

Concepts of Operating System

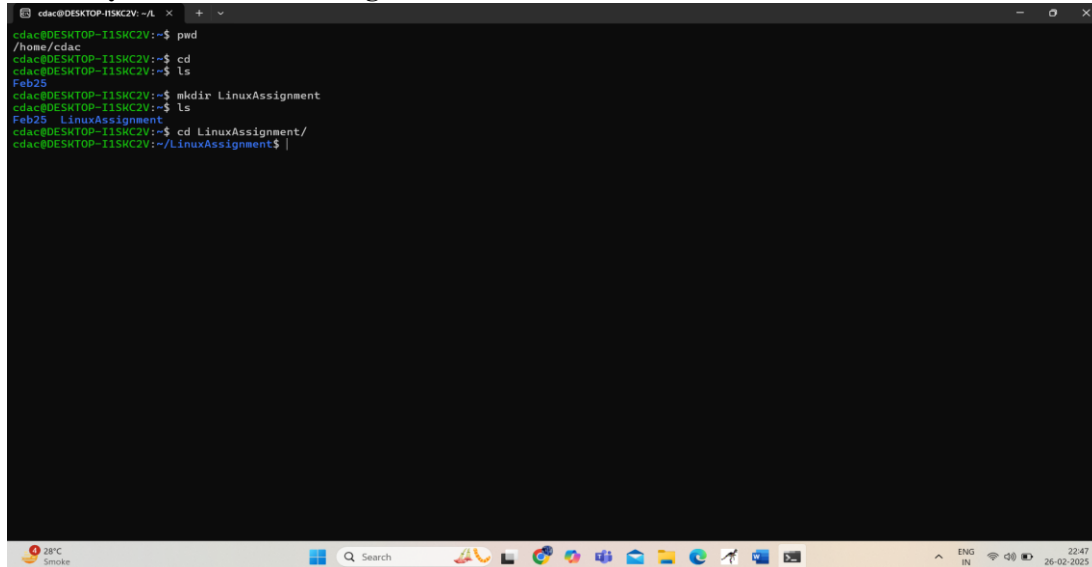
Assignment 1

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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:

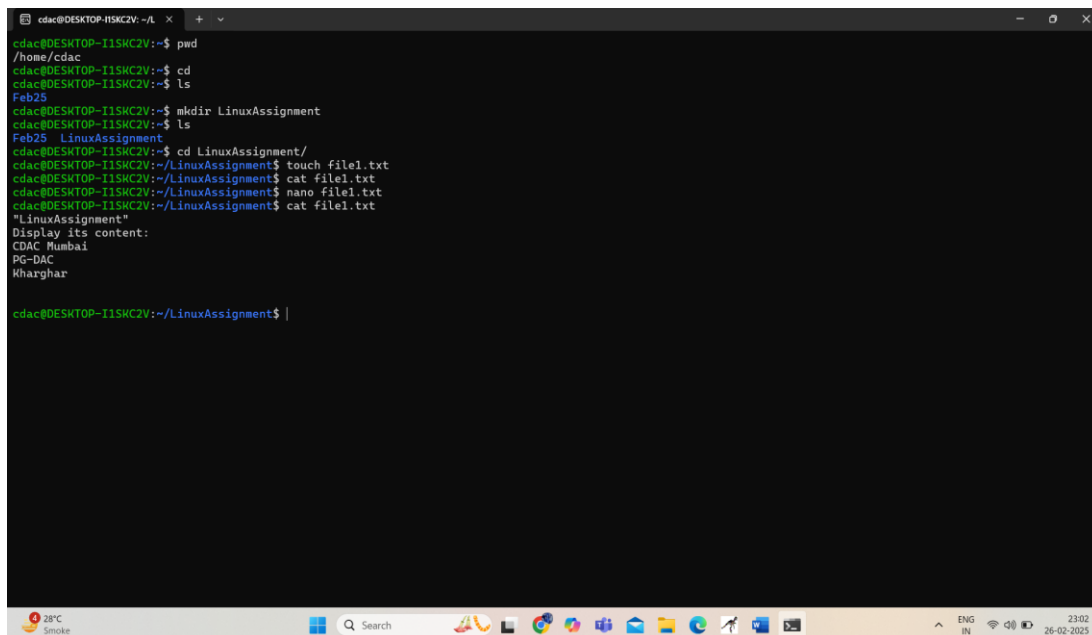
a. Start by navigating to your home directory and list its contents. Then, move into a directory named "LinuxAssignment" if it exists; otherwise, create it.

