NAME: POOJA KIRAN KUMAR JAIN

1. File and Directory Operations (`ls`, `mkdir`, `cd`, `rmdir`, `pwd`, `rm`)

1. Use `ls` to display files sorted by modification time.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -t
abcd  test  dirA
```

2. List files and directories in reverse order using `ls`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -ltr
total 12
drwxr-xr-x 3 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb
 1 05:18 dirA
drwxr-xr-x 2 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb
 1 05:18 test
drwxr-xr-x 2 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb
 1 05:19 abcd
```

3. Use `ls -lh` to display file sizes in a human-readable format.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -lh
total 12K
drwxr-xr-x 2 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4.0K Feb  1 05:19 abcd
drwxr-xr-x 3 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4.0K Feb  1 05:18 dirA
drwxr-xr-x 2 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4.0K Feb  1 05:18 test
```

4. Create a directory structure `dirA/dirB/dirC` using `mkdir -p`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ mkdir -p dirA/dirB/dirC
```

5. Navigate to the parent directory of the current directory using `cd ..`

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cd ..
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/home$
```

6. Use `cd` to move into the `/tmp` directory and confirm your location with `pwd`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/home$ cd /tmp
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/tmp$ pwd
/tmp
```

7. Remove an empty directory named `old_dir` using `rmdir`.

```
old_dir
snap-private-tmp
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-logind.service-9eO7ZZ
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-resolved.service-bL3MvC
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-timesyncd.service-N1oaJa
systemd-private-b9e67063a26e42d499cc57b8e3706a35-wsl-pro.service-tdbYfY
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/tmp$ rmdir old_dir
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/tmp$ ls
snap-private-tmp
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-logind.service-9eO7ZZ
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-resolved.service-bL3MvC
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-timesyncd.service-N1oaJa
systemd-private-b9e67063a26e42d499cc57b8e3706a35-wsl-pro.service-tdbYfY
```

8. Use `rm -rf` to delete a directory `test_dir` and all its contents.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/$ mkdir test_dir
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/$ cd test_dir
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/test_dir$ touch text1.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/test_dir$ touch txt2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/test_dir$ ls
text1.txt  txt2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/test_dir$ dir
text1.txt  txt2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/test_dir$ cd ..
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/$ dir
bin                 init                mnt   sbin.usr-is-merged  usr
bin.usr-is-merged   lib                 opt   snap                var
boot                lib.usr-is-merged   proc  srv
dev                 lib64               root  sys
etc                 lost+found          run   test_dir
home                media               sbin  tmp
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/$ rm -rf test_dir
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/$ dir
bin                 etc   lib.usr-is-merged  mnt   run                 srv  var
bin.usr-is-merged   home  lib64              opt   sbin                sys
boot                init  lost+found         proc  sbin.usr-is-merged  tmp
dev                 lib   media              root  snap                usr
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/$
```

9. Use `ls` with the `-a` flag to display all files, including hidden ones.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -a
.   .bash_history  .bashrc  .landscape   .profile                  abcd  test
..  .bash_logout   .cache   .motd_shown  .sudo_as_admin_successful  dirA
```

10. Use `ls -lR` to list all files and directories recursively.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cd .cache
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/.cache$ ls -lR
.:
total 0
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Jan 31 19:45 motd.legal-displayed
```

2. File Viewing and Manipulation (`cat`, `wc`, `head`, `tail`, `tac`, `more`, `less`)

`cat`

11. Create a file named `example.txt` and write "Hello, World!" into it using `cat > example.txt`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat > example.txt
Hello World1
```

12. Use `cat` to display the contents of `example.txt`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat example.txt
Hello World1
```

13. Append "Welcome to Linux!" to `example.txt` using `cat >> example.txt`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat >> example.txt
Welcome to Linux!
^C
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat example.txt
Hello World1
Welcome to Linux!
```

