

# 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@shankar: ~  
cdac@shankar:~$ pwd  
/home/cdac  
cdac@shankar:~$ ls  
cdac@shankar:~$ cd LinuxAssignment  
-bash: cd: LinuxAssignment: No such file or directory  
cdac@shankar:~$ mkdir LinuxAssignment  
cdac@shankar:~$ ls  
LinuxAssignment  
cdac@shankar:~$
```

b) File Management:

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

```
cdac@shankar: ~/LinuxAssignr  
cdac@shankar:~$ ls  
LinuxAssignment  
cdac@shankar:~$ cd LinuxAssignment  
cdac@shankar:~/LinuxAssignment$ touch file1.txt  
cdac@shankar:~/LinuxAssignment$ ls  
file1.txt  
cdac@shankar:~/LinuxAssignment$ nano file1.txt  
cdac@shankar:~/LinuxAssignment$ cat file1.txt  
india  
china  
bhutan  
srilanka  
maldives  
bangladesh  
pakistan  
cdac@shankar:~/LinuxAssignment$ |
```

c) Directory Management:

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

```
cdac@shankar: ~/LinuxAssignr  
cdac@shankar:~/LinuxAssignment$ mkdir docs  
cdac@shankar:~/LinuxAssignment$ ls  
docs file1.txt  
cdac@shankar:~/LinuxAssignment$
```

d) Copy and Move Files:

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

```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@shankar:~/LinuxAssignment$ ls
docs  file1.txt
cdac@shankar:~/LinuxAssignment$ cd docs
cdac@shankar:~/LinuxAssignment/docs$ ls
file2.txt
cdac@shankar:~/LinuxAssignment/docs$ cat file2.txt
india
china
bhutan
srilanka
maldives
bangladesh
pakistan
cdac@shankar:~/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@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment/docs$ chmod 744 file2.txt
cdac@shankar:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 59 Feb 27 15:38 file2.txt
cdac@shankar:~/LinuxAssignment/docs$ chown cdac file2.txt
cdac@shankar:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 59 Feb 27 15:38 file2.txt
cdac@shankar:~/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@shankar: ~/LinuxAssignr x + v
total 4
-rwxr--r-- 1 cdac cdac 59 Feb 27 15:38 file2.txt
cdac@shankar:~/LinuxAssignment/docs$ ls -l /
total 2448
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 16 root root 3580 Feb 27 15:06 dev
drwxr-xr-x 87 root root 4096 Feb 27 16:16 etc
drwxr-xr-x 3 root root 4096 Feb 24 12:15 home
-rwxrwxrwx 1 root root 2424984 Feb 12 00:59 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 Feb 24 12:13 lost+found
drwxr-xr-x 2 root root 4096 Jan 6 20:13 media
drwxr-xr-x 6 root root 4096 Feb 24 12:14 mnt
drwxr-xr-x 2 root root 4096 Jan 6 20:13 opt
dr-xr-xr-x 228 root root 0 Feb 27 15:06 proc
drwx----- 4 root root 4096 Feb 24 12:14 root
drwxr-xr-x 18 root root 540 Feb 27 15:06 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 Feb 24 12:14 snap
drwxr-xr-x 2 root root 4096 Jan 6 20:13 srv
dr-xr-xr-x 11 root root 0 Feb 27 16:21 sys
drwxrwxrwt 11 root root 4096 Feb 27 15:31 tmp
drwxr-xr-x 12 root root 4096 Jan 6 20:13 usr
drwxr-xr-x 13 root root 4096 Feb 24 12:14 var
cdac@shankar:~/LinuxAssignment/docs$ |
```

g) File Searching:

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

```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment/docs$ find . -name "*.txt"
./file2.txt
cdac@shankar:~/LinuxAssignment/docs$
```

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

```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment/docs$ grep 'india' file2.txt
india is diverse and rich
cdac@shankar:~/LinuxAssignment/docs$ |
```

h) System Information:

- a. Display the current system date and time.

```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment/docs$ date
Thu Feb 27 16:50:29 UTC 2025
cdac@shankar:~/LinuxAssignment/docs$ |
```

i) Networking:

- a. Display the IP address of the system.

