

CSc 3320: Systems Programming

Spring 2021

Homework

3: Total points 100

Submission instructions:

1. Create a Google doc for each homework assignment submission.
2. Start your responses from page 2 of the document and copy these instructions on page 1.
3. Fill in your name, campus ID and panther # in the fields provided. If this information is missing in your document TWO POINTS WILL BE DEDUCTED per submission.
4. Keep this page 1 intact on all your submissions. If this *submissions instructions* page is missing in your submission TWO POINTS WILL BE DEDUCTED per submission.
5. Each homework will typically have 2-3 PARTS, where each PART focuses on specific topic(s).
6. Start your responses to each PART on a new page.
7. If you are being asked to write code copy the code into a separate txt file and submit that as well.
8. If you are being asked to test code or run specific commands or scripts, provide the evidence of your outputs through a screenshot and copy the same into the document.
9. Upon completion, download a .PDF version of the document and submit the same.

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Campus ID: tmichaels1

Panther #: 002430918

10 pts for the neatness factor of your presentation.

PART 1: 30pts

1. For each command tryout at least one example provided in **Chapter 3** of the Unix textbook. Feel free to use your own example. Show the screenshot for each command's output. Present your output in a tabular form with column 1 as index (1,2,3..), second column as the command, third as the usage, fourth as the screenshot of the output. You can just show a small snapshot for the output -- we do not need the entire screen's image.

Part II : 30pts

2. For each command tryout at least one example provided in **Chapter 4** of the Unix textbook. Feel free to use your own example. Show the screenshot for each command's output. Present your output in a tabular form with column 1 as index (1,2,3..), second column as the command, third as the usage, fourth as the screenshot of the output. You can just show a small snapshot for the output -- we do not need the entire screen's image.

Part III : 30pts

3. For each command tryout at least one example provided in **Chapter 5** of the Unix textbook. Feel free to use your own example. Show the screenshot for each command's output. Present your output in a tabular form with column 1 as index (1,2,3..), second column as the command, third as the usage, fourth as the screenshot of the output. You can just show a small snapshot for the output -- we do not need the entire screen's image.

PART 1: 30pts

	Utility	Usage	Screenshot
1	at	Schedule a one time commands or script	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ at now + 1 min at> echo 'Hello' > /dev/pts/41 at> <EOT> job 19 at Thu Feb 18 01:19:00 2021 [tmichaels1@gsuad.gsu.edu@snowball hw2]\$ Hello [tmichaels1@gsuad.gsu.edu@snowball hw2]\$ █</pre>
2	awk	Text processing that scans lines of an inputs and performs actions on every matching like based on defined criteria	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ awk '{ print \$1 }' hw2examples.txt Hello! This My This here here</pre>
3	biff	Enable and disable instant mail notifications (not installed)	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ biff bash: biff: command not found</pre>
4	cmp	Compares two files for equality, if they're exactly the same it returns 0 and displays nothing and if they're different returns 1 and displays first occurrence of deviation	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ cmp hw2examples.txt hw2examples_copy.txt [tmichaels1@gsuad.gsu.edu@snowball hw2]\$ cmp hw2examples.txt hw2examples_edited.txt hw2examples.txt hw2examples_edited.txt differ: byte 107, line 5 [tmichaels1@gsuad.gsu.edu@snowball hw2]\$ █</pre>
5	compress	Replaces file with a compressed version and appends a .Z to the end of the file name (I can read the man page for this utility but when I try to use it I get a command not found error	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ man compress [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ compress -v hw3examples.txt bash: compress: command not found</pre>
6	cpio	Allows you to create archive files from files or directories in a single backup volume; useful for small quantities of data	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ ls *.txt cpio -ov > backup hw2examples_copy.txt hw2examples_edited.txt hw2examples.txt 2 blocks</pre>
7	crontab	Creates a schedule for which a series of jobs are to be executed periodically	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ crontab crontab.cron [tmichaels1@gsuad.gsu.edu@snowball hw2]\$ crontab -l 0 0 * * * echo "It is midnight"</pre>
8	crypt	Creates a key-encoded version of a text file (command cannot be found though I had no trouble reading the man page for it)	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ man crypt [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ crypt password123 < hw3examples_copy.txt > hw3examples_c opy.crypt bash: crypt: command not found</pre>
9	diff	Compares two files and displays the differences between them	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ diff hw2examples.txt hw2examples_edited.txt 4a5 > This line is different than the original file</pre>
10	dump	Creates a dumpFile from a specified file system as a way to perform a for of back up (dump doesn't seem to be installed on the server and since I do not have sudo privileges I am unable to install it)	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ dump 0 dumpFile /dev/rmt/0 /dev/da0 bash: dump: command not found</pre>

