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-FVFGFNRV:~$ pwd
/home/cdac
cdac@LAPTOP-FVFGFNRV:~$ mkdir LinuxAssigment
cdac@LAPTOP-FVFGFNRV:~$ touch abc.txt
cdac@LAPTOP-FVFGFNRV:~$ ls
LinuxAssigment  abc.txt
cdac@LAPTOP-FVFGFNRV:~$
```

b) **File Management:**
   a. Inside the "LinuxAssignment" directory, create a new file named "file1.txt". Display its contents.

```
cdac@LAPTOP-FVFGFNRV:~$ cd LinuxAssigment/
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ touch file1.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ cat file1.txt
Hi! Hello cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ cat file1.txt
Hi! Hello cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$
```

c) **Directory Management:**
   a. Create a new directory named "docs" inside the "LinuxAssignment" directory.

```
Hi! Hello cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ mkdir docs
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ 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-FVFGFNRV:~/LinuxAssigment$ cp file1.txt file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ ls
docs  file1.txt  file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ mv file2.txt docs
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ cd docs/
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/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-FVFGFNRV:~/LinuxAssigment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 10 Aug 29 22:40 file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ sudo chmod u+x file2.txt
[sudo] password for cdac:
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 10 Aug 29 22:40 file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ sudo whoami
root
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 10 Aug 29 22:40 file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ sudo chown root file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ ls -l
total 4
-rwxr--r-- 1 root cdac 10 Aug 29 22:40 file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ sudo chown cdac file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 10 Aug 29 22:40 file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/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@LAPTOP-FVFGFNRV:~$ cd ../..
cdac@LAPTOP-FVFGFNRV:/$ ls -l
total 2144
lrwxrwxrwx   1 root root       7 Nov 23  2023 bin -> usr/bin
drwxr-xr-x   2 root root    4096 Apr 18  2022 boot
drwxr-xr-x  16 root root    3600 Aug 29 22:03 dev
drwxr-xr-x  73 root root    4096 Aug 29 22:30 etc
drwxr-xr-x   3 root root    4096 Aug 28 08:56 home
-rwxrwxrwx   1 root root 2127224 Apr 25 23:47 init
lrwxrwxrwx   1 root root       7 Nov 23  2023 lib -> usr/lib
lrwxrwxrwx   1 root root       9 Nov 23  2023 lib32 -> usr/li
lrwxrwxrwx   1 root root       9 Nov 23  2023 lib64 -> usr/li
lrwxrwxrwx   1 root root      10 Nov 23  2023 libx32 -> usr/l
drwx------   2 root root   16384 Aug 28 08:56 lost+found
drwxr-xr-x   2 root root    4096 Nov 23  2023 media
drwxr-xr-x   6 root root    4096 Aug 28 08:56 mnt
drwxr-xr-x   2 root root    4096 Nov 23  2023 opt
dr-xr-xr-x 239 root root       0 Aug 29 22:01 proc
drwx------   4 root root    4096 Aug 28 08:56 root
drwxr-xr-x  18 root root     540 Aug 29 22:03 run
lrwxrwxrwx   1 root root       8 Nov 23  2023 sbin -> usr/sbi
drwxr-xr-x   8 root root    4096 Nov 23  2023 snap
drwxr-xr-x   2 root root    4096 Nov 23  2023 srv
dr-xr-xr-x  11 root root       0 Aug 29 21:59 sys
drwxrwxrwt  10 root root    4096 Aug 29 22:13 tmp
drwxr-xr-x  14 root root    4096 Nov 23  2023 usr
drwxr-xr-x  13 root root    4096 Nov 23  2023 var
```

g) File Searching:

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

