

# 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\<i>name</i></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 &lt; fname</i> <i>command &lt; fname</i>	Redirect stdin to <i>fname</i>
<i>command 1 &gt; fname</i> <i>command &gt; fname</i>	Redirect stdout to <i>fname</i>
<i>command 2 &gt; fname</i>	Redirect stderr to <i>fname</i>
<i>command 1 &gt; fname 2 &gt; &amp;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 &amp;</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>!<i>prefix</i></i>	Reissue the most recently issued command that begins with <i>prefix</i>
<i>!<i>commandnum</i></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.

Command for Getting Help	
man [section] pagename	(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, dup). Section 3 describes library functions (e.g. printf(), strlen()).

Configuration Commands	
source <i>fname</i>	(Bash) Execute the shell script in <i>fname</i>
export <i>variable=value</i>	(Bash) Set environment <i>variable</i> to <i>value</i>
export PATH= <i>dname1: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 <i>fnames</i>
export MANPATH= <i>dname1: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=value</i>	(Bash) Set shell <i>variable</i> to <i>value</i>
PS1="\h:\w\\$\ "	(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=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>

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 <i>fname ...</i>	(bin) Print <i>fname ...</i> to stdout one screen at a time
less <i>fname ...</i>	(bin) Print <i>fname, ...</i> to stdout one screen at a time The man command pipes its output through less
xxd <i>fname</i>	(bin) Hexadecimal dump <i>fname</i> to stdout
cp [-i] <i>sourcefname targetfname</i>	(bin) Copy <i>sourcefname</i> to <i>targetfname</i>
cp [-i] <i>sourcefname targetdname</i>	(bin) Copy <i>sourcefname</i> to <i>targetdname</i>
cp -r <i>sourcedname targetdname</i>	(bin) Copy (recursively) <i>sourcedname</i> to <i>targetdname</i>
mv [-i] <i>sourcefname targetfname</i>	(bin) Rename <i>sourcefname</i> to <i>targetfname</i>
mv [-i] <i>sourcefname ... 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 [fname ...]</i>	(bin) Remove <i>dname</i> (recursively) and <i>fname ...</i>

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

Software Development Commands	
<code>emacs</code>	(bin) Create or edit a text file using the Emacs editor
<code>gcc217</code>	(bin) Preprocess, compile, assemble, and link a program using options appropriate for COS 217; a variant of <code>gcc</code>
<code>gdb</code>	(bin) Debug a program
<code>make</code>	(bin) Build a program
<code>ar</code>	(bin) Create an archive file containing object code
<code>gprof</code>	(bin) Analyze the performance of a program

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

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

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