A terminal window titled 'cdac@DESKTOP-I15KC2V: ~/LinuxAssignment' showing the following commands and output:

```
cdac@DESKTOP-I15KC2V:~$ pwd
/home/cdac
cdac@DESKTOP-I15KC2V:~$ cd
cdac@DESKTOP-I15KC2V:~$ ls
Feb25
cdac@DESKTOP-I15KC2V:~$ mkdir LinuxAssignment
cdac@DESKTOP-I15KC2V:~$ ls
Feb25 LinuxAssignment
cdac@DESKTOP-I15KC2V:~$ cd LinuxAssignment/
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ |
```

b) File Management:

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

A terminal window titled 'cdac@DESKTOP-I15KC2V: ~/LinuxAssignment' showing the following commands and output:

```
cdac@DESKTOP-I15KC2V:~$ pwd
/home/cdac
cdac@DESKTOP-I15KC2V:~$ cd
cdac@DESKTOP-I15KC2V:~$ ls
Feb25
cdac@DESKTOP-I15KC2V:~$ mkdir LinuxAssignment
cdac@DESKTOP-I15KC2V:~$ ls
Feb25 LinuxAssignment
cdac@DESKTOP-I15KC2V:~$ cd LinuxAssignment/
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ touch file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cat file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ nano file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cat file1.txt
"LinuxAssignment"
Display its content:
CDAC Mumbai
PG-DAC
Kharghar
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ |
```

c) Directory Management:

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

```
cdac@DESKTOP-I15KC2V: ~ - ssh - x
cdac@DESKTOP-I15KC2V:~$ pwd
/home/cdac
cdac@DESKTOP-I15KC2V:~$ cd
cdac@DESKTOP-I15KC2V:~$ ls
Feb25
cdac@DESKTOP-I15KC2V:~$ mkdir LinuxAssignment
cdac@DESKTOP-I15KC2V:~$ ls
Feb25 LinuxAssignment
cdac@DESKTOP-I15KC2V:~$ cd LinuxAssignment/
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ touch file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cat file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ nano file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cat file1.txt
"LinuxAssignment"
CDAC Mumbai
PG-DAC
Kharghar
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ mkdir docs
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ ls
docs file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ |
```

d) Copy and Move Files:

