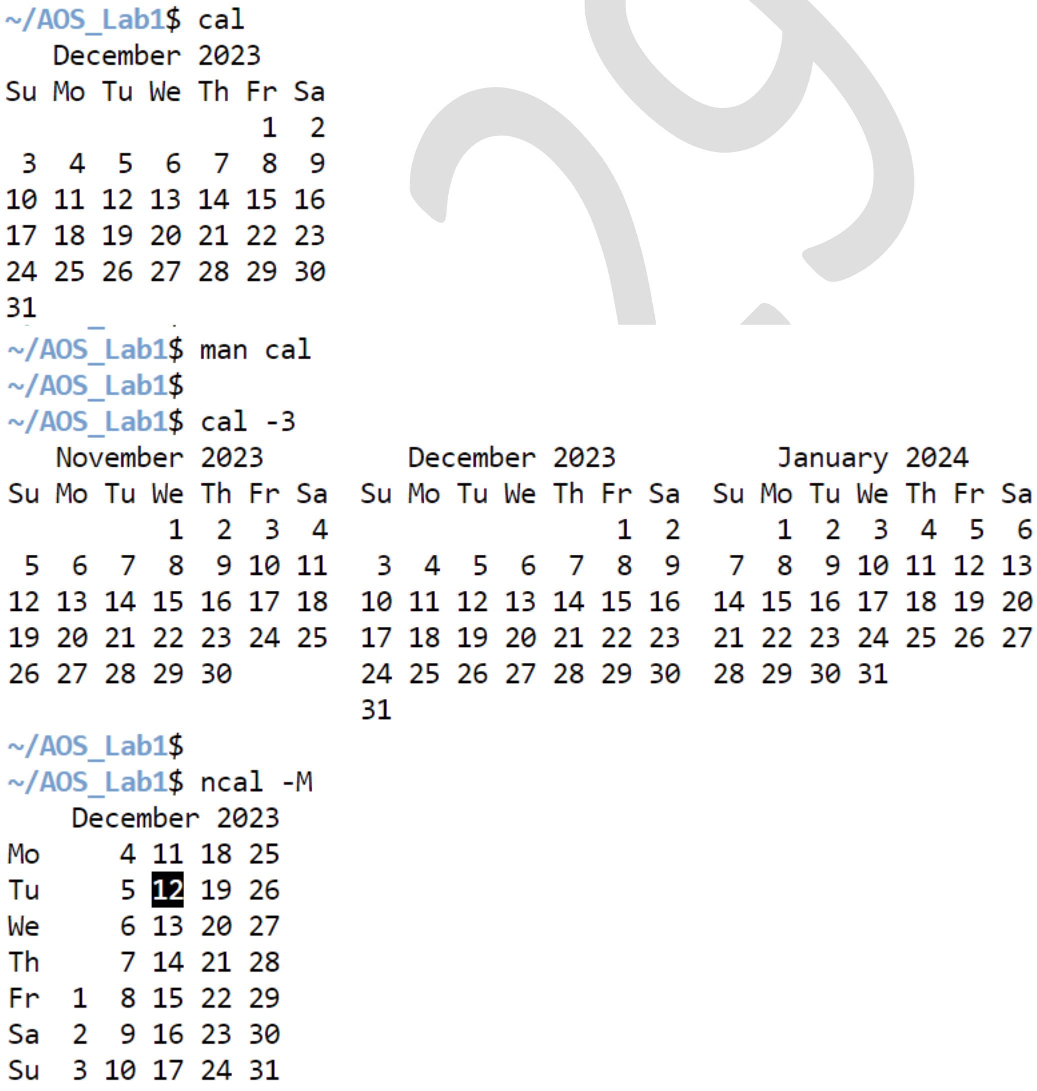
EXPERIMENT: 1

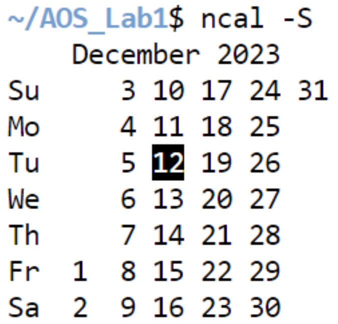
Aim: Study of UNIX commands with all their important options.

A. Information Management:

1. cal: **cal** command is a calendar command in Linux which is used to see the calendar of a specific month or a whole year.

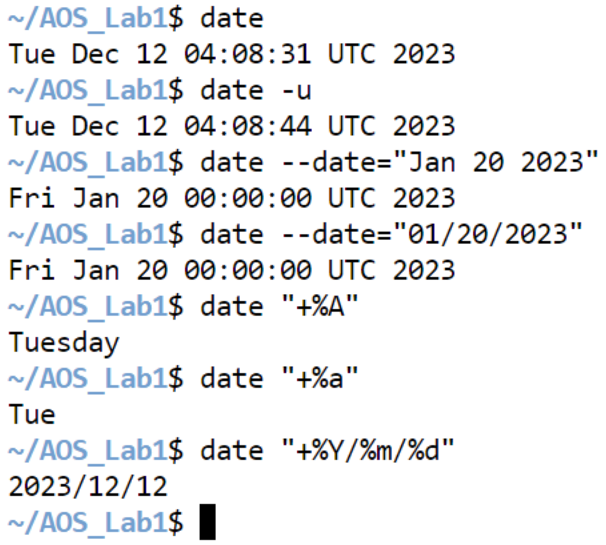


```
~/AOS_Lab1$ cal
   December 2023
Su Mo Tu We Th Fr Sa
                1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
~/AOS_Lab1$ man cal
~/AOS_Lab1$
~/AOS_Lab1$ cal -3
   November 2023         December 2023          January 2024
Su Mo Tu We Th Fr Sa  Su Mo Tu We Th Fr Sa  Su Mo Tu We Th Fr Sa
          1  2  3  4                  1  2      1  2  3  4  5  6
 5  6  7  8  9 10 11   3  4  5  6  7  8  9   7  8  9 10 11 12 13
12 13 14 15 16 17 18  10 11 12 13 14 15 16  14 15 16 17 18 19 20
19 20 21 22 23 24 25  17 18 19 20 21 22 23  21 22 23 24 25 26 27
26 27 28 29 30        24 25 26 27 28 29 30  28 29 30 31
                      31
~/AOS_Lab1$
~/AOS_Lab1$ ncal -M
    December 2023
Mo     4 11 18 25
Tu     5 12 19 26
We     6 13 20 27
Th     7 14 21 28
Fr  1  8 15 22 29
Sa  2  9 16 23 30
Su  3 10 17 24 31
```



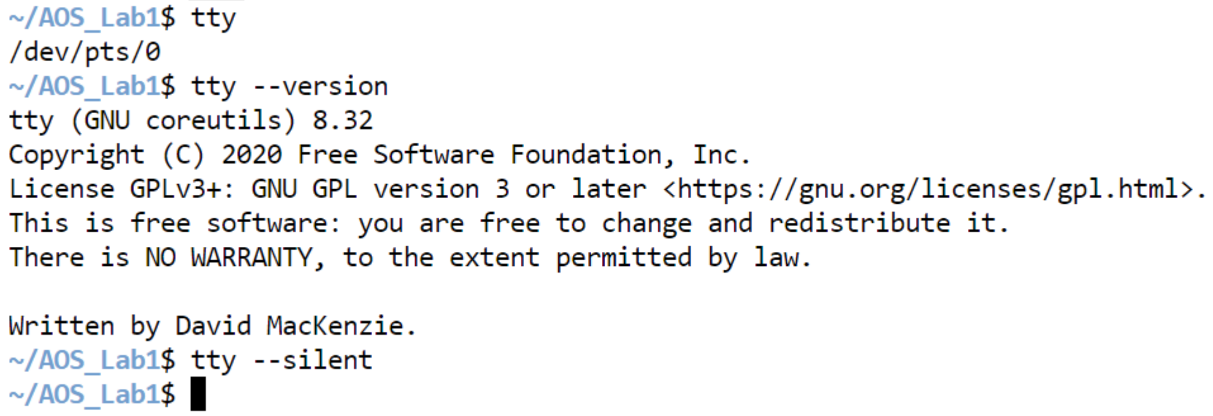
```
~/AOS_Lab1$ ncal -S
    December 2023
Su     3 10 17 24 31
Mo     4 11 18 25
Tu     5 12 19 26
We     6 13 20 27
Th     7 14 21 28
Fr  1  8 15 22 29
Sa  2  9 16 23 30
```

2. date: **date** command is used to display the system date and time. date command is also used to set date and time of the system.



```
~/AOS_Lab1$ date
Tue Dec 12 04:08:31 UTC 2023
~/AOS_Lab1$ date -u
Tue Dec 12 04:08:44 UTC 2023
~/AOS_Lab1$ date --date="Jan 20 2023"
Fri Jan 20 00:00:00 UTC 2023
~/AOS_Lab1$ date --date="01/20/2023"
Fri Jan 20 00:00:00 UTC 2023
~/AOS_Lab1$ date "+%A"
Tuesday
~/AOS_Lab1$ date "+%a"
Tue
~/AOS_Lab1$ date "+%Y/%m/%d"
2023/12/12
~/AOS_Lab1$ █
```

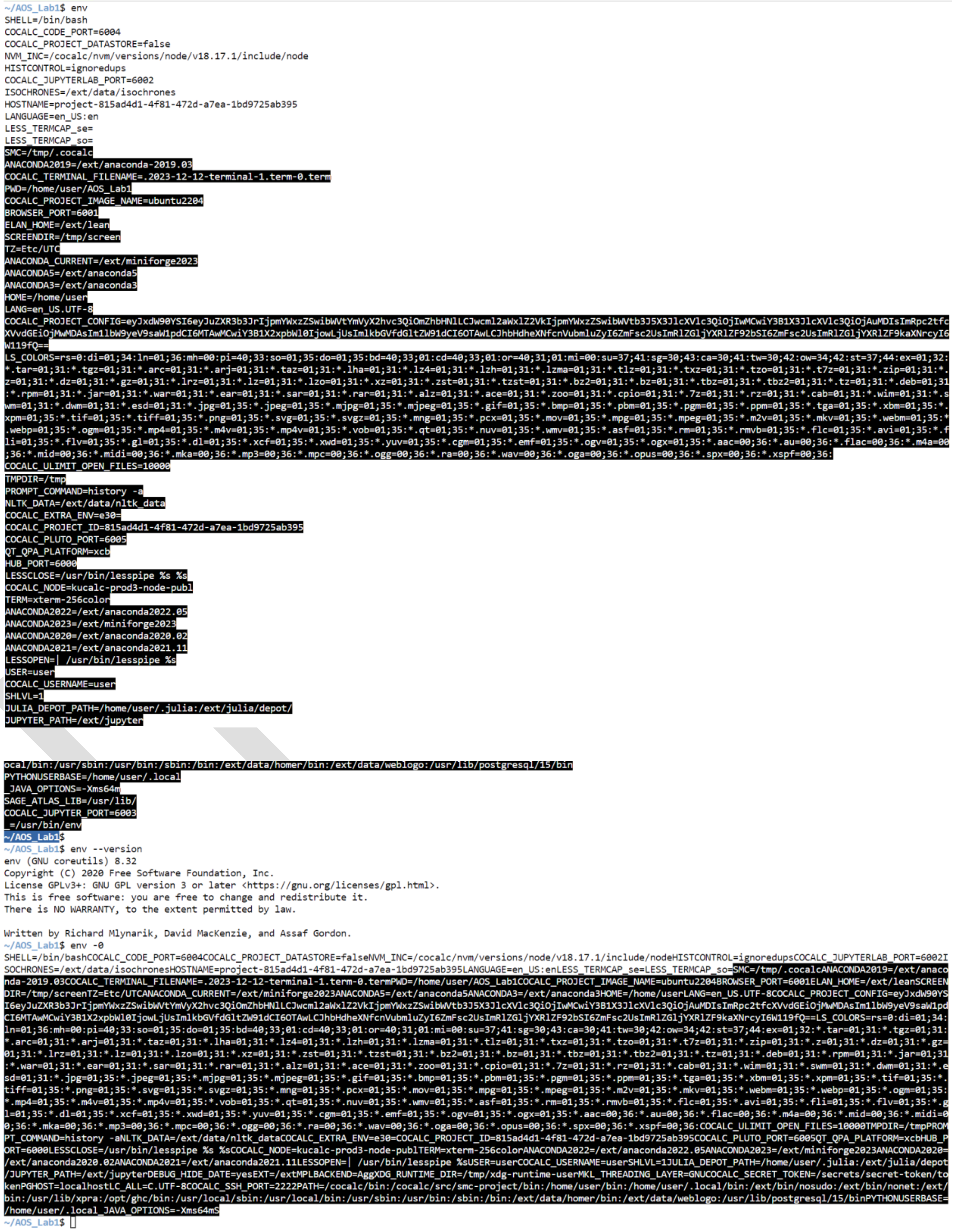
3. tty: The **tty** command of the terminal basically prints the file name of the terminal connected to standard input. **tty** is short for teletype, but popularly known as a terminal it allows you to interact with the system by passing on the data (your input) to the system and displaying the output produced by the system.



```
~/AOS_Lab1$ tty
/dev/pts/0
~/AOS_Lab1$ tty --version
tty (GNU coreutils) 8.32
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by David MacKenzie.
~/AOS_Lab1$ tty --silent
~/AOS_Lab1$ █
```

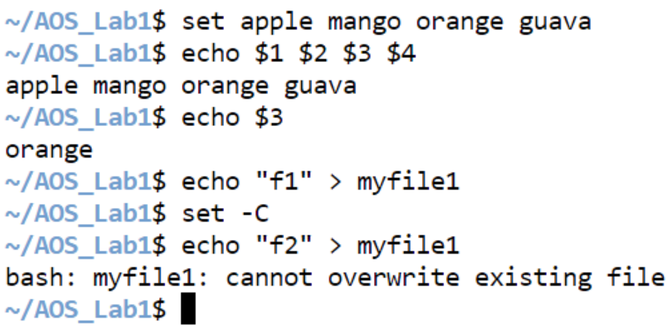
4. sh: **sh** is a command language interpreter that executes commands read from a command line string, the standard input, or a specified file.

