CDAC MUMBAI

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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.

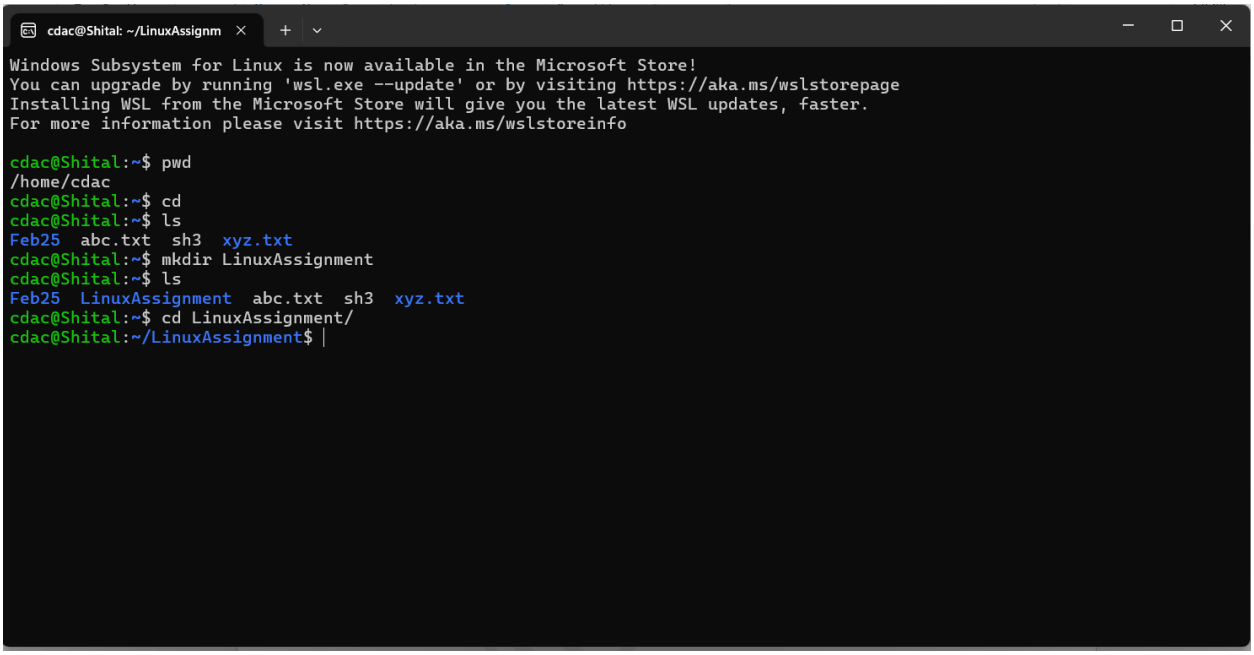
****

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.**

Ans:

```
cdac@Shital:~$ pwd
/home/cdac
cdac@Shital:~$ cd
cdac@Shital:~$ ls
Feb25  abc.txt  sh3  xyz.txt
cdac@Shital:~$ mkdir LinuxAssignment
cdac@Shital:~$ ls
Feb25  LinuxAssignment  abc.txt  sh3  xyz.txt
cdac@Shital:~$ cd LinuxAssignment/
cdac@Shital:~/LinuxAssignment$
```

CDAC Mumbai

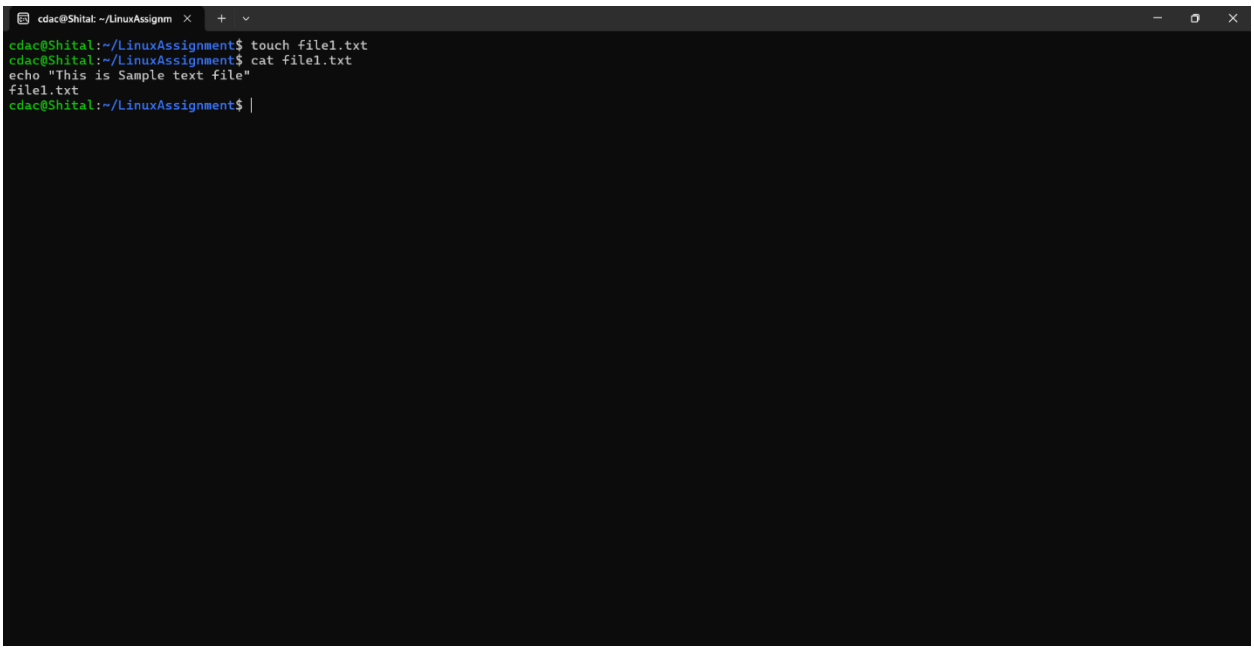


b) **File Management:**

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

Ans:

cdac@Shital:~/LinuxAssignment$ touch file1.txt
cdac@Shital:~/LinuxAssignment$ cat file1.txt
echo "This is Sample text file"
file1.txt
cdac@Shital:~/LinuxAssignment$

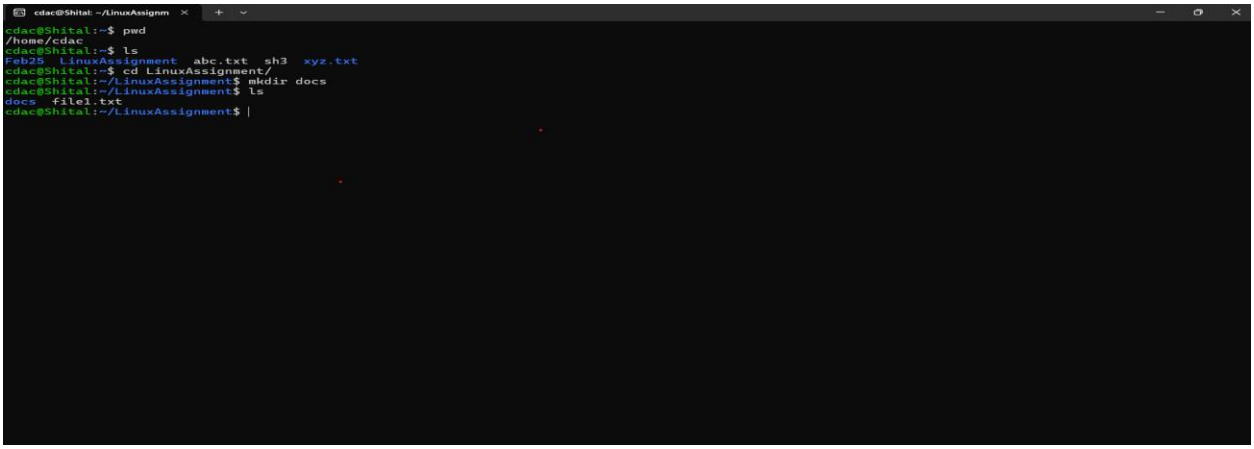


c) **Directory Management:**

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

Ans:

```
cdac@Shital:~$ pwd
/home/cdac
cdac@Shital:~$ ls
Feb25  LinuxAssignment  abc.txt  sh3  xyz.txt
cdac@Shital:~$ cd LinuxAssignment/
cdac@Shital:~/LinuxAssignment$ mkdir docs
cdac@Shital:~/LinuxAssignment$ ls
docs  file1.txt
cdac@Shital:~/LinuxAssignment$
```