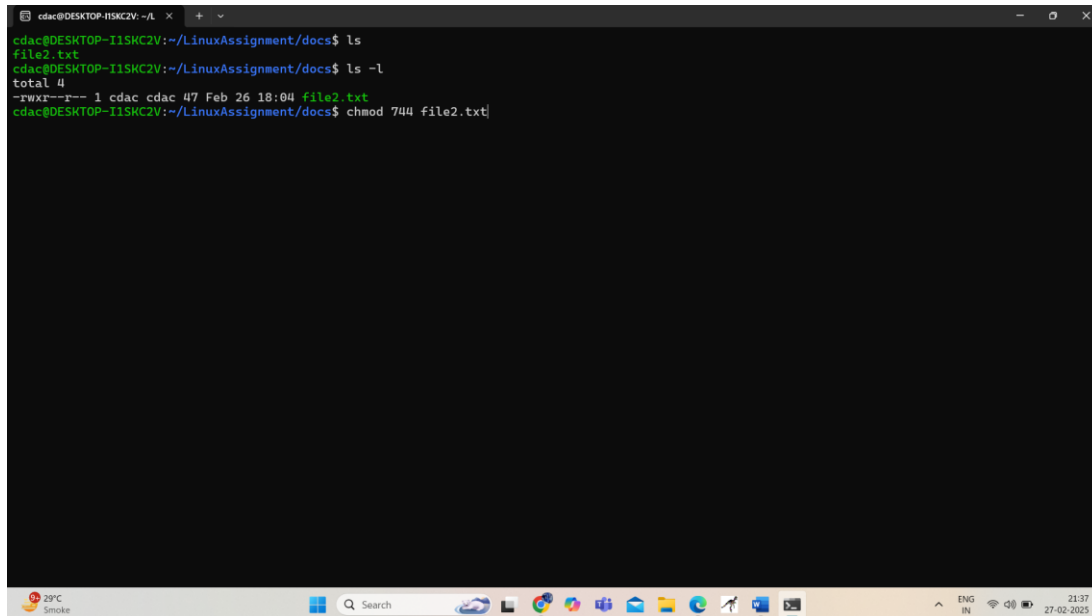
a. Copy the "file1.txt" file into the "docs" directory and rename it to "file2.txt".

```
cdac@DESKTOP-I15KC2V: ~ - ssh - x
cdac@DESKTOP-I15KC2V:~$ pwd
/home/cdac
cdac@DESKTOP-I15KC2V:~$ cd
cdac@DESKTOP-I15KC2V:~$ ls
Feb25
cdac@DESKTOP-I15KC2V:~$ mkdir LinuxAssignment
cdac@DESKTOP-I15KC2V:~$ ls
Feb25 LinuxAssignment
cdac@DESKTOP-I15KC2V:~$ cd LinuxAssignment/
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ touch file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cat file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ nano file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cat file1.txt
"LinuxAssignment"
CDAC Mumbai
PG-DAC
Kharghar
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ mkdir docs
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ ls
docs file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ ls
docs file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cd docs/
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/docs$ ls
file2.txt
cdac@DESKTOP-I15KC2V:~/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.

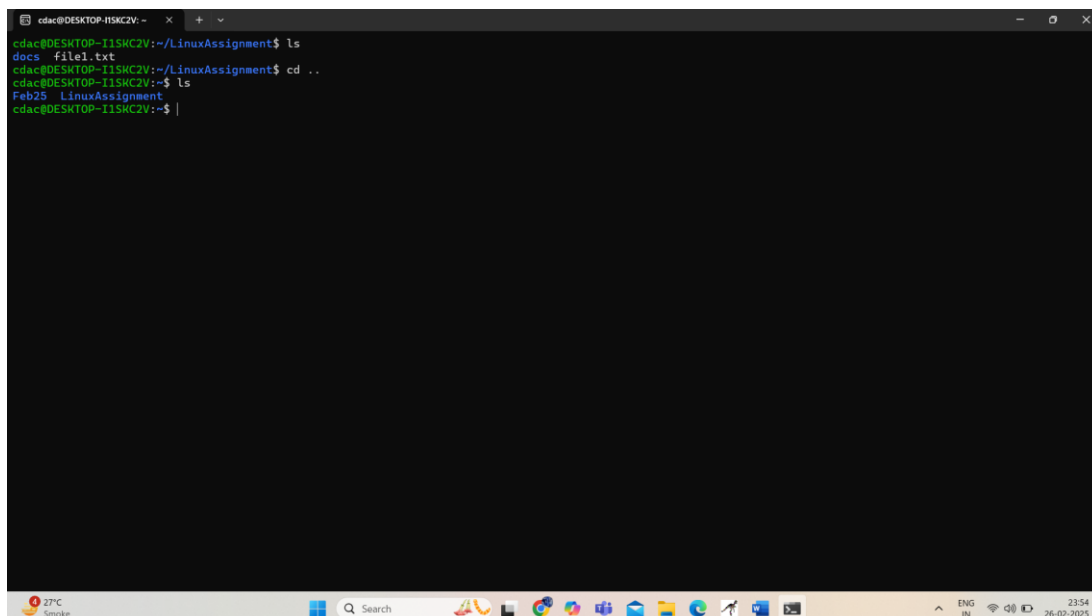
Difficulty to change user. The command `chmod 744 file2.txt` is used to allow read, write, and execute permissions for the owner and only read permissions for others.



