CDAC MUMBAI

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.

```
cdac@LAPTOP-NQM5IGSU:~$ cd ~
cdac@LAPTOP-NQM5IGSU:~$ pwd
/home/cdac
cdac@LAPTOP-NQM5IGSU:~$ ls
A   AAA  ABC   a    aaa   aaaaa  dir3  dir5  file11.txt  file2.zip  g1.txt       practice  s2.sh
AA  AB   ABCD  aa   aaaa  cdac1  dir4  dir6  file2.txt   file3.txt  numbers.txt  s1.sh     s3.sh
cdac@LAPTOP-NQM5IGSU:~$ mkdir LinuxAssignment
cdac@LAPTOP-NQM5IGSU:~$ ls
A   AAA  ABC   LinuxAssignment  aa   aaaa   cdac1  dir4  dir6        file2.txt  file3.txt  numbers.txt  s1.sh  s3.sh
AA  AB   ABCD  a               aaa  aaaaa  dir3   dir5  file11.txt  file2.zip  g1.txt     practice     s2.sh
cdac@LAPTOP-NQM5IGSU:~$
```

b) File Management:

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

```
cdac@LAPTOP-NQM5IGSU:~$ cd LinuxAssignment/
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ cat > file1.txt
This is a text file.
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ cat file1.txt
This is a text file.
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$
```

c) Directory Management:

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

```
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ mkdir docs
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ ls
docs  file1.txt
```

d) Copy and Move Files:

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

```
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ cp file1.txt ./docs/
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ cd docs
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/docs$ ls
file1.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/docs$ mv file1.txt file2.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/docs$ ls
file2.txt
```

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.

```
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 21 Aug 20 20:07 file2.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/docs$ chmod 744 file2.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 21 Aug 20 20:07 file2.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/docs$ chown $(whoami) file2.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 21 Aug 20 20:07 file2.txt
```

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@LAPTOP-NQM5IGSU:~/LinuxAssignment$ ls
docs  file1.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ ls /
bin              boot  etc   init  lib.usr-is-merged  lost+found  mnt  proc  run   sbin.usr-is-merged  srv  tmp  var
bin.usr-is-merged  dev   home  lib   lib64             media       opt  root  sbin  snap                sys  usr
```

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@LAPTOP-NQM5IGSU:~/LinuxAssignment$ find . -type f -name "*.txt"
./docs/file2.txt
./file1.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ cat > test.txt
Linux is an operating system.
Linux is developed by Linus Torvalds in 1991.
Linux is a variant of Unix.
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ grep "Linux" test.txt
Linux is an operating system.
Linux is developed by Linus Torvalds in 1991.
Linux is a variant of Unix.
```

h) System Information:

a. Display the current system date and time.

```
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ date
Wed Aug 20 20:30:56 IST 2025
```

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@LAPTOP-NQM5IGSU:~/LinuxAssignment$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1492 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:f6:3a:2c brd ff:ff:ff:ff:ff:ff
    inet 172.20.95.223/20 brd 172.20.95.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fef6:3a2c/64 scope link
       valid_lft forever preferred_lft forever
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ ping -c 4 google.com
PING google.com (142.250.183.46) 56(84) bytes of data.
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=1 ttl=118 time=26.1 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=2 ttl=118 time=16.8 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=3 ttl=118 time=16.6 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=4 ttl=118 time=18.2 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 4166ms
rtt min/avg/max/mdev = 16.641/19.448/26.061/3.867 ms
```

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@LAPTOP-NQM5IGSU:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ ls
docs  docs.zip  file1.txt  test.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ unzip docs.zip -d my_docs
Archive:  docs.zip
   creating: my_docs/docs/
 extracting: my_docs/docs/file2.txt
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ cd my_docs
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/my_docs$ ls
docs
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment/my_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).

```
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ cat file1.txt
Linux is an operating system.
Linux is secure.
Linux is open source.
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ sed -i 's/Linux/Ubuntu/g' file1.tx
cdac@LAPTOP-NQM5IGSU:~/LinuxAssignment$ cat file1.txt
Ubuntu is an operating system.
Ubuntu is secure.
Ubuntu is open source.
cdac@LAPTOP-NQM5IGSU:~/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@LAPTOP-NQM5IGSU:~$ head data.txt
Linux :
- open source
- free available
- free software available
- live CD distributions
- secure
- no antivirus is required
- low hardware cost
- customizable and fetures
- invented by Linus Torvalds in 1991.
```

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@LAPTOP-NQM5IGSU:~$ tail -n 5 data.txt
- customizable and fetures
- invented by Linus Torvalds in 1991.
- Linux is th variant of Unix.
- Multiuser, multitasking, and multiprogramming
- stable in nature
```

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@LAPTOP-NQM5IGSU:~$ head -n 15 numbers.txt
1
23
45
34
3456
34
455
24
556
5
55
6
1
2
1
```

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

```
cdac@LAPTOP-NQM5IGSU:~$ tail -n 3 numbers.txt
1
2
2
```

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@LAPTOP-NQM5IGSU:~$ cat > input.txt
hello world!
cdac@LAPTOP-NQM5IGSU:~$ tr '[:lower:]' '[:upper:]' <input.txt> temp && mv temp input.txt
cdac@LAPTOP-NQM5IGSU:~$ cat input.txt
HELLO WORLD!
cdac@LAPTOP-NQM5IGSU:~$ mv input.txt output.txt
cdac@LAPTOP-NQM5IGSU:~$ ls
A   AAA  ABC   LinuxAssignment  aa   aaaa   cdac1     dir3  dir5  file11.txt  file2.zip  g1.txt       output.txt  s1.sh  s3.sh
AA  AB   ABCD  a               aaa  aaaaa  data.txt  dir4  dir6  file2.txt   file3.txt  numbers.txt  practice    s2.sh
```

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@LAPTOP-NQM5IGSU:~$ cat > duplicate.txt
My name is Suyog Joshi.
My name is Suyog Joshi.
I am 22 years old.
I am from Ratnagiri.
I am from Ratnagiri.
cdac@LAPTOP-NQM5IGSU:~$ sort duplicate.txt | uniq
I am 22 years old.
I am from Ratnagiri.
My name is Suyog Joshi.
```

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."

```
cdac@LAPTOP-NQM5IGSU:~$ cat > fruit.txt
mango
orange
mango
orange
orange
blueberry
grapes
pineapple
apple
apple
banana
mango
cdac@LAPTOP-NQM5IGSU:~$ sort fruit.txt | uniq -c
      2 apple
      1 banana
      1 blueberry
      1 grapes
      3 mango
      3 orange
      1 pineapple
```