5. env: **env** is used to either print environment variables. It is also used to run a utility or command in a custom environment.



```
~/AOS_Lab1$ env
SHELL=/bin/bash
COCALC_CODE_PORT=6004
COCALC_PROJECT_DATASTORE=false
NVM_INC=/cocalc/nvm/versions/node/v18.17.1/include/node
HISTCONTROL=ignoredups
COCALC_JUPYTERLAB_PORT=6002
ISOCHRONES=/ext/data/isochrones
HOSTNAME=project-815ad4d1-4f81-472d-a7ea-1bd9725ab395
LANGUAGE=en_US:en
LESS_TERMCAP_se=
LESS_TERMCAP_so=
SMC=/tmp/.cocalc
ANACONDA2019=/ext/anaconda-2019.03
COCALC_TERMINAL_FILENAME=.2023-12-12-terminal-1.term-0.term
PWD=/home/user/AOS_Lab1
COCALC_PROJECT_IMAGE_NAME=ubuntu2204
BROWSER_PORT=6001
ELAN_HOME=/ext/lean
SCREENDIR=/tmp/screen
TZ=Etc/UTC
ANACONDA_CURRENT=/ext/miniforge2023
ANACONDA5=/ext/anaconda5
ANACONDA3=/ext/anaconda3
HOME=/home/user
LANG=en_US.UTF-8
COCALC_PROJECT_CONFIG=eyJxdW90YSI6eyJuZXR3b3JrIjpmYWxzZSwibWVtYmVyX2hvc3QiOmZhbHNlLCJwcml2aWxlZ2VkIjpmYWxzZSwibWVtb3J5X3JlcXVlc3QiOjIwMCwiY3B1X3JlcXVlc3QiOjAuMDIsImRpc2tfc
XVvdGEiOjMwMDAsIm1lbW9yeV9saW1pdCI6MTAwMCwiY3B1X2xpbWl0IjowLjUsImlkbGVfdGltZW91dCI6OTAwLCJhbHdheXNfcnVubmluZyI6ZmFsc2UsImRlZGljYXRlZF92bSI6ZmFsc2UsImRlZGljYXRlZF9kaXNrcyI6
W119fQ==
LS_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01:or=40;31;01:mi=00:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;42:st=37;44:ex=01;32:
*.tar=01;31:*.tgz=01;31:*.arc=01;31:*.arj=01;31:*.taz=01;31:*.lha=01;31:*.lz4=01;31:*.lzh=01;31:*.lzma=01;31:*.tlz=01;31:*.txz=01;31:*.tzo=01;31:*.t7z=01;31:*.zip=01;31:*.
z=01;31:*.dz=01;31:*.gz=01;31:*.lrz=01;31:*.lz=01;31:*.lzo=01;31:*.xz=01;31:*.zst=01;31:*.tzst=01;31:*.bz2=01;31:*.bz=01;31:*.tbz=01;31:*.tbz2=01;31:*.tz=01;31:*.deb=01;31
:*.rpm=01;31:*.jar=01;31:*.war=01;31:*.ear=01;31:*.sar=01;31:*.rar=01;31:*.alz=01;31:*.ace=01;31:*.zoo=01;31:*.cpio=01;31:*.7z=01;31:*.rz=01;31:*.cab=01;31:*.wim=01;31:*.s
wm=01;31:*.dwm=01;31:*.esd=01;31:*.jpg=01;35:*.jpeg=01;35:*.mjpg=01;35:*.mjpeg=01;35:*.gif=01;35:*.bmp=01;35:*.pbm=01;35:*.pgm=01;35:*.ppm=01;35:*.tga=01;35:*.xbm=01;35:*.
xpm=01;35:*.tif=01;35:*.tiff=01;35:*.png=01;35:*.svg=01;35:*.svgz=01;35:*.mng=01;35:*.pcx=01;35:*.mov=01;35:*.mpg=01;35:*.mpeg=01;35:*.m2v=01;35:*.mkv=01;35:*.webm=01;35:*
.webp=01;35:*.ogm=01;35:*.mp4=01;35:*.m4v=01;35:*.mp4v=01;35:*.vob=01;35:*.qt=01;35:*.nuv=01;35:*.wmv=01;35:*.asf=01;35:*.rm=01;35:*.rmvb=01;35:*.flc=01;35:*.avi=01;35:*.f
li=01;35:*.flv=01;35:*.gl=01;35:*.dl=01;35:*.xcf=01;35:*.xwd=01;35:*.yuv=01;35:*.cgm=01;35:*.emf=01;35:*.ogv=01;35:*.ogx=01;35:*.aac=00;36:*.au=00;36:*.flac=00;36:*.m4a=00
;36:*.mid=00;36:*.midi=00;36:*.mka=00;36:*.mp3=00;36:*.mpc=00;36:*.ogg=00;36:*.ra=00;36:*.wav=00;36:*.oga=00;36:*.opus=00;36:*.spx=00;36:*.xspf=00;36:
COCALC_ULIMIT_OPEN_FILES=10000
TMPDIR=/tmp
PROMPT_COMMAND=history -a
NLTK_DATA=/ext/data/nltk_data
COCALC_EXTRA_ENV=e30=
COCALC_PROJECT_ID=815ad4d1-4f81-472d-a7ea-1bd9725ab395
COCALC_PLUTO_PORT=6005
QT_QPA_PLATFORM=xcb
HUB_PORT=6000
LESSCLOSE=/usr/bin/lesspipe %s %s
COCALC_NODE=kucalc-prod3-node-publ
TERM=xterm-256color
ANACONDA2022=/ext/anaconda2022.05
ANACONDA2023=/ext/miniforge2023
ANACONDA2020=/ext/anaconda2020.02
ANACONDA2021=/ext/anaconda2021.11
LESSOPEN=| /usr/bin/lesspipe %s
USER=user
COCALC_USERNAME=user
SHLVL=1
JULIA_DEPOT_PATH=/home/user/.julia:/ext/julia/depot/
JUPYTER_PATH=/ext/jupyter


ocal/bin:/usr/sbin:/usr/bin:/sbin:/bin:/ext/data/homer/bin:/ext/data/weblogo:/usr/lib/postgresql/15/bin
PYTHONUSERBASE=/home/user/.local
_JAVA_OPTIONS=-Xms64m
SAGE_ATLAS_LIB=/usr/lib/
COCALC_JUPYTER_PORT=6003
_=/usr/bin/env
~/AOS_Lab1$
~/AOS_Lab1$ env --version
env (GNU coreutils) 8.32
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Richard Mlynarik, David MacKenzie, and Assaf Gordon.
~/AOS_Lab1$ env -0
SHELL=/bin/bashCOCALC_CODE_PORT=6004COCALC_PROJECT_DATASTORE=falseNVM_INC=/cocalc/nvm/versions/node/v18.17.1/include/nodeHISTCONTROL=ignoredupsCOCALC_JUPYTERLAB_PORT=6002I
SOCHRONES=/ext/data/isochronesHOSTNAME=project-815ad4d1-4f81-472d-a7ea-1bd9725ab395LANGUAGE=en_US:enLESS_TERMCAP_se=LESS_TERMCAP_so=SMC=/tmp/.cocalcANACONDA2019=/ext/anaco
nda-2019.03COCALC_TERMINAL_FILENAME=.2023-12-12-terminal-1.term-0.termPWD=/home/user/AOS_Lab1COCALC_PROJECT_IMAGE_NAME=ubuntu2204BROWSER_PORT=6001ELAN_HOME=/ext/leanSCREEN
DIR=/tmp/screenTZ=Etc/UTCANACONDA_CURRENT=/ext/miniforge2023ANACONDA5=/ext/anaconda5ANACONDA3=/ext/anaconda3HOME=/home/userLANG=en_US.UTF-8COCALC_PROJECT_CONFIG=eyJxdW90YS
I6eyJuZXR3b3JrIjpmYWxzZSwibWVtYmVyX2hvc3QiOmZhbHNlLCJwcml2aWxlZ2VkIjpmYWxzZSwibWVtb3J5X3JlcXVlc3QiOjIwMCwiY3B1X3JlcXVlc3QiOjAuMDIsImRpc2tfcXVvdGEiOjMwMDAsIm1lbW9yeV9saW1pd
CI6MTAwMCwiY3B1X2xpbWl0IjowLjUsImlkbGVfdGltZW91dCI6OTAwLCJhbHdheXNfcnVubmluZyI6ZmFsc2UsImRlZGljYXRlZF92bSI6ZmFsc2UsImRlZGljYXRlZF9kaXNrcyI6W119fQ==LS_COLORS=rs=0:di=01;34:
ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01:or=40;31;01:mi=00:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;42:st=37;44:ex=01;32:*.tar=01;31:*.tgz=01;31:
*.arc=01;31:*.arj=01;31:*.taz=01;31:*.lha=01;31:*.lz4=01;31:*.lzh=01;31:*.lzma=01;31:*.tlz=01;31:*.txz=01;31:*.tzo=01;31:*.t7z=01;31:*.zip=01;31:*.z=01;31:*.dz=01;31:*.gz=
01;31:*.lrz=01;31:*.lz=01;31:*.lzo=01;31:*.xz=01;31:*.zst=01;31:*.tzst=01;31:*.bz2=01;31:*.bz=01;31:*.tbz=01;31:*.tbz2=01;31:*.tz=01;31:*.deb=01;31:*.rpm=01;31:*.jar=01;31
:*.war=01;31:*.ear=01;31:*.sar=01;31:*.rar=01;31:*.alz=01;31:*.ace=01;31:*.zoo=01;31:*.cpio=01;31:*.7z=01;31:*.rz=01;31:*.cab=01;31:*.wim=01;31:*.swm=01;31:*.dwm=01;31:*.e
sd=01;31:*.jpg=01;35:*.jpeg=01;35:*.mjpg=01;35:*.mjpeg=01;35:*.gif=01;35:*.bmp=01;35:*.pbm=01;35:*.pgm=01;35:*.ppm=01;35:*.tga=01;35:*.xbm=01;35:*.xpm=01;35:*.tif=01;35:*.
tiff=01;35:*.png=01;35:*.svg=01;35:*.svgz=01;35:*.mng=01;35:*.pcx=01;35:*.mov=01;35:*.mpg=01;35:*.mpeg=01;35:*.m2v=01;35:*.mkv=01;35:*.webm=01;35:*.webp=01;35:*.ogm=01;35:
*.mp4=01;35:*.m4v=01;35:*.mp4v=01;35:*.vob=01;35:*.qt=01;35:*.nuv=01;35:*.wmv=01;35:*.asf=01;35:*.rm=01;35:*.rmvb=01;35:*.flc=01;35:*.avi=01;35:*.fli=01;35:*.flv=01;35:*.g
l=01;35:*.dl=01;35:*.xcf=01;35:*.xwd=01;35:*.yuv=01;35:*.cgm=01;35:*.emf=01;35:*.ogv=01;35:*.ogx=01;35:*.aac=00;36:*.au=00;36:*.flac=00;36:*.m4a=00;36:*.mid=00;36:*.midi=0
0;36:*.mka=00;36:*.mp3=00;36:*.mpc=00;36:*.ogg=00;36:*.ra=00;36:*.wav=00;36:*.oga=00;36:*.opus=00;36:*.spx=00;36:*.xspf=00;36:COCALC_ULIMIT_OPEN_FILES=10000TMPDIR=/tmpPROM
PT_COMMAND=history -aNLTK_DATA=/ext/data/nltk_dataCOCALC_EXTRA_ENV=e30=COCALC_PROJECT_ID=815ad4d1-4f81-472d-a7ea-1bd9725ab395COCALC_PLUTO_PORT=6005QT_QPA_PLATFORM=xcbHUB_P
ORT=6000LESSCLOSE=/usr/bin/lesspipe %s %sCOCALC_NODE=kucalc-prod3-node-publTERM=xterm-256colorANACONDA2022=/ext/anaconda2022.05ANACONDA2023=/ext/miniforge2023ANACONDA2020=
/ext/anaconda2020.02ANACONDA2021=/ext/anaconda2021.11LESSOPEN=| /usr/bin/lesspipe %sUSER=userCOCALC_USERNAME=userSHLVL=1JULIA_DEPOT_PATH=/home/user/.julia:/ext/julia/depot
/JUPYTER_PATH=/ext/jupyterDEBUG_HIDE_DATE=yesEXT=/extMPLBACKEND=AggXDG_RUNTIME_DIR=/tmp/xdg-runtime-userMKL_THREADING_LAYER=GNUCOCALC_SECRET_TOKEN=/secrets/secret-token/to
kenPGHOST=localhostLC_ALL=C.UTF-8COCALC_SSH_PORT=2222PATH=/cocalc/bin:/cocalc/src/smc-project/bin:/home/user/bin:/home/user/.local/bin:/ext/bin/nosudo:/ext/bin/nonet:/ext/
bin:/usr/lib/xpra:/opt/ghc/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/ext/data/homer/bin:/ext/data/weblogo:/usr/lib/postgresql/15/binPYTHONUSERBASE=
/home/user/.local_JAVA_OPTIONS=-Xms64mS
~/AOS_Lab1$
```

6. set: It is used to set or unset specific flags and settings(determines the behaviour of the script and helps in executing the tasks without any issue.) inside the shell environment. It can be used to change or display the shell attributes and parameters.

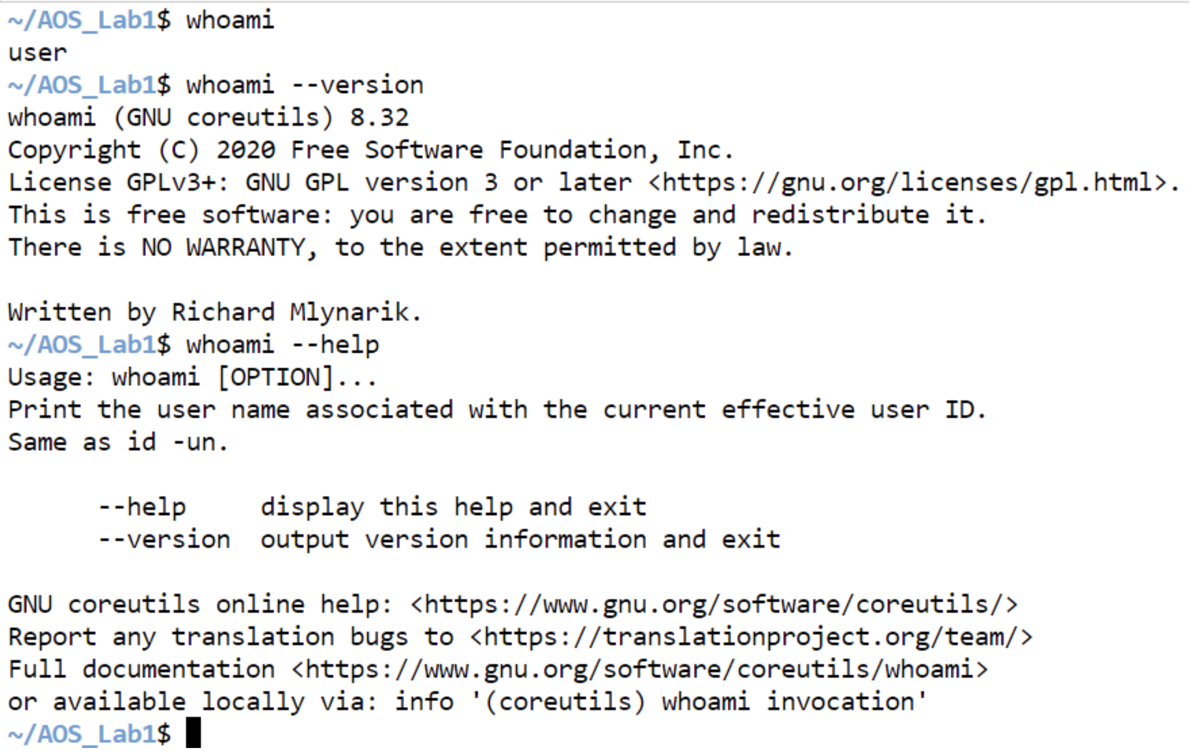


```
~/AOS_Lab1$ set apple mango orange guava
~/AOS_Lab1$ echo $1 $2 $3 $4
apple mango orange guava
~/AOS_Lab1$ echo $3
orange
~/AOS_Lab1$ echo "f1" > myfile1
~/AOS_Lab1$ set -C
~/AOS_Lab1$ echo "f2" > myfile1
bash: myfile1: cannot overwrite existing file
~/AOS_Lab1$ █
```

7. man: ***man*** command in Linux is used to display the user manual of any command that we can run on the terminal. It provides a detailed view of the command which includes NAME, SYNOPSIS, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUES, ERRORS, FILES, VERSIONS, EXAMPLES, AUTHORS and SEE ALSO.

