CSE 4502: Operating System Lab

Lab 2: Intermediate Linux Commands

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1. List of Commands & Syntax (30 Commands)

The following commands are grouped by the assignment parts and reflect the exact syntax used for execution.

Part 1: Preparation, Help, and System Information (6 Commands)

No.	Command	Exact Syntax Used
1	mkdir	mkdir lab2 / mkdir text_data
2	cd	cd lab2
3	man	man tar
4	history	history 10
5	stat	stat text_data
6	uname	uname -a

Part 2: Text Processing and Filters (8 Commands)

Note: The commands below assume successful creation of fileA.txt, fileB.txt, and the combined fileC.txt.

No.	Command	Exact Syntax Used
7	wc	wc -l fileC.txt
8	sort	sort fileC.txt
9	uniq	`sort fileC.txt
10	diff	diff fileA.txt fileB.txt

11	cut	cut -c 1,3,5 fileA.txt
12	tr	tr '[:upper:]' '[:lower:]' < fileA.txt > ofileA.txt
13	sed	sed "2i\cow" fileA.txt
14	more	more fileC.txt

Part 3: Archiving, Compression, and Linking (6 Commands)

No.	Command	Exact Syntax Used
15	tar -czf	tar -czvf text_data_archive.tar.gz text_data
16	tar -xf	tar -xvf ../text_data_archive.tar.gz
17	gzip	gzip fileA.txt
18	gunzip	gunzip fileA.txt.gz
19	ln -s	ln -s ../text_data/fileA.txt fileALink
20	ln	ln ../text_data/fileA.txt fileALinkH.txt

Part 4: System Status and Process Control (6 Commands)

No.	Command	Exact Syntax Used
21	df	df -h
22	free	free
23	top	top
24	ps	ps

| 25 | kill | sleep 60 & followed by kill $PID |
| 26 | ip addr | ip addr |

Part 5: I/O Control, Aliases, and Utilities (4 Commands)

No.	Command	Exact Syntax Used
27	alias	`alias lg="ls
28	>>	echo "message to append" >> fileC.txt
29	`	` (Pipe)
30	date / cal	date && cal

2. Execution Proof

(This section is reserved for the combined screenshot as required by the assignment.)

