x  6 felixnowman   staff     192 Mar 10 14:31 codes
-rw-r--r--@ 1 felixnowman   staff   25190 Feb  4 11:43 lab2_Task1.pdf
-rw-r--r--@ 1 felixnowman   staff   45603 Mar 10 14:07 lab2_Task2.pdf
```

```
-rw-r--r--@ 1 felixnowman  staff    40495 Mar 10 14:43 lab2_Task3.pdf
-rw-r--r--@ 1 felixnowman  staff    65493 Feb  4 10:15 labsysprog2.pdf
-rw-r--r--@ 1 felixnowman  staff        0 Mar 11 09:55 lsOutput_task4.txt
-rw-r--r--@ 1 felixnowman  staff   252451 Mar 11 09:53 man_Task4.txt
  PID TTY           TIME CMD
30464 ttys006    0:00.17 -zsh
 3106 ttys008    0:00.27 /bin/zsh -il
felixnowman@ec2-100-30-1-99 LAB-2 % ps > psOut_task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % sort psOut_task4.txt > psOutSort_task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % cat psOut_task4.txt
  PID TTY           TIME CMD
30464 ttys006    0:00.23 -zsh
 3106 ttys008    0:00.27 /bin/zsh -il
felixnowman@ec2-100-30-1-99 LAB-2 % cat psOutSort_task4.txt
  PID TTY           TIME CMD
 3106 ttys008    0:00.27 /bin/zsh -il
30464 ttys006    0:00.23 -zsh
felixnowman@ec2-100-30-1-99 LAB-2 % ps | sort > psSort_task4.txt
felixnowman@ec2-100-30-1-99 LAB-2 % car psSort_task4.txt
zsh: command not found: car
felixnowman@ec2-100-30-1-99 LAB-2 % cat psSort_task4.txt
  PID TTY           TIME CMD
 3106 ttys008    0:00.27 /bin/zsh -il
30464 ttys006    0:00.26 -zsh
31134 ttys006    0:00.01 sort
felixnowman@ec2-100-30-1-99 LAB-2 % ps | sort | ore
zsh: command not found: ore
felixnowman@ec2-100-30-1-99 LAB-2 % ps | sort | more
  PID TTY           TIME CMD
 3106 ttys008    0:00.27 /bin/zsh -il
30464 ttys006    0:00.28 -zsh
31144 ttys006    0:00.00 sort
31145 ttys006    0:00.00 more
felixnowman@ec2-100-30-1-99 LAB-2 % ps -xo comm | sort | uniq | grep -v sh | more
/Applications/Betternet VPN.app/Contents/MacOS/Betternet VPN
/Applications/Cursor.app/Contents/Frameworks/Cursor Helper (GPU).app/Contents/MacO
S/Cursor Helper (GPU)
/Applications/Cursor.app/Contents/Frameworks/Cursor Helper (Plugin).app/Contents/M
acOS/Cursor Helper (Plugin)
/Applications/Cursor.app/Contents/Frameworks/Cursor Helper (Renderer).app/Contents
/MacOS/Cursor Helper (Renderer)
/Applications/Cursor.app/Contents/Frameworks/Cursor Helper.app/Contents/MacOS/Curs
or Helper
/Applications/Cursor.app/Contents/Frameworks/Squirrel.framework/Resources/ShipIt
/Applications/Cursor.app/Contents/MacOS/Cursor
/Applications/Google Chrome.app/Contents/Frameworks/Google Chrome Framework.framew
ork/Versions/133.0.6943.142/Helpers/Google Chrome Helper (GPU).app/Contents/MacOS/
Google Chrome Helper (GPU)
/Applications/Google Chrome.app/Contents/Frameworks/Google Chrome Framework.framew
ork/Versions/133.0.6943.142/Helpers/Google Chrome Helper (Plugin).app/Contents/Mac
OS/Google Chrome Helper (Plugin)
/Applications/Google Chrome.app/Contents/Frameworks/Google Chrome Framework.framew
ork/Versions/133.0.6943.142/Helpers/Google Chrome Helper.app/Contents/MacOS/Google
 Chrome Helper
/Applications/Google Chrome.app/Contents/MacOS/Google Chrome
/Applications/Telegram.app/Contents/MacOS/Telegram
```

```
/Applications/Telegram.app/Contents/PlugIns/TelegramShare.appex/Contents/MacOS/Tel
egramShare
/Library/Apple/System/Library/PrivateFrameworks/RemotePairing.framework/Versions/A