8. who: The who command is used to get information about currently logged in user on to system.

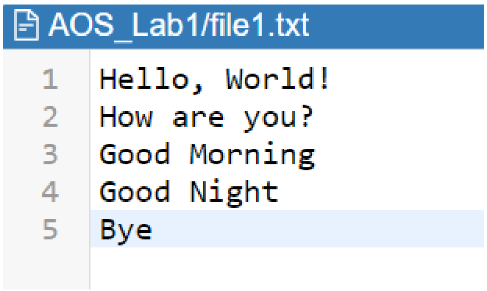
9. whoami: **whoami** command is used both in *Unix Operating System* and as well as in *Windows Operating System*.



```
~/AOS_Lab1$ whoami
user
~/AOS_Lab1$ whoami --version
whoami (GNU coreutils) 8.32
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Richard Mlynarik.
~/AOS_Lab1$ whoami --help
Usage: whoami [OPTION]...
Print the user name associated with the current effective user ID.
Same as id -un.

      --help     display this help and exit
      --version  output version information and exit

GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
Report any translation bugs to <https://translationproject.org/team/>
Full documentation <https://www.gnu.org/software/coreutils/whoami>
or available locally via: info '(coreutils) whoami invocation'
~/AOS_Lab1$ █
```

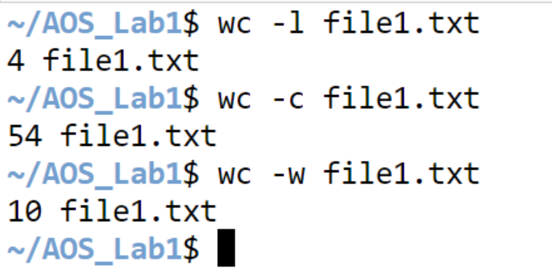
B. Utility Commands:

1. wc: wc stands for **word count**. It is used to find out **number of lines**, **word count**, **byte and characters count** in the files specified in the file arguments. wc stands for **word count**.



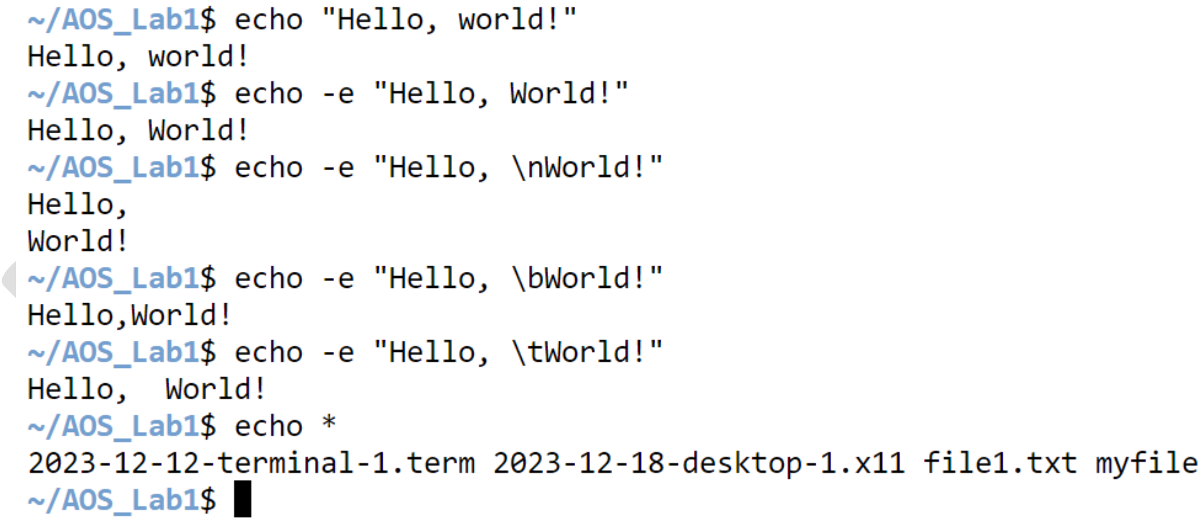
AOS_Lab1/file1.txt

```
Hello, World!
How are you?
Good Morning
Good Night
Bye
```



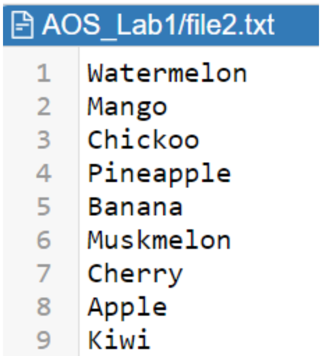
```
~/AOS_Lab1$ wc -l file1.txt
4 file1.txt
~/AOS_Lab1$ wc -c file1.txt
54 file1.txt
~/AOS_Lab1$ wc -w file1.txt
10 file1.txt
~/AOS_Lab1$ 
```

2. echo: The **echo** command in Linux is a built-in command that allows users to display lines of text or strings that are passed as arguments. It is commonly used in shell scripts and batch files to output status text to the screen or a file.



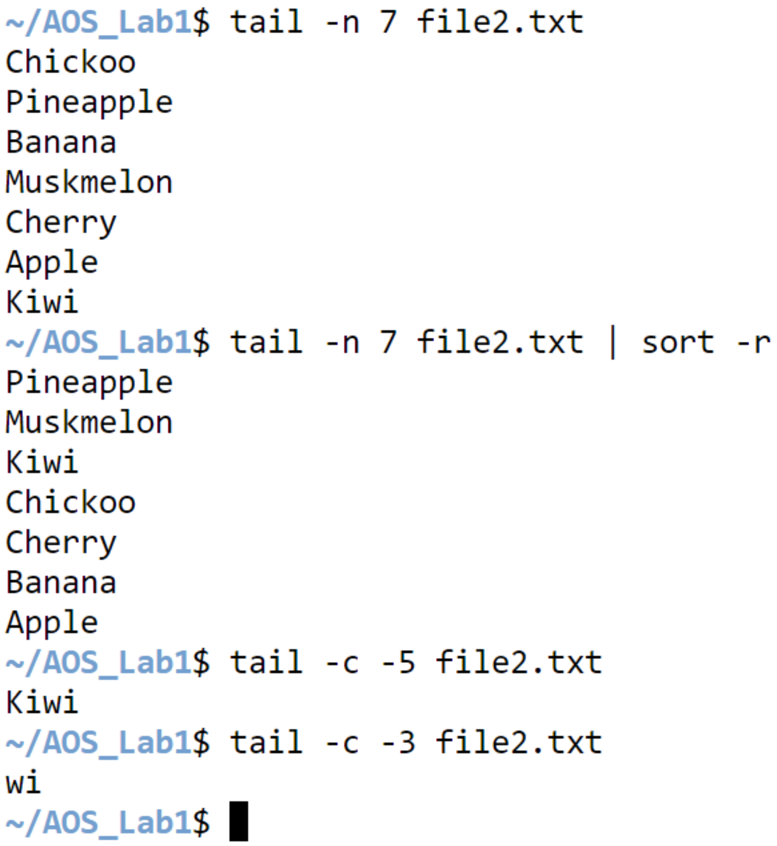
```
~/AOS_Lab1$ echo "Hello, world!"
Hello, world!
~/AOS_Lab1$ echo -e "Hello, World!"
Hello, World!
~/AOS_Lab1$ echo -e "Hello, \nWorld!"
Hello,
World!
~/AOS_Lab1$ echo -e "Hello, \bWorld!"
Hello,World!
~/AOS_Lab1$ echo -e "Hello, \tWorld!"
Hello,  World!
~/AOS_Lab1$ echo *
2023-12-12-terminal-1.term 2023-12-18-desktop-1.x11 file1.txt myfile
~/AOS_Lab1$ 
```

3. tail: The tail command, as the name implies, prints the last N number of data of the given input. By default, it prints the last 10 lines of the specified files. If more than one file name is provided then data from each file is preceded by its file name.

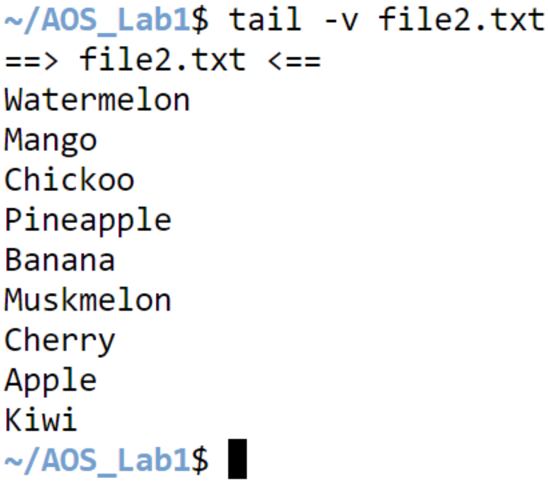


AOS_Lab1/file2.txt

```
Watermelon
Mango
Chickoo
Pineapple
Banana
Muskmelon
Cherry
Apple
Kiwi
```



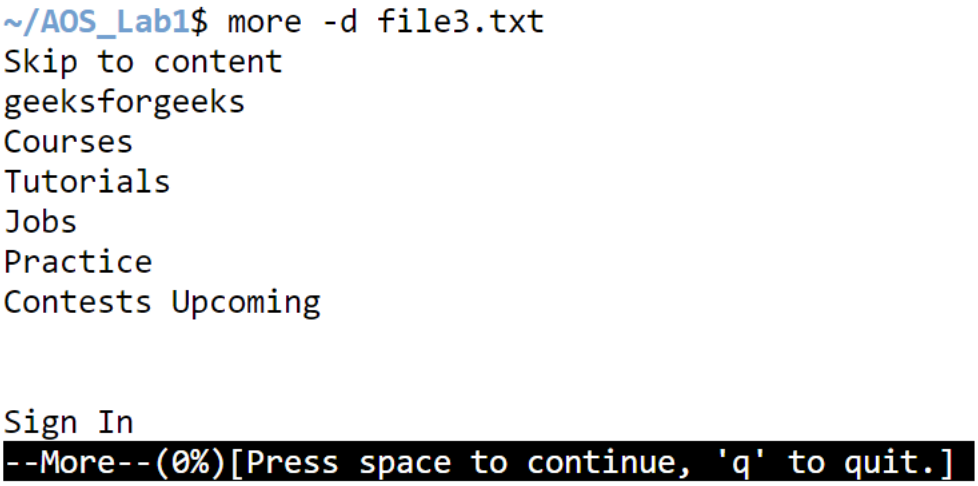
```
~/AOS_Lab1$ tail -n 7 file2.txt
Chickoo
Pineapple
Banana
Muskmelon
Cherry
Apple
Kiwi
~/AOS_Lab1$ tail -n 7 file2.txt | sort -r
Pineapple
Muskmelon
Kiwi
Chickoo
Cherry
Banana
Apple
~/AOS_Lab1$ tail -c -5 file2.txt
Kiwi
~/AOS_Lab1$ tail -c -3 file2.txt
wi
~/AOS_Lab1$
```



```
~/AOS_Lab1$ tail -v file2.txt
==> file2.txt <==
Watermelon
Mango
Chickoo
Pineapple
Banana
Muskmelon
Cherry
Apple
Kiwi
~/AOS_Lab1$
```

4. less: Less command is a Linux utility that can be used to read the contents of a text file one page (one screen) at a time. It has faster access because if a file is large, it doesn’t access the complete file, but accesses it page by page.

5. more: **more** command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large (For example log files).



```
~/AOS_Lab1$ more -d file3.txt
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--More--(0%)[Press space to continue, 'q' to quit.]
```

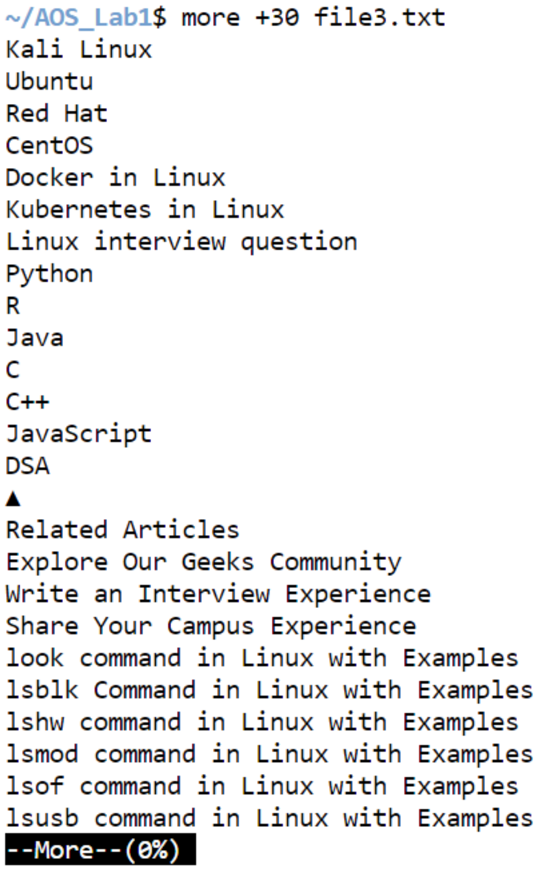

```
~/AOS_Lab1$ more +30 file3.txt
Kali Linux
Ubuntu
Red Hat
CentOS
Docker in Linux
Kubernetes in Linux
Linux interview question
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R
Java
C
C++
JavaScript
DSA
▲
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lshw command in Linux with Examples
lsmod command in Linux with Examples
lsof command in Linux with Examples
lsusb command in Linux with Examples
--More--(0%)
```

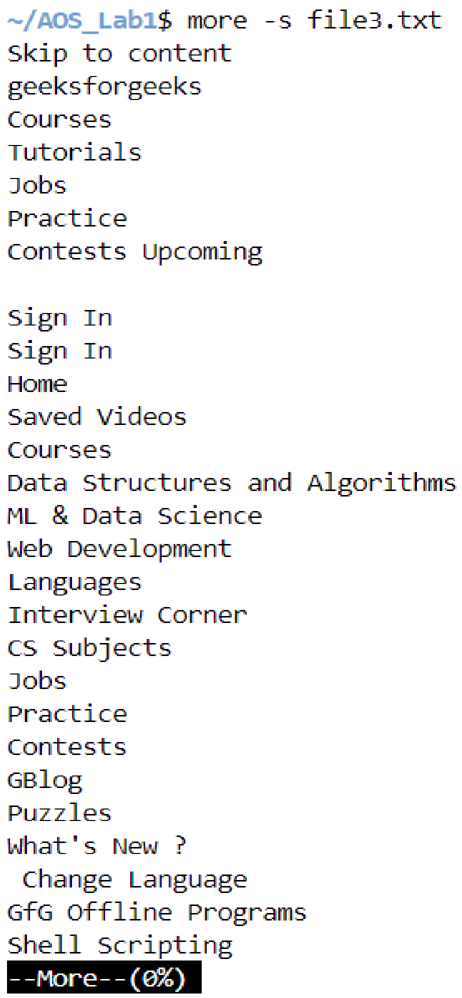

```
~/AOS_Lab1$ more -s file3.txt
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Puzzles
What's New ?
 Change Language
GfG Offline Programs
Shell Scripting
--More--(0%)
```
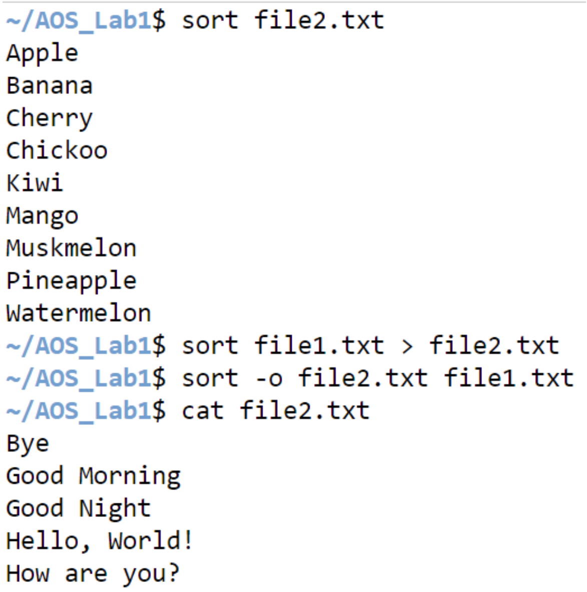
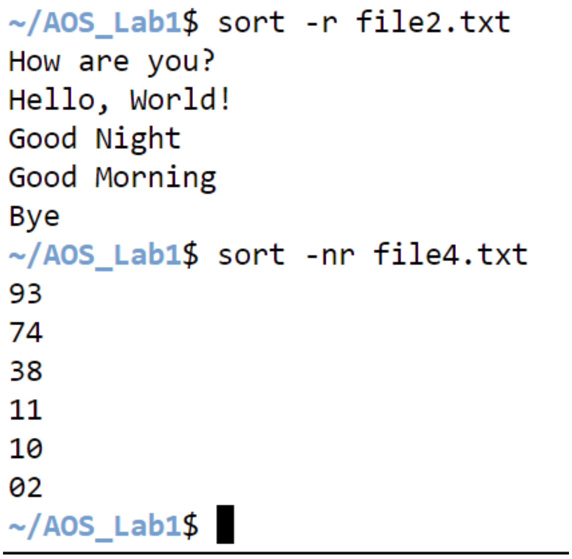

6. sort: SORT command is used to sort a file, arranging the records in a particular order. By default, the sort command sorts file assuming the contents are ASCII. Using options in the sort command can also be used to sort numerically.

