CSc 3320: Systems Programming
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Homework
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Chapter 3 Unix Commands

Index	Command	Usage	Example

1	at	Allows you to schedule a series of jobs to be executed on a one-time basis; Allows you to schedule one-time commands or scripts; view your list of scheduled jobs	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ at now + 2 minutes`
			`at> echo done > /dev/tty1`
			`at> <EOT>`
			`job 21 at Thu Feb 18 11:16:00 2021`
			`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ at -l`
			`21      Thu Feb 18 11:16:00 2021 a jrogers75@gsuad.gsu.edu`

2	awk	A utility that scans one or more files and performs an action on all of the lines that match a particular condition; a programmable text-processing utility that scans the lines of its input and performs actions on every line that matches a particular criterion.	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ awk '/.*ing/ {print NR ":" $1}' p`
			`bem.txt`
			`3:Rough`
			`3:By`

3	biff	Allows you to enable and disable instant mail notification	Command not found so was not able to create an example
4	cmp	Finds the first byte that differs between two files; determines whether two files are the same.	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ cmp hw3_ch3.txt hw3_ch3_2.txt` `hw3_ch3.txt hw3_ch3_2.txt differ: byte 49, line 5`
5	compress	Replaces a file with its compressed version, appending a .Z suffix	Command not found so was not able to create an example

6	cpio	Allows you to save directory structures to a single backup volume; used for saving small quantities of data, but doesn't work for	`TRAILER!!![jrogers75@gsuad.gsu.edu@snowball Homeworks]$ cpio -it < backup`
			`1 block`
			`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ cpio -it < backup1`
			`1 block`

		large back ups; create and access special cpio-format files	

7	crontab	Allows you to create a scheduling table that describes a series of jobs to be executed on a periodic basis; user interface to the UNIX cron system.	Have not been able to successfully execute this one:
			`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ crontab -u float.txt`
			`must be privileged to use -u`

8	crypt	Performs one of two duties: if the standard input is regular text, an encoded version of the text is sent to standard output, using key as the encoding key. If the standard input is encoded text, a decoded version of the text is sent to standard output, using key as the decoding key.	Command not found so was not able to create an example

9	diff	Displays all the differences and similarities between two files; compares two files and displays a list of editing changes that would convert the first file into the second file	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ diff hw3_ch3.txt hw3_ch3_2.txt`
			`5,6d4`
			`< Chuck Lopez`
			`< Dakota Lopez`

10	dump	Allows you to save a file system to multiple back up volumes; especially designed for total and incremental back ups but restoring individual files is tricky	Command not found so was not able to create an example

11	egrep	Filtering files; a utility that allows you to search for a pattern in a list of files using regular and extended expressions	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ egrep "ss|ll|mm|oo" poem.txt`
			`Shall I compare thee to a summer's day?`
			`A summer's lease hath all too short a date.`
			`Sometime too hot the eye of heaven shines.`
			`And often is his gold complexion dimmed;`
			`By chance, or nature's changing course, untrimmed;`
			`But thy eternal summer shall not fade,`
			`Nor lose possession of that fair thou ow'st,`
			`Nor shall death brag thou wand'rest in his shade,`

| 12 | fgrep | Filtering files; can only search for fixed strings | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ fgrep "'s" poem.txt
Shall I compare thee to a summer's day?
And summer's lease hath all too short a date.
By chance, or nature's changing course, untrimmed;
Nor lose possession of that fair thou ow'st,
When in eternal lines to Time thou grow'st.
``` |
|---|---|---|---|
| 13 | find | A utility that recursively descends through pathList and applies expression to every file; can do more that simply locate a named file; Can performs actions on a set of files that satisfy specific conditions | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ find *.txt
awktest8.txt
homework_instructions.txt
hw3_8.txt
poem.txt
samplecolon.txt
sortsample.txt
``` |
| 14 | grep | Filtering files; a utility that allows you to search for a pattern in a list of files using regular expressions. | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ grep e.$ poem.txt
Thou art more lovely and more temperate.
And summer's lease hath all too short a date.
But thy eternal summer shall not fade,
Nor shall death brag thou wand'rest in his shade,
So long as men can breathe, or eyes can see,
``` |
| 15 | gunzip | Uncompresses a file created by gzip or compress | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ gunzip -v poem.txt.gz
poem.txt.gz:     54.8% -- replaced with poem.txt
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$
``` |
| 16 | gzip | Replaces a file with its compressed version, appending a .gz suffix. | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ gzip -v poem.txt
poem.txt:     54.8% -- replaced with poem.txt.gz
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$
``` |
| 17 | ln | A utility that allows you to create hard links or symbolic (soft) links to existing files. | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ ln poem.txt tmp
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ ls-l
-bash: ls-l: command not found
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ ls -l
total 68
``` |
| 18 | mount | Allows you to splice a device's file system into the root hierarchy. | Command not found so was not able to create an example |