14. Concatenate two files `file1.txt` and `file2.txt` and save the result into `merged.txt`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ touch file1.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ touch file2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat >> file1.txt
Pooja Jain
^C
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat >> file2.txt
A1-18
^C
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat file1.txt file2.txt > merged.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat merged.txt
Pooja Jain
A1-18
```

15. Display the contents of a file `data.txt` with line numbers using `cat -n`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat -n data.txt
     1  My name is Pooja Jain
     2  I aspire to become a Chartered Financial Analyst
     3  My hobbies are:
     4  dancing
     5  singing
     6  drama
     7  writing
```

16. View a file's contents with non-printable characters shown as `^` using `cat -v`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat -v merged.txt
Pooja Jain
A1-18
EXTC
```

17. Use `cat` with redirection to create a file and append content in one step.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat < merged.txt >> data.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat data.txt
My name is Pooja Jain
I aspire to become a Chartered Financial Analyst
My hobbies are:
dancing
singing
drama
writing
reading
photo and video editing
Pooja Jain
A1-18
EXTC
```

wc

18. Count the number of lines in `data.txt` using `wc -l`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ wc -l data.txt
15 data.txt
```

19. Use `wc -w` to count the words in `notes.txt`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ wc -w notes.txt
10 notes.txt
```

20. Calculate the number of characters in `notes.txt` using `wc -c`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ wc -c notes.txt
58 notes.txt
```

21. Combine `cat` and `wc` to count lines in a file displayed on the terminal.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat notes.txt | wc -l
5
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat notes.txt
Places I want to visit
Spiti Valley
Paris
Greece
Scotland
```

22. Use `wc` to display the total number of lines, words, and characters in a file.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ wc notes.txt
 5 10 58 notes.txt
```

23. Apply `wc` to all `.txt` files in the current directory and sort the results by word count.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ wc -w *.txt | sort -n
  1 file2.txt
  2 file1.txt
  4 merged.txt
  5 example.txt
 10 notes.txt
 29 data.txt
 51 total
```

24. Count the lines in a directory's files using `find` and `wc`

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ find . -type f -exec wc -l {} +
  5 ./notes.txt
  2 ./example.txt
  6 ./merged.txt
  1 ./file1.txt
  1 ./file2.txt
 15 ./data.txt
 30 total
```

head

25. Display the first 3 lines of `example.txt` using `head -n 3`.

```
Hello World1
Welcome to Linux!
Ubuntu is installed on this PC using WSL
this is Pooja's personal PC
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ head -n 3 example.txt
Hello World1
Welcome to Linux!
Ubuntu is installed on this PC using WSL
```

26. Use `head` with multiple files to show their first 5 lines.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ head -n 5 *.txt
==> data.txt <==
My name is Pooja Jain
I aspire to become a Chartered Financial Analyst
My hobbies are:
dancing
singing

==> example.txt <==
Hello World1
Welcome to Linux!
Ubuntu is installed on this PC using WSL
this is Pooja's personal PC

==> file1.txt <==
Pooja Jain

==> file2.txt <==
A1-18

==> merged.txt <==
Pooja Jain
A1-18
EXTC
```

tail

27. View the last 2 lines of `logfile.txt` using `tail`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ tail -n 2 logfile.txt
EMA
CCN
```

28. Monitor a log file in real time using `tail -f logfile.txt`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ tail -f logfile.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   58 Feb  1 05:57 notes.txt
total 32
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain  177 Feb  1 05:55 data.txt
drwxr-xr-x 3 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 05:18 dirB
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain  102 Feb  1 06:06 example.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   11 Feb  1 05:48 file1.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain    6 Feb  1 05:48 file2.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain  704 Feb  1 06:16 logfile.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   26 Feb  1 05:53 merged.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   58 Feb  1 05:57 notes.txt
```

`tac`

29. Reverse the lines in `data.txt` using `tac`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ tac data.txt > revdata.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat revdata.txt



EXTC
A1-18
Pooja Jain
photo and video editing
reading
writing
drama
singing
dancing
My hobbies are:
I aspire to become a Chartered Financial Analyst
My name is Pooja Jain
```

`more` and `less`

30. Use `more` to view a large file and scroll through it line by line.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ more .bash_history
ls -t
mkdir -p dirA/dirB/dirC
```

```
cd test_dir
mkdir test_dir
mkdir test
sudo chmod 777 /
mkdir test_dir
cd test_dir
touch text1.txt
touch txt2.txt
ls
dir
cd ..
dir
--More--(90%)
```