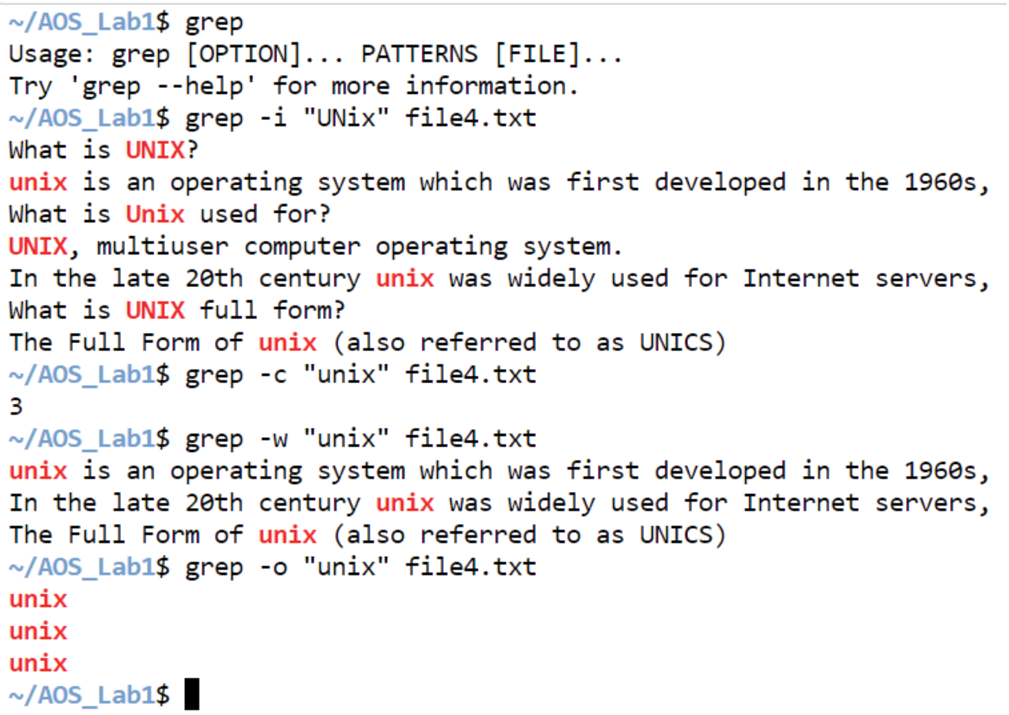


```
~/AOS_Lab1$ sort file2.txt
Apple
Banana
Cherry
Chickoo
Kiwi
Mango
Muskmelon
Pineapple
Watermelon
~/AOS_Lab1$ sort file1.txt > file2.txt
~/AOS_Lab1$ sort -o file2.txt file1.txt
~/AOS_Lab1$ cat file2.txt
Bye
Good Morning
Good Night
Hello, World!
How are you?
```



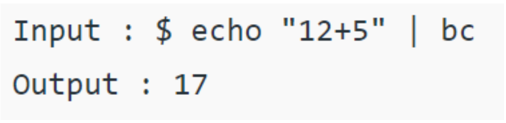
```
~/AOS_Lab1$ sort -r file2.txt
How are you?
Hello, World!
Good Night
Good Morning
Bye
~/AOS_Lab1$ sort -nr file4.txt
93
74
38
11
10
02
~/AOS_Lab1$
```

7. grep: The grep filter searches a file for a particular pattern of characters and displays all lines that contain that pattern.

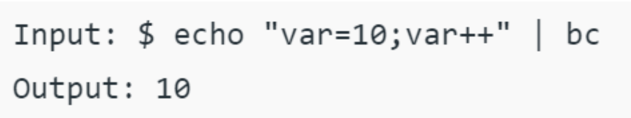


```
~/AOS_Lab1$ grep
Usage: grep [OPTION]... PATTERNS [FILE]...
Try 'grep --help' for more information.
~/AOS_Lab1$ grep -i "UNix" file4.txt
What is UNIX?
unix is an operating system which was first developed in the 1960s,
What is Unix used for?
UNIX, multiuser computer operating system.
In the late 20th century unix was widely used for Internet servers,
What is UNIX full form?
The Full Form of unix (also referred to as UNICS)
~/AOS_Lab1$ grep -c "unix" file4.txt
3
~/AOS_Lab1$ grep -w "unix" file4.txt
unix is an operating system which was first developed in the 1960s,
In the late 20th century unix was widely used for Internet servers,
The Full Form of unix (also referred to as UNICS)
~/AOS_Lab1$ grep -o "unix" file4.txt
unix
unix
unix
~/AOS_Lab1$
```

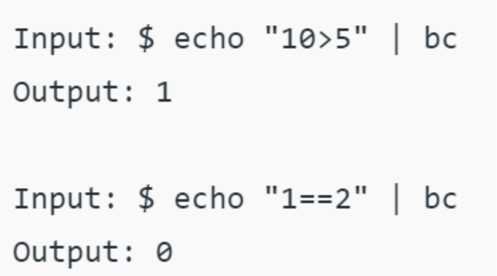
8. bc: **bc** command is used for command line calculator. It is similar to basic calculator by using which we can do basic mathematical calculations.



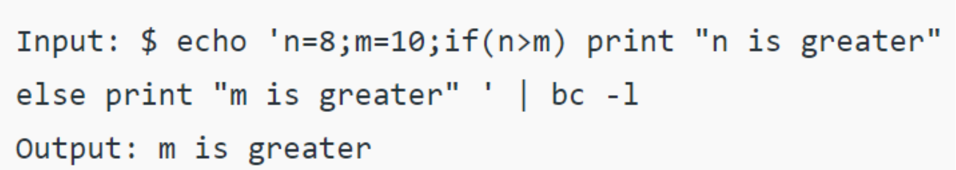
```
Input : $ echo "12+5" | bc
Output : 17
```



```
Input: $ echo "var=10;var++" | bc
Output: 10
```

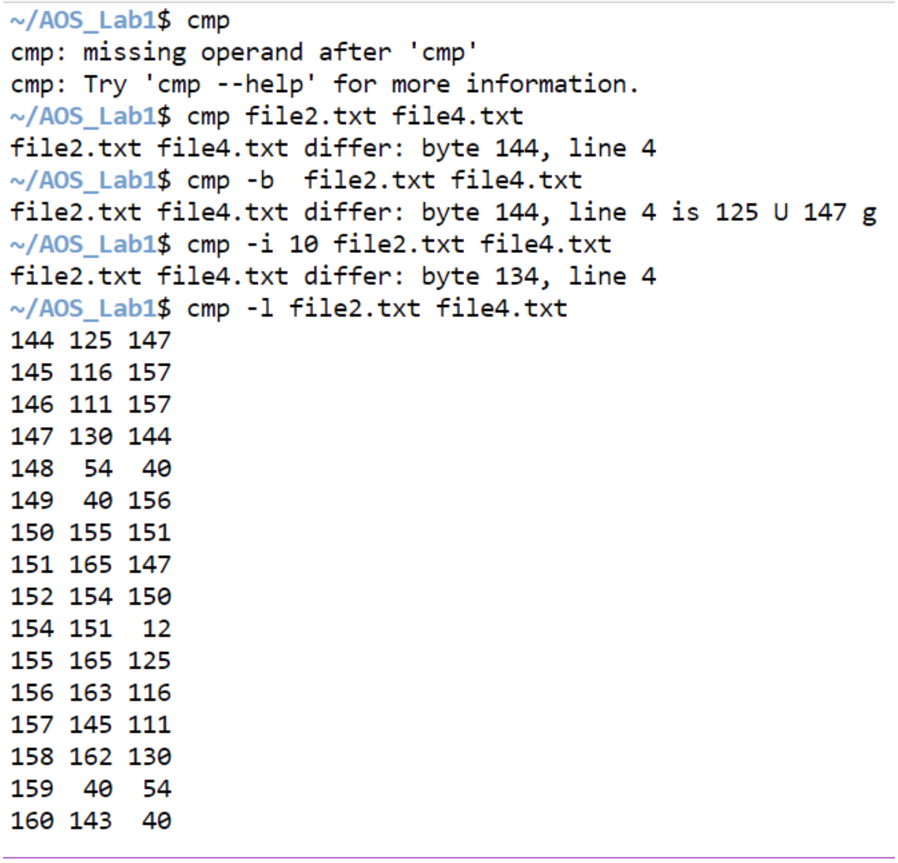


```
Input: $ echo "10>5" | bc
Output: 1

Input: $ echo "1==2" | bc
Output: 0
```



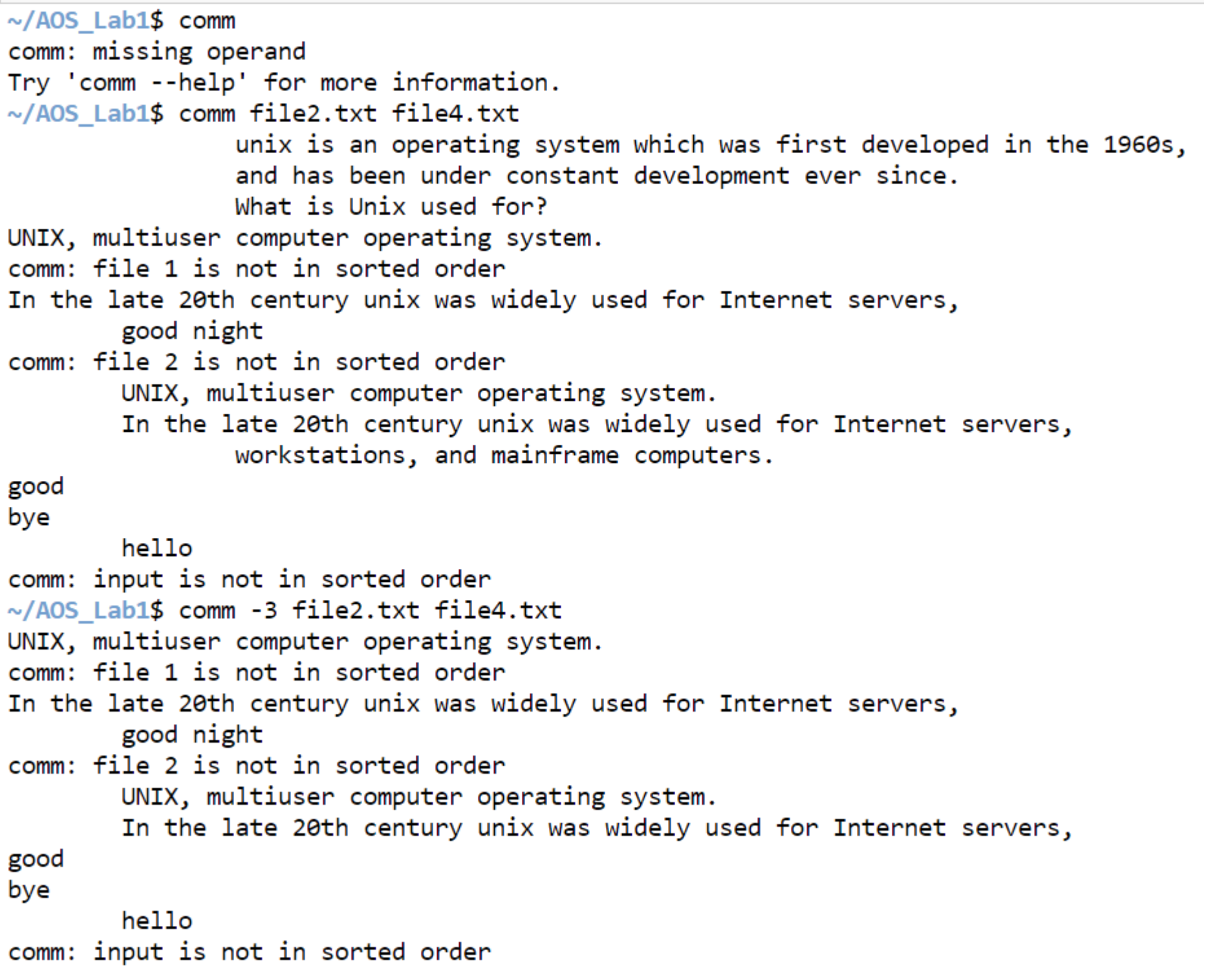
```
Input: $ echo 'n=8;m=10;if(n>m) print "n is greater"
else print "m is greater" ' | bc -l
Output: m is greater
```

9. cmp: **cmp** command in Linux/UNIX is used to compare the two files byte by byte and helps you to find out whether the two files are identical or not.



```
~/AOS_Lab1$ cmp
cmp: missing operand after 'cmp'
cmp: Try 'cmp --help' for more information.
~/AOS_Lab1$ cmp file2.txt file4.txt
file2.txt file4.txt differ: byte 144, line 4
~/AOS_Lab1$ cmp -b  file2.txt file4.txt
file2.txt file4.txt differ: byte 144, line 4 is 125 U 147 g
~/AOS_Lab1$ cmp -i 10 file2.txt file4.txt
file2.txt file4.txt differ: byte 134, line 4
~/AOS_Lab1$ cmp -l file2.txt file4.txt
144 125 147
145 116 157
146 111 157
147 130 144
148  54  40
149  40 156
150 155 151
151 165 147
152 154 150
154 151  12
155 165 125
156 163 116
157 145 111
158 162 130
159  40  54
160 143  40
```

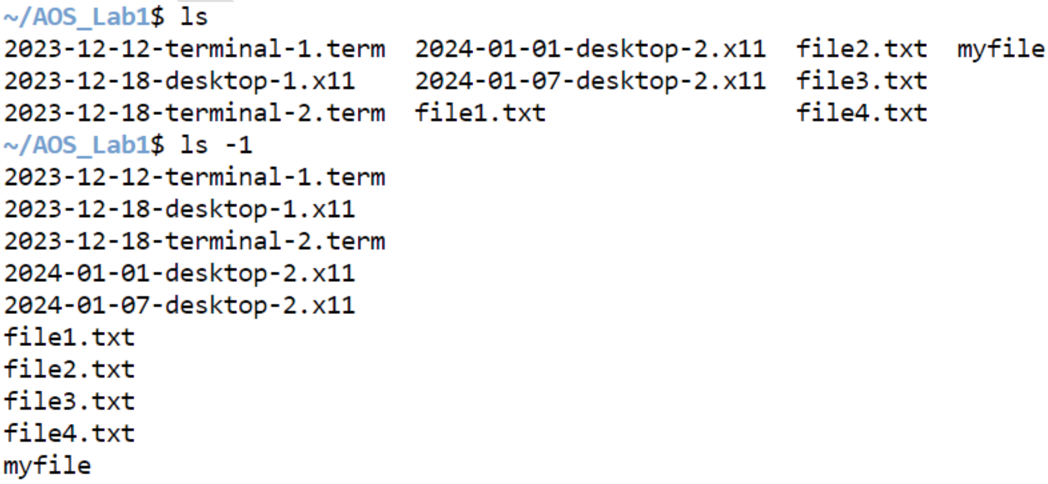
10. comm: comm compare two sorted files line by line and write to standard output; the lines that are common and the lines that are unique.