| 19 | od | Displays the contents of fileName in a form specified by one of many options. Ex -a Interpret bytes as characters and print as ACSII names | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ od ~/public/Homeworks/poem.txt
0000000 044127 024117 024461 020040 020040 020040 020040 020040
0000020 020040 020040 020040 020040 020040 020040 020040 020040
0000040 071525 071145 041440 066557 060555 062156 020163 020040
0000060 020040 020040 020040 020040 020040 020040 020040 020040
0000100 020040 020040 020040 053440 047510 030450 005051 005012
0000120 047012 046501 005105 020040 020040 020040 073440 067550
0000140 026440 071440 067550 020167 064167 020157 071551 066040
0000160 063557 062547 020144 067157 005012 054523 047516 051520
0000200 051511 020012 020040 020040 020040 064167 020157 047533
0000220 052120 047511 056516 027056 020056 020133 044506 042514
0000240 076040 040440 043522 020061 051101 031107 056440 005012
``` |
| 20 | restore | Allows you to restore a set of files from a previous dump file. | Command not found so was not able to create an example |
| 21 | sed | Edits an input stream according to a script that contains editing commands | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ sed 1,5d hw3_8.txt
Line 6
Line 7
Line 8
Line 9
Line 10
Line 11
Line 12
``` |
| 22 | sort | Sorts a file in ascending or descending order on the basis of one or more sort fields | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ sort -r -t: +1 -2 samplecolon.txt
Ocean's: 13: Third: Movie
Ocean's: 12: Second: Movie
Ocean's: 11: First: Movie
``` |
| 23 | su | Creates a temporary shell with userName's real and effective user and group IDs | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ su -c ls jrogers75
Password:
at.csh          float.crypt          hw3_ch3_2.txt      sortsample.txt
awktest8.txt    float.txt            hw3_ch3.txt        test
backup          h1.awk               nohup.out          tmp
backup1         h2.awk               poem.cpy           ultest.txt
float           homework_instructions.txt  poem.txt
float.cpy       hw3_8.txt            samplecolon.txt
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$
``` |
| 24 | tar | Allows you to save directory structures to a single back up volume; specifically designed to save files to tape so it archives at the end of the storage medium; not usable for large back ups; allows you to create and access special tar-format | ```
[jrogers75@gsuad.gsu.edu@snowball ~]$ tar cvf shfiles.tar shfiles
shfiles/
shfiles/simple_copy.sh
shfiles/checkError_copy.sh
``` |

		archive files.	
| 25 | time | Command to be used to report the execution time of any UNIX command specified by the command-line. | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ time ls *.txt
awktest8.txt              hw3_8.txt       poem.txt
float.txt                 hw3_ch3_2.txt   samplecolon.txt
homework_instructions.txt hw3_ch3.txt     sortsample.txt

real    0m0.003s
user    0m0.002s
sys     0m0.002s
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$
``` |
| 26 | tr | Maps all of the characters in its standard input from the character set string1 to the character set string2; can change from all lowercase to uppercase, etc. | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ cat sortsample.txt
Jamie December 11
Chuck November 26
Xander May 26
Dakota January 23