31. Navigate backward and forward in a file using `less`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ less .bash_history
```

```
dir
cd ..
dir
rm -rf test_dir
dir
ls -a
ls -lR
```

3. File Permissions (`chmod`)

32. Use `chmod 744` to give read/write/execute permissions to the owner and read-only permissions to others.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ chmod 744 data.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ ls -l data.txt
-rwxr--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 177 Feb  1 05:55 data.txt
```

33. Change the permissions of `script.sh` to make it executable by everyone.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ ls -l script.sh
-r--r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 87 Feb  1 06:30 script.sh
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ chmod 755 script.sh
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ ls -l script.sh
-rwxr-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 87 Feb  1 06:30 script.sh
```

34. Set `file1.txt` to have read/write permissions for the owner only using symbolic notation.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ chmod u=rw,go= file1.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ ls -l file1.txt
-rw------- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 11 Feb  1 05:48 file1.txt
```

35. Remove execute permissions from a directory `test_dir` using `chmod`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -l test_dir
total 0
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 06:35 abcd.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 06:35 efgh.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ chmod -x test_dir
```

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -l test_dir
ls: cannot access 'test_dir/efgh.txt': Permission denied
ls: cannot access 'test_dir/abcd.txt': Permission denied
```

36. Use `chmod` recursively to set read-only permissions for all `.txt` files in a directory.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/abcd$ ls
largefile.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/abcd$ chmod 444 *.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/abcd$ ls -l largefile.txt
-r--r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 54 Feb  1 06:21 largefile.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/abcd$
```

37. Add execute permissions to all files in a directory using `chmod +x *`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ chmod -R +x test_dir
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -l test_dir
total 0
-rwxr-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 06:35 abcd.txt
-rwxr-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 06:35 efgh.txt
```

38. Display the permissions of `file.txt` using `ls -l` and interpret them.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ ls -l file1.txt
-rw------- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 11 Feb  1 05:48 file1.txt
```

4. File and Directory Copying and Moving (`cp`, `mv`)

`cp`

39. Copy a file `source.txt` to `destination.txt` using `cp`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat source.txt
ABCD this is source
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cp source.txt destination.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cat destination.txt
ABCD this is source
```

40. Copy all `.txt` files from the current directory to `backup/` using `cp`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ mkdir backup
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cp *.txt backup
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cd backup
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA/backup$ ls
data.txt  destination.txt  example.txt  file1.txt  file2.txt  logfile.txt  merged.txt  notes.txt  revdata.txt  source.txt
```

41. Use `cp -r` to copy an entire directory `project` to `project_backup`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cp -r project project_backup
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls project
dirA  linux.txt  mouse.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls project_backup
dirA  linux.txt  mouse.txt
```

42. Overwrite a file without confirmation using `cp`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cp -f source.txt destination.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cat destination.txt
Human body is 71% water.
```

43. Use `cp -i` to enable confirmation before overwriting files.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cp -i source.txt destination.txt
cp: overwrite 'destination.txt'? y
```

44. Copy files and preserve their attributes using `cp -p`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cp -p source.txt destination.txt
```

mv

45. Rename `old_name.txt` to `new_name.txt` using `mv`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ ls
backup    destination.txt  example.txt  file2.txt    merged.txt  old_name.txt  script.sh
data.txt  dirB             file1.txt    logfile.txt  notes.txt   revdata.txt   source.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ mv old_name.txt new_name.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ ls
backup    destination.txt  example.txt  file2.txt    merged.txt    notes.txt    script.sh
data.txt  dirB             file1.txt    logfile.txt  new_name.txt  revdata.txt  source.txt
```