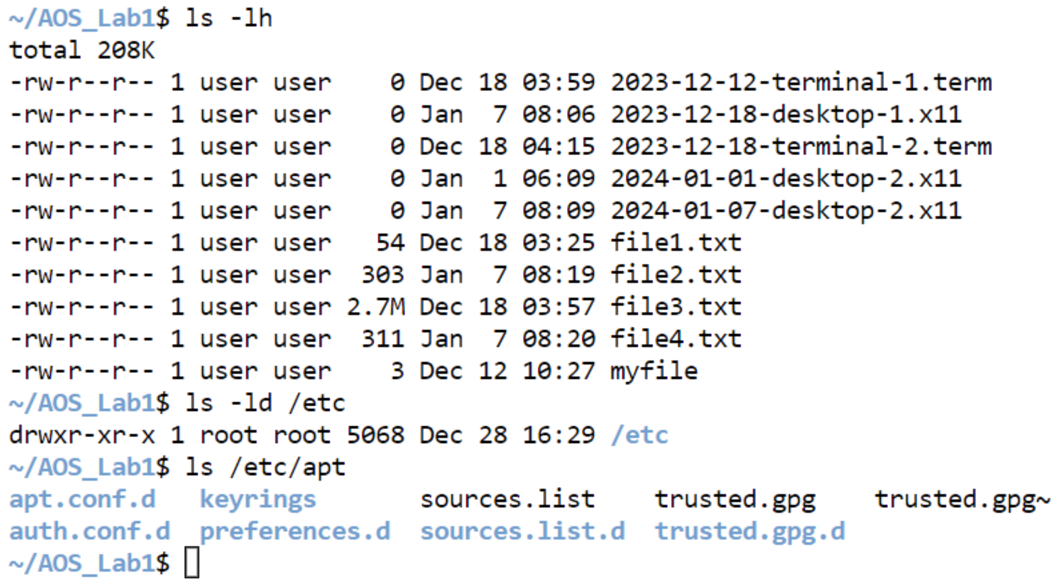
```
~/AOS_Lab1$ comm
comm: missing operand
Try 'comm --help' for more information.
~/AOS_Lab1$ comm file2.txt file4.txt
                unix is an operating system which was first developed in the 1960s,
                and has been under constant development ever since.
                What is Unix used for?
UNIX, multiuser computer operating system.
comm: file 1 is not in sorted order
In the late 20th century unix was widely used for Internet servers,
        good night
comm: file 2 is not in sorted order
        UNIX, multiuser computer operating system.
        In the late 20th century unix was widely used for Internet servers,
                workstations, and mainframe computers.
good
bye
        hello
comm: input is not in sorted order
~/AOS_Lab1$ comm -3 file2.txt file4.txt
UNIX, multiuser computer operating system.
comm: file 1 is not in sorted order
In the late 20th century unix was widely used for Internet servers,
        good night
comm: file 2 is not in sorted order
        UNIX, multiuser computer operating system.
        In the late 20th century unix was widely used for Internet servers,
good
bye
        hello
comm: input is not in sorted order
```

C. File System Managment:

1. ls: **ls** is a Linux shell command that lists directory contents of files and directories. It provides valuable information about files, directories, and their attributes.

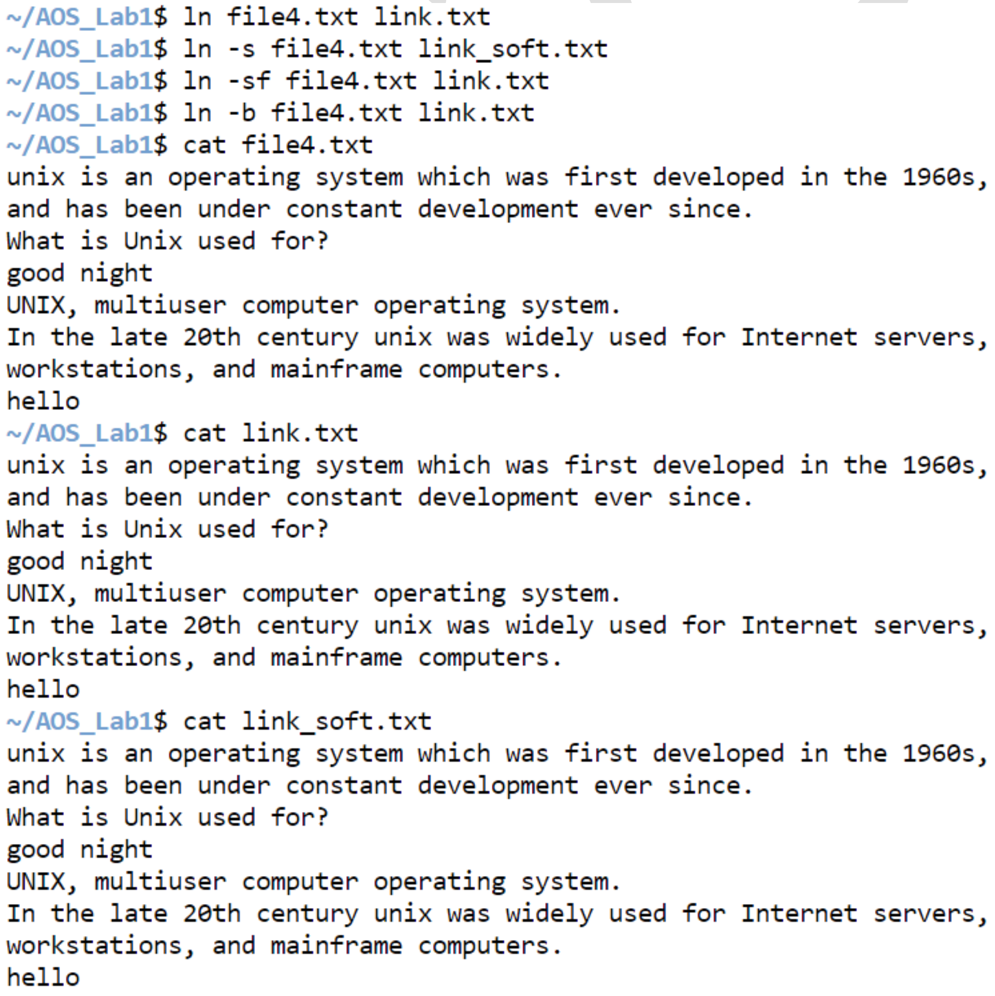


```
~/AOS_Lab1$ ls
2023-12-12-terminal-1.term  2024-01-01-desktop-2.x11  file2.txt  myfile
2023-12-18-desktop-1.x11    2024-01-07-desktop-2.x11  file3.txt
2023-12-18-terminal-2.term  file1.txt                 file4.txt
~/AOS_Lab1$ ls -1
2023-12-12-terminal-1.term
2023-12-18-desktop-1.x11
2023-12-18-terminal-2.term
2024-01-01-desktop-2.x11
2024-01-07-desktop-2.x11
file1.txt
file2.txt
file3.txt
file4.txt
myfile
```



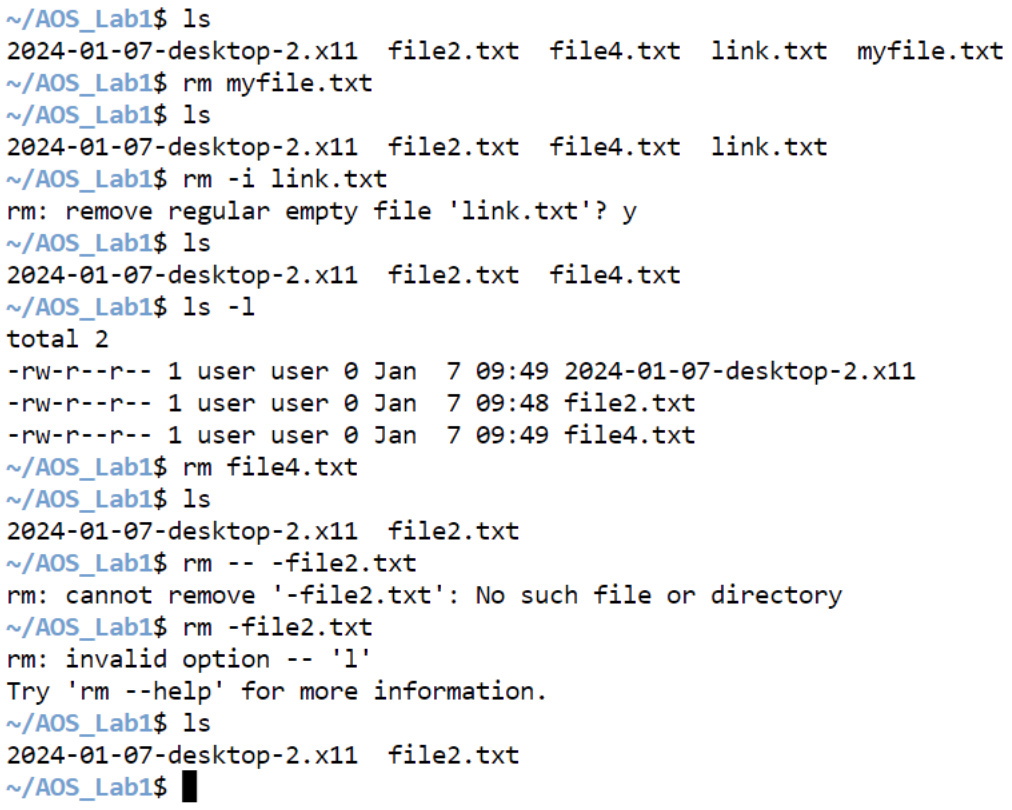
```
~/AOS_Lab1$ ls -lh
total 208K
-rw-r--r-- 1 user user    0 Dec 18 03:59 2023-12-12-terminal-1.term
-rw-r--r-- 1 user user    0 Jan  7 08:06 2023-12-18-desktop-1.x11
-rw-r--r-- 1 user user    0 Dec 18 04:15 2023-12-18-terminal-2.term
-rw-r--r-- 1 user user    0 Jan  1 06:09 2024-01-01-desktop-2.x11
-rw-r--r-- 1 user user    0 Jan  7 08:09 2024-01-07-desktop-2.x11
-rw-r--r-- 1 user user   54 Dec 18 03:25 file1.txt
-rw-r--r-- 1 user user  303 Jan  7 08:19 file2.txt
-rw-r--r-- 1 user user 2.7M Dec 18 03:57 file3.txt
-rw-r--r-- 1 user user  311 Jan  7 08:20 file4.txt
-rw-r--r-- 1 user user    3 Dec 12 10:27 myfile
~/AOS_Lab1$ ls -ld /etc
drwxr-xr-x 1 root root 5068 Dec 28 16:29 /etc
~/AOS_Lab1$ ls /etc/apt
apt.conf.d   keyrings        sources.list    trusted.gpg    trusted.gpg~
auth.conf.d  preferences.d  sources.list.d  trusted.gpg.d
~/AOS_Lab1$ 
```

2. ln: The ln command in Unix is used to create hard or symbolic links between files.



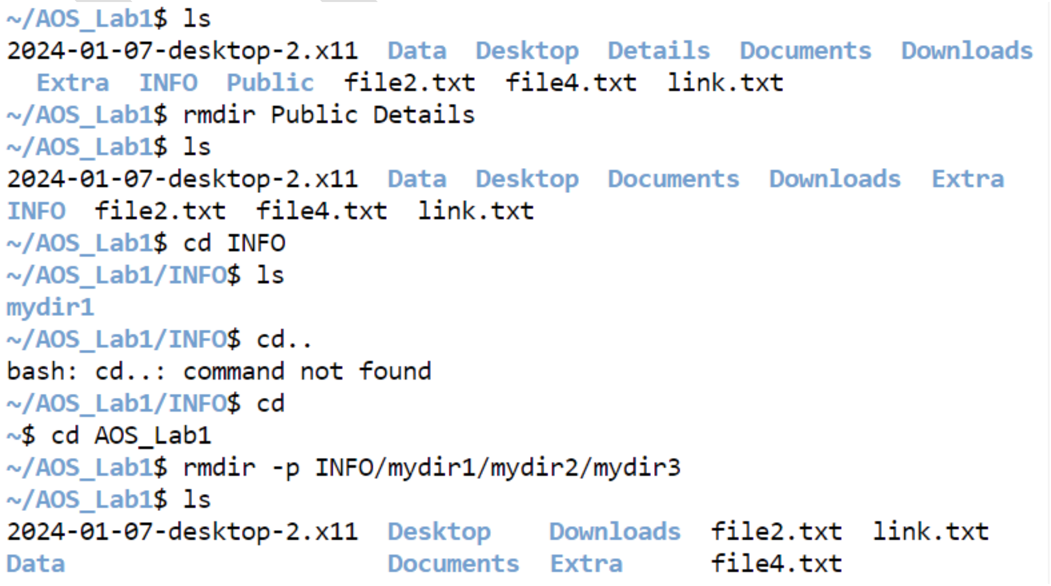
```
~/AOS_Lab1$ ln file4.txt link.txt
~/AOS_Lab1$ ln -s file4.txt link_soft.txt
~/AOS_Lab1$ ln -sf file4.txt link.txt
~/AOS_Lab1$ ln -b file4.txt link.txt
~/AOS_Lab1$ cat file4.txt
unix is an operating system which was first developed in the 1960s,
and has been under constant development ever since.
What is Unix used for?
good night
UNIX, multiuser computer operating system.
In the late 20th century unix was widely used for Internet servers,
workstations, and mainframe computers.
hello
~/AOS_Lab1$ cat link.txt
unix is an operating system which was first developed in the 1960s,
and has been under constant development ever since.
What is Unix used for?
good night
UNIX, multiuser computer operating system.
In the late 20th century unix was widely used for Internet servers,
workstations, and mainframe computers.
hello
~/AOS_Lab1$ cat link_soft.txt
unix is an operating system which was first developed in the 1960s,
and has been under constant development ever since.
What is Unix used for?
good night
UNIX, multiuser computer operating system.
In the late 20th century unix was widely used for Internet servers,
workstations, and mainframe computers.
hello
```

3. rm: rm stands for **remove** here. rm command is used to remove objects such as files, directories, symbolic links and so on from the file system like UNIX.



