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.

Commands:

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

b) File Management:

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

Commands:

```
cdac@Tanmay:~$ cd LinuxAssignment
cdac@Tanmay:~/LinuxAssignment$ touch file1.txt
cdac@Tanmay:~/LinuxAssignment$ cat > file1.txt
Hello World!
Ctrl + D to save
cdac@Tanmay:~/LinuxAssignment$ cat file1.txt
Hello World!
```

c) Directory Management:

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

Commands:

```
cdac@Tanmay:~$ cd LinuxAssignment
cdac@Tanmay:~/LinuxAssignment$ mkdir docs
```

d) Copy and Move Files:

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

Commands:

```
cdac@Tanmay:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@Tanmay:~/LinuxAssignment$ cd docs
cdac@Tanmay:~/LinuxAssignment/docs$ cat file2.txt
Hello World!
```

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.
Commands:

```
cdac@Tanmay:~/LinuxAssignment/docs$ chmod 744 file2.txt
cdac@Tanmay:~/LinuxAssignment/docs$ ls -l file2.txt
-rwxr--r-- 1 cdac cdac 0 Aug 18 13:39 file2.txt
cdac@Tanmay:~/LinuxAssignment/docs$ sudo chown cdactanmay file2.txt
cdac@Tanmay:~/LinuxAssignment/docs$ ls -l file2.txt
-rwxr--r-- 1 cdactanmay cdac 0 Aug 18 13:39 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.
Commands:

```
cdac@Tanmay:~/LinuxAssignment/docs$ cd ..
cdac@Tanmay:~/LinuxAssignment$ ls -l
total 40
-rw-r--r-- 1 cdac cdac  455 Aug 18 14:15 data.txt
drwxr-xr-x 2 cdac cdac 4096 Aug 18 13:39 docs
-rw-r--r-- 1 cdac cdac  316 Aug 18 13:58 docs.zip
-rw-r--r-- 1 cdac cdac  121 Aug 18 14:21 duplicate.txt
-rw-r--r-- 1 cdac cdac  125 Aug 18 14:09 file1.txt
-rw-r--r-- 1 cdac cdac   58 Aug 18 14:22 fruit.txt
-rw-r--r-- 1 cdac cdac   53 Aug 18 14:20 input.txt
drwxr-xr-x 3 cdac cdac 4096 Aug 18 14:01 newdocs
-rw-r--r-- 1 cdac cdac   51 Aug 18 14:18 numbers.txt
-rw-r--r-- 1 cdac cdac   53 Aug 18 14:20 output.txt
cdac@Tanmay:~/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 21 06:52 dev
drwxr-xr-x  88 root root    4096 Aug 21 07:33 etc
drwxr-xr-x   4 root root    4096 Aug 18 04:17 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 02:58 lost+found
drwxr-xr-x   2 root root    4096 Jan  6  2025 media
drwxr-xr-x   5 root root    4096 Aug 18 02:59 mnt
```

```
drwxr-xr-x   2 root root    4096 Jan  6  2025 opt
dr-xr-xr-x 220 root root       0 Aug 21 06:52 proc
drwx------   4 root root    4096 Aug 18 04:16 root
drwxr-xr-x  19 root root     620 Aug 21 07:32 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 02:59 snap
drwxr-xr-x   2 root root    4096 Jan  6  2025 srv
dr-xr-xr-x  13 root root       0 Aug 21 06:52 sys
drwxrwxrwt   9 root root    4096 Aug 21 07:01 tmp
drwxr-xr-x  12 root root    4096 Jan  6  2025 usr
drwxr-xr-x  13 root root    4096 Aug 18 02:59 var
```

g) File Searching:
a. Search for all files with the extension ".txt" in the current directory and its subdirectories.
Commands:

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

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

```
cdac@Tanmay:~/LinuxAssignment$ cat > file1.txt
hello world
this is linux
world of commands
cdac@Tanmay:~/LinuxAssignment$ grep "linux" file1.txt
this is linux
```

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

```
cdac@Tanmay:~/LinuxAssignment$ date
Mon Aug 18 13:51:22 UTC 2025
```

i) Networking:
a. Display the IP address of the system.
Commands:

```
cdac@Tanmay:~/LinuxAssignment$ hostname -I
172.29.245.39
```

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

```
cdac@Tanmay:~/LinuxAssignment$ ping -c 4 google.com
PING google.com (142.250.67.78) 56(84) bytes of data.
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=1 ttl=111 time=95.6 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=2 ttl=111 time=80.7 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=3 ttl=111 time=78.8 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=4 ttl=111 time=94.7 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 78.817/87.450/95.575/7.742 ms
```

j) File Compression:

a. Compress the "docs" directory into a zip file.

Commands:

```
cdac@Tanmay:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
cdac@Tanmay:~/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 cdac cdac 4096 Aug 18 13:39 docs
-rw-r--r-- 1 cdac cdac  316 Aug 18 13:58 docs.zip
-rw-r--r-- 1 cdac cdac  103 Aug 18 13:50 file1.txt
```

b. Extract the contents of the zip file into a new directory.

Commands:

```
cdac@Tanmay:~/LinuxAssignment$ unzip docs.zip -d newdocs
Archive:  docs.zip
   creating: newdocs/docs/
 extracting: newdocs/docs/file2.txt
cdac@Tanmay:~/LinuxAssignment$ cd newdocs
cdac@Tanmay:~/LinuxAssignment/newdocs$ ls
docs
```

k) File Editing:

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

Commands:

```
cdac@Tanmay:~/LinuxAssignment$ vi file1.txt
Press i for insert mode
hello world
this is linux
```

world of commands
linux is powerful
Press esc
Type :wq for save and exit

b. Replace a specific word in the "file1.txt" file with another word (provide the original word and the word to replace it with).
Commands:
cdac@Tanmay:~/LinuxAssignment$ sed -i 's/world/Earth/g' file1.txt
cdac@Tanmay:~/LinuxAssignment$ cat file1.txt
hello Earth
this is linux
Earth of commands
linux is powerful

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.
Commands:
cdac@Tanmay:~/LinuxAssignment$ cat > data.txt
Red
Yellow
Purple
White
Black
Green
Blue
Brown
Orange
Pink
Grey
Silver
Gold
Press ctrl+D
cdac@Tanmay:~/LinuxAssignment$ head -n 10 data.txt
Red
Yellow
Purple
White
Black
Green
Blue

Brown
Orange
Pink

b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command.
Commands:
cdac@Tanmay:~/LinuxAssignment$ tail -n 5 data.txt
Orange
Pink
Grey
Silver
Gold

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.
Commands:
cdac@Tanmay:~/LinuxAssignment$ cat > numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Press ctrl+D
cdac@Tanmay:~/LinuxAssignment$ head -n 15 numbers.txt
1
2
3
4

5
6
7
8
9
10
11
12
13
14
15

d. To focus on the last few numbers of the dataset, display the last 3 lines of "numbers.txt".
Commands:
cdac@Tanmay:~/LinuxAssignment$ tail -n 3 numbers.txt
18
19
20

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."
Commands:
cdac@Tanmay:~/LinuxAssignment$ cat > input.txt
linux is powerful
practice makes perfect
hello world
Press ctrl+D
cdac@Tanmay:~/LinuxAssignment$ tr 'a-z' 'A-Z' < input.txt > output.txt
cdac@Tanmay:~/LinuxAssignment$ cat output.txt
LINUX IS POWERFUL
PRACTICE MAKES PERFECT
HELLO WORLD

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."
Commands:
cdac@Tanmay:~/LinuxAssignment$ cat > duplicate.txt
Linux is powerful
Hello World
Practice makes perfect
Linux is powerful
Hello World
Learn everyday

Practice makes perfect
Press ctrl+D
cdac@Tanmay:~/LinuxAssignment$ sort duplicate.txt | uniq
Hello World
Learn everyday
Linux is powerful
Practice makes perfect

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."
Commands:
cdac@Tanmay:~/LinuxAssignment$ cat > fruit.txt
Apple
Banana
Mango
Apple
Orange
Banana
Apple
Grapes
Mango
Press ctrl+D
cdac@Tanmay:~/LinuxAssignment$ sort fruit.txt | uniq -c
3 Apple
2 Banana
1 Grapes
2 Mango
1 Orange