1. **Ls**: List Files

```
                              csed@csed-VirtualBox: ~

 File  Edit  View  Search  Terminal  Help
csed@csed-VirtualBox:~$ ls
aradhak   Documents          hello    namay       Pictures    second      vishal.txt
desktop   Downloads          mayank   oslab       prog1.txt   Templates
Desktop   examples.desktop   Music    parmeshwar  Public      Videos
csed@csed-VirtualBox:~$
```

2. **Ls – a**: List even hidden files

```
csed@csed-VirtualBox:~$ ls -a
.                 .config           hello         oslab        .ssh                      vishal.txt
..                desktop           .ICEauthority parmeshwar   .sudo_as_admin_successful .vishal.txt.swp
aradhak           Desktop           .local        Pictures     .sumOfSeries.sh.swp
.bash_history     Documents         mayank        .profile     .swp
.bash_logout      Downloads         .mozilla      prog1.txt    Templates
.bashrc           examples.desktop  Music         Public       Videos
.cache            .gnupg            namay         second       .viminfo
```

3. **Ls – l**: List contents of Directory

```
csed@csed-VirtualBox:~$ ls -l
total 80
-rw-rw-r-- 1 csed csed  207 Jul 29  2022 aradhak
drwxrwxr-x 3 csed csed 4096 Jul 27  2022 desktop
drwxr-xr-x 7 csed csed 4096 Jul 31 15:17 Desktop
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Documents
drwxr-xr-x 2 csed csed 4096 Nov 15  2022 Downloads
-rw-r--r-- 1 csed csed 8980 Nov 10  2021 examples.desktop
drwxrwxr-x 2 csed csed 4096 Jul 26  2022 hello
drwxrwxr-x 2 csed csed 4096 Aug 29  2023 mayank
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Music
drwxrwxr-x 3 csed csed 4096 Jul 25  2022 namay
drwxrwxr-x 2 csed csed 4096 May 13  2022 oslab
drwxrwxr-x 2 csed csed 4096 May 13  2022 parmeshwar
drwxr-xr-x 2 csed csed 4096 Aug  6 08:42 Pictures
-rw-rw-r-- 1 csed csed   24 Aug 29  2023 prog1.txt
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Public
drwxrwxr-x 2 csed csed 4096 Jul 25  2022 second
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Templates
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Videos
-rw-rw-r-- 1 csed csed    0 Aug 29  2023 vishal.txt
```

4. **ls -lh**: list directory contents in a long format with human-readable file sizes.

```
csed@csed-VirtualBox:~$ ls -lh
total 80K
-rw-rw-r-- 1 csed csed  207 Jul 29  2022 aradhak
drwxrwxr-x 3 csed csed 4.0K Jul 27  2022 desktop
drwxr-xr-x 7 csed csed 4.0K Jul 31 15:17 Desktop
drwxr-xr-x 2 csed csed 4.0K Nov 10  2021 Documents
drwxr-xr-x 2 csed csed 4.0K Nov 15  2022 Downloads
-rw-r--r-- 1 csed csed 8.8K Nov 10  2021 examples.desktop
drwxrwxr-x 2 csed csed 4.0K Jul 26  2022 hello
drwxrwxr-x 2 csed csed 4.0K Aug 29  2023 mayank
drwxr-xr-x 2 csed csed 4.0K Nov 10  2021 Music
drwxrwxr-x 3 csed csed 4.0K Jul 25  2022 namay
drwxrwxr-x 2 csed csed 4.0K May 13  2022 oslab
drwxrwxr-x 2 csed csed 4.0K May 13  2022 parmeshwar
drwxr-xr-x 2 csed csed 4.0K Aug  6 08:42 Pictures
-rw-rw-r-- 1 csed csed   24 Aug 29  2023 prog1.txt
drwxr-xr-x 2 csed csed 4.0K Nov 10  2021 Public
drwxrwxr-x 2 csed csed 4.0K Jul 25  2022 second
drwxr-xr-x 2 csed csed 4.0K Nov 10  2021 Templates
drwxr-xr-x 2 csed csed 4.0K Nov 10  2021 Videos
-rw-rw-r-- 1 csed csed    0 Aug 29  2023 vishal.txt
```