/XPCServices/remotepairingd.xpc/Contents/MacOS/remotepairingd
/Library/Developer/PrivateFrameworks/CoreSimulator.framework/Versions/A/Resources/
SimAudioProcessorServices.simdeviceio/Contents/XPCServices/SimAudioProcessorServic
e.xpc/Contents/MacOS/SimAudioProcessorService
/Library/Developer/PrivateFrameworks/CoreSimulator.framework/Versions/A/Resources/
SimStreamProcessorServices.simdeviceio/Contents/XPCServices/SimStreamProcessorServ
ice.xpc/Contents/MacOS/SimStreamProcessorService
/Library/Developer/PrivateFrameworks/CoreSimulator.framework/Versions/A/XPCService
s/SimLaunchHost.arm64.xpc/Contents/MacOS/SimLaunchHost.arm64
/Library/Developer/PrivateFrameworks/CoreSimulator.framework/Versions/A/XPCService
s/SimulatorTrampoline.xpc/Contents/MacOS/SimulatorTrampoline
/Library/Developer/PrivateFrameworks/CoreSimulator.framework/Versions/A/XPCService
s/com.apple.CoreSimulator.CoreSimulatorService.xpc/Contents/MacOS/com.apple.CoreSi
mulator.CoreSimulatorService
/System/Applications/Calendar.app/Contents/PlugIns/CalendarWidgetExtension.appex/C
ontents/MacOS/CalendarWidgetExtension
/System/Applications/Clock.app/Contents/PlugIns/WorldClockWidget.appex/Contents/Ma
cOS/WorldClockWidget
/System/Applications/FindMy.app/Contents/PlugIns/FindMyWidgetItems.appex/Contents/
MacOS/FindMyWidgetItems
/System/Applications/FindMy.app/Contents/PlugIns/FindMyWidgetPeople.appex/Contents
/MacOS/FindMyWidgetPeople
/System/Applications/Home.app/Contents/PlugIns/HomeEnergyWidgetsExtension.appex/Co
ntents/MacOS/HomeEnergyWidgetsExtension
/System/Applications/Home.app/Contents/PlugIns/HomeWidget.appex/Contents/MacOS/Hom
eWidget
/System/Applications/Messages.app/Contents/MacOS/Messages
/System/Applications/Messages.app/Contents/PlugIns/Messages Share Extension.appex/
Contents/MacOS/Messages Share Extension
/System/Applications/Notes.app/Contents/MacOS/Notes
/System/Applications/Notes.app/Contents/PlugIns/com.apple.Notes.SpotlightIndexExte
nsion.appex/Contents/MacOS/com.apple.Notes.SpotlightIndexExtension
/System/Applications/Notes.app/Contents/PlugIns/com.apple.Notes.WidgetExtension.ap
pex/Contents/MacOS/com.apple.Notes.WidgetExtension
/System/Applications/Photos.app/Contents/PlugIns/PhotosReliveWidget.appex/Contents
/MacOS/PhotosReliveWidget
/System/Applications/Preview.app/Contents/MacOS/Preview
/System/Applications/Reminders.app/Contents/PlugIns/RemindersWidgetExtension.appex
/Contents/MacOS/RemindersWidgetExtension
/System/Applications/Stocks.app/Contents/PlugIns/StocksWidget.appex/Contents/MacOS
/StocksWidget
/System/Applications/Utilities/Terminal.app/Contents/MacOS/Terminal
/System/Applications/Weather.app/Contents/PlugIns/WeatherWidget.appex/Contents/Mac
OS/WeatherWidget
/System/Cryptexes/App/System/Library/CoreServices/SafariSupport.bundle/Contents/Ma
cOS/SafariBookmarksSyncAgent
/System/Cryptexes/App/usr/libexec/AuthenticationServicesAgent
/System/Cryptexes/App/usr/libexec/PasswordBreachAgent
/System/Cryptexes/App/usr/libexec/com.apple.Safari.History
/System/Cryptexes/App/usr/libexec/webinspectord
/System/Library/CoreServices/AirPlayUIAgent.app/Contents/MacOS/AirPlayUIAgent
/System/Library/CoreServices/Batteries.app/Contents/PlugIns/BatteriesAvocadoWidget
Extension.appex/Contents/MacOS/BatteriesAvocadoWidgetExtension
```