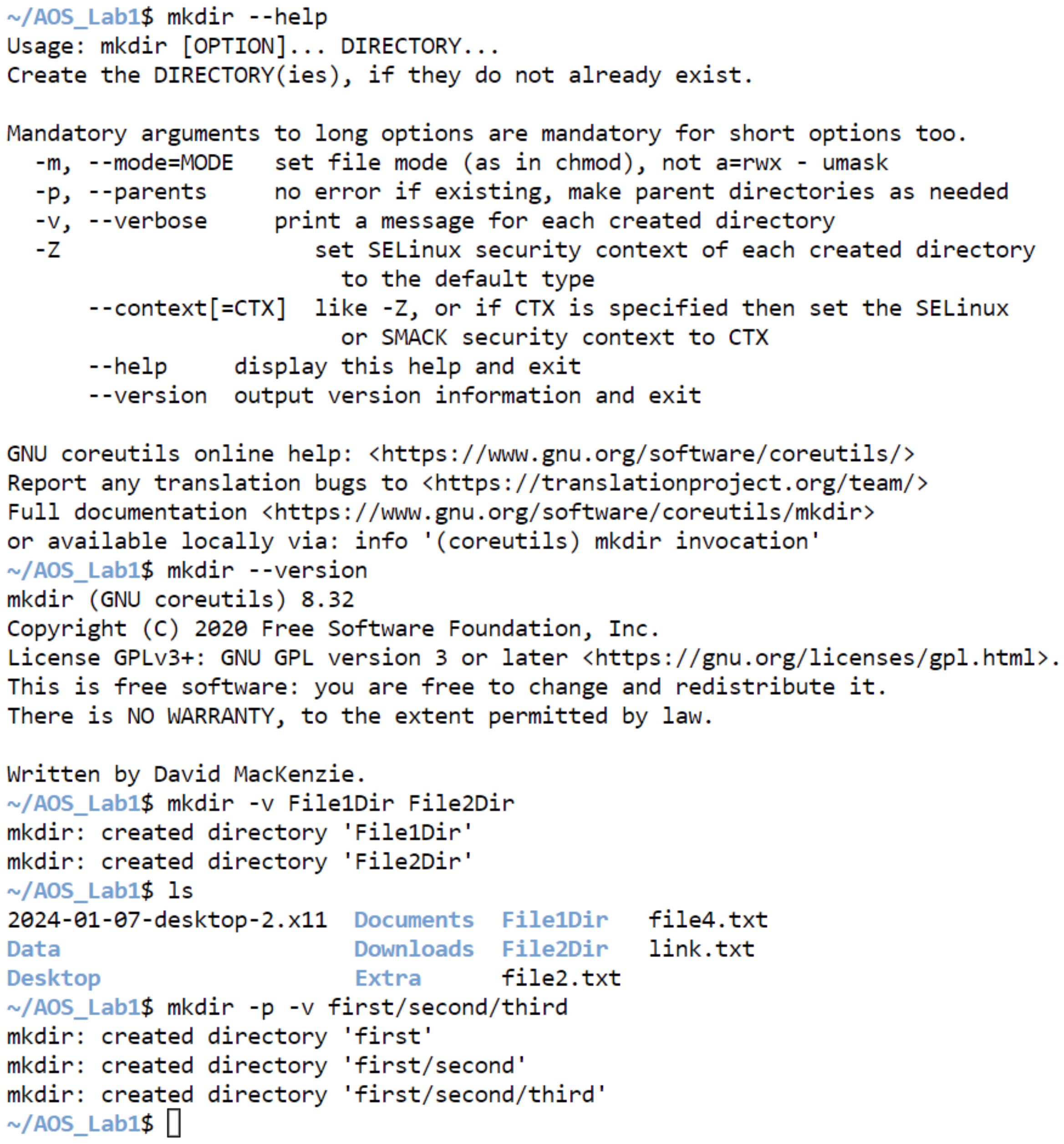
```
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  file2.txt  file4.txt  link.txt  myfile.txt
~/AOS_Lab1$ rm myfile.txt
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  file2.txt  file4.txt  link.txt
~/AOS_Lab1$ rm -i link.txt
rm: remove regular empty file 'link.txt'? y
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  file2.txt  file4.txt
~/AOS_Lab1$ ls -l
total 2
-rw-r--r-- 1 user user 0 Jan  7 09:49 2024-01-07-desktop-2.x11
-rw-r--r-- 1 user user 0 Jan  7 09:48 file2.txt
-rw-r--r-- 1 user user 0 Jan  7 09:49 file4.txt
~/AOS_Lab1$ rm file4.txt
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  file2.txt
~/AOS_Lab1$ rm -- -file2.txt
rm: cannot remove '-file2.txt': No such file or directory
~/AOS_Lab1$ rm -file2.txt
rm: invalid option -- 'l'
Try 'rm --help' for more information.
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  file2.txt
~/AOS_Lab1$ █
```

4. rmdir: The **rmdir command** is useful when you want to remove the empty directories from the filesystem in Linux. This command lets you specify the terminal to **remove a particular directory** right from the terminal.



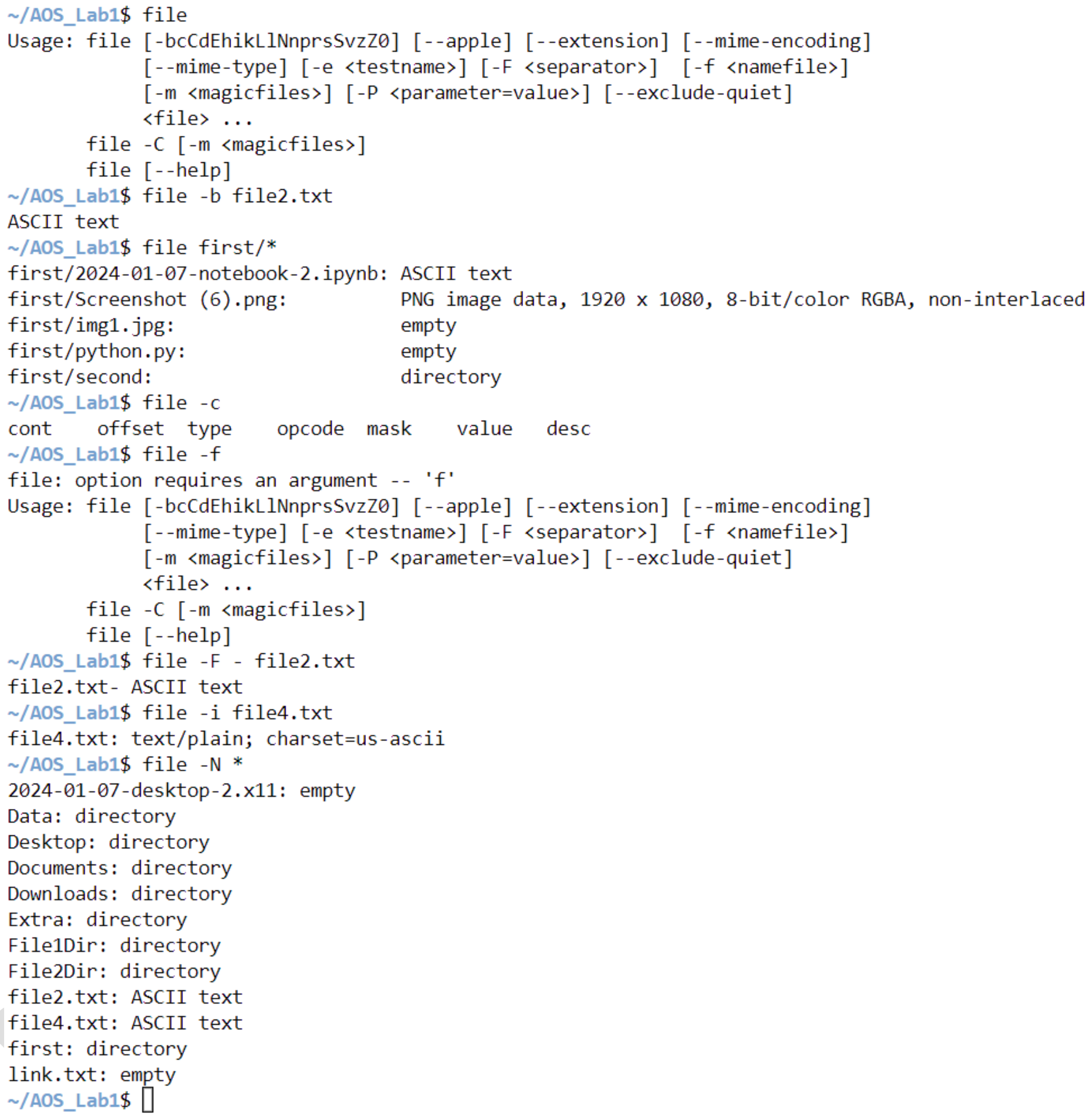
```
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  Data  Desktop  Details  Documents  Downloads
  Extra  INFO  Public  file2.txt  file4.txt  link.txt
~/AOS_Lab1$ rmdir Public Details
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  Data  Desktop  Documents  Downloads  Extra
INFO  file2.txt  file4.txt  link.txt
~/AOS_Lab1$ cd INFO
~/AOS_Lab1/INFO$ ls
mydir1
~/AOS_Lab1/INFO$ cd..
bash: cd..: command not found
~/AOS_Lab1/INFO$ cd
~$ cd AOS_Lab1
~/AOS_Lab1$ rmdir -p INFO/mydir1/mydir2/mydir3
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  Desktop    Downloads  file2.txt  link.txt
Data                      Documents  Extra      file4.txt
```

5. mkdir: In Linux, the ‘mkdir’ command is like a magic wand for creating folders super easily. ‘mkdir’ stands for “make directory,” and it helps you organize your computer stuff by creating folders with just one command.



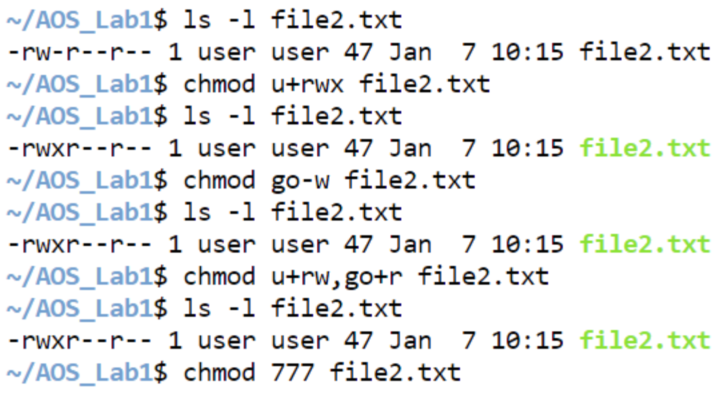
```
~/AOS_Lab1$ mkdir --help
Usage: mkdir [OPTION]... DIRECTORY...
Create the DIRECTORY(ies), if they do not already exist.

Mandatory arguments to long options are mandatory for short options too.
  -m, --mode=MODE   set file mode (as in chmod), not a=rwx - umask
  -p, --parents     no error if existing, make parent directories as needed
  -v, --verbose     print a message for each created directory
  -Z                   set SELinux security context of each created directory
                         to the default type
      --context[=CTX]  like -Z, or if CTX is specified then set the SELinux
                         or SMACK security context to CTX
      --help     display this help and exit
      --version  output version information and exit

GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
Report any translation bugs to <https://translationproject.org/team/>
Full documentation <https://www.gnu.org/software/coreutils/mkdir>
or available locally via: info '(coreutils) mkdir invocation'
~/AOS_Lab1$ mkdir --version
mkdir (GNU coreutils) 8.32
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by David MacKenzie.
~/AOS_Lab1$ mkdir -v File1Dir File2Dir
mkdir: created directory 'File1Dir'
mkdir: created directory 'File2Dir'
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  Documents  File1Dir   file4.txt
Data                      Downloads  File2Dir   link.txt
Desktop                   Extra      file2.txt
~/AOS_Lab1$ mkdir -p -v first/second/third
mkdir: created directory 'first'
mkdir: created directory 'first/second'
mkdir: created directory 'first/second/third'
~/AOS_Lab1$ 
```

6. file: **file command** is used to determine the type of a file. ***.file*** type may be of human-readable(e.g. ‘ASCII text’) or MIME type(e.g. ‘text/plain; charset=us-ascii’). This command tests each argument in an attempt to categorize it.

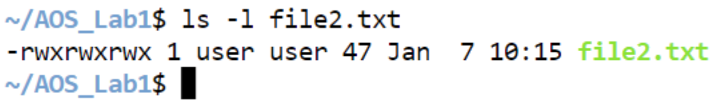


```
~/AOS_Lab1$ file
Usage: file [-bcCdEhikLlNnprsSvzZ0] [--apple] [--extension] [--mime-encoding]
            [--mime-type] [-e <testname>] [-F <separator>]  [-f <namefile>]
            [-m <magicfiles>] [-P <parameter=value>] [--exclude-quiet]
            <file> ...
       file -C [-m <magicfiles>]
       file [--help]
~/AOS_Lab1$ file -b file2.txt
ASCII text
~/AOS_Lab1$ file first/*
first/2024-01-07-notebook-2.ipynb: ASCII text
first/Screenshot (6).png:          PNG image data, 1920 x 1080, 8-bit/color RGBA, non-interlaced
first/img1.jpg:                    empty
first/python.py:                   empty
first/second:                      directory
~/AOS_Lab1$ file -c
cont    offset  type    opcode  mask    value   desc
~/AOS_Lab1$ file -f
file: option requires an argument -- 'f'
Usage: file [-bcCdEhikLlNnprsSvzZ0] [--apple] [--extension] [--mime-encoding]
            [--mime-type] [-e <testname>] [-F <separator>]  [-f <namefile>]
            [-m <magicfiles>] [-P <parameter=value>] [--exclude-quiet]
            <file> ...
       file -C [-m <magicfiles>]
       file [--help]
~/AOS_Lab1$ file -F - file2.txt
file2.txt- ASCII text
~/AOS_Lab1$ file -i file4.txt
file4.txt: text/plain; charset=us-ascii
~/AOS_Lab1$ file -N *
2024-01-07-desktop-2.x11: empty
Data: directory
Desktop: directory
Documents: directory
Downloads: directory
Extra: directory
File1Dir: directory
File2Dir: directory
file2.txt: ASCII text
file4.txt: ASCII text
first: directory
link.txt: empty
~/AOS_Lab1$ 
```

7. chmod: In Unix operating systems, the **chmod** command is used to change the access mode of a file. The name is an abbreviation of **change mode**.