5. **ls -R**: Lists all files and directories recursively, showing the contents of all subdirectories.

```
csed@csed-VirtualBox:~$ ls -R
.:
aradhak    Documents         hello    namay       Pictures   second      vishal.txt
desktop    Downloads         mayank   oslab       prog1.txt  Templates
Desktop    examples.desktop  Music    parmeshwar  Public     Videos

./desktop:
s    test.txt

./desktop/s:

./Desktop:
 a.out    deadshot    hii          pv     recv       recvr.c    "sender.c'"   UDPServer.c
 coe      hey2        npEval.odt   rcvs   recvr2.c   sender.c   sndr

./Desktop/coe:
os

./Desktop/coe/os:
hey

./Desktop/coe/os/hey:

./Desktop/deadshot:
a.out   c   s   UDPClient.c   UDPServer.c

./Desktop/hey2:

./Desktop/hii:
list

./Desktop/pv:

./Documents:

./Downloads:
npEval.pdf   SendAnywhere_263774.zip
```

6. **ls -t**: lists files and directories sorted by modification time, with the most recently modified items appearing first.

```
csed@csed-VirtualBox:~$ ls -t
Pictures   prog1.txt    aradhak    second    parmeshwar   Public      examples.desktop
Desktop    vishal.txt   desktop    namay     Documents    Templates
mayank     Downloads    hello      oslab     Music        Videos
```

7. **ls -s**: list directory contents along with their sizes.

```
csed@csed-VirtualBox:~$ ls -s
total 80
 4 aradhak     4 Documents        4 hello     4 namay       4 Pictures    4 second      0 vishal.txt
 4 desktop     4 Downloads        4 mayank    4 oslab       4 prog1.txt   4 Templates
 4 Desktop    12 examples.desktop 4 Music     4 parmeshwar  4 Public      4 Videos
```

8. **ls ../**: command lists the contents of the parent directory

```
csed@csed-VirtualBox:~$ ls ../
csed
```

9. **ls -lx**: lists directory contents in long format (-l) and sorts them by extension (-x).

```
csed@csed-VirtualBox:~$ ls -lX
total 80
-rw-rw-r-- 1 csed csed  207 Jul 29  2022 aradhak
drwxrwxr-x 3 csed csed 4096 Jul 27  2022 desktop
drwxr-xr-x 7 csed csed 4096 Jul 31 15:17 Desktop
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Documents
drwxr-xr-x 2 csed csed 4096 Nov 15  2022 Downloads
drwxrwxr-x 2 csed csed 4096 Jul 26  2022 hello
drwxrwxr-x 2 csed csed 4096 Aug 29  2023 mayank
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Music
drwxrwxr-x 3 csed csed 4096 Jul 25  2022 namay
drwxrwxr-x 2 csed csed 4096 May 13  2022 oslab
drwxrwxr-x 2 csed csed 4096 May 13  2022 parmeshwar
drwxr-xr-x 2 csed csed 4096 Aug  6 08:42 Pictures
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Public
drwxrwxr-x 2 csed csed 4096 Jul 25  2022 second
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Templates
drwxr-xr-x 2 csed csed 4096 Nov 10  2021 Videos
-rw-r--r-- 1 csed csed 8980 Nov 10  2021 examples.desktop
-rw-rw-r-- 1 csed csed   24 Aug 29  2023 prog1.txt
-rw-rw-r-- 1 csed csed    0 Aug 29  2023 vishal.txt
```

10. **ls d */**: Lists all directories in the current location without showing their contents.

```
csed@csed-VirtualBox:~$ ls d */
ls: cannot access 'd': No such file or directory
desktop/:
s   test.txt

Desktop/:
 a.out    deadshot   hii          pv      recv       recvr.c    "sender.c'"   UDPServer.c
 coe      hey2       npEval.odt   rcvs    recvr2.c   sender.c   sndr

Documents/:

Downloads/:
npEval.pdf   SendAnywhere_263774.zip

hello/:

mayank/:
maxx.sh   mayank.sh

Music/:

namay/:
coe1.txt   first

oslab/:
oddeven.sh   primeno.sh   sumofseries.sh

parmeshwar/:

Pictures/:
'Screenshot from 2022-11-15 16-57-57.png'   'Screenshot from 2022-11-16 14-53-59.png'
'Screenshot from 2022-11-15 17-00-09.png'   'Screenshot from 2022-11-16 14-54-00.png'
'Screenshot from 2022-11-15 17-01-29.png'   'Screenshot from 2024-08-06 08-35-09.png'
'Screenshot from 2022-11-15 17-03-11.png'   'Screenshot from 2024-08-06 08-39-12.png'
'Screenshot from 2022-11-16 14-51-55.png'   'Screenshot from 2024-08-06 08-41-37.png'
'Screenshot from 2022-11-16 14-51-59.png'   'Screenshot from 2024-08-06 08-42-11.png'

Public/:
```

11. **ls -g**: lists directory contents in long format without showing the owner information.

