

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@DESKTOP-3701C3V: ~/LinuxAssignment
cdac@DESKTOP-3701C3V:~$ ls
aaa.cpp abc.txt dir1
cdac@DESKTOP-3701C3V:~$ mkdir LinuxAssignment
cdac@DESKTOP-3701C3V:~$ ls
LinuxAssignment aaa.cpp abc.txt dir1
cdac@DESKTOP-3701C3V:~$ cd ./
.cache/          LinuxAssignment/ dir1/
cdac@DESKTOP-3701C3V:~$ cd ./LinuxAssignment
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

b) File Management:

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

```
cdac@DESKTOP-3701C3V:~$ cd ./LinuxAssignment
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ touch file1.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cat > file1.txt
Hello
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cat file1.txt
Hello
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

c) Directory Management:

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

```
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ mkdir docs
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ ls
docs file1.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

d) **Copy and Move Files:**

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

```
cdac@DESKTOP-3701C3V: ~/LinuxAssignment/docs
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ ls
docs  file1.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cp file1.txt ./docs
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cd ./docs
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ ls
file1.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ mv file1.txt file2.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ ls
file2.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$
```

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@DESKTOP-3701C3V: ~/LinuxAssignment/docs
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 6 Aug 18 14:03 file2.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ chmod 704 file2.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ ls -l
total 4
-rwx---r-- 1 cdac cdac 6 Aug 18 14:03 file2.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ whoami
cdac
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ sudo chown cdac file2.txt
[sudo] password for cdac:
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ ls -l
total 4
-rwx---r-- 1 cdac cdac 6 Aug 18 14:03 file2.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$
```

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@DESKTOP-3701C3V: ~/LinuxAssignment
cdac@DESKTOP-3701C3V:~/LinuxAssignment/docs$ cd ..
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 18 14:03 docs
-rw-r--r-- 1 cdac cdac 6 Aug 18 13:51 file1.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ ls -l /
total 2740
lrwxrwxrwx 1 root root 7 Apr 22 2024 bin -> usr/bin
drwxr-xr-x 2 root root 4096 Feb 26 2024 bin.usr-is-merged
drwxr-xr-x 2 root root 4096 Apr 22 2024 boot
drwxr-xr-x 15 root root 3860 Aug 18 13:43 dev
drwxr-xr-x 88 root root 4096 Aug 18 13:43 etc
drwxr-xr-x 3 root root 4096 Aug 18 03:17 home
-rwxrwxrwx 1 root root 2724480 Jul 31 14:56 init
lrwxrwxrwx 1 root root 7 Apr 22 2024 lib -> usr/lib
drwxr-xr-x 2 root root 4096 Apr 8 2024 lib.usr-is-merged
lrwxrwxrwx 1 root root 9 Apr 22 2024 lib64 -> usr/lib64
drwx----- 2 root root 16384 Aug 18 03:15 lost+found
drwxr-xr-x 2 root root 4096 Aug 5 16:55 media
drwxr-xr-x 5 root root 4096 Aug 18 03:16 mnt
drwxr-xr-x 2 root root 4096 Aug 5 16:55 opt
dr-xr-xr-x 215 root root 0 Aug 18 13:43 proc
drwx----- 4 root root 4096 Aug 18 13:43 root
drwxr-xr-x 19 root root 560 Aug 18 13:43 run
lrwxrwxrwx 1 root root 8 Apr 22 2024 sbin -> usr/sbin
drwxr-xr-x 2 root root 4096 Mar 31 2024 sbin.usr-is-merged
drwxr-xr-x 2 root root 4096 Aug 18 03:16 snap
drwxr-xr-x 2 root root 4096 Aug 5 16:55 srv
dr-xr-xr-x 13 root root 0 Aug 18 13:42 sys
drwxrwxrwt 8 root root 4096 Aug 18 13:44 tmp
drwxr-xr-x 12 root root 4096 Aug 5 16:55 usr
drwxr-xr-x 13 root root 4096 Aug 18 03:16 var
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

g) **File Searching:**

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

```
cdac@DESKTOP-3701C3V: ~  
cdac@DESKTOP-3701C3V:~$ find -name "*.txt"  
./LinuxAssignment/docs/file2.txt  
./LinuxAssignment/file1.txt  
./abc.txt  
./cdac/file3.txt  
./cdac/file2.txt  
./cdac/file4.txt  
./cdac/file1.txt  
./cdac/numbers.txt  
./cdac/edit.txt  
cdac@DESKTOP-3701C3V:~$
```

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