```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment/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:56:82:d8 brd ff:ff:ff:ff:ff:ff
    inet 172.22.119.31/20 brd 172.22.127.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe56:82d8/64 scope link
        valid_lft forever preferred_lft forever
cdac@shankar:~/LinuxAssignment/docs$ |
```

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

```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment/docs$ ping google.com
PING google.com (142.250.199.142) 56(84) bytes of data:
64 bytes from bom07s36-in-f14.1e100.net (142.250.199.142): icmp_seq=1 ttl=59 time=18.5 ms
64 bytes from bom07s36-in-f14.1e100.net (142.250.199.142): icmp_seq=2 ttl=59 time=18.5 ms
64 bytes from bom07s36-in-f14.1e100.net (142.250.199.142): icmp_seq=3 ttl=59 time=17.2 ms
64 bytes from bom07s36-in-f14.1e100.net (142.250.199.142): icmp_seq=4 ttl=59 time=17.5 ms
^C
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 2999ms
rtt min/avg/max/mdev = 17.222/17.915/18.482/0.564 ms
cdac@shankar:~/LinuxAssignment/docs$ |
```

j) File Compression:

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

```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment$ zip -r docs.zip . -i docs
zip warning: zip file empty
cdac@shankar:~/LinuxAssignment$ ls
docs  docs.zip  file1.txt
cdac@shankar:~/LinuxAssignment$ |
```

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

```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment/docs$ unzip docs.zip -d docs1
Archive: docs.zip
warning [docs.zip]: zipfile is empty
cdac@shankar:~/LinuxAssignment/docs$ |
```

k) File Editing:

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

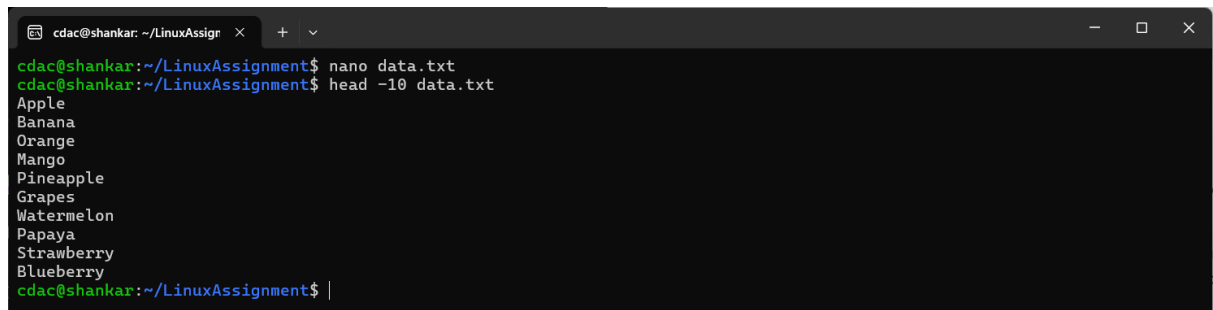
```
cdac@shankar: ~/LinuxAssignr x + v
GNU nano 7.2 file1.txt
Hello world
india
china
bhutan
srilanka
maldives
bangladesh
pakistan
```

- 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@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment$ sed -i 's/Hello/Hi/g' file1.txt
cdac@shankar:~/LinuxAssignment$ cat file1.txt
Hi world
india
china
bhutan
srilanka
maldives
bangladesh
pakistan
cdac@shankar:~/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.



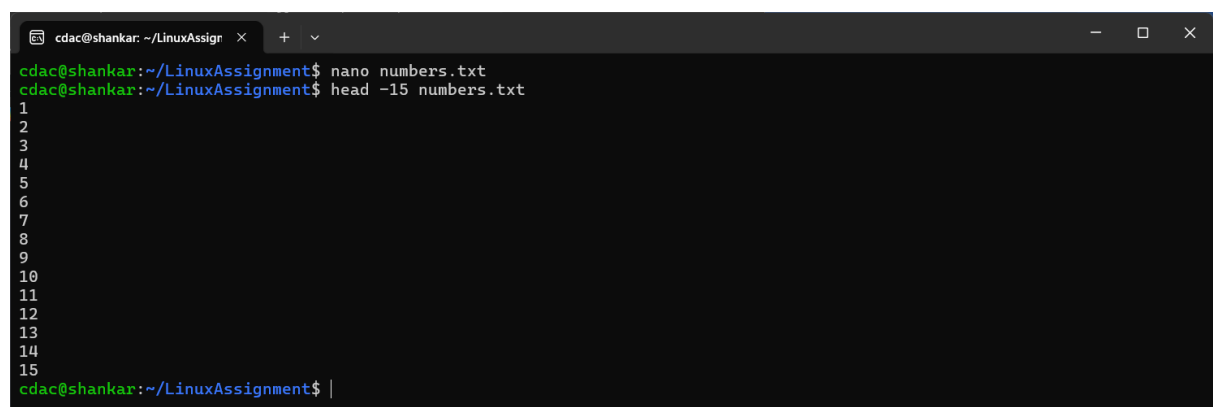
```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment$ nano data.txt
cdac@shankar:~/LinuxAssignment$ head -10 data.txt
Apple
Banana
Orange
Mango
Pineapple
Grapes
Watermelon
Papaya
Strawberry
Blueberry
cdac@shankar:~/LinuxAssignment$ |
```

- b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command.



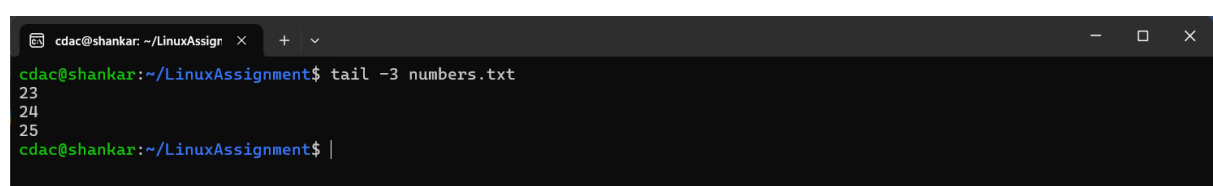
```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment$ tail -5 data.txt
Lychee
Pomegranate
Avocado
Guava
Fig
cdac@shankar:~/LinuxAssignment$ |
```

- 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@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment$ nano numbers.txt
cdac@shankar:~/LinuxAssignment$ head -15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
cdac@shankar:~/LinuxAssignment$ |
```