12. ls -n: lists directory contents in long format, displaying numeric user and group IDs instead of names.

13. ls –color: lists directory contents with color-coded output to distinguish file types.

14. **ls -p**: lists directory contents and appends a / to directory names to distinguish them

```
csed@csed-VirtualBox:~$ ls -p
aradhak    Documents/       hello/    namay/        Pictures/  second/     vishal.txt
desktop/   Downloads/       mayank/   oslab/        prog1.txt  Templates/
Desktop/   examples.desktop Music/    parmeshwar/   Public/    Videos/
```

from files.

15. **cat prog1.txt**: displays the contents of the file

```
csed@csed-VirtualBox:~$ cat prog1.txt
echo "hello mayank"
:w
```

16. **cat oddeven.sh primeno.sh**: displays the contents of both files

```
csed@csed-VirtualBox:~/oslab$ cat oddeven.sh primeno.sh
echo 'enter number'
read num
ans=`expr $num \% 2`
echo $ans
if [ $ans -eq 0 ]
then
echo 'even'
else
        echo 'odd'
fi
echo 'prime no.'

i=1
```

17. **cat -n oddeven.sh**: display content with line number

```
csed@csed-VirtualBox:~/oslab$ cat -n oddeven.sh
     1  echo 'enter number'
     2  read num
     3  ans=`expr $num \% 2`
     4  echo $ans
     5  if [ $ans -eq 0 ]
     6  then
     7  echo 'even'
     8  else
     9          echo 'odd'
    10  fi
```

18. **cat > newfile.txt**: create newfile with option to add text

```
csed@csed-VirtualBox:~/oslab$ cat >newfile.txt
yo yo this is lab
^C
csed@csed-VirtualBox:~/oslab$ cat newfile.txt
yo yo this is lab
```

19. **cat /etc/shells**: displays the contents of the /etc/shells file, which lists all the valid login shells available on our system.

```
csed@csed-VirtualBox:~$ cat /etc/shells
# /etc/shells: valid login shells
/bin/sh
/bin/bash
/bin/rbash
/bin/dash
/usr/bin/tmux
/bin/zsh
/usr/bin/zsh
```

20. **sudo apt-get install**: to install software packages on Ubuntu.

```
csed@csed-VirtualBox:~$ sudo apt-get install
[sudo] password for csed:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  linux-hwe-5.4-headers-5.4.0-100 linux-hwe-5.4-headers-5.4.0-110 linux-hwe-5.4-hea
  linux-hwe-5.4-headers-5.4.0-131 linux-hwe-5.4-headers-5.4.0-42 linux-hwe-5.4-head
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 55 not upgraded.
```

21. **cat b.txt**: create txt file

```
csed@csed-VirtualBox:~$ cat b.txt
okay
csed@csed-VirtualBox:~$ cat b.txt > we.txt
csed@csed-VirtualBox:~$ cat we.txt
okay
```

22. **cat c.txt >> we.txt**: appends the contents of c.txt to the end of d.txt. If d.txt does not exist, it will be created.

```
csed@csed-VirtualBox:~$ cat c.txt >> we.txt
csed@csed-VirtualBox:~$ cat we.txt
okay
okay

hello

bye
```

23. **cat -E c.txt**: Displays the contents of c.txt with a $ at the end of each line to show line

```
csed@csed-VirtualBox:~$ cat c.txt
okay

hello

bye
csed@csed-VirtualBox:~$ tac c.txt
bye

hello

okay
```

endings.

```
csed@csed-VirtualBox:~$ cat -E c.txt
okay$
$
hello$
$
bye$
```

24. **cat c.txt | more**: Displays the contents of c.txt one page at a time using the more command for easier reading.

```
csed@csed-VirtualBox:~$ cat c.txt|more
okay

hello

bye
```

25**. cat c.txt d.txt > we.txt**: Concatenates the contents of c.txt and d.txt into a new file we.txt, overwriting we.txt if it exists.

```
bye
csed@csed-VirtualBox:~$ cat c.txt d.txt > we.txt
csed@csed-VirtualBox:~$ cat we.txt
okay

hello

bye
oraNGE

BLUEW

121212

yellow

computer

hp
thapar
sky

cricket

football

13
```