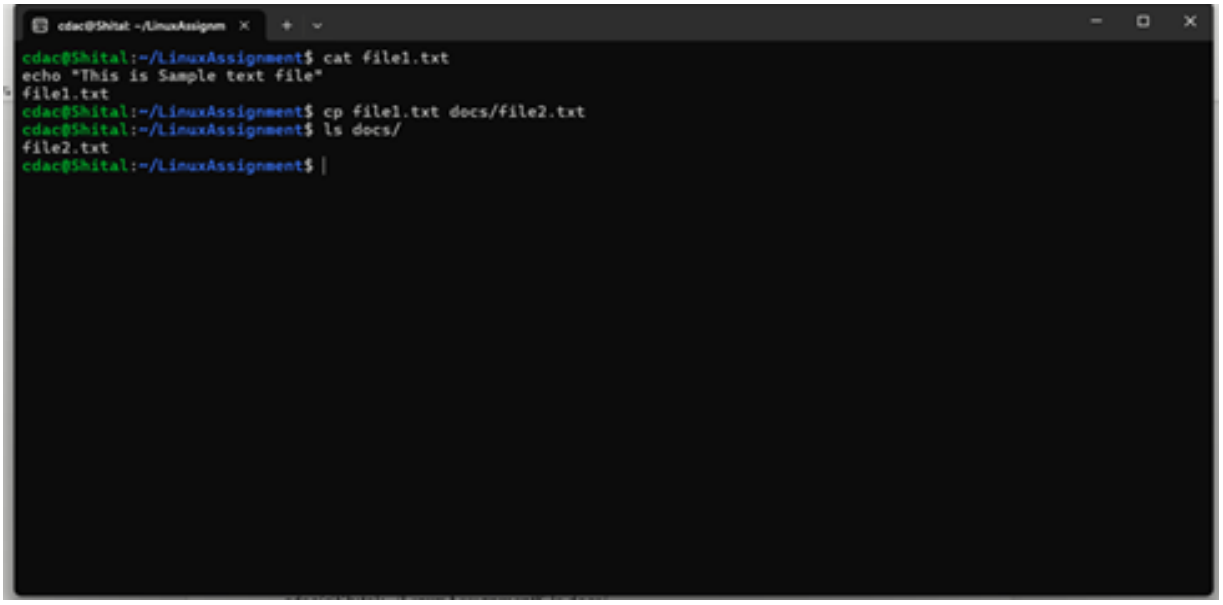


d) **Copy and Move Files:**

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

Ans:

```
cdac@Shital:~/LinuxAssignment$ cat file1.txt
echo "This is Sample text file"
file1.txt
cdac@Shital:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@Shital:~/LinuxAssignment$ ls docs/
file2.txt
cdac@Shital:~/LinuxAssignment$
```