```
cdac@LAPTOP-FVFGFNRV:~$ find . -type f -name "*.txt"
./LinuxAssigment/file1.txt
./LinuxAssigment/docs/file2.txt
./abc.txt
cdac@LAPTOP-FVFGFNRV:~$ ls -l
total 4
drwxr-xr-x 3 cdac cdac 4096 Aug 29 22:44 LinuxAssigment
-rw-r--r-- 1 cdac cdac    0 Aug 29 22:06 abc.txt
cdac@LAPTOP-FVFGFNRV:~$ cd docs
-bash: cd: docs: No such file or directory
cdac@LAPTOP-FVFGFNRV:~$ cd LinuxAssignment/
-bash: cd: LinuxAssignment/: No such file or directory
cdac@LAPTOP-FVFGFNRV:~$ cd LinuxAssigment/
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ cd docs
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 10 Aug 29 22:40 file2.txt
```

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

```
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ grep "H" file2.txt
Hi! Hello
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$
```

h) System Information:

a. Display the current system date and time.

```
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ date
Thu Aug 29 23:30:10 IST 2024
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$
```

i) Networking:

a. Display the IP address of the system.

```
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ ip addr
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
    inet 10.255.255.254/32 brd 10.255.255.254 scope global 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 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:17:f2:c9 brd ff:ff:ff:ff:ff:ff
    inet 192.168.120.105/20 brd 192.168.127.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe17:f2c9/64 scope link
       valid_lft forever preferred_lft forever
```

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

```
sudo apt install net-tools
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/docs$ ping cdac.in
PING cdac.in (196.1.1.30) 56(84) bytes of data.
```

j) File Compression:

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

```
Processing triggers for man-db (2.10.2-1) ...
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ zip -r do  docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ ls
do.zip  docs  file1.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$
```

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

```
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ unzip do.zip -d newdocs
Archive:  do.zip
   creating: newdocs/docs/
 extracting: newdocs/docs/file2.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ ls
do.zip  docs  file1.txt  newdocs
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ cd newdocs
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment/newdocs$ ls -l
total 4
drwxr-xr-x 2 cdac cdac 4096 Aug 29 22:44 docs
```

k) File Editing:

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

```
cdac@LAPTOP-FVFGFNRV:~$ cd LinuxAssigment
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ nano file1.txt
```

```
cdac@LAPTOP-FVFGFNRV: ~/LinuxAssigment
  GNU nano 6.2                                        file1.txt *
Hi! Hello
Sunday
Monday
tuesday
```

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-FVFGFNRV:~/LinuxAssigment$ cat file1.txt
Hi! Hello
Sunday
Monday
Tuesday
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ sed -i 's/Sunday/Friday/g' file1.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ cat file1.txt
Hi! Hello
Friday
Monday
Tuesday
```

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-FVFGFNRV:~/LinuxAssigment$ ls
data.txt  docs  file1.txt  newdocs
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ head data.txt
Mountain
River
Desert
Forest
Ocean
Peak
Island
Peninsula
Volcano
Glacier
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$
```

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-FVFGFNRV:~/LinuxAssigment$ tail -5 data.txt
Island
Peninsula
Volcano
Glacier
```

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-FVFGFNRV:~/LinuxAssigment$ head -15 Number.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$
```

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

```
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ tail -3  Number.txt
13
14
15
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$
```

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-FVFGFNRV:~/LinuxAssigment$ ls
Number.txt  data.txt  docs  file1.txt  input.txt  newdocs
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ cat input.txt
This is Assingnment 1
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ tr 'a-z' 'A-Z' <input.txt> output.txt
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$ cat output.txt
THIS IS ASSINGNMENT 1
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$
```

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-FVFGFNRV:~/LinuxAssigment$ sort duplicate.txt | uniq
are
from
hello
how
where
you
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$
```

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-FVFGFNRV:~/LinuxAssigment$ cat fruit.txt
kiwi
banana
apple
mango
apple
kiwi
orange
mango
pineapple
bananacdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$  sort fruit.txt | uniq -c
      2 apple
      1 banana
      1 banana
      2 kiwi
      2 mango
      1 orange
      1 pineapple
cdac@LAPTOP-FVFGFNRV:~/LinuxAssigment$
```