```
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/docs$ ls
file2.txt
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 47 Feb 26 18:04 file2.txt
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/docs$ chmod 744 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.



```
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment$ ls
docs  file1.txt
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment$ cd ..
cdac@DESKTOP-I1SKC2V:~$ ls
Feb25  LinuxAssignment
cdac@DESKTOP-I1SKC2V:~$ |
```

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).**

```
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment$ ls
docs  file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ find . -type f -name "*.txt"
./docs/file2.txt
./file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ grep "PG" file1.txt
PG=DAC
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ |
```

h) System Information:

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

```
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment$ date
Wed Feb 26 18:32:05 UTC 2025
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ |
```

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).

⇒ Ip address - 172.27.21.149

⇒ The output shows the destination and its IP address. The time it took a packet to reach the destination and come back to the source.

```
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ 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
    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:09:8c:80 brd ff:ff:ff:ff:ff:ff
    inet 172.27.21.149/20 brd 172.27.31.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe09:8c80/64 scope link
        valid_lft forever preferred_lft forever
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ ping 172.27.21.149
PING 172.27.21.149 (172.27.21.149) 56(84) bytes of data:
 64 bytes from 172.27.21.149: icmp_seq=1 ttl=64 time=0.042 ms
 64 bytes from 172.27.21.149: icmp_seq=2 ttl=64 time=0.041 ms
 64 bytes from 172.27.21.149: icmp_seq=3 ttl=64 time=0.039 ms
 64 bytes from 172.27.21.149: icmp_seq=4 ttl=64 time=0.040 ms
 64 bytes from 172.27.21.149: icmp_seq=5 ttl=64 time=0.066 ms
 64 bytes from 172.27.21.149: icmp_seq=6 ttl=64 time=0.061 ms
 64 bytes from 172.27.21.149: icmp_seq=7 ttl=64 time=0.043 ms
 64 bytes from 172.27.21.149: icmp_seq=8 ttl=64 time=0.044 ms
 64 bytes from 172.27.21.149: icmp_seq=9 ttl=64 time=0.054 ms
 64 bytes from 172.27.21.149: icmp_seq=10 ttl=64 time=0.050 ms
 64 bytes from 172.27.21.149: icmp_seq=11 ttl=64 time=0.043 ms
 64 bytes from 172.27.21.149: icmp_seq=12 ttl=64 time=0.044 ms
 64 bytes from 172.27.21.149: icmp_seq=13 ttl=64 time=0.043 ms
 64 bytes from 172.27.21.149: icmp_seq=14 ttl=64 time=0.058 ms
 64 bytes from 172.27.21.149: icmp_seq=15 ttl=64 time=0.044 ms
```

j) File Compression:

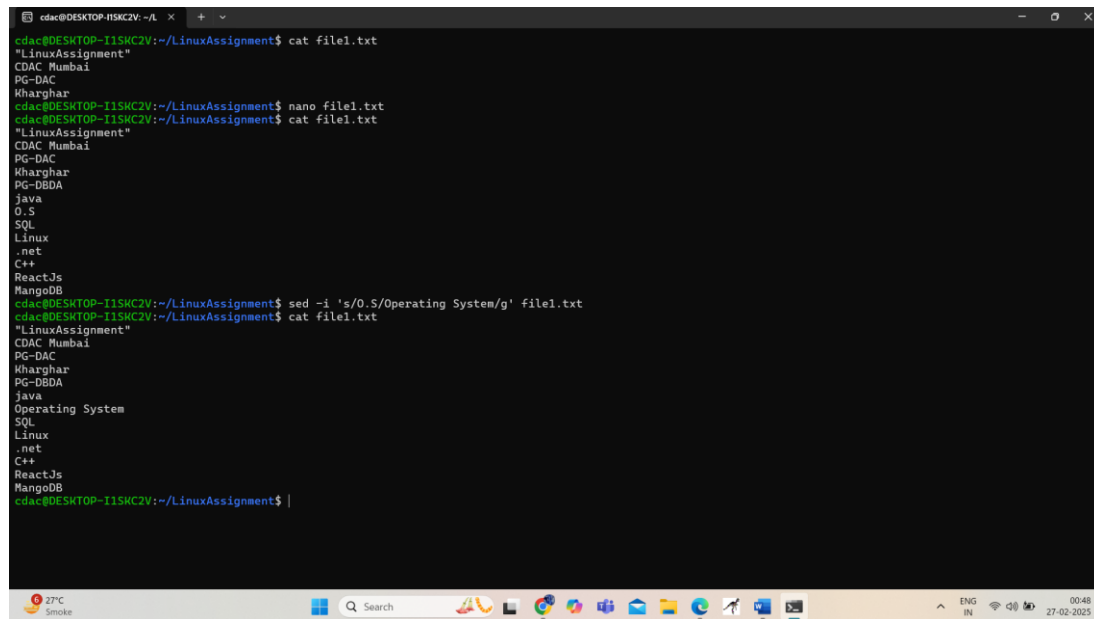
a. Compress the "docs" directory into a zip file.

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

```
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ ls
docs  file1.txt
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (deflated 2%)
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ mkdir docs2
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ ls
docs  docs.zip  docs2  file1.txt
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ unzip docs.zip -d docs2
Archive: docs.zip
  creating: docs2/docs/
  inflating: docs2/docs/file2.txt
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ ls
docs  docs.zip  docs2  file1.txt
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment$ cd docs2
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment/docs2$ ls
docs
cdac@DESKTOP-I1SKC2V: ~ - LinuxAssignment/docs2$
```

k) File Editing:

- a. Open the "file1.txt" file in a text editor and add some text to it.**
- b. Replace a specific word in the "file1.txt" file with another word (provide the original word and the word to replace it with).**