26. **cat *.txt**: Displays the contents of all .txt files in the current directory.

```
csed@csed-VirtualBox:~$ cat *.txt
okay
okay

hello

bye
oraNGE


BLUEW

121212

yellow

computer

hp

thapar

sky

cricket

football

13
hi
hhello everyone
hello to operating systems.
4
$
q
navigate using arrow keys after pressing escape plus i (small letter).
writing another line.
bye
.
this is append number 2.
```

27. **ls | wc**: Lists the number of lines, words, and bytes.

```
csed@csed-VirtualBox:~$ ls | wc
     61      63     495
```

28. **echo $PATH**: Displays the current value of the PATH environment variable, which lists directories where executable files are located.

```
     61      63     495
csed@csed-VirtualBox:~$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/
```

29. **type cat**: Displays the type of command, whether a built-in shell command, an alias, or an external executable.

```
/usr/tocat/sotii./usr/tocat/otii./usr/sotii./usr/otii./sbti
csed@csed-VirtualBox:~$ type cat
cat is hashed (/bin/cat)
```

30. **ls; pwd; whoami:** List files, directories, current working directory, and shows current user's username.

```
csed@csed-VirtualBox:~$ ls; pwd; whoami
 Aaryan.c    aradhak          b.txt       Downloads         fcfs_imp.c   ipc
 a.cpp       ashish.cpp       c.txt       d.txt             file         ipc.c
 anu         ashish.cpp.save  desktop     examples.desktop  file1        lab1.sh
 anu.c       bruh             Desktop     fcfs.cpp          geeks.txt    lab.sh
 a.out       bruhh            Documents   fcfs_imp          hello        list
/home/csed
csed
```

31. **echo hello, my name is sam >> neww.txt:** Appends the text "hello, my name is sam" to the end of neww.txt. If neww.txt doesn't exist, it will be created.

```
csed@csed-VirtualBox:~$ echo hello, my name is sam >> neww.txt
csed@csed-VirtualBox:~$ cat neww.txt
hello, my name is sam
```

32. **echo -e "abc \bklm \bxyz"**: Uses the -e option to enable interpretation of backslash escapes. The \b escape sequence represents a backspace.

```
csed@csed-VirtualBox:~$ echo -e "abc \bklm \bxyz"
abcklmxyz
```

33. **echo -e "abc \cabc abc":** The \c escape sequence suppresses any further output.

```
csed@csed-VirtualBox:~$ echo -e "abc \cabc abc"
abc csed@csed-VirtualBox:~$
```

34. **echo -e "abc \nklm \nxyz":** The \n inserts text in new line.

```
abc csed@csed-VirtualBox:~$ echo -e "abc \nklm \nxyz"
abc
klm
xyz
```

35. **echo -e "abc \vklm \vxyz":** The \v inserts text in new line and vertically.

```
csed@csed-VirtualBox:~$ echo -e "abc \vklm \vxyz"
abc
    klm
        xyz
```

36. **echo ***: lists all files and directories in the current directory.

```
csed@csed-VirtualBox:~$ echo *
Aaryan.c a.cpp anu anu.c a.out aradhak ashish.cpp ashish.cpp.save bruh bruhh b.txt
ipc ipc.c lab1.sh lab.sh list lovedeep.txt Music namay neww.txt okay oslab parmeshw
thread thread1.cpp thread.cpp Untitled Document 1.sh vandita.txt vaniya.txt Videos
csed@csed-VirtualBox:~$
```

37. pwd: Shows **P**resent **W**orking **D**irectory.

```
csed@csed-VirtualBox:~$ pwd
/home/csed
```

38. **history:** displays previously executed commands.

```
csed@csed-VirtualBox:~$ history
    1  su
    2  sudo apt install update
    3  sudo apt install build-essential
    4  sudo apt install update
    5  sudo apt update
    6  sudo apt install update
    7  sudo apt update
    8  sudo apt install build-essential
    9  gcc --version
   10  sudo apt install gcc
   11  sudo apt install gcc-c++
   12  sudo apt update
   13  sudo apt install gcc
   14  sudo apt update
   15  java --version
   16  su
   17  sudo apt update
   18  ls
   19  cd Desktop
   20  ls
   21  touch file1
   22  rm file1
   23  touch forgn.c
   24  cc forgn.c
```