46. Move `example.txt` to the `documents/` directory using `mv`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ mv example.txt Documents
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cd Documents
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA/Documents$ ls
example.txt
```

47. Use `mv` to relocate all `.log` files to the `/tmp` directory.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ mv *.log /tmp
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ cd ..
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cd /tmp
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:/tmp$ ls
file1.log
file2.log
snap-private-tmp
systemd-private-b9e67063a26e42d499cc57b8e3706a35-polkit.service-hynLTC
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-logind.service-9eO7ZZ
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-resolved.service-bL3MvC
systemd-private-b9e67063a26e42d499cc57b8e3706a35-systemd-timesyncd.service-N1oaJa
systemd-private-b9e67063a26e42d499cc57b8e3706a35-wsl-pro.service-tdbYfY
test_dir
```

48. Move a directory `old_dir` to a new location `new_dir`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ mv old_dir new_dir
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ ls
Documents  data.txt         dirB       file2.txt    merged.txt  new_name.txt  revdata.txt  source.txt
backup     destination.txt  file1.txt  logfile.txt  new_dir     notes.txt     script.sh
```

5. Searching and History (`find`, `history`)

`find`

49. Find all `.txt` files in the current directory using `find`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/dirA$ find . -type f -name "*.txt"
./notes.txt
./backup/notes.txt
./backup/example.txt
./backup/source.txt
./backup/logfile.txt
./backup/merged.txt
./backup/file1.txt
./backup/revdata.txt
./backup/file2.txt
./backup/data.txt
./backup/destination.txt
./source.txt
./logfile.txt
./new_name.txt
./Documents/example.txt
./merged.txt
./file1.txt
./revdata.txt
./file2.txt
./new_dir/backup/notes.txt
./new_dir/backup/example.txt
./new_dir/backup/source.txt
./new_dir/backup/logfile.txt
./new_dir/backup/merged.txt
./new_dir/backup/file1.txt
./new_dir/backup/revdata.txt
./new_dir/backup/file2.txt
./new_dir/backup/data.txt
./new_dir/backup/destination.txt
./data.txt
./destination.txt
```

50. Locate files modified within the last 3 days using `find`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/abcd$ find . -type f -mtime -3
./largefile.txt
```

51. Search for files larger than 5 MB in the `/var` directory using `find`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ find var -type f -size +5M
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$
```

52. Use `find` to locate empty files and delete them.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ find . -type f -empty -delete
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls
abcd  backup  destination.txt  dirA  project  project_backup  source.txt  test  test_dir
```

history

53. Display the last 15 commands executed using `history`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ history 15
  217  mv old_dir new_dir
  218  ls
  219  find . -type f -name "*.txt"
  220  cd ..
  221  ls
  222  find . -type f -mtime -3
  223  cd abcd
  224  find . -type f -mtime -3
  225  cd ..
  226  find . -type f -empty -delete
  227  ls
  228  mv -r dirA var
  229  mv dirA var
  230  find var -type f -size +5M
  231  history 15
```

54. Search your history for commands related to `chmod`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ history | grep chmod
   23  sudo chmod 777 /
  112  chmod 744 data.txt
  114  chmod 744 data.txt
  118  chmod 444 script.sh
  120  chmod 755 script.sh
  122  chmod u=rw,go= file1.txt
  124  chmod u=rw,go= file1.txt
  134  chmod -x test_dir
  138  chmod 444 *.txt
  143  sudo chmod 777 test_dir
```

55. Clear the command history for the current session using `history -c`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ history -c
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ history
    1  history
```

6. Miscellaneous Commands (`touch`, `man`, `clear`)

56. Create an empty file `empty.txt` using `touch`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/backup$ touch empty.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/backup$ ls
empty.txt
```

57. Update the timestamp of `file.txt` using `touch`.

