

Princeton University
 COS 217: Introduction to Programming Systems
 UNIX and bash

| Filenames and Directorynames | |
|------------------------------|----------------|
| <i>/dir1/.../dirN</i> | Absolute dname |
| <i>dir1/.../dirN</i> | Relative dname |
| <i>/dir1/.../file</i> | Absolute fname |
| <i>dir1/.../file</i> | Relative fname |

| Special Filename and Directoryname Characters | |
|---|--|
| <i>fnameord*name</i> | * matches 0 or more characters |
| <i>fnameord?name</i> | ? matches any single character |
| <i>"fname or dname"</i> | " allows whitespace in a dname or fname |
| <i>'fname or dname'</i> | ' allows whitespace in a dname or fname |
| <i>fnameord\name</i> | Backslash (escape) character allows special characters in a dname or fname |
| <i>~loginid</i> | Home directory of <i>loginid</i> |
| <i>~</i> | Your home directory |
| <i>..</i> | Parent of working directory |
| <i>.</i> | Working directory |

| Special Command Characters | |
|--|---|
| <i>command 0 < fname</i> <i>command < fname</i> | Redirect stdin to <i>fname</i> |
| <i>command 1 > fname</i> <i>command > fname</i> | Redirect stdout to <i>fname</i> |
| <i>command 2 > fname</i> | Redirect stderr to <i>fname</i> |
| <i>command 1 > fname 2 > &1</i> | Redirect stdout and stderr to <i>fname</i> |
| <i>command1 command2</i> | Pipe from <i>command1</i> to <i>command2</i> |
| <i>^d</i> | End of file |
| <i>command &</i> | Run <i>command</i> as a background process |
| <i>^z</i> | Turn my foreground process into a stopped background process |
| <i>^c</i> | Send a SIGINT signal |
| <i>↑</i> | Scroll backward through the command history list |
| <i>↓</i> | Scroll forward through the command history list |
| <i>!prefix</i> | Reissue the most recently issued command that begins with <i>prefix</i> |
| <i>!commandnum</i> | Reissue the command whose number is <i>commandnum</i> (see the "history" command) |

Commands

Commands marked with “(bash)” are shell built-in commands.

Commands marked with “(bin)” are executable binary files.

| Directory-Related Commands | |
|----------------------------|---|
| pwd | (bash, bin) Print the name of the working directory to stdout |
| cd [<i>dname</i>] | (bash) Make <i>dname</i> the working directory |
| ls [-la] [<i>dname</i>] | (bin) List the contents of <i>dname</i> to stdout |
| ls [-la] [<i>fname</i>] | (bin) List the attributes of <i>fname</i> to stdout |
| mkdir <i>dname</i> | (bin) Create <i>dname</i> |
| rmdir <i>dname</i> | (bin) Destroy the empty directory <i>dname</i> |

| File-Related Commands | |
|---|---|
| cat | (bin) Concatenate (print) stdin to stdout |
| cat <i>fname</i> ... | (bin) Concatenate (print) <i>fname</i> ... to stdout |
| more | (bin) Print stdin to stdout one screen at a time |
| more <i>fname</i> ... | (bin) Print <i>fname</i> ... to stdout one screen at a time |
| od [-t x1] <i>fname</i> | (bin) Octal dump <i>fname</i> to stdout |
| cp [-i] <i>sourcefname</i> <i>targetfname</i> | (bin) Copy <i>sourcefname</i> to <i>targetfname</i> |
| cp [-i] <i>sourcefname</i> <i>targetdname</i> | (bin) Copy <i>sourcefname</i> to <i>targetdname</i> |
| cp -r <i>sourcedname</i> <i>targetdname</i> | (bin) Copy (recursively) <i>sourcedname</i> to <i>targetdname</i> |
| mv [-i] <i>sourcefname</i> <i>targetfname</i> | (bin) Rename <i>sourcefname</i> to <i>targetfname</i> |
| mv [-i] <i>sourcefname</i> ... <i>targetdname</i> | (bin) Move <i>sourcefname</i> ... to <i>targetdname</i> |
| rm [-i] <i>fname</i> ... | (bin) Remove <i>fname</i> ... |
| rm -r [-i] <i>dname</i> [<i>fname</i> ...] | (bin) Remove <i>dname</i> (recursively) and <i>fname</i> ... |