11	egrep	Search for a pattern using extended regular expressions	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ egrep -n '^T' hw2examples.txt 2:This is a test file for homework 2 4:This is the 4th line of this document</pre>
12	fgrep	Search for a pattern using a fixed string	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ fgrep -n 'Tracy Michaels' hw2examples.txt 3:My name is Tracy Michaels</pre>
13	find	Recursively searches through file path to find files that match a pattern for either the name, permission flags, file type, ...etc depending on options passed	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ find -name '*.txt' ./hw2examples.txt ./hw2examples_copy.txt ./hw2examples_edited.txt</pre>
14	grep	Search for a pattern using basic regex	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ grep 'H.*' hw2examples.txt Hello!</pre>
15	gunzip	Uncompresses a file that was created with either gzip or compress utilities	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ gunzip hw3examples_copy.txt.gz [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ ll total 52 -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 1024 Feb 17 23:54 backup -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 32 Feb 18 00:34 crontab.cron -rwxr-xr-x 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 38 Feb 18 01:14 Hello.bash -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 175 Feb 18 01:35 hw3examples_copy.txt -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 222 Feb 18 01:35 hw3examples_edited.txt</pre>
16	gzip	Replaces file with its compressed version and appends a .gz to the end of the filename	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ gzip hw3examples_copy.txt [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ ll total 52 -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 1024 Feb 17 23:54 backup -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 32 Feb 18 00:34 crontab.cron -rwxr-xr-x 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 38 Feb 18 01:14 Hello.bash -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 152 Feb 18 01:35 hw3examples_copy.txt.gz -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 222 Feb 18 01:35 hw3examples_edited.txt</pre>
17	ln	Creates hard and symbolic links between files	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ ln hw2examples.txt hw2examples_linked.txt [tmichaels1@gsuad.gsu.edu@snowball hw2]\$ ll total 52 -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 1024 Feb 17 23:54 backup -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 32 Feb 18 00:34 crontab.cron -rwxr-xr-x 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 38 Feb 18 01:14 Hello.bash -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 175 Feb 17 23:37 hw2examples_copy.txt -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 222 Feb 17 23:40 hw2examples_edited.txt -rw-rw-r-- 2 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 175 Feb 17 23:33 hw2examples_linked.txt -rw-rw-r-- 2 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 175 Feb 17 23:33 hw2examples_linked.txt -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 10240 Feb 18 00:01 hw2.tar -rw-rw-r-- 1 tmichaels1@gsuad.gsu.edu tmichaels1@gsuad.gsu.edu 10240 Feb 18 00:00 v</pre>
18	mount	Allows you to mount a file system. Passing no arguments displays list of currently mounted devices.	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ mount sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel) proc on /proc type proc (rw,nosuid,nodev,noexec,relatime) devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=3992588k,nr_inodes=998147,mode=755) securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime) tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,seclabel) devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,seclabel,gid=5,mode=620,ptmxmode=000) tmpfs on /run type tmpfs (rw,nosuid,nodev,seclabel,mode=755) tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,seclabel,mode=755) cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,xattr,release_agent=/usr/lib/systemd/systemd-cgroups-agent,name=systemd) pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime) cgroup on /sys/fs/cgroup/cpu,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,cgroup=/sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,n</pre>