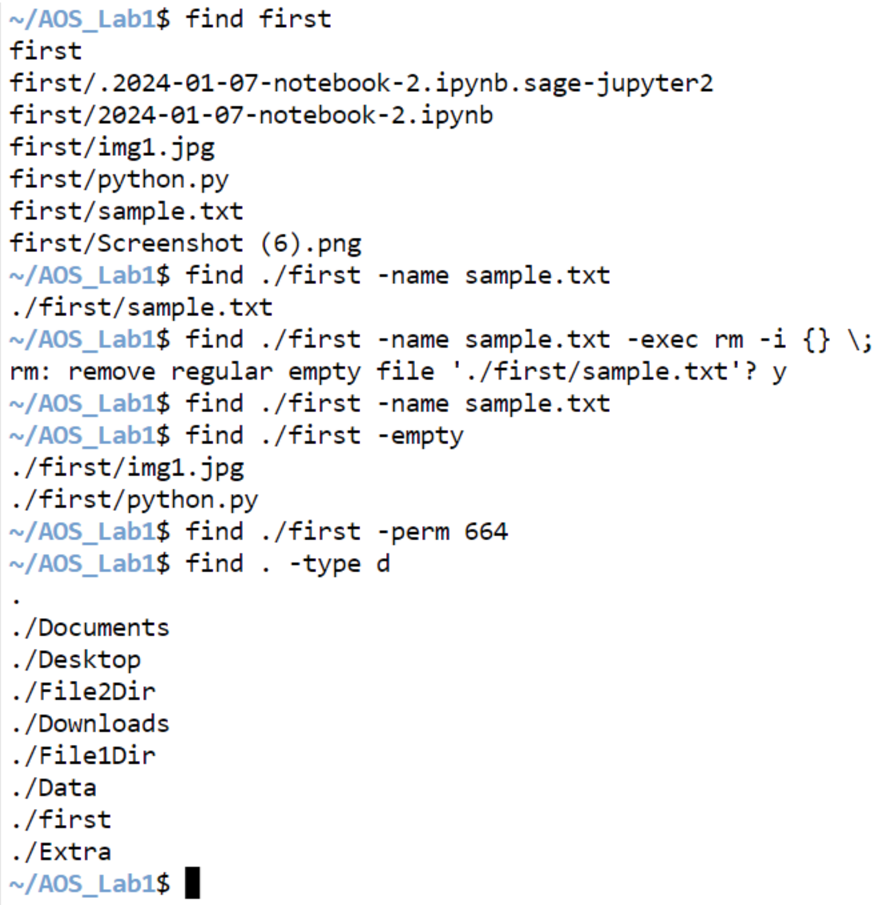


```
~/AOS_Lab1$ ls -l file2.txt
-rw-r--r-- 1 user user 47 Jan  7 10:15 file2.txt
~/AOS_Lab1$ chmod u+rwx file2.txt
~/AOS_Lab1$ ls -l file2.txt
-rwxr--r-- 1 user user 47 Jan  7 10:15 file2.txt
~/AOS_Lab1$ chmod go-w file2.txt
~/AOS_Lab1$ ls -l file2.txt
-rwxr--r-- 1 user user 47 Jan  7 10:15 file2.txt
~/AOS_Lab1$ chmod u+rw,go+r file2.txt
~/AOS_Lab1$ ls -l file2.txt
-rwxr--r-- 1 user user 47 Jan  7 10:15 file2.txt
~/AOS_Lab1$ chmod 777 file2.txt
```



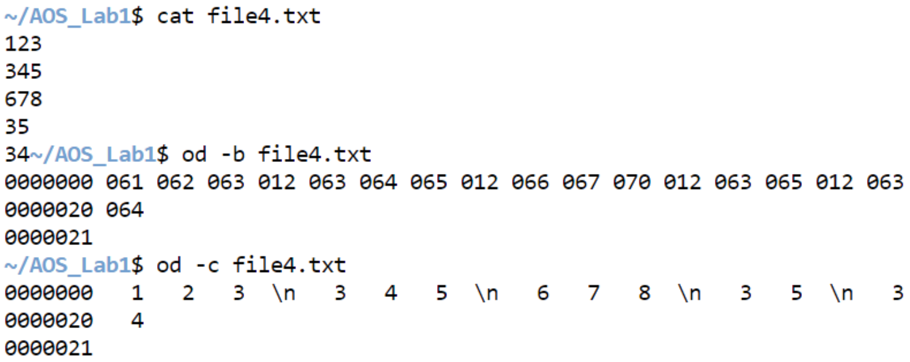
```
~/AOS_Lab1$ ls -l file2.txt
-rwxrwxrwx 1 user user 47 Jan  7 10:15 file2.txt
~/AOS_Lab1$ 
```

8. find: The find command in Linux is a dynamic utility designed for comprehensive file and directory searches within a hierarchical structure. Its adaptability allows users to search by name, size, modification time, or content, providing a flexible and potent solution.

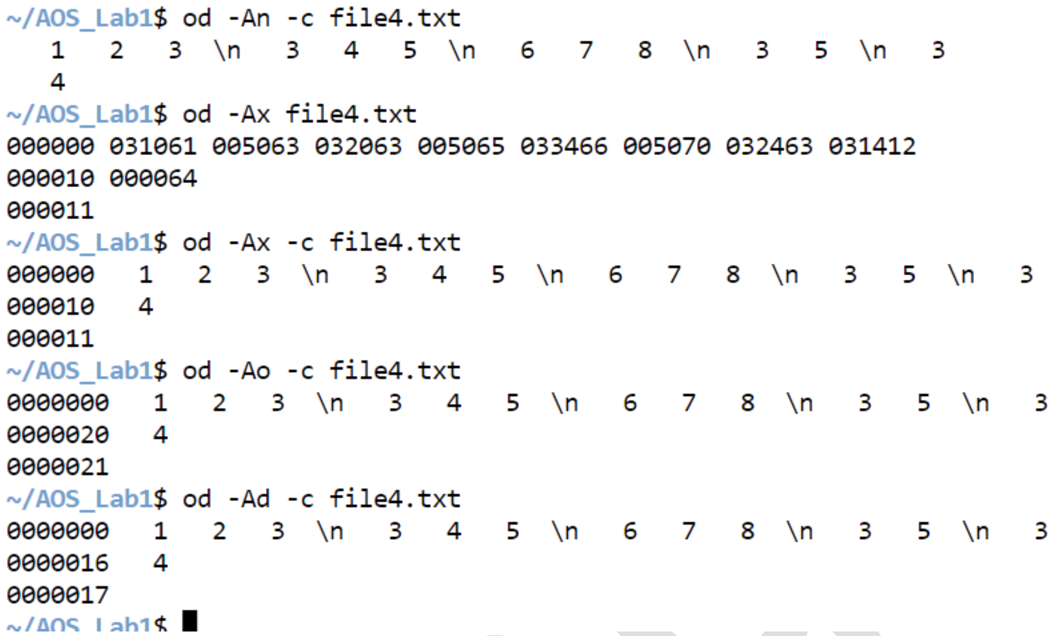


```
~/AOS_Lab1$ find first
first
first/.2024-01-07-notebook-2.ipynb.sage-jupyter2
first/2024-01-07-notebook-2.ipynb
first/img1.jpg
first/python.py
first/sample.txt
first/Screenshot (6).png
~/AOS_Lab1$ find ./first -name sample.txt
./first/sample.txt
~/AOS_Lab1$ find ./first -name sample.txt -exec rm -i {} \;
rm: remove regular empty file './first/sample.txt'? y
~/AOS_Lab1$ find ./first -name sample.txt
~/AOS_Lab1$ find ./first -empty
./first/img1.jpg
./first/python.py
~/AOS_Lab1$ find ./first -perm 664
~/AOS_Lab1$ find . -type d
.
./Documents
./Desktop
./File2Dir
./Downloads
./File1Dir
./Data
./first
./Extra
~/AOS_Lab1$ 
```

9. od: **od** command in Linux is used to convert the content of input in different formats with octal format as the default format.

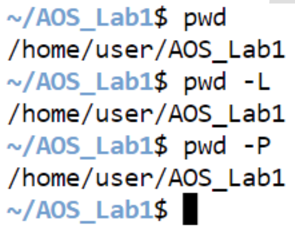


```
~/AOS_Lab1$ cat file4.txt
123
345
678
35
34~/AOS_Lab1$ od -b file4.txt
0000000 061 062 063 012 063 064 065 012 066 067 070 012 063 065 012 063
0000020 064
0000021
~/AOS_Lab1$ od -c file4.txt
0000000   1   2   3  \n   3   4   5  \n   6   7   8  \n   3   5  \n   3
0000020   4
0000021
```



```
~/AOS_Lab1$ od -An -c file4.txt
   1   2   3  \n   3   4   5  \n   6   7   8  \n   3   5  \n   3
   4
~/AOS_Lab1$ od -Ax file4.txt
000000 031061 005063 032063 005065 033466 005070 032463 031412
000010 000064
000011
~/AOS_Lab1$ od -Ax -c file4.txt
000000   1   2   3  \n   3   4   5  \n   6   7   8  \n   3   5  \n   3
000010   4
000011
~/AOS_Lab1$ od -Ao -c file4.txt
0000000   1   2   3  \n   3   4   5  \n   6   7   8  \n   3   5  \n   3
0000020   4
0000021
~/AOS_Lab1$ od -Ad -c file4.txt
0000000   1   2   3  \n   3   4   5  \n   6   7   8  \n   3   5  \n   3
0000016   4
0000017
~/AOS_Lab1$ █
```

10. pwd: The 'pwd,' which stands for "print working directory." In this article, we will delve into the 'pwd' command, exploring its functionality, usage, and various examples. It prints the path of the working directory, starting from the root.



```
~/AOS_Lab1$ pwd
/home/user/AOS_Lab1
~/AOS_Lab1$ pwd -L
/home/user/AOS_Lab1
~/AOS_Lab1$ pwd -P
/home/user/AOS_Lab1
~/AOS_Lab1$ █
```

11. locate: *locate* command in Linux is used to find the files by name. There are two most widely used file-searching utilities accessible to users called to find and *locate*.

Syntax of `locate` command in Linux
locate [OPTION]... PATTERN...

12.Updated: The 'update' command for Linux is a fundamental command for system maintenance. To update the package lists for upgrades and new package installations, use 'sudo apt-get update' or 'sudo apt update'. For a complete system update, use the 'upgrade' command after the 'update' command.

Syntax:
'sudo apt-get update' or 'sudo apt update'

13. Mount: **mount** command is used to mount the filesystem found on a device to big tree structure(**Linux** filesystem) rooted at '**/**'.

Some Important Options:

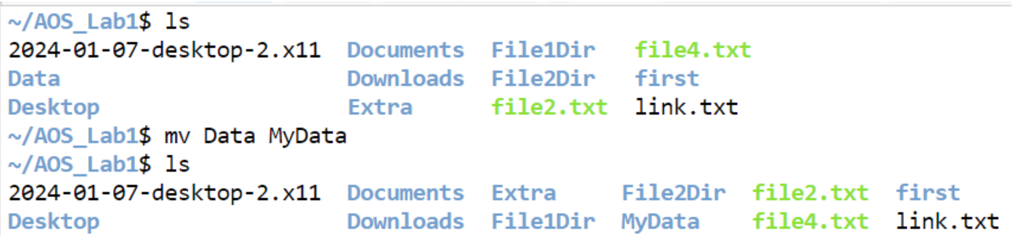
- **l** : Lists all the file systems mounted yet.
- **h** : Displays options for command.
- **V** : Displays the version information.
- **a** : Mounts all devices described at **/etc/fstab**.
- **t** : Type of filesystem device uses.
- **T** : Describes an alternative fstab file.
- **r** : Read-only mode mounted.

14. Unmount: The **umount** command detaches the file system(s) mentioned from the file hierarchy. A file system is specified by giving the directory where it has been mounted. Giving the special device on which the file system lives may also work, but is obsolete, mainly because it will fail in case this device was mounted on more than one directory.

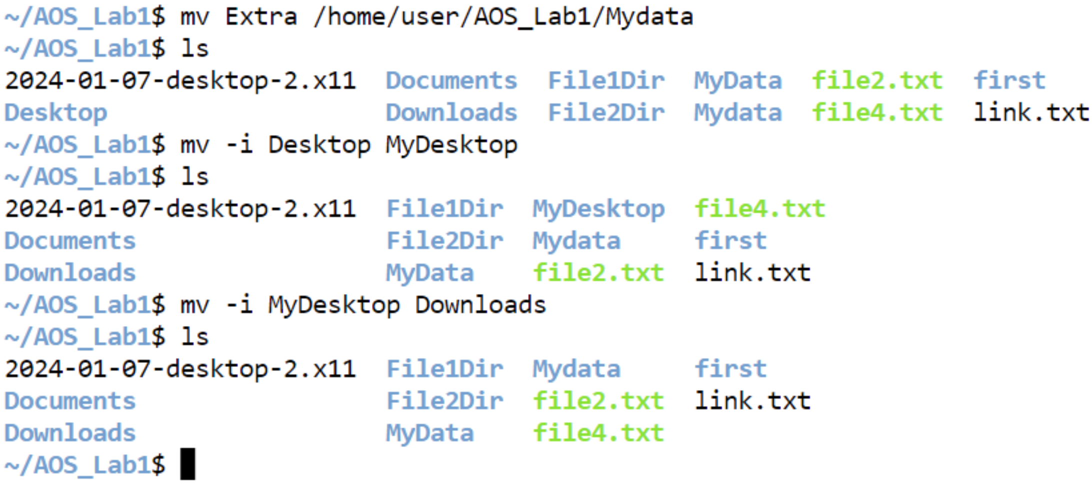
Some Important Options:

-V: Print version information and exit.
-h: Print a help message and exit.
-v: Run in verbose mode.
-n: Unmount without writing in /etc/mtab.
-r: In case unmounting fails, try to remount read-only.
-d: In case the unmounted device was a loop device, also free this loop device.
-i: Don't call the /sbin/umount.filesystem helper even if it exists. By default /sbin/umount.filesystem helper is called if one exists.
-a: All of the file systems described in /etc/mtab are to be unmounted. (With umount version 2.7 and later, the proc filesystem is not unmounted.)

15. mv: The `mv` command in Linux is like a superhero tool that can do a bunch of cool stuff with your files and folders.



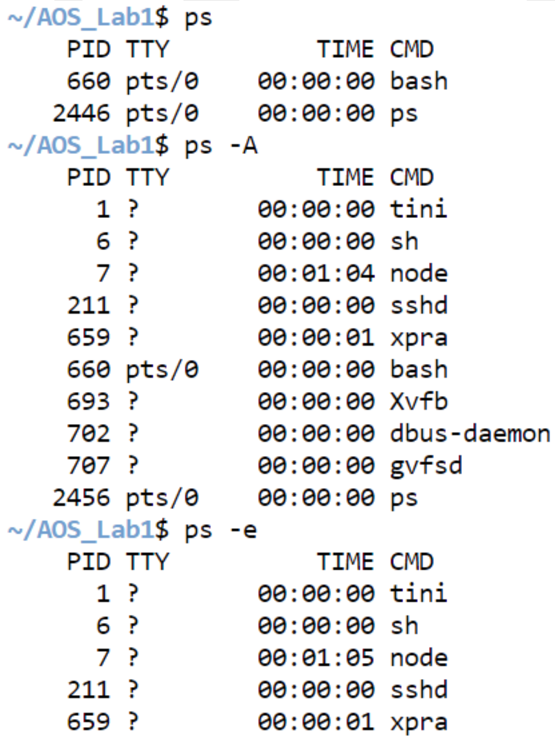
```
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  Documents  File1Dir  file4.txt
Data                      Downloads  File2Dir  first
Desktop                   Extra      file2.txt  link.txt
~/AOS_Lab1$ mv Data MyData
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  Documents  Extra     File2Dir  file2.txt  first
Desktop                   Downloads  File1Dir  MyData    file4.txt  link.txt
```



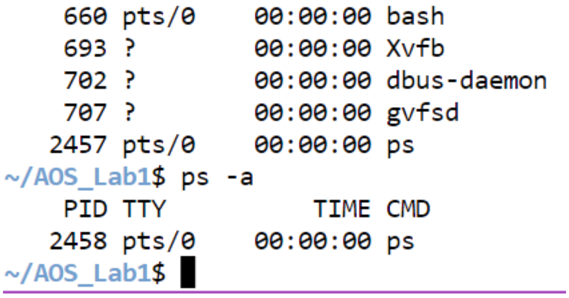
```
~/AOS_Lab1$ mv Extra /home/user/AOS_Lab1/Mydata
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  Documents  File1Dir  MyData  file2.txt  first
Desktop                   Downloads  File2Dir  Mydata  file4.txt  link.txt
~/AOS_Lab1$ mv -i Desktop MyDesktop
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  File1Dir  MyDesktop  file4.txt
Documents                 File2Dir  Mydata     first
Downloads                 MyData    file2.txt  link.txt
~/AOS_Lab1$ mv -i MyDesktop Downloads
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  File1Dir  Mydata     first
Documents                 File2Dir  file2.txt  link.txt
Downloads                 MyData    file4.txt
~/AOS_Lab1$ █
```

D. Process Managment:

1. ps: The `**ps**` command, which stands for "process status," is like a computer tool that helps you see what's happening inside your Linux computer. Imagine your computer is doing several things simultaneously, like running different programs or apps.