| Configuration Commands | |
|--|--|
| source <i>fname</i> | (bash) Execute the shell script in <i>fname</i> |
| export <i>variable</i> = <i>value</i> | (bash) Set environment <i>variable</i> to <i>value</i> |
| export PATH= <i>dname1</i> : <i>dname2</i> :... | (bash) Set the PATH environment variable indicating that bash should search <i>dname1</i> , <i>dname2</i> , ... to find commands that are specified as relative fnames |
| export MANPATH= <i>dname1</i> : <i>dname2</i> :... | (bash) Set the MANPATH environment variable indicating that the man command should search <i>dname1</i> , <i>dname2</i> , ... to find man pages |
| <i>variable</i> = <i>value</i> | (bash) Set shell <i>variable</i> to <i>value</i> |
| PS1=" <i>h</i> : <i>w</i> \\$ " | (bash) Set the PS1 shell variable to indicate that the command prompt should contain the name of the host computer, a colon, the name of the working directory, a dollar sign, and a space |
| set -o <i>shelloption</i> | (bash) Turn on <i>shelloption</i> |
| set +o <i>shelloption</i> | (bash) Turn off <i>shelloption</i> |
| set -o ignoreeof | (bash) Turn on the ignoreeof shell option to indicate that ^D entered at the bash prompt should not terminate bash |
| set -o noclobber | (bash) Turn on the noclobber shell option to indicate that bash should not overwrite files via redirection |
| alias <i>aliasname</i> = <i>string</i> | (bash) Create an alias definition such that <i>aliasname</i> as an abbreviation for <i>string</i> |
| unalias <i>aliasname</i> | (bash) Destroy the alias definition that defines <i>aliasname</i> |

| File and Directory Permission Commands | |
|--|---|
| chmod <i>mask fnameordname ...</i> | (bin) Set the permissions of <i>fnameordname ...</i> as indicated by <i>mask</i> |
| umask <i>mask</i> | (bash) Set the default permissions used when creating new files and directories as indicated by <i>mask</i> |

| Software Development Commands (described throughout the course) | |
|---|--|
| xemacs | (bin) Create or edit a text file using the xemacs editor |
| gcc | (bin) Preprocess, compile, assemble, and link a program |
| gdb | (bin) Debug a program |
| make | (bin) Build a program |
| ar | (bin) Create an archive file containing object code |
| gprof | (bin) Analyze the performance of a program |

| Commands for Getting Help | |
|--|--|
| man [<i>section</i>] <i>pagename</i> | (bin) Print to stdout the UNIX manual page (from <i>section</i>) whose name is <i>pagename</i> . Section 1 describes commands and utilities (e.g. cat, ls). Section 2 describes UNIX system calls (e.g. fork, pipe). Section 3 describes library functions (e.g. printf, strlen). |
| apropos <i>keyword</i> | (bin) Print to stdout each UNIX manual page NAME line that contains <i>keyword</i> |

| Miscellaneous Commands | |
|------------------------------|--|
| history | (bash) Print a numbered command history list to stdout |
| passwd <i>oldpassword</i> | (bin) Change my password from <i>oldpassword</i> |
| wc [<i>fname ...</i>] | (bin) Print a count of characters, words, and lines in <i>fname ...</i> (or stdin) to stdout |
| date | (bin) Print the date and time to stdout |
| printenv [<i>variable</i>] | (bin) Print the definition of environment <i>variable</i> (or of all environment variables) to stdout |
| echo [<i>arg ...</i>] | (bash, bin) Print <i>arg ...</i> to stdout |
| who | (bin) Print information about current users to stdout |
| grep <i>string fname ...</i> | (bin) Print each line of <i>fname</i> that contains <i>string</i> to stdout |
| sort [<i>fname</i>] | (bin) Print each line of <i>fname</i> (or stdin) in lexicographic order to stdout |
| diff <i>fname1 fname2</i> | (bin) Print an indication of the differences between the contents of <i>fname1</i> and <i>fname2</i> to stdout |
| which <i>command</i> | (bin) Search PATH for <i>command</i> , and print the dname where it was found to stdout |
| finger <i>loginid</i> | (bin) Print information about user <i>loginid</i> to stdout |

| Process Control Commands | |
|---|--|
| jobs | (bash) List the names and jobnums of my background processes to stdout |
| fg [% <i>jobnum</i>] | (bash) Move my background process with the given <i>jobnum</i> to the foreground |
| bg [% <i>jobnum</i>] | (bash) Turn my stopped background process into a running background process |
| kill [- <i>signal</i>] % <i>jobnum</i> | (bash) Send <i>signal</i> to my background process with the given <i>jobnum</i> |
| ps | (bin) Display a list of my processes |
| kill [- <i>signal</i>] <i>pid</i> | (bin) Send <i>signal</i> to the process whose id is <i>pid</i> |
| exit | (bash) Exit bash |
| logout | (bash) Exit bash and the terminal session |

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