CDAC MUMBAI
Concepts of Operating System
Assignment 1

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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.

Ans:
Create directory named "LinuxAssignment"

```
cdac@LAPTOP-RLVRS19J:~$
cdac@LAPTOP-RLVRS19J:~$
cdac@LAPTOP-RLVRS19J:~$ whoami
cdac
cdac@LAPTOP-RLVRS19J:~$ pwd
/home/cdac
cdac@LAPTOP-RLVRS19J:~$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 28 18:26 LinuxAssignment
-rw-r--r-- 1 cdac cdac   37 Aug 28 14:27 file1
cdac@LAPTOP-RLVRS19J:~$
```

b) File Management:

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

```
cdac@LAPTOP-RLVRS19J:~$ cd LinuxAssignment/
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ touch file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls
file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ nano file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls
file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ cat file1.txt
This is file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$
```

c) Directory Management:

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

Ans:

```
-rw-r--r-- 1 cdac cdac   37 Aug 28 14:27 file1
cdac@LAPTOP-RLVRS19J:~$ cd LinuxAssignment/
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ mkdir docs
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls
docs  file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 28 19:33 docs
-rw-r--r-- 1 cdac cdac   18 Aug 28 18:36 file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$
```

d) Copy and Move Files:

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

Ans:

```
cdac@LAPTOP-RLVRS19J:~$ cd LinuxAssignment/
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 28 19:33 docs
-rw-r--r-- 1 cdac cdac   18 Aug 28 18:36 file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 28 20:24 docs
-rw-r--r-- 1 cdac cdac   18 Aug 28 18:36 file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ cd docs/
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 18 Aug 28 20:24 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ cat file2.txt
This is file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ cd ..
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls
docs  file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ cat file1.txt
This is file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$
```

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.
Ans:

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 18 Aug 28 20:24 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ chmod 744 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 18 Aug 28 20:24 file2.txt
```

change the owner of "file2.txt" to the current user:

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 18 Aug 28 20:24 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ sudo chown newuser file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 newuser cdac 18 Aug 28 20:24 file2.txt
cdac@LAPTOP-RLVRS19J:~/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.
Ans:

```
cdac@LAPTOP-RLVRS19J:~$ ls
LinuxAssignment
cdac@LAPTOP-RLVRS19J:~$ cd LinuxAssignment/
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 28 21:54 docs
-rw-r--r-- 1 cdac cdac   18 Aug 28 18:36 file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ cd docs/
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 newuser cdac 18 Aug 28 20:24 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$
```

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).
Ans

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ls -l *.txt
-rwxr--r-- 1 newuser cdac 18 Aug 28 20:24 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$
```

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 cdac cdac 4096 Aug 28 23:41 docs
-rw-r--r-- 1 cdac cdac   18 Aug 28 18:36 file1.txt
-rw-r--r-- 1 cdac cdac   15 Aug 29 13:30 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ grep "is" file1.txt file2.txt
file1.txt:This is file1.txt
file2.txt:this is file2
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$
```

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

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ date
Wed Aug 28 22:50:21 IST 2024
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ date +"%d-%m-%y"
28-08-24
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$
```

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).

Ans:

a.

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group d
efault 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:43:6c:14 brd ff:ff:ff:ff:ff:ff
    inet 172.17.143.90/20 brd 172.17.143.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe43:6c14/64 scope link
       valid_lft forever preferred_lft forever
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ hostname -I
172.17.143.90
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$
```

b.

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ping facebook.com
PING facebook.com (157.240.23.35) 56(84) bytes of data.
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=1 ttl=56 time=10.0 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=2 ttl=56 time=29.9 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=3 ttl=56 time=10.3 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=4 ttl=56 time=9.93 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=5 ttl=56 time=8.90 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=6 ttl=56 time=10.3 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=7 ttl=56 time=23.7 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=8 ttl=56 time=20.8 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=9 ttl=56 time=31.5 ms
64 bytes from edge-star-mini-shv-01-maa2.facebook.com (157.240.23.35): icmp
_seq=10 ttl=56 time=10.6 ms
^X^C64 bytes from 157.240.23.35: icmp_seq=11 ttl=56 time=34.0 ms

--- facebook.com ping statistics ---
11 packets transmitted, 11 received, 0% packet loss, time 10014ms
rtt min/avg/max/mdev = 8.901/18.171/33.958/9.550 ms
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$
```

j) File Compression:

