Concepts of Operating System

Assignment 1

Problem 1: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.

a) Navigate and List:

a. Start by navigating to your home directory and list its contents. Then, move into a directory named "LinuxAssignment" if it exists; otherwise, create it.

```
Select cdac@Maverick: ~
cdac@Maverick:~$ pwd
/home/cdac
cdac@Maverick:~$ cd ~
cdac@Maverick:~$ ls
cdac@Maverick:~$ mkdir LinuxAssignment
cdac@Maverick:~$ ls
LinuxAssignment
cdac@Maverick:~$ cd LinuxAssignment
```

b) File Management:

a. Inside the "LinuxAssignment" directory, create a new file named "file1.txt". Display its contents.

```
cdac@Maverick:~/LinuxAssignment$ touch file1.txt
cdac@Maverick:~/LinuxAssignment$ ls
docs   file1.txt
cdac@Maverick:~/LinuxAssignment$ cat > file1.txt
Hi My Name Is Shubham Thakur
cdac@Maverick:~/LinuxAssignment$ cat file1.txt
Hi My Name Is Shubham Thakur
```

c) Directory Management:

a. Create a new directory named "docs" inside the "LinuxAssignment" directory.

```
cdac@Maverick:~/LinuxAssignment$ mkdir docs
cdac@Maverick:~/LinuxAssignment$ ls
docs
```

d) Copy and Move Files:

a. Copy the "file1.txt" file into the "docs" directory and rename it to "file2.txt".

```
cdac@Maverick:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@Maverick:~/LinuxAssignment$ cd docs
cdac@Maverick:~/LinuxAssignment/docs$ cat file2.txt
Hi My Name Is Shubham Thakur
```

e) Permissions and Ownership:

a. Change the permissions of "file2.txt" to allow read, write, and execute permissions for the owner and only read permissions for others. Then, change the owner of "file2.txt" to the current user.   7 for user (4+2+1 w+r+e) 4 for group (only read r--) 4 for others (only read r--)

```
cdac@Maverick:~/LinuxAssignment/docs$ chmod 744 file2.txt
cdac@Maverick:~/LinuxAssignment/docs$ whoami
cdac
cdac@Maverick:~/LinuxAssignment/docs$ sudo chown cdac file2.txt
[sudo] password for cdac:
```

f) Final Checklist:

a. Finally, list the contents of the "LinuxAssignment" directory and the root directory to ensure that all operations were performed correctly.

```
cdac@Maverick:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 18 14:09 docs
-rw-r--r-- 1 cdac cdac   29 Aug 18 14:02 file1.txt
```

```
cdac@Maverick:~$ ls -l
total 4
drwxr-xr-x 3 cdac cdac 4096 Aug 18 14:01 LinuxAssignment
cdac@Maverick:~$
```

g) File Searching:

a. Search for all files with the extension ".txt" in the current directory and its subdirectories.

b. Display lines containing a specific word in a file (provide a file name and the specific word to search).

cdac@Maverick: ~/LinuxAssignment
```
cdac@Maverick:~/LinuxAssignment$ find . -type f -name "*.txt"
./file1.txt
./docs/file2.txt
cdac@Maverick:~/LinuxAssignment$
```

B

cdac@Maverick: ~/LinuxAssignment
```
cdac@Maverick:~/LinuxAssignment$ grep "Shubham" file1.txt
Hi My Name Is Shubham Thakur
cdac@Maverick:~/LinuxAssignment$
```

h) System Information: a. Display the current system date and time.

```
cdac@Maverick: ~/LinuxAssignment
cdac@Maverick:~/LinuxAssignment$ date
Tue Aug 19 02:46:26 UTC 2025
cdac@Maverick:~/LinuxAssignment$
```

i) Networking:

a. Display the IP address of the system.

b. Ping a remote server to check connectivity (provide a remote server address to ping).

```
cdac@Maverick: ~
cdac@Maverick:~$ hostname -I
172.25.181.131
cdac@Maverick:~$
```

```
cdac@Maverick: ~
cdac@Maverick:~$ ping google.com
PING google.com (142.250.77.46) 56(84) bytes of data.
64 bytes from bom07s26-in-f14.1e100.net (142.250.77.46): icmp_seq=1 ttl=117 time=13.9 ms
64 bytes from bom07s26-in-f14.1e100.net (142.250.77.46): icmp_seq=2 ttl=117 time=7.41 ms
64 bytes from bom07s26-in-f14.1e100.net (142.250.77.46): icmp_seq=3 ttl=117 time=9.92 ms
64 bytes from bom07s26-in-f14.1e100.net (142.250.77.46): icmp_seq=4 ttl=117 time=13.0 ms
64 bytes from bom07s26-in-f14.1e100.net (142.250.77.46): icmp_seq=5 ttl=117 time=8.42 ms
^C
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4004ms
rtt min/avg/max/mdev = 7.406/10.529/13.871/2.531 ms
cdac@Maverick:~$
```