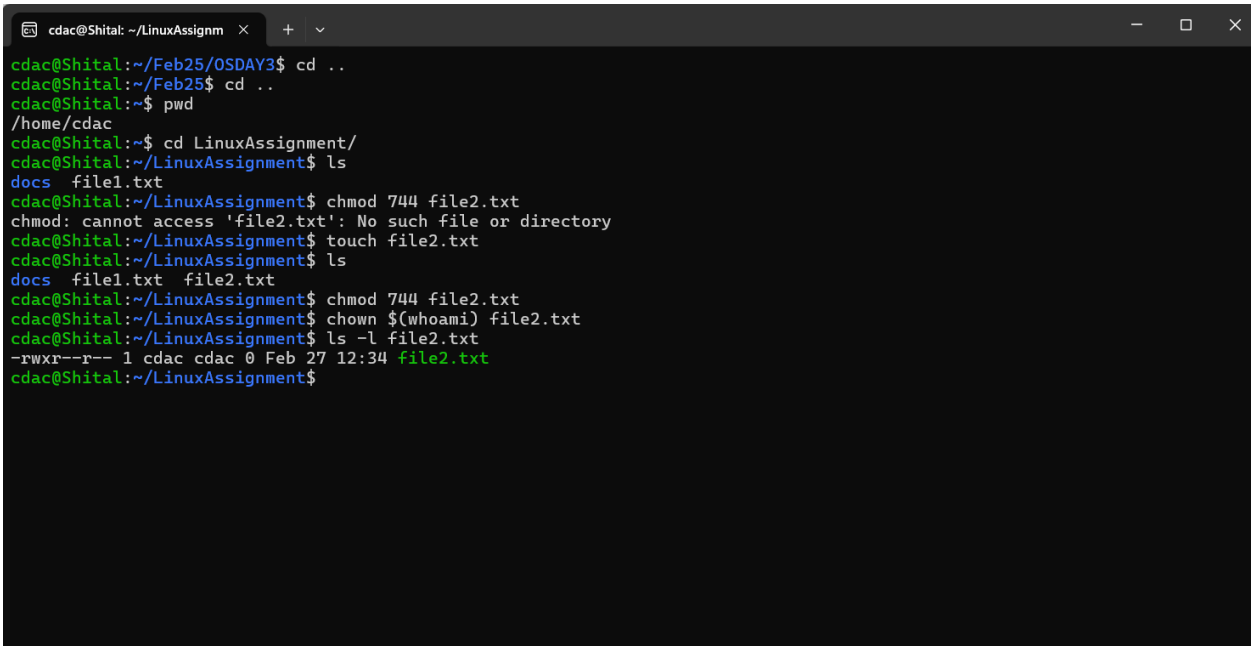


e) **Permissions and Ownership:**

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@Shital:~$ pwd
/home/cdac
cdac@Shital:~$ cd LinuxAssignment/
cdac@Shital:~/LinuxAssignment$ ls
docs  file1.txt
cdac@Shital:~/LinuxAssignment$ chmod 744 file2.txt
chmod: cannot access 'file2.txt': No such file or directory
cdac@Shital:~/LinuxAssignment$ touch file2.txt
cdac@Shital:~/LinuxAssignment$ ls
docs  file1.txt  file2.txt
cdac@Shital:~/LinuxAssignment$ chmod 744 file2.txt
cdac@Shital:~/LinuxAssignment$ chown $(whoami) file2.txt
cdac@Shital:~/LinuxAssignment$ ls -l file2.txt
-rwxr--r-- 1 cdac cdac 0 Feb 27 12:34 file2.txt
    cdac@Shital:~/LinuxAssignment$
```



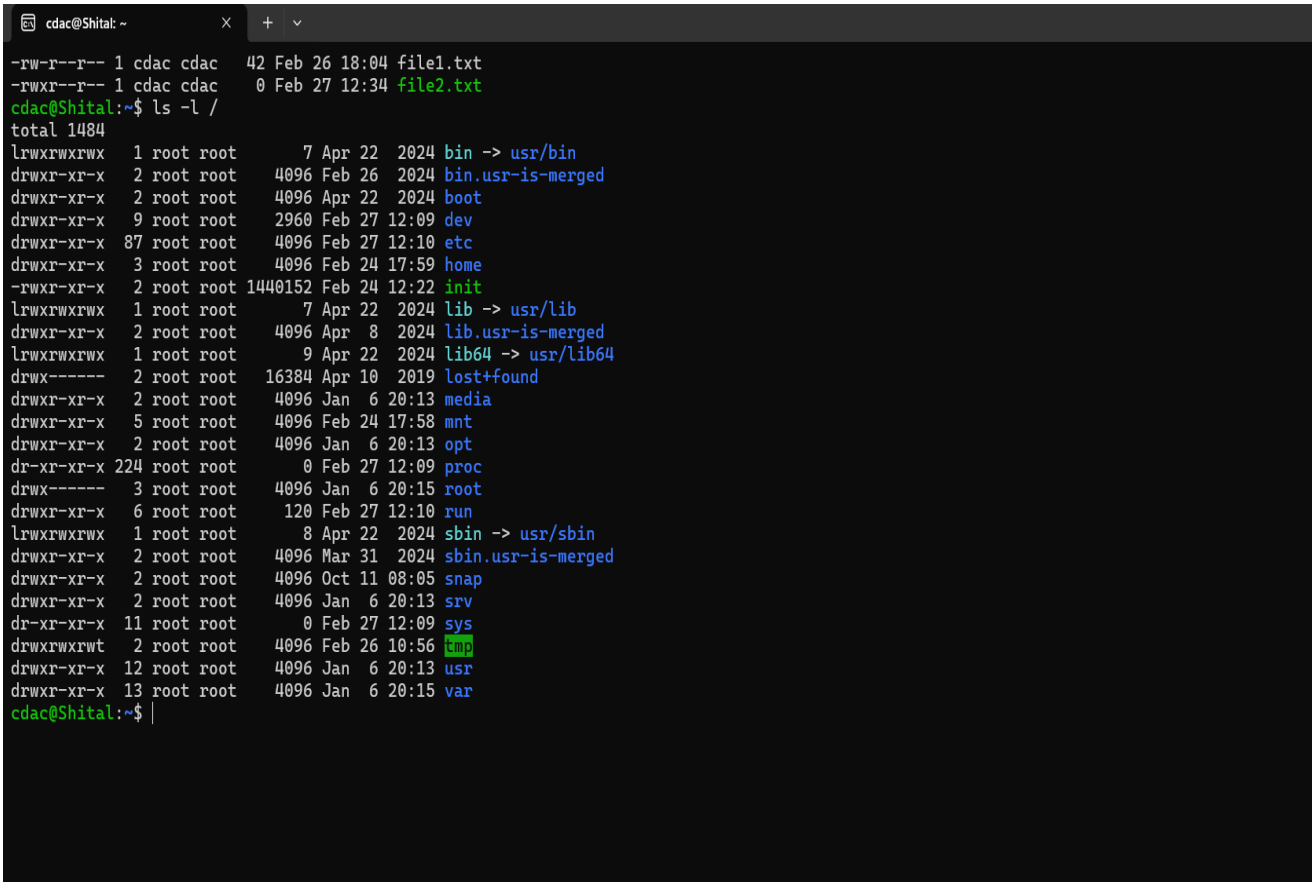
f) **Final Checklist:**

a. **Finally, list the contents of the "LinuxAssignment" directory and the root directory to ensure that all operations were performed correctly.**

Ans:

```
cdac@Shital:~$ pwd
/home/cdac
cdac@Shital:~$ ls -l ~
total 36
drwxr-xr-x 4 cdac cdac 4096 Feb 27 10:16 Feb25
drwxr-xr-x 3 cdac cdac 4096 Feb 27 12:34 LinuxAssignment
-rw-r--r-- 1 cdac cdac   30 Feb 26 11:03 abc.txt
-rw-r--r-- 1 cdac cdac   40 Feb 27 09:33 myfile.txt
drwxr-xr-x 2 cdac cdac 4096 Feb 27 09:58 myfile1
-rw-r--r-- 1 cdac cdac   57 Feb 27 09:37 myfile1.txt
-rw-r--r-- 1 cdac cdac    0 Feb 27 09:58 myfile2
-rw-r--r-- 1 cdac cdac   32 Feb 27 09:34 myfile2.txt
-rw-r--r-- 1 cdac cdac   37 Feb 26 11:04 sh3
drwxr-xr-x 2 cdac cdac 4096 Feb 26 10:24 xyz.txt
cdac@Shital:~$ ls -l ~/LinuxAssignment
total 8
drwxr-xr-x 2 cdac cdac 4096 Feb 26 18:07 docs
-rw-r--r-- 1 cdac cdac   42 Feb 26 18:04 file1.txt
-rwxr--r-- 1 cdac cdac    0 Feb 27 12:34 file2.txt
cdac@Shital:~$ ls -l /
total 1484
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   9 root root    2960 Feb 27 12:09 dev
```

drwxr-xr-x 87 root root   4096 Feb 27 12:10 etc
drwxr-xr-x   3 root root   4096 Feb 24 17:59 home
-rwxr-xr-x   2 root root 1440152 Feb 24 12:22 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 Apr 10 2019 lost+found
drwxr-xr-x   2 root root   4096 Jan 6 20:13 media
drwxr-xr-x   5 root root   4096 Feb 24 17:58 mnt
drwxr-xr-x   2 root root   4096 Jan 6 20:13 opt
dr-xr-xr-x 224 root root   0 Feb 27 12:09 proc
drwx------   3 root root   4096 Jan 6 20:15 root
drwxr-xr-x   6 root root   120 Feb 27 12:10 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 Oct 11 08:05 snap
drwxr-xr-x   2 root root   4096 Jan 6 20:13 srv
dr-xr-xr-x 11 root root   0 Feb 27 12:09 sys
drwxrwxrwt   2 root root   4096 Feb 26 10:56 tmp
drwxr-xr-x 12 root root   4096 Jan 6 20:13 usr
drwxr-xr-x 13 root root   4096 Jan 6 20:15 var
cdac@Shital:~$

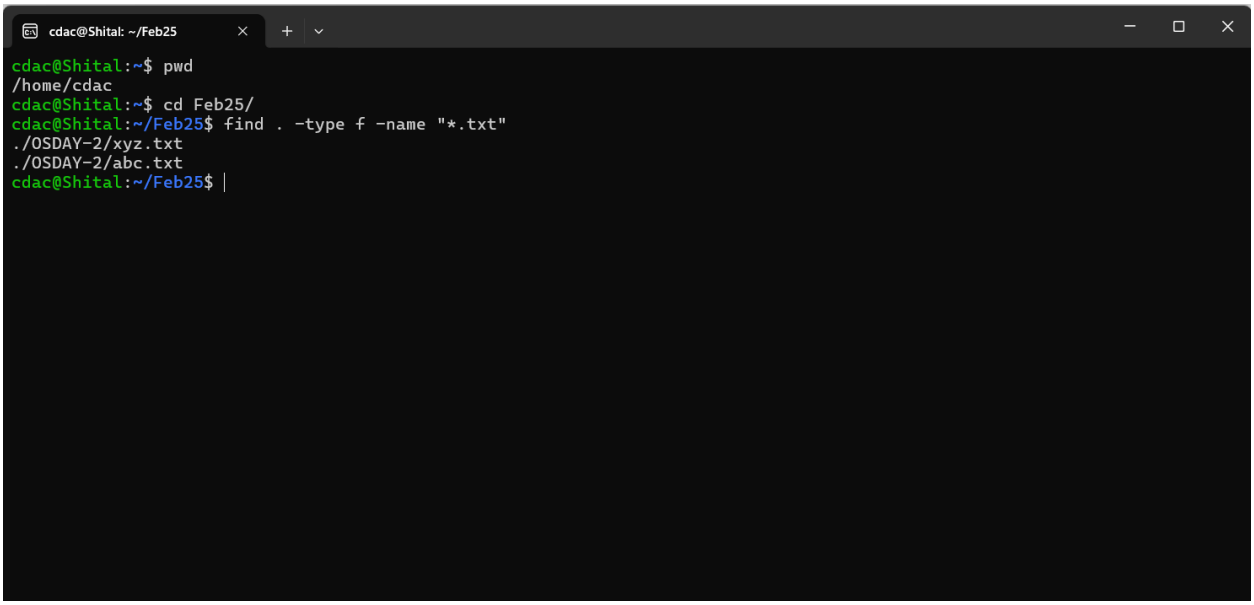


g) **File Searching:**

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

Ans:

```
cdac@Shital:~$ pwd
/home/cdac
cdac@Shital:~$ cd Feb25/
cdac@Shital:~/Feb25$ find . -type f -name "*.txt"
./OSDAY-2/xyz.txt
./OSDAY-2/abc.txt
cdac@Shital:~/Feb25$
```

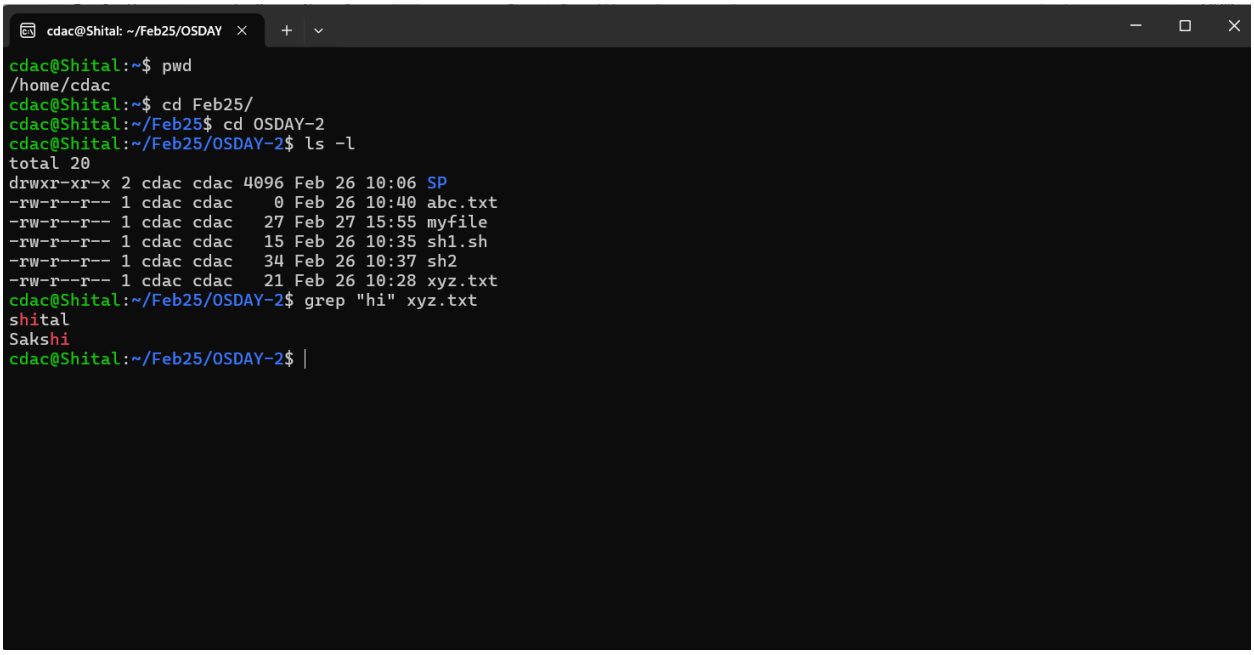


b. **Display lines containing a specific word in a file (provide a file name and the specific word to search).**

Ans:

```
cdac@Shital:~$ pwd
/home/cdac
cdac@Shital:~$ cd Feb25/
cdac@Shital:~/Feb25$ cd OSDAY-2
cdac@Shital:~/Feb25/OSDAY-2$ ls -l
total 20
drwxr-xr-x 2 cdac cdac 4096 Feb 26 10:06 SP
-rw-r--r-- 1 cdac cdac    0 Feb 26 10:40 abc.txt
-rw-r--r-- 1 cdac cdac   27 Feb 27 15:55 myfile
-rw-r--r-- 1 cdac cdac   15 Feb 26 10:35 sh1.sh
-rw-r--r-- 1 cdac cdac   34 Feb 26 10:37 sh2
-rw-r--r-- 1 cdac cdac   21 Feb 26 10:28 xyz.txt
cdac@Shital:~/Feb25/OSDAY-2$ grep "hi" xyz.txt
shital
Sakshi
```

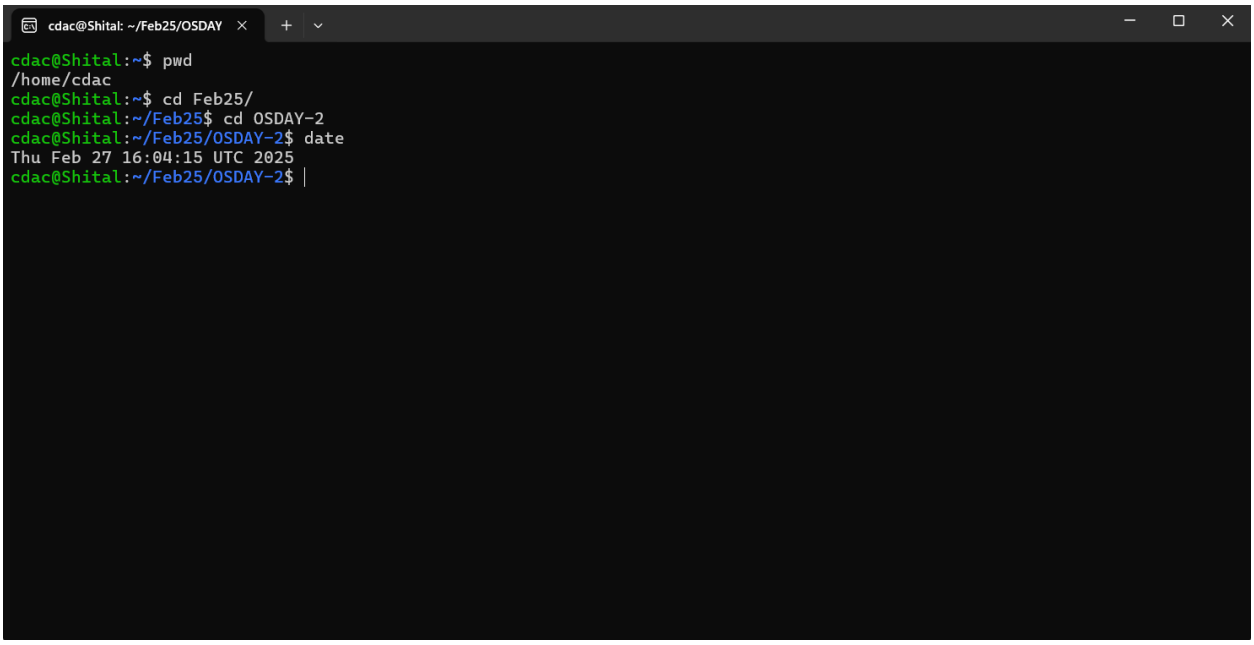
cdac@Shital:~/Feb25/OSDAY-2$



h) **System Information:**

a. **Display the current system date and time.**

Ans:
cdac@Shital:~$ pwd
/home/cdac
cdac@Shital:~$ cd Feb25/
cdac@Shital:~/Feb25$ cd OSDAY-2
cdac@Shital:~/Feb25/OSDAY-2$ date
Thu Feb 27 16:04:15 UTC 2025
cdac@Shital:~/Feb25/OSDAY-2$



i) **Networking:**

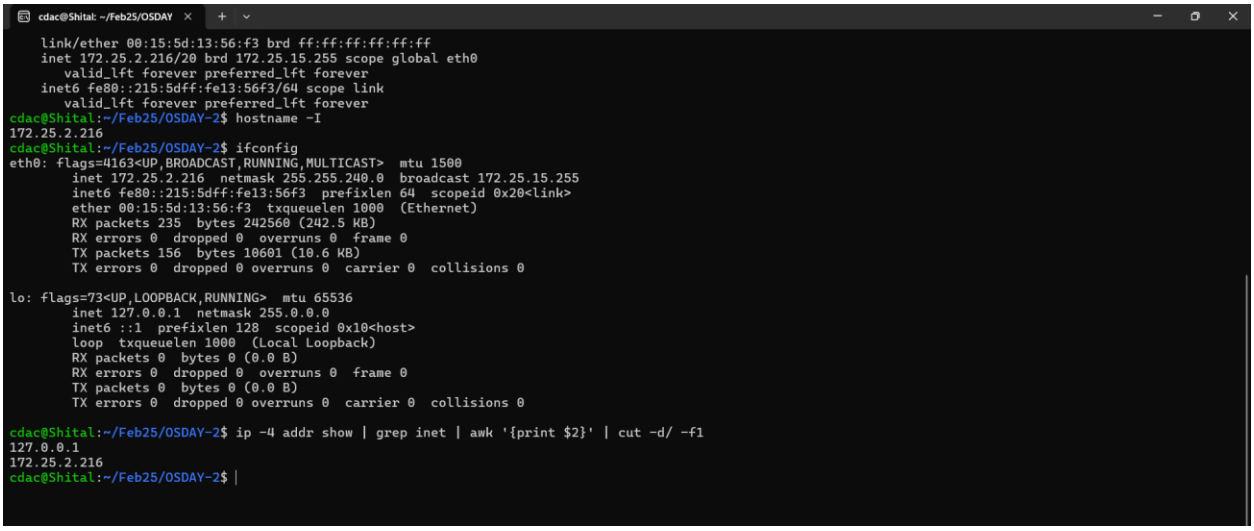
a. **Display the IP address of the system.**

Ans:

```
cdac@Shital:~/Feb25/OSDAY-2$ pwd
/home/cdac/Feb25/OSDAY-2
cdac@Shital:~/Feb25/OSDAY-2$ ip a
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
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: bond0: <BROADCAST,MULTICAST,MASTER> mtu 1500 qdisc noop state DOWN group default
qlen 1000
    link/ether 46:d3:77:5d:eb:d0 brd ff:ff:ff:ff:ff:ff
3: dummy0: <BROADCAST,NOARP> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether b6:59:c1:2e:02:65 brd ff:ff:ff:ff:ff:ff
4: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/ipip 0.0.0.0 brd 0.0.0.0
5: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
6: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default
qlen 1000
    link/ether 00:15:5d:13:56:f3 brd ff:ff:ff:ff:ff:ff
    inet 172.25.2.216/20 brd 172.25.15.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe13:56f3/64 scope link
       valid_lft forever preferred_lft forever
cdac@Shital:~/Feb25/OSDAY-2$ hostname -I
172.25.2.216
cdac@Shital:~/Feb25/OSDAY-2$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.25.2.216  netmask 255.255.240.0  broadcast 172.25.15.255
        inet6 fe80::215:5dff:fe13:56f3  prefixlen 64  scopeid 0x20<link>
        ether 00:15:5d:13:56:f3  txqueuelen 1000  (Ethernet)
        RX packets 235  bytes 242560 (242.5 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 156  bytes 10601 (10.6 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

cdac@Shital:~/Feb25/OSDAY-2$ ip -4 addr show | grep inet | awk '{print $2}' | cut -d/ -f1
127.0.0.1
172.25.2.216
cdac@Shital:~/Feb25/OSDAY-2$
```



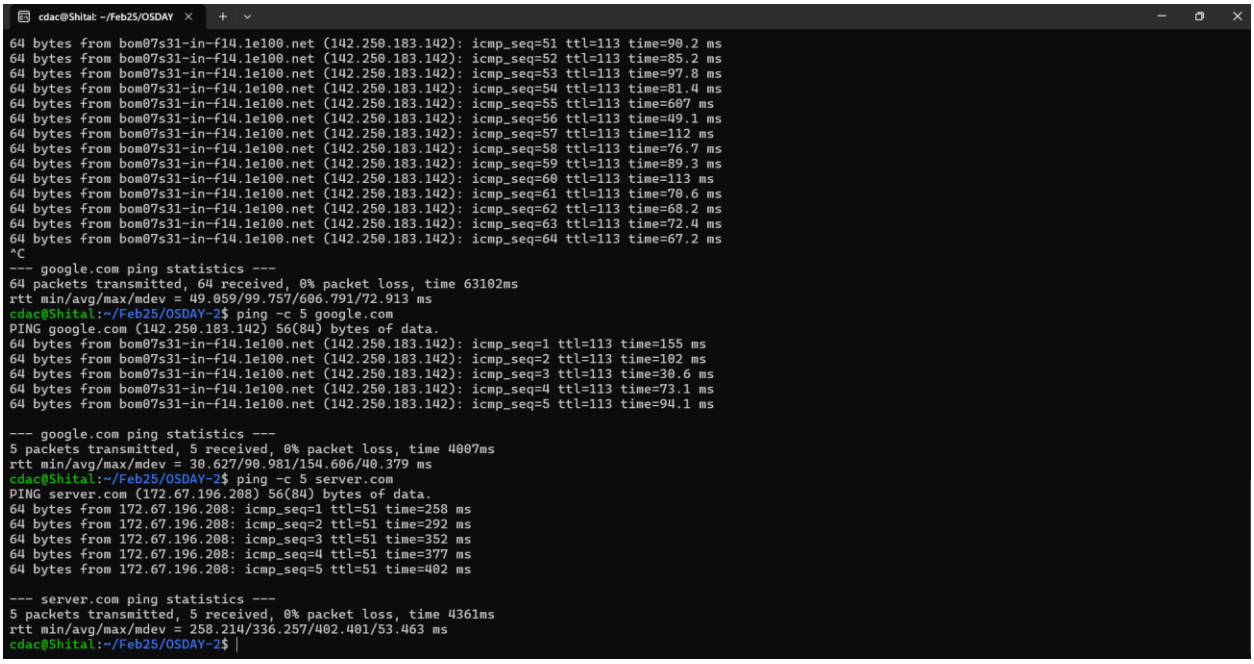
b. **Ping a remote server to check connectivity (provide a remote server address to ping).**

Ans:

cdac@Shital:~/Feb25/OSDAY-2$ ping -c 5 google.com
PING google.com (142.250.183.142) 56(84) bytes of data.
64 bytes from bom07s31-in-f14.1e100.net (142.250.183.142): icmp_seq=1 ttl=113 time=155 ms
64 bytes from bom07s31-in-f14.1e100.net (142.250.183.142): icmp_seq=2 ttl=113 time=102 ms
64 bytes from bom07s31-in-f14.1e100.net (142.250.183.142): icmp_seq=3 ttl=113 time=30.6 ms
64 bytes from bom07s31-in-f14.1e100.net (142.250.183.142): icmp_seq=4 ttl=113 time=73.1 ms
64 bytes from bom07s31-in-f14.1e100.net (142.250.183.142): icmp_seq=5 ttl=113 time=94.1 ms

--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4007ms
rtt min/avg/max/mdev = 30.627/90.981/154.606/40.379 ms
cdac@Shital:~/Feb25/OSDAY-2$ ping -c 5 server.com
PING server.com (172.67.196.208) 56(84) bytes of data.
64 bytes from 172.67.196.208: icmp_seq=1 ttl=51 time=258 ms
64 bytes from 172.67.196.208: icmp_seq=2 ttl=51 time=292 ms
64 bytes from 172.67.196.208: icmp_seq=3 ttl=51 time=352 ms
64 bytes from 172.67.196.208: icmp_seq=4 ttl=51 time=377 ms
64 bytes from 172.67.196.208: icmp_seq=5 ttl=51 time=402 ms

--- server.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4361ms
rtt min/avg/max/mdev = 258.214/336.257/402.401/53.463 ms
cdac@Shital:~/Feb25/OSDAY-2$

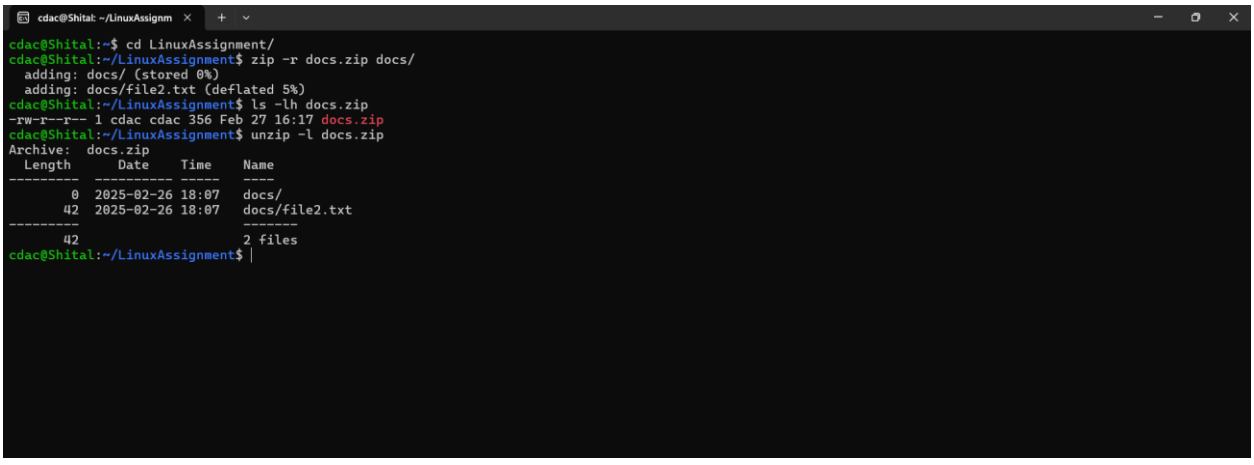


j) **File Compression:**

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

Ans:

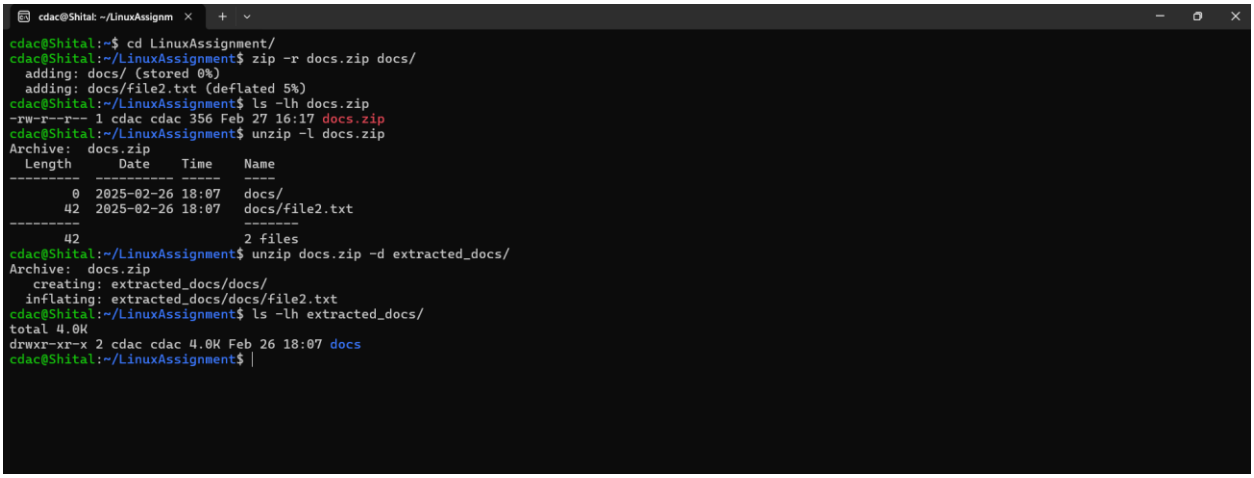
```
cdac@Shital:~$ cd LinuxAssignment/
cdac@Shital:~/LinuxAssignment$ zip -r docs.zip docs/
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (deflated 5%)
cdac@Shital:~/LinuxAssignment$ ls -lh docs.zip
-rw-r--r-- 1 cdac cdac 356 Feb 27 16:17 docs.zip
cdac@Shital:~/LinuxAssignment$ unzip -l docs.zip
Archive:  docs.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
        0  2025-02-26 18:07   docs/
       42  2025-02-26 18:07   docs/file2.txt
---------                     -------
       42                     2 files
cdac@Shital:~/LinuxAssignment$
```



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

Ans:

```
cdac@Shital:~/LinuxAssignment$ unzip docs.zip -d extracted_docs/
Archive:  docs.zip
   creating: extracted_docs/docs/
  inflating: extracted_docs/docs/file2.txt
cdac@Shital:~/LinuxAssignment$ ls -lh extracted_docs/
total 4.0K
drwxr-xr-x 2 cdac cdac 4.0K Feb 26 18:07 docs
cdac@Shital:~/LinuxAssignment$
```



k) **File Editing:**

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

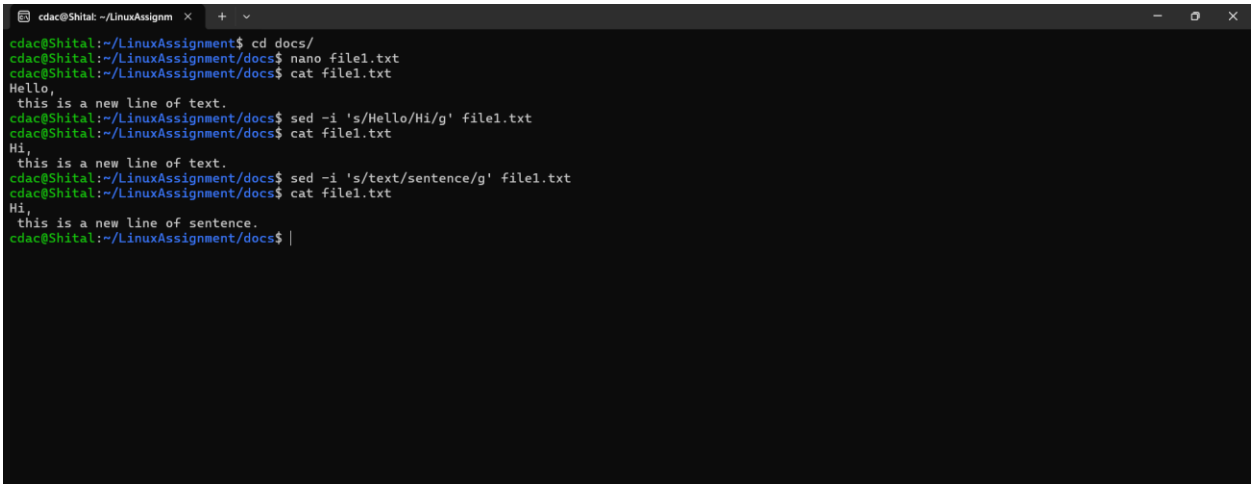
Ans:

```
cdac@Shital:~/LinuxAssignment$ cd docs/
cdac@Shital:~/LinuxAssignment/docs$ nano file1.txt
cdac@Shital:~/LinuxAssignment/docs$ cat file1.txt
Hello,
 this is a new line of text.
cdac@Shital:~/LinuxAssignment/docs$
```

b. **Replace a specific word in the "file1.txt" file with another word (provide the original word and the word to replace it with).**

Ans:

```
cdac@Shital:~/LinuxAssignment$ cd docs/
cdac@Shital:~/LinuxAssignment/docs$ nano file1.txt
cdac@Shital:~/LinuxAssignment/docs$ cat file1.txt
Hello,
 this is a new line of text.
cdac@Shital:~/LinuxAssignment/docs$ sed -i 's/Hello/Hi/g' file1.txt
cdac@Shital:~/LinuxAssignment/docs$ cat file1.txt
Hi,
 this is a new line of text.
cdac@Shital:~/LinuxAssignment/docs$ sed -i 's/text/sentence/g' file1.txt
cdac@Shital:~/LinuxAssignment/docs$ cat file1.txt
Hi,
 this is a new line of sentence.
cdac@Shital:~/LinuxAssignment/docs$
```



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.**

Ans:

cdac@Shital:~/LinuxAssignment/docs$ pwd

/home/cdac/LinuxAssignment/docs

cdac@Shital:~/LinuxAssignment/docs$ ls -l

total 8

-rw-r--r-- 1 cdac cdac 37 Feb 27 16:31 file1.txt

-rw-r--r-- 1 cdac cdac 42 Feb 26 18:07 file2.txt

cdac@Shital:~/LinuxAssignment/docs$ touch data.txt

cdac@Shital:~/LinuxAssignment/docs$ nano data.txt

cdac@Shital:~/LinuxAssignment/docs$ cat data.txt

echo

Line 1

Line 2

Line 3

Line 4

Line 5

Line 6

Line 7

Line 8

Line 9

Line 10

Line 11

cdac@Shital:~/LinuxAssignment/docs$ ls -l

total 12

-rw-r--r-- 1 cdac cdac 85 Feb 27 16:38 data.txt

-rw-r--r-- 1 cdac cdac 37 Feb 27 16:31 file1.txt

-rw-r--r-- 1 cdac cdac 42 Feb 26 18:07 file2.txt

cdac@Shital:~/LinuxAssignment/docs$ head -n 10 data.txt

echo

Line 1

Line 2

Line 3

Line 4

Line 5

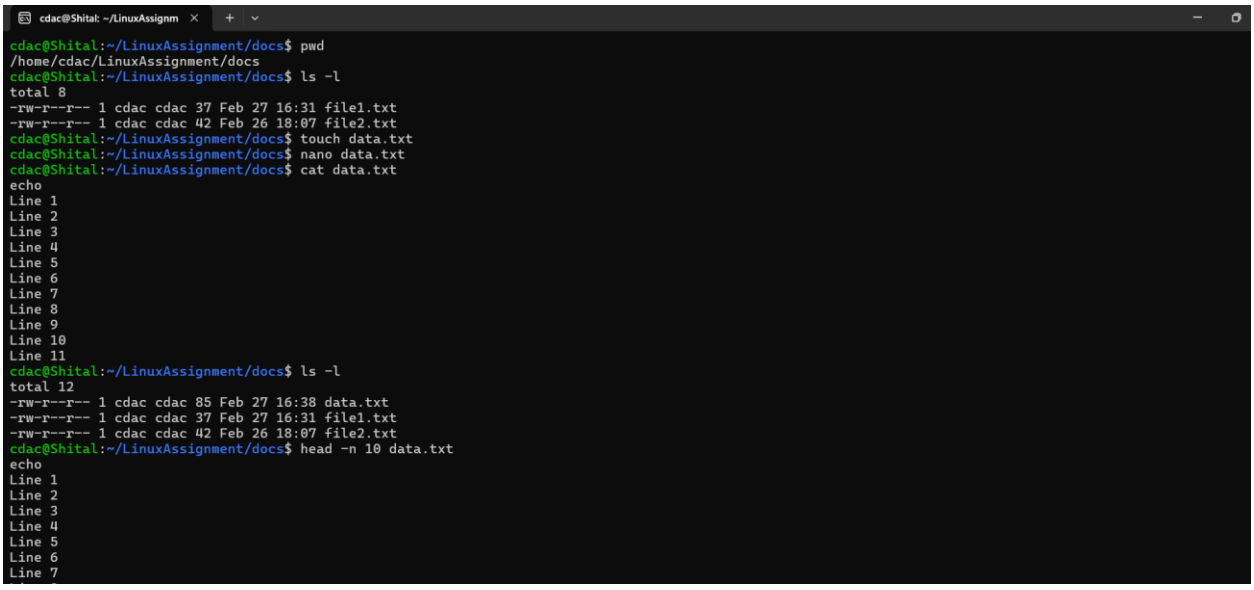
Line 6

Line 7

Line 8

Line 9

cdac@Shital:~/LinuxAssignment/docs$



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

Ans:

cdac@Shital:~/LinuxAssignment/docs$ ls -l

total 12

-rw-r--r-- 1 cdac cdac 85 Feb 27 16:38 data.txt

-rw-r--r-- 1 cdac cdac 37 Feb 27 16:31 file1.txt

-rw-r--r-- 1 cdac cdac 42 Feb 26 18:07 file2.txt

cdac@Shital:~/LinuxAssignment/docs$ tail -n 5 data.txt

Line 7

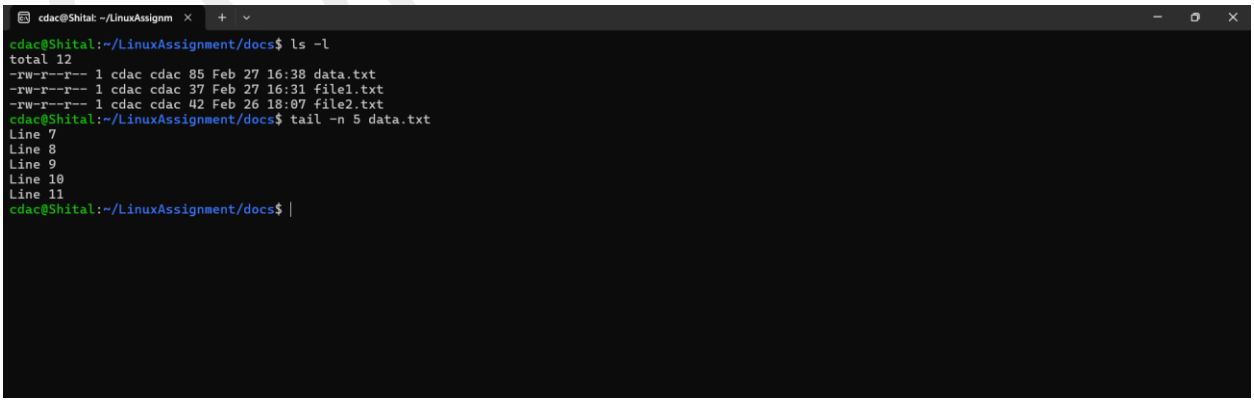
Line 8

Line 9

Line 10

Line 11

cdac@Shital:~/LinuxAssignment/docs$

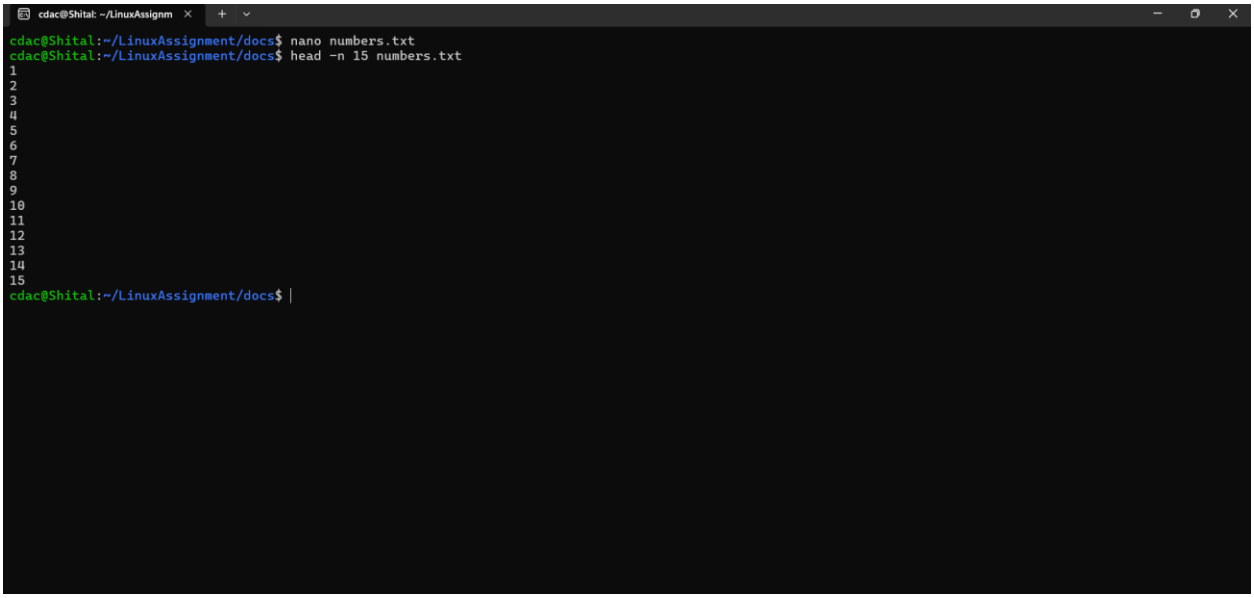


c. **In a file named "numbers.txt," there are a series of numbers. Display the first 15 lines of this file to analyze the initial data set.**

Ans:

cdac@Shital:~/LinuxAssignment/docs$ nano numbers.txt
cdac@Shital:~/LinuxAssignment/docs$ head -n 15 numbers.txt
1
2
3
4
5
6

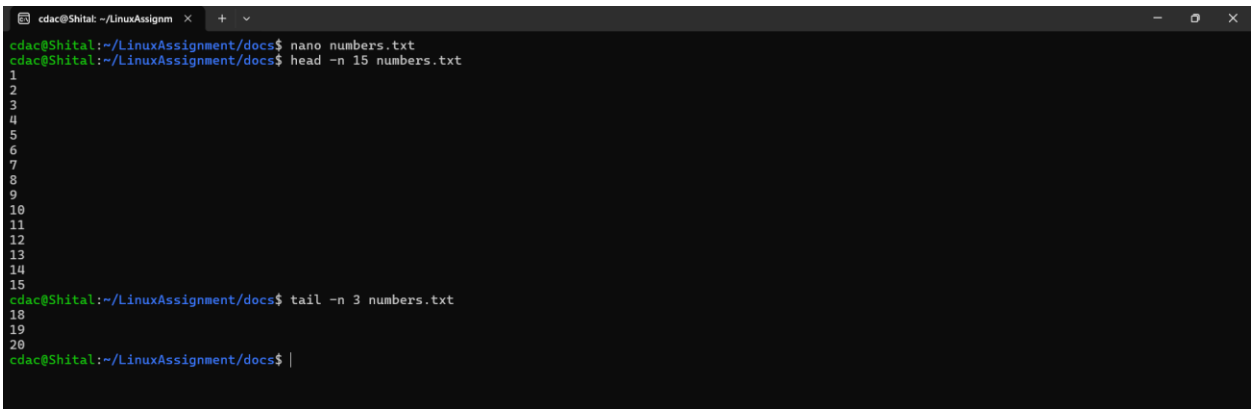
7
8
9
10
11
12
13
14
15
cdac@Shital:~/LinuxAssignment/docs$



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

Ans:

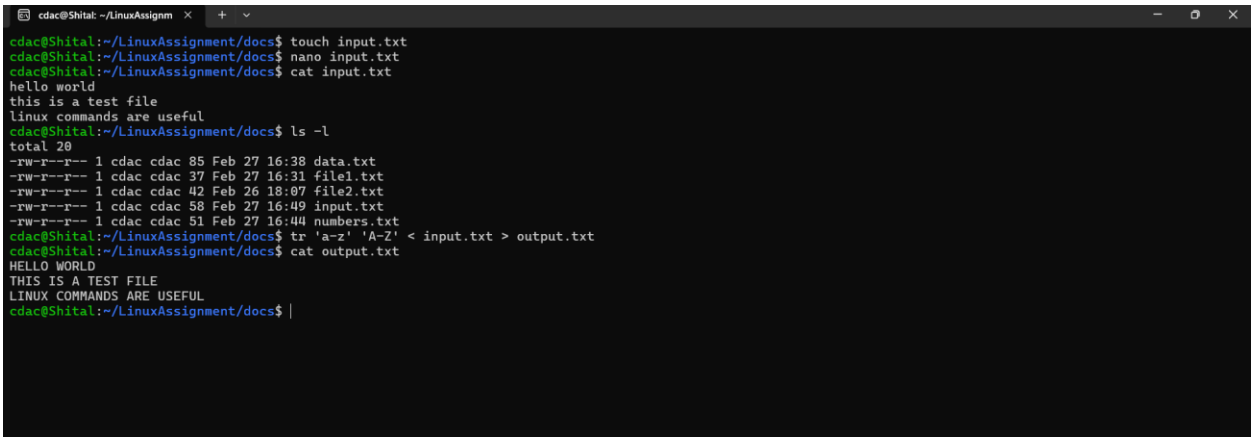
cdac@Shital:~/LinuxAssignment/docs$ tail -n 3 numbers.txt
18
19
20
cdac@Shital:~/LinuxAssignment/docs$



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."**

Ans:

```
cdac@Shital:~/LinuxAssignment/docs$ touch input.txt
cdac@Shital:~/LinuxAssignment/docs$ nano input.txt
cdac@Shital:~/LinuxAssignment/docs$ cat input.txt
hello world
this is a test file
linux commands are useful
cdac@Shital:~/LinuxAssignment/docs$ ls -l
total 20
-rw-r--r-- 1 cdac cdac 85 Feb 27 16:38 data.txt
-rw-r--r-- 1 cdac cdac 37 Feb 27 16:31 file1.txt
-rw-r--r-- 1 cdac cdac 42 Feb 26 18:07 file2.txt
-rw-r--r-- 1 cdac cdac 58 Feb 27 16:49 input.txt
-rw-r--r-- 1 cdac cdac 51 Feb 27 16:44 numbers.txt
cdac@Shital:~/LinuxAssignment/docs$ tr 'a-z' 'A-Z' < input.txt > output.txt
cdac@Shital:~/LinuxAssignment/docs$ cat output.txt
HELLO WORLD
THIS IS A TEST FILE
LINUX COMMANDS ARE USEFUL
cdac@Shital:~/LinuxAssignment/docs$
```



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."**

Ans:

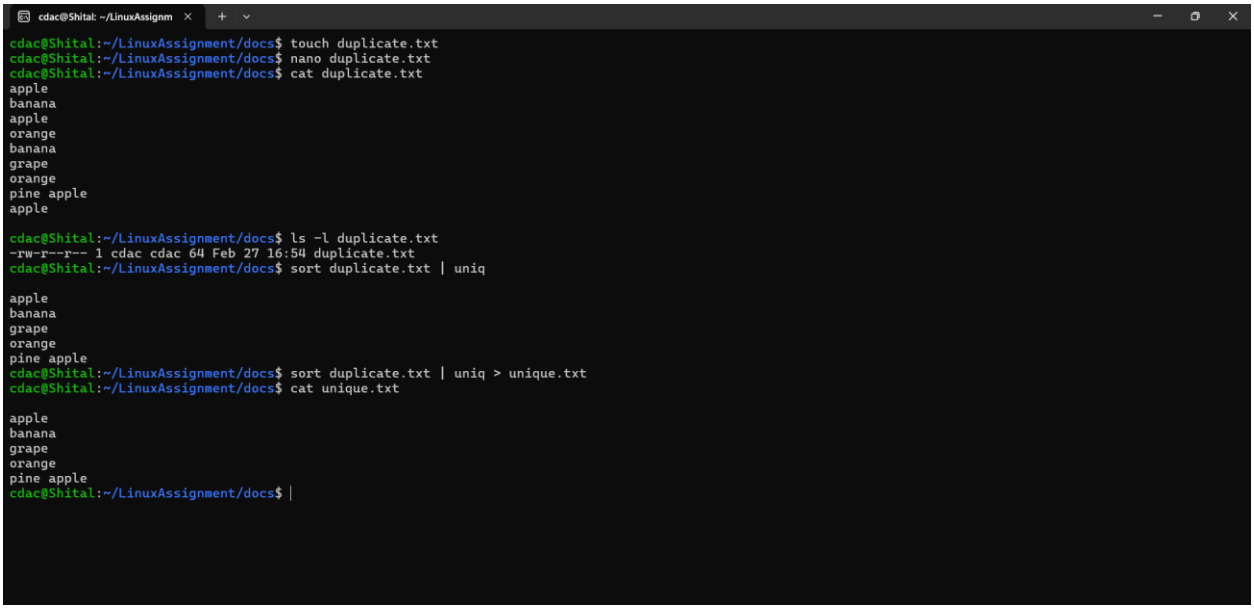
```
cdac@Shital:~/LinuxAssignment/docs$ touch duplicate.txt
cdac@Shital:~/LinuxAssignment/docs$ nano duplicate.txt
cdac@Shital:~/LinuxAssignment/docs$ cat duplicate.txt
apple
banana
apple
orange
banana
grape
orange
pine apple
```

apple

cdac@Shital:~/LinuxAssignment/docs$ ls -l duplicate.txt
-rw-r--r-- 1 cdac cdac 64 Feb 27 16:54 duplicate.txt
cdac@Shital:~/LinuxAssignment/docs$ sort duplicate.txt | uniq

apple
banana
grape
orange
pine apple
cdac@Shital:~/LinuxAssignment/docs$ sort duplicate.txt | uniq > unique.txt
cdac@Shital:~/LinuxAssignment/docs$ cat unique.txt

apple
banana
grape
orange
pine apple



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."**

Ans:

cdac@Shital:~/LinuxAssignment/docs$ nano fruit.txt
cdac@Shital:~/LinuxAssignment/docs$ cat fruit.txt
apple
apple
banana
grape
orange
pine apple
banana
garpes
gava
orange

cdac@Shital:~/LinuxAssignment/docs$ sort fruit.txt | uniq -c > fruit_count.txt
cdac@Shital:~/LinuxAssignment/docs$ cat fruit_count.txt
2 apple
2 banana
1 garpes
1 gava
1 grape
2 orange
1 pine apple
cdac@Shital:~/LinuxAssignment/docs$