19	od	Stands for Octal Dump, allows you to look at the raw file contents	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ od hw3examples.txt 0000000 062510 066154 020557 052012 064550 020163 071551 060440 0000020 072040 071545 020164 064546 062554 063040 071157 064040 0000040 066557 073545 071157 020153 005063 074515 067040 066541 0000060 020145 071551 052040 060562 074543 046440 061551 060550 0000100 066145 005163 064124 071551 064440 020163 064164 020145 0000120 072064 020150 064554 062556 067440 020146 064164 071551 0000140 062040 061557 066565 067145 005164 062550 062562 064440 0000160 020163 067555 062562 072040 074145 020164 067564 063040 0000200 066151 020154 070165 071440 060560 062543 064012 071145 0000220 020145 071551 066440 071157 020145 062564 072170 072040 0000240 020157 064546 066154 072440 020160 070163 061541 005145 0000260 [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ od -a hw3examples.txt 0000000 H e l l o ! n l T h i s s p i s s p a 0000020 s p t e s t s p f i l e s p f o r s p h 0000040 o m e w o r k s p 3 n l M y s p n a m 0000060 e s p i s s p T r a c y s p M i c h a 0000100 e l s n l T h i s s p i s s p t h e s p 0000120 4 t h s p l i n e s p o f s p t h i s 0000140 s p d o c u m e n t n l h e r e s p i 0000160 s s p m o r e s p t e x t s p t o s p f 0000200 i l l s p u p s p s p a c e n l h e r 0000220 e s p i s s p m o r e s p t e x t s p t 0000240 o s p f i l l s p u p s p s p a c e n l 0000260</pre>
20	perl	Stands for Practical Extraction Report Language. Originally used for scanning files and extracting information, but has grown into a general-purpose programming language	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ echo 'print "hello\n";' perl hello</pre>
21	restore	Restore a set of files from a previous dump file. (as I was unable to create a dump file I am unable to use this utility as well)	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ restore -x f /dev/rmt0 *.txt bash: restore: command not found</pre>
22	sed	This utility is a stream editor which scans one or more files and performs an editing action on all of the lines that match a regex pattern	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ sed 's/Tracy Michaels/Michaels, Tracy/g' hw3examples.txt Hello! This is a test file for homework 3 My name is Michaels, Tracy This is the 4th line of this document here is more text to fill up space here is more text to fill up space [tmichaels1@gsuad.gsu.edu@snowball hw3]\$</pre>
23	sort	Sorts lines in input in ascending or descending order based on options passed to it	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ sort hw2examples.txt Hello! here is more text to fill up space here is more text to fill up space My name is Tracy Michaels This is a test file for homework 2 This is the 4th line of this document</pre>
24	su	Stands for substitute user. Allows you to run commands with a substitute user and group id, with no arguments it defaults to root	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ su tmichaels1 Password: [tmichaels1@gsuad.gsu.edu@snowball hw2]\$ exit [tmichaels1@gsuad.gsu.edu@snowball hw2]\$</pre>
25	tar	Creates and accesses tar archive files	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ tar -cf hw2.tar *.txt [tmichaels1@gsuad.gsu.edu@snowball hw2]\$ tar -tvf hw2.tar -rw-rw-r-- tmichaels1@gsuad.gsu.edu/tmichaels1@gsuad.gsu.edu 175 2021-02-17 23:37 hw2examples_cop y.txt -rw-rw-r-- tmichaels1@gsuad.gsu.edu/tmichaels1@gsuad.gsu.edu 222 2021-02-17 23:40 hw2examples_edi ted.txt -rw-rw-r-- tmichaels1@gsuad.gsu.edu/tmichaels1@gsuad.gsu.edu 175 2021-02-17 23:33 hw2examples.txt</pre>