```
4 drwxr-xr-x 3 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 07:05 new_dir
4 drwxr-xr-x 2 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 06:59 Documents
4 drwxr-xr-x 2 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 06:48 backup
4 -rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   20 Feb  1 06:46 destination.txt
4 -rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   20 Feb  1 06:46 source.txt
4 -rwxr-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   87 Feb  1 06:30 script.sh
4 -rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain  177 Feb  1 06:18 revdata.txt
4 -rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 1408 Feb  1 06:16 logfile.txt
4 -rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   58 Feb  1 05:57 notes.txt
4 -rwxr--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain  177 Feb  1 05:55 data.txt
4 -rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   26 Feb  1 05:53 merged.txt
4 -rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain    6 Feb  1 05:48 file2.txt
4 -rw------- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   11 Feb  1 05:48 file1.txt
4 drwxr-xr-x 3 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 05:18 dirB
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ touch file1.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ ls -ltr
total 56
drwxr-xr-x 3 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 05:18 dirB
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain    6 Feb  1 05:48 file2.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   26 Feb  1 05:53 merged.txt
-rwxr--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain  177 Feb  1 05:55 data.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   58 Feb  1 05:57 notes.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 1408 Feb  1 06:16 logfile.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain  177 Feb  1 06:18 revdata.txt
-rwxr-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   87 Feb  1 06:30 script.sh
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   20 Feb  1 06:46 source.txt
-rw-r--r-- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   20 Feb  1 06:46 destination.txt
drwxr-xr-x 2 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 06:48 backup
drwxr-xr-x 2 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 06:59 Documents
drwxr-xr-x 3 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 4096 Feb  1 07:05 new_dir
-rw------- 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain   11 Feb  1 07:24 file1.txt
```

58. Use `man` to open the manual for the `ls` command.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/backup$ man ls
```

```
NAME
       ls - list directory contents

SYNOPSIS
       ls [OPTION]... [FILE]...

DESCRIPTION
       List information about the FILEs (the current directory by default).  Sort entries alphabetically if none of -cftuvSUX nor
       --sort is specified.

       Mandatory arguments to long options are mandatory for short options too.

       -a, --all
              do not ignore entries starting with .

       -A, --almost-all
              do not list implied . and ..

       --author
              with -l, print the author of each file

       -b, --escape
              print C-style escapes for nongraphic characters

       --block-size=SIZE
              with -l, scale sizes by SIZE when printing them; e.g., '--block-size=M'; see SIZE format below

       -B, --ignore-backups
              do not list implied entries ending with ~

 Manual page ls(1) line 1 (press h for help or q to quit)
```

59. Find out more about the `chmod` command using `man`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/backup$ man chmod
```

```
NAME
       chmod - change file mode bits

SYNOPSIS
       chmod [OPTION]... MODE[,MODE]... FILE...
       chmod [OPTION]... OCTAL-MODE FILE...
       chmod [OPTION]... --reference=RFILE FILE...

DESCRIPTION
       This  manual  page  documents  the GNU version of chmod.  chmod changes the file mode bits of each given file according to
       mode, which can be either a symbolic representation of changes to make, or an octal number representing  the  bit  pattern
       for the new mode bits.

       The  format  of  a symbolic mode is [ugoa...][[-+=][perms...]...], where perms is either zero or more letters from the set
       rwxXst, or a single letter from the set ugo.  Multiple symbolic modes can be given, separated by commas.

       A combination of the letters ugoa controls which users' access to the file will be changed: the  user  who  owns  it  (u),
       other  users  in  the  file's  group (g), other users not in the file's group (o), or all users (a).  If none of these are
       given, the effect is as if (a) were given, but bits that are set in the umask are not affected.

       The operator + causes the selected file mode bits to be added to the existing file mode bits of each file; -  causes  them
       to  be  removed;  and = causes them to be added and causes unmentioned bits to be removed except that a directory's unmen-
       tioned set user and group ID bits are not affected.

       The letters rwxXst select file mode bits for the affected users: read (r), write (w), execute (or search for  directories)
       (x), execute/search only if the file is a directory or already has execute permission for some user (X), set user or group
       ID on execution (s), restricted deletion flag or sticky bit (t).  Instead of one or more of these letters, you can specify
       exactly  one  of  the  letters  ugo: the permissions granted to the user who owns the file (u), the permissions granted to
       other users who are members of the file's group (g), and the permissions granted to users that are in neither of  the  two
       preceding categories (o).
 Manual page chmod(1) line 1 (press h for help or q to quit)
```

60. Clear the terminal screen using `clear`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ clear
```