[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ tr a-z A-Z < sortsample.txt
JAMIE DECEMBER 11
CHUCK NOVEMBER 26
XANDER MAY 26
DAKOTA JANUARY 23
``` |
| 27 | ul | Transforms underline characters in its input so that they will be displayed correctly on the specified terminal. | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ echo $'hello W\b_o\b_r\b_l\b_d\b_
!\b_' | ul
hello World!
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$
``` |
| 28 | umount | Unmounts a previously mounted file system. | Command not found so was not able to create an example |
| 29 | uncompress | Reverses the effect of compress, recreates the original file from its compressed version | Command not found so was not able to create an example |

| 30 | uniq | Filters out duplicate adjacent lines; displays its input file with all adjacent repeated lines collapsed to a single occurrence of the repeated line | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ cat hw3_ch3.txt
Jamie Lopez
Jamie Lopez
Chuck Lopez
Chuck Lopez
Chuck Lopez
Dakota Lopez
Dakota Lopez
Dakota Lopez
Xander Lopez
Xander Lopez
Lopez Family
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ uniq hw3_ch3.txt
Jamie Lopez
Chuck Lopez
Dakota Lopez
Xander Lopez
Lopez Family
``` |
|---|---|---|---|
| 31 | whoami | Displays the name of the owner of a shell | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ whoami
jrogers75@gsuad.gsu.edu
``` |
| 32 | tty | Displays the pathname of your terminal; returns 0 if its standard input os a terminal; otherwise, it returns 1. | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ tty
/dev/pts/11
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$
``` |
| 33 | loan | Prints a table, given a loan amount, an interest rate, and a payment to be made each month. | Command not found so was not able to create an example |

Chapter 4 The UNIX Shells

Index	Command	Usage	Example

1	chsh	Allows you to change your default login shell; Prompts for full pathname of new shell, which is then used as your shell for subsequent logins.	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ chsh`
			`Changing shell for jrogers75@gsuad.gsu.edu.`
			`New shell [/bin/bash]:`

2	echo	Built-in shell command that displays all of its arguments to standard output. By default, it appends a newline to the output.	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ echo Hello, World!`
			`Hello, World!`
			`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ echo 2+2`
			`2+2`
			`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ echo Homework 3 due Friday`
			`Homework 3 due Friday`

3	kill	Sends the signal with a signal ID code to the list of numbered processes; By default, sends a TERM message which causes the receiving processes to terminate/	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ kill 3446` `[1]+  Terminated              ( sleep 600; echo done )`

4	nohup	Executes command and makes it immune to the hangup and terminate signals	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ nohup sleep 10000 &`
			`[1] 2651`
			`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ nohup: ignoring input and appendi`
			`ng output to 'nohup.out'`

| 5 | ps | Allows you to monitor the status of processes; generates a list of process status information | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ ps
  PID TTY          TIME CMD
  367 pts/6    00:00:00 bash
 1539 pts/6    00:00:00 ps
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ ps -efl
F S UID        PID  PPID  C PRI  NI ADDR SZ WCHAN  STIME TTY          TIME CMD
4 S root         1     0  0  80   0 - 48550 ep_pol Jan11 ?        00:13:53 /usr
1 S root         2     0  0  80   0 -     0 kthrea Jan11 ?        00:00:04 [kth
1 S root         4     2  0  60 -20 -     0 worker Jan11 ?        00:00:00 [kwo
1 S root         6     2  0  80   0 -     0 smpboo Jan11 ?        00:00:08 [kso
1 S root         7     2  0 -40   - -     0 smpboo Jan11 ?        00:00:02 [mig
1 S root         8     2  0  80   0 -     0 rcu_gp Jan11 ?        00:00:00 [rcu
``` |
| 6 | sleep | Sleeps for the specified number of seconds and then terminates | ```
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ (sleep 10; echo done) &
[1] 2128
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ ps
  PID TTY          TIME CMD
  367 pts/6    00:00:00 bash
 2128 pts/6    00:00:00 bash
 2129 pts/6    00:00:00 sleep
 2136 pts/6    00:00:00 ps
[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ done
``` |

PART III: 30pts

Chapter 5 The Bourne Shell

Index	Command	Usage	Example

1	expr	Evaluates the expression and sends the result to the standard output.	`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ expr \( 2 + 6 \) \* 5`
			`40`
			`[jrogers75@gsuad.gsu.edu@snowball Homeworks]$ `

2	test	Returns a zero exit code if the expression evaluates to true; Otherwise, it returns a nonzero exit status.	`[jrogers75@gsuad.gsu.edu@snowball ~]$ test 25 -lt 50 && echo "Yes" || echo "No"`
			`Yes`
			`[jrogers75@gsuad.gsu.edu@snowball ~]$ test 55 -lt 50 && echo "Yes" || echo "No"`
			
			`No`