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



```
cdac@shankar: ~/LinuxAssignr x + v
cdac@shankar:~/LinuxAssignment$ tail -3 numbers.txt
23
24
25
cdac@shankar:~/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@shankar: ~/LinuxAssign x + v
cdac@shankar:~/LinuxAssignment$ cat input.txt
Apple
Banana
Orange
Mango
Pineapple
Grapes
Watermelon
Papaya

cdac@shankar:~/LinuxAssignment$ cat input.txt | tr '[:lower:]' '[:upper:]' > output.txt
cdac@shankar:~/LinuxAssignment$ cat output.txt
APPLE
BANANA
ORANGE
MANGO
PINEAPPLE
GRAPES
WATERMELON
PAPAYA

cdac@shankar:~/LinuxAssignment$ |
```

- 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@shankar: ~/LinuxAssign x + v
cdac@shankar:~/LinuxAssignment$ cat duplicate.txt
APPLE
WATERMELON
BANANA
MANGO
ORANGE
MANGO
PINEAPPLE
GRAPES
MANGO
WATERMELON
PAPAYA
WATERMELON

cdac@shankar:~/LinuxAssignment$ sort duplicate.txt | uniq
APPLE
BANANA
GRAPES
MANGO
ORANGE
PAPAYA
PINEAPPLE
WATERMELON

cdac@shankar:~/LinuxAssignment$ |
```

- 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@shankar: ~/LinuxAssign x + v
cdac@shankar:~/LinuxAssignment$ man uniq
cdac@shankar:~/LinuxAssignment$ sort fruit.txt | uniq -c
 1 APPLE
 1 BANANA
 1 GRAPES
 3 MANGO
 1 ORANGE
 1 PAPAYA
 1 PINEAPPLE
 3 WATERMELON

cdac@shankar:~/LinuxAssignment$ |
```