7. Combined Tasks (Focus on `cat`, `wc`, `chmod`, `cp`, `mv`)

61. Combine `cat` and `wc` to count the number of words in the first 10 lines of `data.txt`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ cat data.txt | head -n 10 | wc -w
27
```

62. Use `find` to locate all `.txt` files and append their contents to `merged.txt` using `cat`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ find . -type f | cat >> merged.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ cat merged.txt
Pooja Jain
A1-18
EXTC



./notes.txt
./backup/notes.txt
./backup/example.txt
./backup/source.txt
./backup/logfile.txt
./backup/merged.txt
./backup/file1.txt
./backup/revdata.txt
```

63. Use `chmod` to set permissions of all `.sh` files in a directory to `755`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ chmod 755 *.sh
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ ls
Documents  data.txt         dirB       file2.txt    merged.txt  notes.txt    script.sh
backup     destination.txt  file1.txt  logfile.txt  new_dir     revdata.txt  source.txt
```

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ ls -l script.sh
-rwxr-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 87 Feb  1 06:30 script.sh
```

64. Combine `cp` and `find` to copy all `.log` files to a new directory.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ find . -type f -name "*.log" -exec cp {} /home/pooja_kiran_kumar_jain/new \;
```

65. Create a directory, copy a file into it, and then move it to another location.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ mkdir pkkj
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls
abcd  backup  data.txt  destination.txt  pkkj  pooja  project  project_backup  source.txt  test  test_dir  var
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cp data.txt pkkj
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ mv pkkj /home/pooja_kiran_kumar_jain/project
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cd project
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ ls
dirA  linux.txt  mouse.txt  new  newdir  pkkj  pooja
```

66. Use `mv` to rename all `.txt` files in a directory by adding a `_backup` suffix.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ find . -type f -name "*.txt" -exec bash -c 'mv "$0" "${0%.txt}_backup.txt"' {} \;
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ ls
dirA  linux_backup.txt  mouse_backup.txt  new  newdir  pkkj  pooja
```

8. Additional Exercises

67. Reverse the contents of `data.txt` and save the result into `reversed.txt`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ tac data.txt > reversed.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cat reversed.txt
honey
grapes
fig
eucalyptus
drumstick
carrot
banana
apple
YZ
UVWX
QRST
MNOP
IJKL
EFGH
ABCD
```

68. Count the total words in multiple files and sort the result.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ wc -w data.txt destination.txt source.txt | sort -n
  5 destination.txt
  5 source.txt
 15 data.txt
 25 total
```

69. Copy only `.png` files from a directory to another directory.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ find . -type f -name "*.png" -exec {} mv pooja/ \;
```

70. Move all files starting with `test_` to a folder named `test_files`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ mv test_* test_files/
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls test_files
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls
abcd    data.txt         pooja    project_backup  source.txt  test_files
backup  destination.txt  project  reversed.txt    test        var
```

71. Find and delete all `.tmp` files from the current directory using `find`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ find . -type f -name "*.tmp" -delete
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$
```

9. Advanced Challenges

72. Use `chmod` to set group ownership and permissions for a shared directory.
73. Combine `cat`, `tac`, and `head` to display the first 3 lines of a file in reverse order.
74. Create a backup script that uses `cp` and `find` to archive files modified within the last 7 days.
75. Write a command to display only the longest line in a file using `wc` and `sort`.

10. Comprehensive Practical Tasks

76. Create multiple files using `touch` and change their permissions using `chmod`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ touch file1.txt file2.txt file3.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ chmod 655 file1.txt file2.txt file3.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -ltr file1.txt file2.txt file3.txt
-rw-r-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 12:56 file3.txt
-rw-r-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 12:56 file2.txt
-rw-r-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 12:56 file1.txt
```

77. Write a command to find the most recent `.txt` file in a directory.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -lt *.txt | head -n 1
-rw-r-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain  0 Feb  1 12:56 file1.txt
```

78. Create a pipeline to search for a term in multiple files and count the occurrences.
79. Copy all `.conf` files from `/etc` to a `backup/` directory while preserving permissions.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cp -p /etc/*.conf backup/
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cd backup/ | ls
abcd      backup    destination.txt  file2.txt  pooja    project_backup  source.txt  test_files  xyz.png
abcd.png  data.txt  file1.txt        file3.txt  project  reversed.txt    test        var
```

80. Use `chmod` to remove all execute permissions from a directory and its subdirectories.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ sudo chmod -R a-x /home/pooja_kiran_kumar_jain/var
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/var$ ls -ltr
ls: cannot open directory '.': Permission denied
```