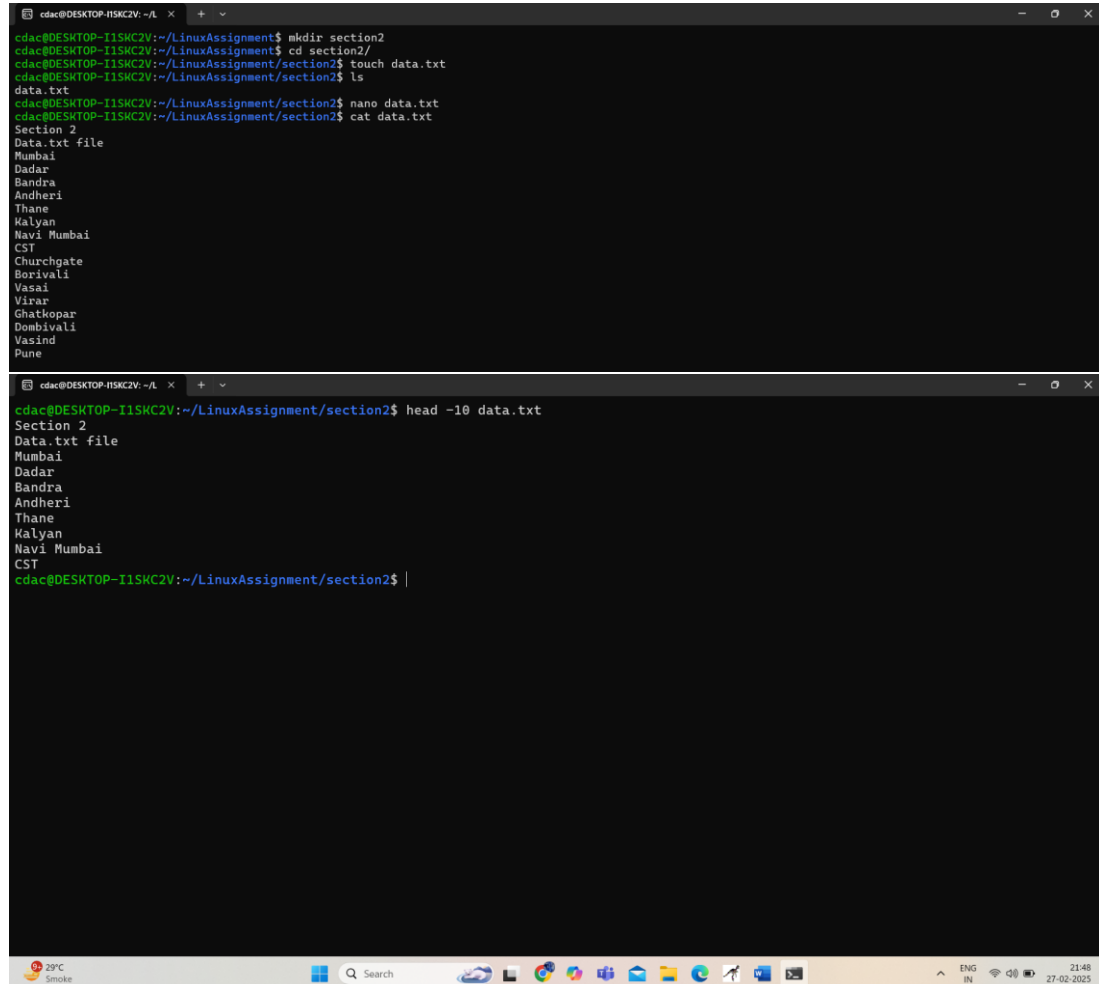
```
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment$ cat file1.txt
"LinuxAssignment"
CDAC Mumbai
PG-DAC
Kharghar
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ nano file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cat file1.txt
"LinuxAssignment"
CDAC Mumbai
PG-DAC
Kharghar
PG-DBDA
java
O.S
SQL
Linux
.net
C++
ReactJs
MongoDB
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ sed -i 's/O.S/Operating System/g' file1.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ cat file1.txt
"LinuxAssignment"
CDAC Mumbai
PG-DAC
Kharghar
PG-DBDA
java
Operating System
SQL
Linux
.net
C++
ReactJs
MongoDB
cdac@DESKTOP-I15KC2V:~/LinuxAssignment$ |
```

The screenshot shows a Windows terminal window with a dark background. The user is in the directory ~/LinuxAssignment. They first run 'cat file1.txt' and see the original content. Then they use 'nano file1.txt' to edit it. After editing, they run 'cat file1.txt' again to see the changes. Finally, they use the 'sed' command to replace 'O.S' with 'Operating System' in the file. The terminal output shows the file content before and after each command. The Windows taskbar is visible at the bottom, showing the date as 27-02-2025 and time as 00:48.

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.