39. **mkdir sumit: M**ake **D**irecotory named as 'sumit'.

```
csed@csed-VirtualBox:~$ mkdir sumit
csed@csed-VirtualBox:~$ cd sumit
csed@csed-VirtualBox:~/sumit$
```

40. **cd sumit1**: **C**hange **D**irectory to sumit1.
41. **Touch newtext.txt:** Creates empty file.

```
csed@csed-VirtualBox:~/sumit$ mkdir sumit1
csed@csed-VirtualBox:~/sumit$ cd sumit1
csed@csed-VirtualBox:~/sumit/sumit1$ touch newtext.txt
csed@csed-VirtualBox:~/sumit/sumit1$ la
newtext.txt
```

42. **echo -e "aabc xyx"**: alert return with -e to have a sound alert.

```
ubuntu@ubuntu-VirtualBox:~$ echo -e "aabc xyx"
aabc xyx
```

43. **cd /** : go to root directory.

44. **cd ~** : go to home diretory.

45. **cd ..** : move to parent directory of current directory or one level up.

46. **cd -** : go to previous directory.

```
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ cd /
ubuntu@ubuntu-VirtualBox:/$ cd ~
ubuntu@ubuntu-VirtualBox:~$ cd ..
ubuntu@ubuntu-VirtualBox:/home$ cd -
/home/ubuntu
```

47. **cd ~username**: go to username's directory.

48. **shutdown/poweroff**: shuts down the machine.

49. **rmdir**: remove directory.

50. **rmdir -p**: removes the directory with all the sub- directory as well.

51. **rm:** remove files/directories.

52. **zip/unzip**: compress and archive files or vice versa.

53. **ping**: check connection to a server.

```
ubuntu@ubuntu-VirtualBox:~$ ping www.google.com
PING www.google.com (172.217.166.4) 56(84) bytes of data.
64 bytes from del03s17-in-f4.1e100.net (172.217.166.4): icmp_seq=1 ttl=118 time=
16.6 ms
64 bytes from del03s17-in-f4.1e100.net (172.217.166.4): icmp_seq=2 ttl=118 time=
18.6 ms
64 bytes from del03s17-in-f4.1e100.net (172.217.166.4): icmp_seq=3 ttl=118 time=
18.9 ms
64 bytes from del03s17-in-f4.1e100.net (172.217.166.4): icmp_seq=4 ttl=118 time=
16.9 ms
64 bytes from del03s17-in-f4.1e100.net (172.217.166.4): icmp_seq=5 ttl=118 time=
17.5 ms
```

54. **clear:** clear screen (terminal).

55. **head:** displays first 10 lines of a file.

```
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ head 1.sh
#!/bin/bash
read -p "Enter 1st number" n1
read -p "Enter 2nd number" n2
sum=$((n1 + n2))
echo "sum is $sum"ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$
```

56.**tail:** displays last 10 lines of a file.

57. **cal:** to see calendar.

```
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ cal
      August 2024
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
```

58. **who**: see current user.

```
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ who
ubuntu   seat0           2024-08-29 04:31 (login screen)
ubuntu   :0              2024-08-29 04:31 (:0)
```

59. **wc:** count lines, words, letters.

60. **man**: see user manual (detail view) of any command.

61. **help**: see info about shell built-in commmands.

62. **printf**: to print something.

63. **passwd**: change user account password.

64. **uname**: prints basic info about OS name.

65. **uname -s**: prints kernel name.

66. **tty**: prints info related to terminal.

67. **stty**: used to change and print terminal line settings.

```
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ uname
Linux
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ uname -s
Linux
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ tty
/dev/pts/0
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ stty
speed 38400 baud; line = 0;
-brkint -imaxbel iutf8
```

68. **comm**: compare 2 sorted file line by line and print it.

69. **cmp:** compare the two files byte by byte.

70. **diff:** display the differences in the files by comparing the files line by line.

71. **- rwx rwx rwx:** Owner, Group, Other

72. **chmod 751 myfile:** Read, write, exe to owner, read and exe to group, exe to other users.

73. **find ~ -name readme.txt :** Search the entire filesystem.

74. **expr 8+5:** expr command performs aithmetic operations and evaluates strings etc.

```
ubuntu@ubuntu-VirtualBox:/media/sf_Ubuntu_Files$ expr 8 + 5
13
```