11. Additional Variations

81. Count the total characters in a directory's files and sort by file size.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ wc -c *.txt | sort -n
  0 file1.txt
  0 file2.txt
  0 file3.txt
 25 destination.txt
 25 source.txt
 91 data.txt
 91 reversed.txt
232 total
```

82. Move all files containing the word "report" to a specific directory.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ find . -type f -name 'report' -exec {} mv var/ \;
```

83. Create a command pipeline to display only the middle lines of a file.
84. Display the last 5 commands related to file permissions from the command history.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ history | grep chmod | tail -n 5
  168  sudo chmod -R a-x /home/pooja_kiran_kumar_jain/var
  170  sudo chmod 777 var
  172  sudo chmod 777 var
  174  sudo chmod 777 dirB file2.txt data.txt notes.txt logfile.txt revdata.txt script.sh source.txt destination.txt bac
kup Documents new_dir file1.txt merged.txt
  179  history | grep chmod | tail -n 5
```

85. Reverse the contents of multiple files and save the output into corresponding new files.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ tac source.txt destination.txt > revsource.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ cat revsource.txt
Human body is 71% water.
Human body is 71% water.
```

12. Extra Questions

86. Use `find` to locate files with specific permissions and modify them using `chmod`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/pooja$ find . -type f -perm 644 -exec chmod 755 {} \;
```

87. Use `cat` to create a file, display its contents, and then append to it.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/pooja$ cat < curious_cat.txt >> idkfile.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/pooja$ cat idkfile.txt
I am a curious cat.pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/pooja$
```

88. Copy files from one directory to another while excluding certain file types.
89. Write a script that uses `chmod`, `mv`, and `cp` to manage file backups.
90. Create a pipeline to count the number of unique words in a file.

13. Exploring the command

91. Explore the effect of `chmod` symbolic notation by modifying specific bits.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ chmod u-x file2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ chmod g-r file3.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -ltr file2.txt file3.txt
-rw---xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 12:56 file3.txt
-rw-r-xr-x 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 12:56 file2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$
```

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ chmod 777 file2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~$ ls -ltr file2.txt
-rwxrwxrwx 1 pooja_kiran_kumar_jain pooja_kiran_kumar_jain 0 Feb  1 12:56 file2.tx
```

92. Use `cat` to combine contents from files in different directories.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ cat /home/pooja_kiran_kumar_jain/pooja/idkfile.txt /home/pooja_kiran_kumar_jain/pro
ject/example2.txt > combined.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ cat combined.txt
I am a curious cat.this is an example as i end towards expt 1
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$
```

93. Create a nested directory structure, copy files into it, and then delete it.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ mkdir -p parent/child/grandchild
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ cp -r file1.txt /home/pooja_kiran_kumar_jain/project/parent
cp: cannot stat 'file1.txt': No such file or directory
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ cp -r file1.txt /home/pooja_kiran_kumar_jain/project/parent/
cp: cannot stat 'file1.txt': No such file or directory
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ cp -r mouse_backup.txt /home/pooja_kiran_kumar_jain/project/parent/
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ rm -rf /parent
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ ls
combined.txt  dirA  example2.txt  linux_backup.txt  mouse_backup.txt  new  newdir  parent  pkkj  pooja  pooja_kiran_kumar_jain
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ rm -rf parent
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ ls
combined.txt  dirA  example2.txt  linux_backup.txt  mouse_backup.txt  new  newdir  pkkj  pooja  pooja_kiran_kumar_jain
```

94. Find and display all files modified within the past hour using `find`.

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ find . -type f -mmin -60
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ touch example2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ find . -type f -mmin -60
./example2.txt
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$
```

95. Use `cp` with the `-n` flag

```
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$ cp -n mouse_backup.txt drama.txt
cp: warning: behavior of -n is non-portable and may change in future; use --update=none instead
pooja_kiran_kumar_jain@DESKTOP-4EBS4NR:~/project$
```