Screenshot Placement:
[Place the combined screenshot showing the execution of the commands here when generating the final PDF.]

```
prince0203@WLMS-F15-PRINCE:~/lab2$ echo -e "cat\ndog\nhuman\ninsect" > fileA
.txt
prince0203@WLMS-F15-PRINCE:~/lab2$ cat fileA.txt
cat
dog
human
insect
prince0203@WLMS-F15-PRINCE:~/lab2$ echo -e "taco\nnacho\nchowmein\nsushi" >
fileB.txt
prince0203@WLMS-F15-PRINCE:~/lab2$ cat fileA.txt fileB.txt > fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2$ sort fileC.txt
cat
chowmein
dog
human
insect
nacho
sushi
taco
prince0203@WLMS-F15-PRINCE:~/lab2$ wc -l fileC.txt
8 fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2$ echo -e "\nhuman" >> fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2$ cat fileC.txt
cat
dog
human
insect
taco
nacho
chowmein
sushi

human
prince0203@WLMS-F15-PRINCE:~/lab2$ sort fileC.txt

cat
chowmein
dog
human
human
insect
nacho
sushi
taco
prince0203@WLMS-F15-PRINCE:~/lab2$ sort fileC.txt | uniq

cat
chowmein
dog
human
insect
nacho
sushi
taco
prince0203@WLMS-F15-PRINCE:~/lab2$ ls
fileA.txt  fileB.txt  fileC.txt  my_file.txt  text_data
prince0203@WLMS-F15-PRINCE:~/lab2$ mv fileA.txt fileB.txt fileC.txt text_data/
prince0203@WLMS-F15-PRINCE:~/lab2$ ls
my_file.txt  text_data
prince0203@WLMS-F15-PRINCE:~/lab2$ cd text_data
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ ls
fileA.txt  fileB.txt  fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ ls
```

```
prince0203@WLMS-F15-PRINCE:~/lab2$ tar -czvf text_data_archive.tar.gz text_data/
text_data/
text_data/fileB.txt
text_data/fileA.txt
text_data/fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2$ ls
my_file.txt  text_data  text_data_archive.tar.gz
prince0203@WLMS-F15-PRINCE:~/lab2$ mkdir extracted_data
prince0203@WLMS-F15-PRINCE:~/lab2$ cd extracted_data
prince0203@WLMS-F15-PRINCE:~/lab2/extracted_data$ tar -xvzf /../text_data_archive.tar.gz
tar (child): /../text_data_archive.tar.gz: Cannot open: No such file or directory
tar (child): Error is not recoverable: exiting now
tar: Child returned status 2
tar: Error is not recoverable: exiting now
prince0203@WLMS-F15-PRINCE:~/lab2/extracted_data$ tar -xvzf ../text_data_arc
hive.tar.gz
text_data/
text_data/fileB.txt
text_data/fileA.txt
text_data/fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2/extracted_data$ ls
text_data
prince0203@WLMS-F15-PRINCE:~/lab2/extracted_data$ cd ..
prince0203@WLMS-F15-PRINCE:~/lab2$ mkdir link
prince0203@WLMS-F15-PRINCE:~/lab2$ cd link
prince0203@WLMS-F15-PRINCE:~/lab2/link$ cd ..
prince0203@WLMS-F15-PRINCE:~/lab2$ ls
extracted_data  link  my_file.txt  text_data  text_data_archive.tar.gz
prince0203@WLMS-F15-PRINCE:~/lab2$ cd text_data
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ ls
fileA.txt  fileB.txt  fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ cd ..
prince0203@WLMS-F15-PRINCE:~/lab2$ cd lin
-bash: cd: lin: No such file or directory
prince0203@WLMS-F15-PRINCE:~/lab2$ cd link
prince0203@WLMS-F15-PRINCE:~/lab2/link$ ln -s ../text_data/fileA.txt fileALink
prince0203@WLMS-F15-PRINCE:~/lab2/link$ ls
fileALink
prince0203@WLMS-F15-PRINCE:~/lab2/link$ ln  ../text_data/fileA.txt fileALink
(Hard).txt
-bash: syntax error near unexpected token `('
prince0203@WLMS-F15-PRINCE:~/lab2/link$ ln  ../text_data/fileA.txt fileALinkH.txt
prince0203@WLMS-F15-PRINCE:~/lab2/link$ ls
fileALink  fileALinkH.txt
prince0203@WLMS-F15-PRINCE:~/lab2/link$ ls -l fileALink
lrwxrwxrwx 1 prince0203 prince0203 22 Nov 28 04:58 fileALink -> ../text_data/fileA.txt
prince0203@WLMS-F15-PRINCE:~/lab2/link$ ls -l fileALinkH.txt
-rw-r--r-- 2 prince0203 prince0203 21 Nov 28 04:21 fileALinkH.txt
prince0203@WLMS-F15-PRINCE:~/lab2/link$ cd ..
prince0203@WLMS-F15-PRINCE:~/lab2$ df -h
Filesystem      Size  Used Avail Use% Mounted on
none            3.8G     0  3.8G   0% /usr/lib/modules/6.6.87.2-microsoft-standard-WSL2
none            3.8G  4.0K  3.8G   1% /mnt/wsl
drivers         171G  161G  9.9G  95% /usr/lib/wsl/drivers
/dev/sdd       1007G  2.2G  954G   1% /
none            3.8G  120K  3.8G   1% /mnt/wslg
none            3.8G     0  3.8G   0% /usr/lib/wsl/lib
rootfs          3.8G  2.7M  3.8G   1% /init
none            3.8G  544K  3.8G   1% /run
none            3.8G     0  3.8G   0% /run/lock
none            3.8G     0  3.8G   0% /run/shm
none            3.8G   76K  3.8G   1% /mnt/wslg/versions.txt
none            3.8G   76K  3.8G   1% /mnt/wslg/doc
C:\             171G  161G  9.9G  95% /mnt/c
```

```
prince0203@WLMS-F15-PRINCE:~/lab2$ free
              total        used        free      shared  buff/cache   available
Mem:        7938236      532612     7227424        3800      334732     7405624