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

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

Ans:

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$ ls -l
total 8
-rw-r--r-- 1 cdac    cdac 22 Aug 28 23:41 compress.zip
-rwxr--r-- 1 newuser cdac 18 Aug 28 20:24 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment/docs$
```

k) File Editing:

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

```
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 cdac cdac 4096 Aug 28 23:41 docs
-rw-r--r-- 1 cdac cdac   18 Aug 28 18:36 file1.txt
-rw-r--r-- 1 cdac cdac   15 Aug 29 13:30 file2.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ nano file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$
```

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-RLVRS19J:~/LinuxAssignment$ nano file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ cat file1.txt
this is file1.txt
cdac@LAPTOP-RLVRS19J:~/LinuxAssignment$ sed 's/this/that/g' file1.txt
that is file1.txt
cdac@LAPTOP-RLVRS19J:~/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-RLVRS19J:~/A1/P2$ ls
data.txt
cdac@LAPTOP-RLVRS19J:~/A1/P2$ head -n 10 data.txt
0
1
2
3
4
5
6
7
8
9
cdac@LAPTOP-RLVRS19J:~/A1/P2$
```

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-RLVRS19J:~/A1/P2$ nano data.txt
cdac@LAPTOP-RLVRS19J:~/A1/P2$ tail -n 5 data.txt
10
11
x
y
z
cdac@LAPTOP-RLVRS19J:~/A1/P2$
```

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-RLVRS19J:~/A1/P2$ nano numbers.txt
cdac@LAPTOP-RLVRS19J:~/A1/P2$ head -n 15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
cdac@LAPTOP-RLVRS19J:~/A1/P2$
```

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

```
cdac@LAPTOP-RLVRS19J:~/A1/P2$ tail -3 numbers.txt
15
16
17
cdac@LAPTOP-RLVRS19J:~/A1/P2$
```

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."

```
Try 'tr --help' for more information.
cdac@LAPTOP-RLVRS19J:~/A1/P2$ tr '[:lower:]' '[:upper:]' < input.txt
A A
B B
C C
D D
cdac@LAPTOP-RLVRS19J:~/A1/P2$ tr '[:upper:]' '[:lower:]' < input.txt
a a
b b
c c
d d
cdac@LAPTOP-RLVRS19J:~/A1/P2$ tr --help
Usage: tr [OPTION]... SET1 [SET2]
```

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-RLVRS19J:~/A1/P2$ cat duplicate.txt
apple
banana
apple
cherry
banana
date
day
night
night
cdac@LAPTOP-RLVRS19J:~/A1/P2$ sort duplicate.txt | uniq
apple
banana
cherry
date
day
night
cdac@LAPTOP-RLVRS19J:~/A1/P2$
```

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."

```
data.txt  duplicate.txt  fruit.txt  input.txt  numbers.txt
cdac@LAPTOP-RLVRS19J:~/A1/P2$ cat fruit.txt
apple
banana
apple
cherry
banana
mango
mango
mango
cdac@LAPTOP-RLVRS19J:~/A1/P2$ sort fruit.txt | uniq
apple
banana
cherry
mango
cdac@LAPTOP-RLVRS19J:~/A1/P2$ sort fruit.txt | uniq -c
      2 apple
      2 banana
      1 cherry
      3 mango
cdac@LAPTOP-RLVRS19J:~/A1/P2$ sort fruit.txt | uniq -c | sort -nr
      3 mango
      2 banana
      2 apple
      1 cherry
cdac@LAPTOP-RLVRS19J:~/A1/P2$ sort fruit.txt | uniq -c | sort -n
      1 cherry
      2 apple
      2 banana
      3 mango
cdac@LAPTOP-RLVRS19J:~/A1/P2$ sort fruit.txt | uniq -c | sort -r
      3 mango
      2 banana
      2 apple
      1 cherry
cdac@LAPTOP-RLVRS19J:~/A1/P2$
```