26	time	Reports the execution time of any command	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ time sort hw3examples.txt Hello! here is more text to fill up space here is more text to fill up space My name is Tracy Michaels This is a test file for homework 3 This is the 4th line of this document real 0m0.003s user 0m0.001s sys 0m0.002s</pre>
27	tr	Maps the character set of the input to that of the output	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ rev alph=zyxwvutsrqonmlkjihgfedcba [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ tr a-z "\$rev_alph" This is the input and the next line is the output where all characters are reversed Tsrq rg fsv rljef zlw fsv lvbf nrlv rg fsv kejfef csvhv znn xszhzxfvhg zhv hvdvhgww</pre>
28	tty	Identifies the name of your terminal and displays pathname	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ tty /dev/pts/41</pre>
29	ul	Removes underlining from characters so it displays properly in the terminal	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ man who ul -tdumb > man.txt [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ head man.txt WHO(1) User Commands WHO(1) NAME who - show who is logged on SYNOPSIS who [OPTION]... [FILE ARG1 ARG2]</pre>
30	umount	Unmounts a previously mounted file system (unable to perform because of permissions)	
31	uncompress	Uncompress files compressed using the compress command (wasn't able to use the compress command)	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ man uncompress [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ uncompress bash: uncompress: command not found</pre>
32	uniq	Displays contents of file with all repeated lines collapsed into one line	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ uniq -c hw2examples.txt 1 Hello! 1 This is a test file for homework 2 1 My name is Tracy Michaels 1 This is the 4th line of this document 2 here is more text to fill up space</pre>
33	whoami	Displays users name	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw2]\$ whoami tmichaels1@gsuad.gsu.edu</pre>

Part II : 30pts

	Utility	Usage	Screenshot
1	chsh	Allows you to change the default login shell	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ chsh Changing shell for tmichaels1@gsuad.gsu.edu. New shell [/bin/bash]: /bin/bash chsh: Shell not changed.</pre>
2	echo	Displays arguments of this utility to the standard output	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ echo 'hello' hello</pre>
3	kill	Terminates a process	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ ps PID TTY TIME CMD 7668 pts/41 00:00:00 bash 18392 pts/41 00:00:00 ps 29541 pts/41 00:00:00 at 30043 pts/41 00:00:00 at [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ kill -9 29541 [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ ps PID TTY TIME CMD 7668 pts/41 00:00:00 bash 18423 pts/41 00:00:00 ps 30043 pts/41 00:00:00 at [2]- Killed at now + 1 min (wd: ~/hw2) (wd now: ~/hw3)</pre>
4	nohup	Makes commands immune to hangup and terminate signals	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ nohup echo 'hello' nohup: ignoring input and appending output to 'nohup.out' [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ cat nohup.out hello</pre>
5	ps	Lists process status information within current shell	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ ps PID TTY TIME CMD 7668 pts/41 00:00:00 bash 16538 pts/41 00:00:00 ps 29175 pts/41 00:00:00 at 29541 pts/41 00:00:00 at 30043 pts/41 00:00:00 at</pre>
6	sleep	Causes shell to sleep for a specified number of seconds	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ date; sleep 10; date Thu Feb 18 03:16:05 EST 2021 Thu Feb 18 03:16:15 EST 2021</pre>
7	tee	Copies its standard input to the specified files and to its standard output	<pre>[tmichaels1@gsuad.gsu.edu@snowball hw3]\$ who tee who.capture sort btogola1@gsuad.gsu.edu pts/11 2021-02-17 20:37 (99-50-133-188.lightspeed.tukrga.sbcglobal.net) smattey1@gsuad.gsu.edu pts/22 2021-02-17 23:45 (71-140-150-140.lightspeed.tukrga.sbcglobal.net) sndemera1@gsuad.gsu.edu pts/1 2021-02-18 00:14 (c-73-82-199-113.hsd1.ga.comcast.net) [tmichaels1@gsuad.gsu.edu@snowball hw3]\$ cat who.capture sndemera1@gsuad.gsu.edu pts/1 2021-02-18 00:14 (c-73-82-199-113.hsd1.ga.comcast.net) btogola1@gsuad.gsu.edu pts/11 2021-02-17 20:37 (99-50-133-188.lightspeed.tukrga.sbcglobal.net) smattey1@gsuad.gsu.edu pts/22 2021-02-17 23:45 (71-140-150-140.lightspeed.tukrga.sbcglobal.net)</pre>

Part III : 30pts

	Utility	Usage	Screenshot
1	env	Assigns values to specified environment variables	
2	expr	Evaluates an expression and sends the result to the standard output	
3	test	Returns a 0 exit code if expression evaluates to true and a nonzero exit status if it evaluates to false	