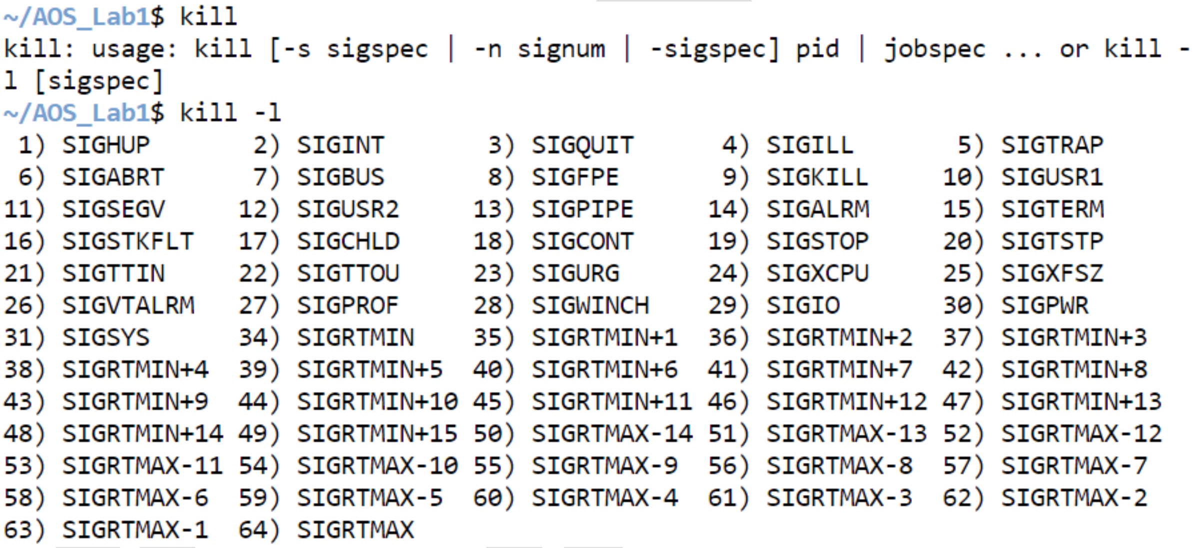


```
~/AOS_Lab1$ ps
    PID TTY          TIME CMD
    660 pts/0    00:00:00 bash
   2446 pts/0    00:00:00 ps
~/AOS_Lab1$ ps -A
    PID TTY          TIME CMD
      1 ?        00:00:00 tini
      6 ?        00:00:00 sh
      7 ?        00:01:04 node
    211 ?        00:00:00 sshd
    659 ?        00:00:01 xpra
    660 pts/0    00:00:00 bash
    693 ?        00:00:00 Xvfb
    702 ?        00:00:00 dbus-daemon
    707 ?        00:00:00 gvfsd
   2456 pts/0    00:00:00 ps
~/AOS_Lab1$ ps -e
    PID TTY          TIME CMD
      1 ?        00:00:00 tini
      6 ?        00:00:00 sh
      7 ?        00:01:05 node
    211 ?        00:00:00 sshd
    659 ?        00:00:01 xpra
```



```
    660 pts/0    00:00:00 bash
    693 ?        00:00:00 Xvfb
    702 ?        00:00:00 dbus-daemon
    707 ?        00:00:00 gvfsd
   2457 pts/0    00:00:00 ps
~/AOS_Lab1$ ps -a
    PID TTY          TIME CMD
   2458 pts/0    00:00:00 ps
~/AOS_Lab1$ █
```

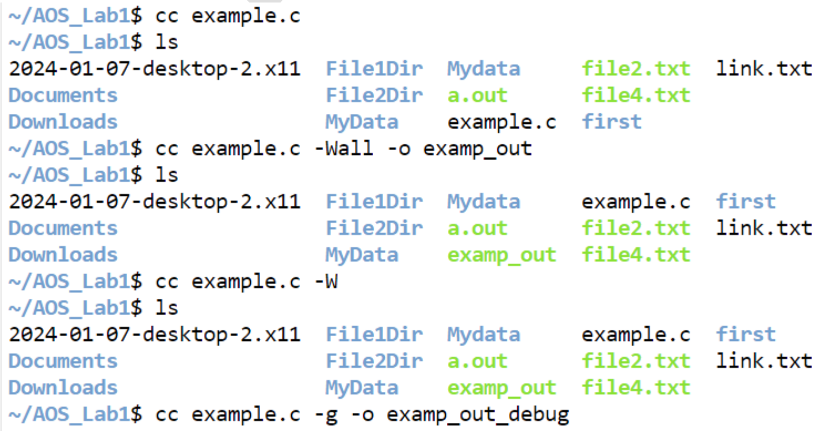
2. kill: kill command in Linux (located in /bin/kill), is a built-in command which is used to terminate processes manually. *kill* command sends a signal to a process that terminates the process.



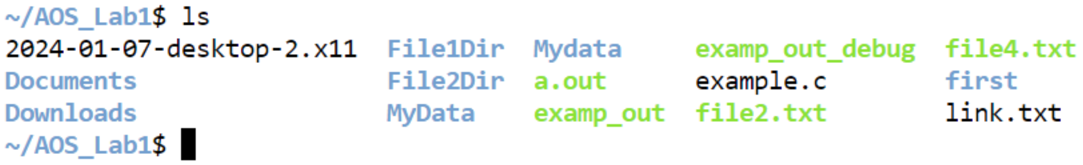
```
~/AOS_Lab1$ kill
kill: usage: kill [-s sigspec | -n signum | -sigspec] pid | jobspec ... or kill -
l [sigspec]
~/AOS_Lab1$ kill -l
 1) SIGHUP       2) SIGINT       3) SIGQUIT      4) SIGILL       5) SIGTRAP
 6) SIGABRT      7) SIGBUS       8) SIGFPE       9) SIGKILL     10) SIGUSR1
11) SIGSEGV     12) SIGUSR2     13) SIGPIPE     14) SIGALRM     15) SIGTERM
16) SIGSTKFLT   17) SIGCHLD     18) SIGCONT     19) SIGSTOP     20) SIGTSTP
21) SIGTTIN     22) SIGTTOU     23) SIGURG      24) SIGXCPU     25) SIGXFSZ
26) SIGVTALRM   27) SIGPROF     28) SIGWINCH    29) SIGIO       30) SIGPWR
31) SIGSYS      34) SIGRTMIN    35) SIGRTMIN+1  36) SIGRTMIN+2  37) SIGRTMIN+3
38) SIGRTMIN+4  39) SIGRTMIN+5  40) SIGRTMIN+6  41) SIGRTMIN+7  42) SIGRTMIN+8
43) SIGRTMIN+9  44) SIGRTMIN+10 45) SIGRTMIN+11 46) SIGRTMIN+12 47) SIGRTMIN+13
48) SIGRTMIN+14 49) SIGRTMIN+15 50) SIGRTMAX-14 51) SIGRTMAX-13 52) SIGRTMAX-12
53) SIGRTMAX-11 54) SIGRTMAX-10 55) SIGRTMAX-9  56) SIGRTMAX-8  57) SIGRTMAX-7
58) SIGRTMAX-6  59) SIGRTMAX-5  60) SIGRTMAX-4  61) SIGRTMAX-3  62) SIGRTMAX-2
63) SIGRTMAX-1  64) SIGRTMAX
```

E. Compliation and Debugging:

1. cc: **cc** command is stands for **C Compiler**, usually an alias command to *gcc* or *clang*. As the name suggests, executing the cc command will usually call the **gcc** on Linux systems. It is used to compile the C language codes and create executables.

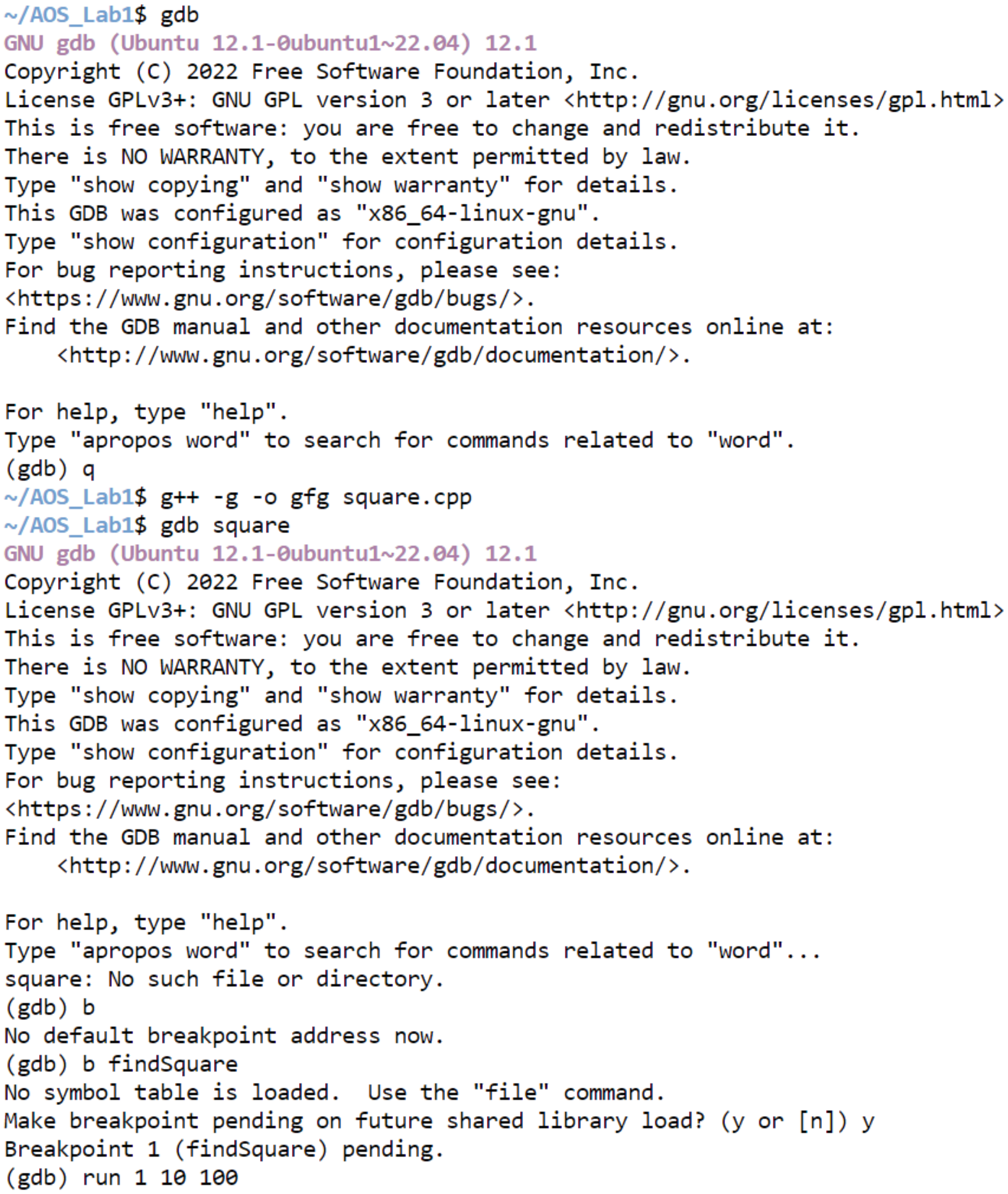


```
~/AOS_Lab1$ cc example.c
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  File1Dir  Mydata     file2.txt  link.txt
Documents                 File2Dir  a.out      file4.txt
Downloads                 MyData    example.c  first
~/AOS_Lab1$ cc example.c -Wall -o examp_out
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  File1Dir  Mydata     example.c  first
Documents                 File2Dir  a.out      file2.txt  link.txt
Downloads                 MyData    examp_out  file4.txt
~/AOS_Lab1$ cc example.c -W
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  File1Dir  Mydata     example.c  first
Documents                 File2Dir  a.out      file2.txt  link.txt
Downloads                 MyData    examp_out  file4.txt
~/AOS_Lab1$ cc example.c -g -o examp_out_debug
```



```
~/AOS_Lab1$ ls
2024-01-07-desktop-2.x11  File1Dir  Mydata     examp_out_debug  file4.txt
Documents                 File2Dir  a.out      example.c        first
Downloads                 MyData    examp_out  file2.txt        link.txt
~/AOS_Lab1$ █
```

2. gdb: **gdb** is the acronym for GNU Debugger. This tool helps to debug the programs written in C, C++, Ada, Fortran, etc. The console can be opened using the **gdb** command on terminal.



```
~/AOS_Lab1$ gdb
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1
Copyright (C) 2022 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word".
(gdb) q
~/AOS_Lab1$ g++ -g -o gfg square.cpp
~/AOS_Lab1$ gdb square
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1
Copyright (C) 2022 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
square: No such file or directory.
(gdb) b
No default breakpoint address now.
(gdb) b findSquare
No symbol table is loaded.  Use the "file" command.
Make breakpoint pending on future shared library load? (y or [n]) y
Breakpoint 1 (findSquare) pending.
(gdb) run 1 10 100
```

F. Editors:

1. vi: The default editor that comes with the UNIX operating system is called **vi** (visual editor). Using vi editor, we can edit an existing file or create a new file from scratch. we can also use this editor to just read a text file. The advanced version of the vi editor is the **vim** editor.

2. joe: JOE was among the default editors in the early popular Linux distributions, which gave it some prominence and helped build a user base. It continues to be included as an option in Linux distributions, sometimes in the critical role as a "rescue mode" editor.

3. mcedit: mcedit is a link to mc, the main GNU Midnight Commander executable. Executing GNU Midnight Commander under this name requests staring the internal editor and opening the file specified on the command line. The editor is based on the terminal version of cooledit - standalone editor for X Window System.

4. emac: Emacs is a text editor designed for POSIX operating systems and available on Linux, BSD, macOS, Windows, and more. Users love Emacs because it features efficient commands for common but complex actions and for the plugins and configuration hacks that have developed around it for nearly 40 years.