⇒ head 10 data.txt

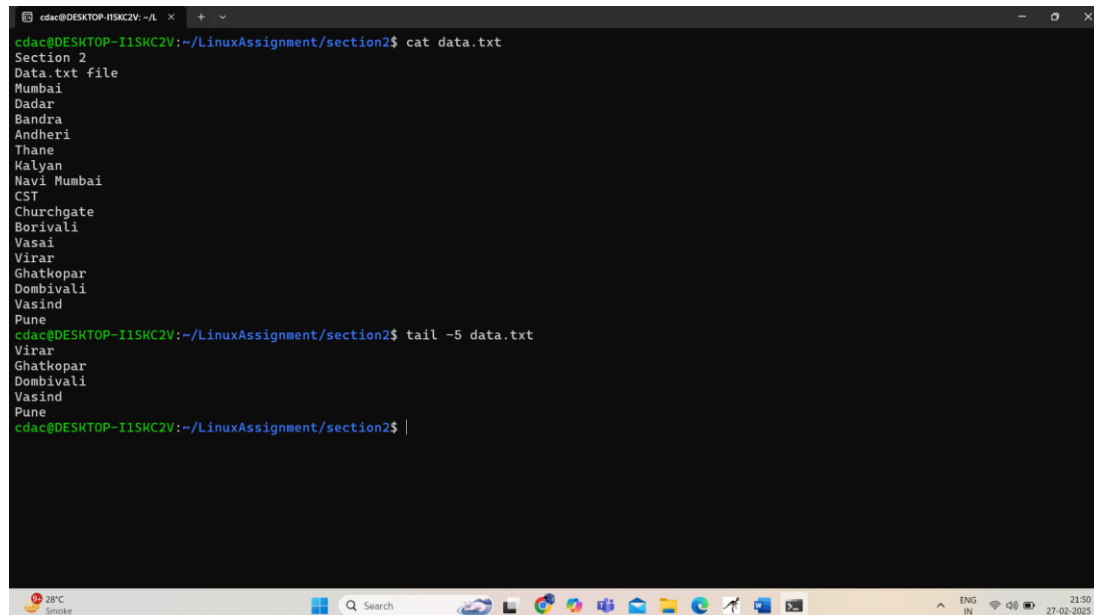


```
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment$ mkdir section2
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment$ cd section2/
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment/section2$ touch data.txt
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment/section2$ ls
data.txt
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment/section2$ nano data.txt
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment/section2$ cat data.txt
Section 2
Data.txt file
Mumbai
Dadar
Bandra
Andheri
Thane
Kalyan
Navi Mumbai
CST
Churchgate
Borivali
Vasai
Virar
Ghatkopar
Dombivali
Vasind
Pune

cdac@DESKTOP-I15KC2V: ~/LinuxAssignment/section2$ head -10 data.txt
Section 2
Data.txt file
Mumbai
Dadar
Bandra
Andheri
Thane
Kalyan
Navi Mumbai
CST
cdac@DESKTOP-I15KC2V: ~/LinuxAssignment/section2$ |
```