Swap:       2097152           0     2097152
prince0203@WLMS-F15-PRINCE:~/lab2$ top
top - 18:52:30 up  5:01,  1 user,  load average: 0.00, 0.00, 0.00
Tasks:  24 total,   1 running,  23 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.0 us,  0.0 sy,  0.0 ni,100.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.
MiB Mem :   7752.2 total,   7034.8 free,    538.9 used,    331.2 buff/cache
MiB Swap:   2048.0 total,   2048.0 free,      0.0 used.   7213.3 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+
      1 root      20   0   21828  12492   9420 S   0.0   0.2   0:02.12
      2 root      20   0    3072   1664   1664 S   0.0   0.0   0:00.01
      9 root      20   0    3088   1920   1920 S   0.0   0.0   0:00.00
     58 root      19  -1   66816  14920  14024 S   0.0   0.2   0:03.01
    112 root      20   0   25268   6400   4864 S   0.0   0.1   0:07.55
    174 systemd+  20   0   21452  12800  10624 S   0.0   0.2   0:00.37
    183 systemd+  20   0   91020   7680   6784 S   0.0   0.1   0:00.73
    195 root      20   0    4236   2432   2304 S   0.0   0.0   0:00.19
    196 message+  20   0    9636   4992   4480 S   0.0   0.1   0:00.70
    207 root      20   0   17960   8448   7552 S   0.0   0.1   0:00.34
    209 root      20   0 1756096  14208  10624 S   0.0   0.2   0:00.90
    224 root      20   0    3160   1920   1792 S   0.0   0.0   0:00.19
    228 syslog    20   0  222508   5632   4352 S   0.0   0.1   0:00.36
    230 root      20   0    3116   1792   1664 S   0.0   0.0   0:00.00
    231 root      20   0  107020  22400  13184 S   0.0   0.3   0:00.14
    316 root      20   0    3088    896    896 S   0.0   0.0   0:00.00
    318 root      20   0    3088   1152   1024 S   0.0   0.0   0:00.33
    322 prince0+  20   0    6068   5120   3456 S   0.0   0.1   0:00.36
    323 root      20   0    6664   4224   3584 S   0.0   0.1   0:00.01
    370 prince0+  20   0   20316  11264   9216 S   0.0   0.1   0:00.39
    371 prince0+  20   0   21152   3520   1792 S   0.0   0.0   0:00.00
    393 prince0+  20   0    6072   4992   3456 S   0.0   0.1   0:00.01
   2451 polkitd   20   0  308164   7552   6784 S   0.0   0.1   0:00.38
   4823 prince0+  20   0    9292   5504   3328 R   0.0   0.1   0:00.04
```

```
prince0203@WLMS-F15-PRINCE:~/lab2$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet 10.255.255.254/32 brd 10.255.255.254 scope global lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:4e:05:ad brd ff:ff:ff:ff:ff:ff
    inet 172.28.126.253/20 brd 172.28.127.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe4e:5ad/64 scope link
       valid_lft forever preferred_lft forever
prince0203@WLMS-F15-PRINCE:~/lab2$ sleep 60 &
[1] 4825
prince0203@WLMS-F15-PRINCE:~/lab2$ process_id= $!
4825: command not found
prince0203@WLMS-F15-PRINCE:~/lab2$ process_id= 4825!
4825!: command not found
prince0203@WLMS-F15-PRINCE:~/lab2$ process_id= $4825!
825!: command not found
prince0203@WLMS-F15-PRINCE:~/lab2$ process_id= $4825
825: command not found
prince0203@WLMS-F15-PRINCE:~/lab2$ process_id= $4825
825: command not found
prince0203@WLMS-F15-PRINCE:~/lab2$ process_id= $ 4825
$: command not found
[1]+  Done                    sleep 60
prince0203@WLMS-F15-PRINCE:~/lab2$ echo $ PID
$ PID
prince0203@WLMS-F15-PRINCE:~/lab2$ sleep 5 &
[1] 4896
prince0203@WLMS-F15-PRINCE:~/lab2$ PID= 4896
4896: command not found
[1]+  Done                    sleep 5
prince0203@WLMS-F15-PRINCE:~/lab2$ cat PID
cat: PID: No such file or directory
prince0203@WLMS-F15-PRINCE:~/lab2$ echo $!
4896
prince0203@WLMS-F15-PRINCE:~/lab2$ kill "$PID"
-bash: kill: `': not a pid or valid job spec
prince0203@WLMS-F15-PRINCE:~/lab2$ sleep 60 &
[1] 4907
prince0203@WLMS-F15-PRINCE:~/lab2$ PID= $!
4907: command not found
prince0203@WLMS-F15-PRINCE:~/lab2$ echo $!
4907
prince0203@WLMS-F15-PRINCE:~/lab2$ PID=$!
prince0203@WLMS-F15-PRINCE:~/lab2$ kill "$PID"
-bash: kill: (4907) - No such process
[1]+  Done                    sleep 60
prince0203@WLMS-F15-PRINCE:~/lab2$ sleep 60 &
[1] 4917
prince0203@WLMS-F15-PRINCE:~/lab2$ PID=$!
prince0203@WLMS-F15-PRINCE:~/lab2$ kill "$PID"
prince0203@WLMS-F15-PRINCE:~/lab2$ PS
PS: command not found
[1]+  Terminated              sleep 60
prince0203@WLMS-F15-PRINCE:~/lab2$ ps
    PID TTY          TIME CMD
    322 pts/0    00:00:00 bash
   4931 pts/0    00:00:00 ps
```

```
  4931 pts/0    00:00:00 ps
prince0203@WLMS-F15-PRINCE:~/lab2$ ls -l | grep "text"
drwxr-xr-x 2 prince0203 prince0203 4096 Nov 28 04:38 text_data
-rw-r--r-- 1 prince0203 prince0203  260 Nov 28 04:40 text_data_archive.tar.gz
prince0203@WLMS-F15-PRINCE:~/lab2$ echo "all that is left is to give you my life, jack" >>