```
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cat >> file1.txt  
My name is Dhaval Patil  
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cat file1.txt  
Hello  
My name is Dhaval Patil  
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ grep "Dhaval" file1.txt  
My name is Dhaval Patil  
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

h) **System Information:**

- a. Display the current system date and time.

```
cdac@DESKTOP-3701C3V: ~/LinuxAssignment  
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ date  
Tue Aug 19 13:52:06 UTC 2025  
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ date "+%Y-%m-%d %H:%M:%S"  
2025-08-19 13:53:20  
cdac@DESKTOP-3701C3V:~/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@DESKTOP-3701C3V: ~/LinuxAssignment
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ hostname -I
172.28.210.54
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ ping 172.28.210.54
PING 172.28.210.54 (172.28.210.54) 56(84) bytes of data.
64 bytes from 172.28.210.54: icmp_seq=1 ttl=64 time=0.481 ms
64 bytes from 172.28.210.54: icmp_seq=2 ttl=64 time=0.040 ms
64 bytes from 172.28.210.54: icmp_seq=3 ttl=64 time=0.052 ms
64 bytes from 172.28.210.54: icmp_seq=4 ttl=64 time=0.054 ms
64 bytes from 172.28.210.54: icmp_seq=5 ttl=64 time=0.054 ms
^C
--- 172.28.210.54 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4348ms
rtt min/avg/max/mdev = 0.040/0.136/0.481/0.172 ms
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

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@DESKTOP-3701C3V: ~/LinuxAssignment/newdocs
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ ls
docs  docs.zip  file1.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cd ./docs.zip
-bash: cd: ./docs.zip: Not a directory
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ unzip docs.zip -d newdocs
Archive:  docs.zip
  creating: newdocs/docs/
  extracting: newdocs/docs/file2.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ ls
docs  docs.zip  file1.txt  newdocs
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cd ./newdocs
cdac@DESKTOP-3701C3V:~/LinuxAssignment/newdocs$ ls
docs
cdac@DESKTOP-3701C3V:~/LinuxAssignment/newdocs$ ls docs
file2.txt
cdac@DESKTOP-3701C3V:~/LinuxAssignment/newdocs$
```

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@DESKTOP-37O1C3V: ~/LinuxAssignment
cdac@DESKTOP-37O1C3V:~/LinuxAssignment$ vi file1.txt
cdac@DESKTOP-37O1C3V:~/LinuxAssignment$ cat file1.txt
Hello My name is Dhaval Patil
cdac@DESKTOP-37O1C3V:~/LinuxAssignment$ sed -i 's/Hello/Hey/g' file1.txt
cdac@DESKTOP-37O1C3V:~/LinuxAssignment$ cat file1.txt
Hey My name is Dhaval Patil
cdac@DESKTOP-37O1C3V:~/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@DESKTOP-3701C3V: ~/LinuxAssignment
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ cat > data.txt
array
List
String
Graph
ArrayList
LinkList
Dynammic programming
HashMap
Binary Search Tree
Tree
Trie
Two Pointer
Greedy
Binery Search
Queue
Stack
Sorting
Heap
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ head data.txt
array
List
String
Graph
ArrayList
LinkList
Dynammic programming
HashMap
Binary Search Tree
Tree
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

- 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@DESKTOP-3701C3V: ~/LinuxAssignment
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ tail -5 data.txt
Binery Search
Queue
Stack
Sorting
Heap
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

- 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@DESKTOP-3701C3V: ~/LinuxAssignment
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ head -15 numbers.txt
1
2
3
6
5
8
0
5
3
6
8
32
345
66
12
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

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

```
cdac@DESKTOP-3701C3V:~/LinuxAssignment$ head -n 3 numbers.txt
1
2
3
cdac@DESKTOP-3701C3V:~/LinuxAssignment$
```

- 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@DESKTOP-3701C3V: ~
cdac@DESKTOP-3701C3V:~$ cat > input.txt
Hello my name is dhaval patil
cdac@DESKTOP-3701C3V:~$ tr 'a-z' 'A-Z' < input.txt > output.txt
cdac@DESKTOP-3701C3V:~$ cat output.txt
HELLO MY NAME IS DHAVAL PATIL
cdac@DESKTOP-3701C3V:~$
```


- 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@DESKTOP-3701C3V: ~  
cdac@DESKTOP-3701C3V:~$ cat duplicate.txt  
hello  
dhaval  
hello  
patil  
dhaval  
is  
my  
is  
cdac@DESKTOP-3701C3V:~$ sort duplicate.txt | uniq  
dhaval  
hello  
is  
my  
patil  
cdac@DESKTOP-3701C3V:~$ _
```

- 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@DESKTOP-3701C3V: ~  
cdac@DESKTOP-3701C3V:~$ cat > fruit.txt  
apple  
banana  
grapes  
apple  
orange  
banana  
pineapple  
cdac@DESKTOP-3701C3V:~$ sort fruit.txt | uniq -c  
2 apple  
2 banana  
1 grapes  
1 orange  
1 pineapple  
cdac@DESKTOP-3701C3V:~$ _
```

Submission Guidelines:

- Document each step of your solution and any challenges faced.
- Upload it on your GitHub repository

Additional Tips:

- Experiment with different options and parameters of each command to explore their functionalities.