j) File Compression: a. Compress the "docs" directory into a zip file. b. Extract the contents of the zip file into a new directory.

```
cdac@Maverick: ~/LinuxAssignment/extracted_docs
cdac@Maverick:~$ cd LinuxAssignment
cdac@Maverick:~/LinuxAssignment$ zip -r docs.zip docs/
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
cdac@Maverick:~/LinuxAssignment$ ls
docs   docs.zip   file1.txt
cdac@Maverick:~/LinuxAssignment$ mkdir extrcted_docs
cdac@Maverick:~/LinuxAssignment$ ls
docs   docs.zip   extrcted_docs   file1.txt
cdac@Maverick:~/LinuxAssignment$ unzip docs.zip -d extracted_docs/
Archive:   docs.zip
   creating: extracted_docs/docs/
 extracting: extracted_docs/docs/file2.txt
cdac@Maverick:~/LinuxAssignment$ cd extracted_docs
cdac@Maverick:~/LinuxAssignment/extracted_docs$ ls
docs
cdac@Maverick:~/LinuxAssignment/extracted_docs$
```

k) File Editing:

a. Open the "file1.txt" file in a text editor and add some text to it.

b. Replace a specific word in the "file1.txt" file with another word (provide the original

word and the word to replace it with).   (sed -i 's/oldword/newword/g' file1.txt)

```
cdac@Maverick: ~/LinuxAssignment
cdac@Maverick:~/LinuxAssignment$ nano file1.txt


Use "fg" to return to nano.

[1]+  Stopped                    nano file1.txt
cdac@Maverick:~/LinuxAssignment$ cat file1.txt

Hi My Name Is Shubham Thakur
this is the 1st assignment
cdac@Maverick:~/LinuxAssignment$ sed -i 's/the/my/g' file1.txt
cdac@Maverick:~/LinuxAssignment$ cat file1.txt

Hi My Name Is Shubham Thakur
this is my 1st assignment
cdac@Maverick:~/LinuxAssignment$
```

Problem 2: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.

a. Suppose you have a file named "data.txt" containing important information. Display the

first 10 lines of this file to quickly glance at its contents using a command.

```
cdac@Maverick:~$ cat > data.txt
samarth burkule
akanksha
akanksha
vaishnavi
shubham
pranav
rahul
sarthak
these
are
some
of
the
examples
of
names
cdac@Maverick:~$ head data.txt
samarth burkule
akanksha
akanksha
vaishnavi
shubham
pranav
rahul
sarthak
these
are
cdac@Maverick:~$
```

b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command.

```
cdac@Maverick:~$ tail -5 data.txt
of
the
examples
of
names
cdac@Maverick:~$
```

c. In a file named "numbers.txt," there are a series of numbers. Display the first 15 lines of this file to analyze the initial data set.

```
cdac@Maverick: ~
cdac@Maverick:~$ cat > numbers.txt
1
2
4
5
6
3
7
8
9
44
5

6

81
5
5
8
78
98
21
cdac@Maverick:~$ head -15 numbers.txt
1
2
4
5
6
3
7
8
9
44
5

6

81
cdac@Maverick:~$
```

d. To focus on the last few numbers of the dataset, display the last 3 lines of "numbers.txt".

```
cdac@Maverick: ~
cdac@Maverick:~$ tail -3 numbers.txt
78
98
21
cdac@Maverick:~$ cat numbers.txt
```

e. Imagine you have a file named "input.txt" with text content. Use a command to translate all lowercase letters to uppercase in "input.txt" and save the modified text in a new file named "output.txt."

```
cdac@Maverick: ~                                                    —
cdac@Maverick:~$ tr 'a-z' 'A-Z' <input.txt> output.txt
cdac@Maverick:~$ ls
LinuxAssignment  cdac  data.txt  file1.txt  input.txt  numbers.txt  output.txt
cdac@Maverick:~$ cat output.txt
THIS IS
THE
SECOND
QUESTION
OF
THE
COS
MODULE
ALL
LOWERCASE
TO
UPPERCASE
cdac@Maverick:~$
```

f. In a file named "duplicate.txt," there are several lines of text, some of which are duplicates. Use a command to display only the unique lines from "duplicate.txt."

```
cdac@Maverick: ~
cdac@Maverick:~$ cat duplicate.txt
hi
hi
hello
hello
my
my
name
is
shubham
cdac@Maverick:~$ sort duplicate.txt | uniq
hello
hi
is
my
name
shubham
cdac@Maverick:~$
```

g. In a file named "fruit.txt," there is a list of fruits, but some fruits are repeated. Use a command to display each unique fruit along with the count of its occurrences in "fruit.txt."

Select cdac@Maverick: ~

```
cdac@Maverick:~$ cat fruit.txt
banana
apple
guava
mango
apple
orange
mango
banana
cdac@Maverick:~$ sort fruit.txt | uniq -c
      2 apple
      2 banana
      1 guava
      2 mango
      1 orange
cdac@Maverick:~$
```