-bash: syntax error near unexpected token `newline'
prince0203@WLMS-F15-PRINCE:~/lab2$ ls
extracted_data  link  my_file.txt  text_data  text_data_archive.tar.gz
prince0203@WLMS-F15-PRINCE:~/lab2$ cd text_data
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ ;s
-bash: syntax error near unexpected token `;'
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ ls
fileA.txt  fileB.txt  fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ echo "all that is left is to give you my life, jack" >> fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias ll= "ls -la"
-bash: alias: ls -la: not found
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias ll= 'ls -la'
-bash: alias: ls -la: not found
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias ll= 'ls -l'
-bash: alias: ls -l: not found
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias
alias alert='notify-send --urgency=low -i "$([ $? = 0 ] && echo terminal || echo error)" "$(history|tail -n1|sed -e '\''s/^\s*[0-9]\+\s*//;s/[;&|]\s*alert$//'\'')"'
alias egrep='egrep --color=auto'
alias fgrep='fgrep --color=auto'
alias grep='grep --color=auto'
alias l='ls -CF'
alias la='ls -A'
alias ll=''
alias ls='ls --color=auto'
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias ll= 'ls
> ^C
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias ll "ls | grep 'file'"
alias ll=''
-bash: alias: ls | grep 'file': not found
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias
alias alert='notify-send --urgency=low -i "$([ $? = 0 ] && echo terminal || echo error)" "$(history|tail -n1|sed -e '\''s/^\s*[0-9]\+\s*//;s/[;&|]\s*alert$//'\'')"'
alias egrep='egrep --color=auto'
alias fgrep='fgrep --color=auto'
alias grep='grep --color=auto'
alias l='ls -CF'
alias la='ls -A'
alias ll=''
alias ls='ls --color=auto'
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias lg = "ls | grep 'file'"
-bash: alias: lg: not found
-bash: alias: =: not found
-bash: alias: ls | grep 'file': not found
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias
alias alert='notify-send --urgency=low -i "$([ $? = 0 ] && echo terminal || echo error)" "$(history|tail -n1|sed -e '\''s/^\s*[0-9]\+\s*//;s/[;&|]\s*alert$//'\'')"'
alias egrep='egrep --color=auto'
alias fgrep='fgrep --color=auto'
alias grep='grep --color=auto'
alias l='ls -CF'
alias la='ls -A'
alias ll=''
alias ls='ls --color=auto'
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias lla ="ls -la"
-bash: alias: lla: not found
-bash: alias: =ls -la: not found
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ ll
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ lg
lg: command not found
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias lg ="ls | grep 'file'"
-bash: alias: lg: not found
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ alias lg="ls | grep 'file'"
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ lg
fileA.txt
fileB.txt
fileC.txt
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ date cal
date: invalid date 'cal'
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ date
Fri Nov 28 19:58:09 +06 2025
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ cal
Command 'cal' not found, but can be installed with:
sudo apt install ncal
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ date && cal
Fri Nov 28 19:58:27 +06 2025
Command 'cal' not found, but can be installed with:
sudo apt install ncal
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ sudo apt install ncal
[sudo] password for prince0203:
Sorry, try again.
[sudo] password for prince0203:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  ncal
0 upgraded, 1 newly installed, 0 to remove and 90 not upgraded.
Need to get 21.0 kB of archives.
After this operation, 59.4 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/universe amd64 ncal amd64 12.1.8 [21.0 kB]
Fetched 21.0 kB in 1s (18.0 kB/s)
Selecting previously unselected package ncal.
(Reading database ... 46096 files and directories currently installed.)
Preparing to unpack .../archives/ncal_12.1.8_amd64.deb ...
Unpacking ncal (12.1.8) ...
Setting up ncal (12.1.8) ...
Processing triggers for man-db (2.12.0-4build2) ...
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ date & cal
[1] 5087
Fri Nov 28 19:59:21 +06 2025
    November 2025
Su Mo Tu We Th Fr Sa
                   1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30
[1]+  Done                    date
prince0203@WLMS-F15-PRINCE:~/lab2/text_data$ date && cal
Fri Nov 28 19:59:37 +06 2025
    November 2025
Su Mo Tu We Th Fr Sa
                   1
 2  3  4  5  6  7  8
 9 10 11 12 13 14 15
```