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

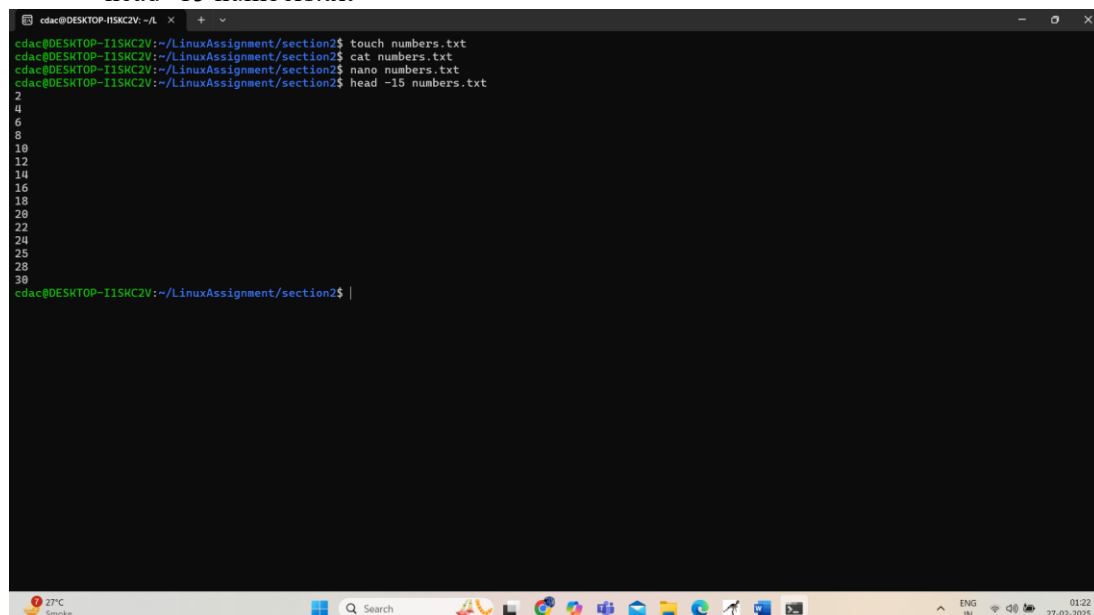
⇒ tail -5 data.txt

A terminal window titled 'cdac@DESKTOP-I1SKC2V - /A' showing the execution of 'cat data.txt' and 'tail -5 data.txt'. The 'cat' command lists 20 locations in Mumbai. The 'tail' command shows the last 5 lines of the file, which are 'Virar', 'Ghatkopar', 'Dombivali', 'Vasind', and 'Pune'.

```
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/section2$ cat data.txt
Section 2
Data.txt file
Mumbai
Dadar
Bandra
Andheri
Thane
Kalyan
Navi Mumbai
CST
Churchgate
Borivali
Vasai
Virar
Ghatkopar
Dombivali
Vasind
Pune
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/section2$ tail -5 data.txt
Virar
Ghatkopar
Dombivali
Vasind
Pune
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/section2$ |
```

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.

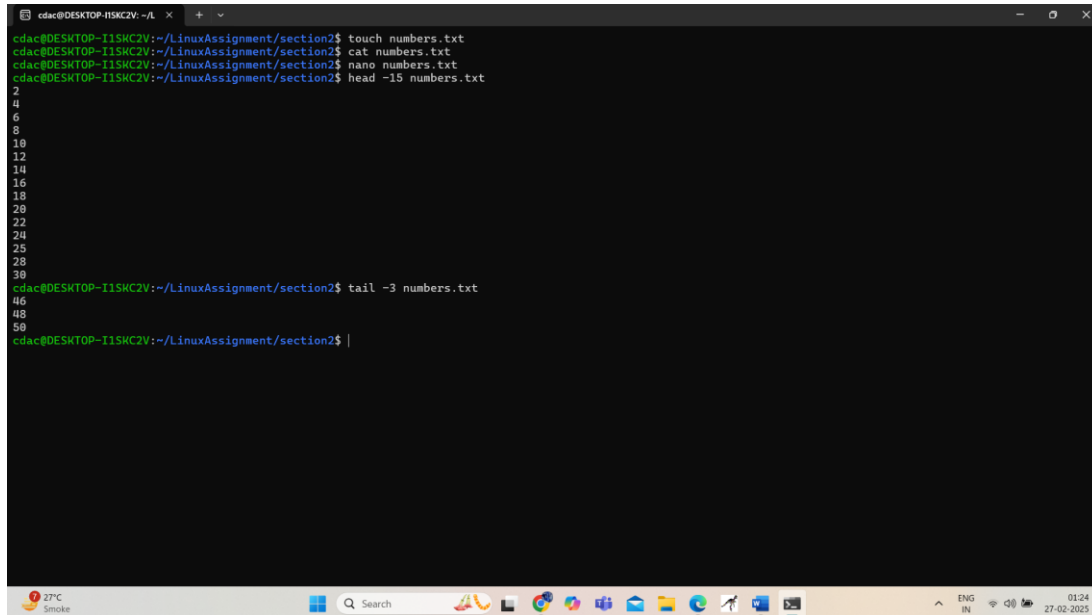
⇒ head -15 numbers.txt

A terminal window titled 'cdac@DESKTOP-I1SKC2V - /A' showing the creation and display of 'numbers.txt'. The file is created with 'touch', opened with 'nano', and then the first 15 lines are displayed using 'head -15 numbers.txt'. The first 15 lines of the file are even numbers from 2 to 30.

```
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/section2$ touch numbers.txt
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/section2$ cat numbers.txt
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/section2$ nano numbers.txt
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/section2$ head -15 numbers.txt
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
cdac@DESKTOP-I1SKC2V:~/LinuxAssignment/section2$ |
```


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

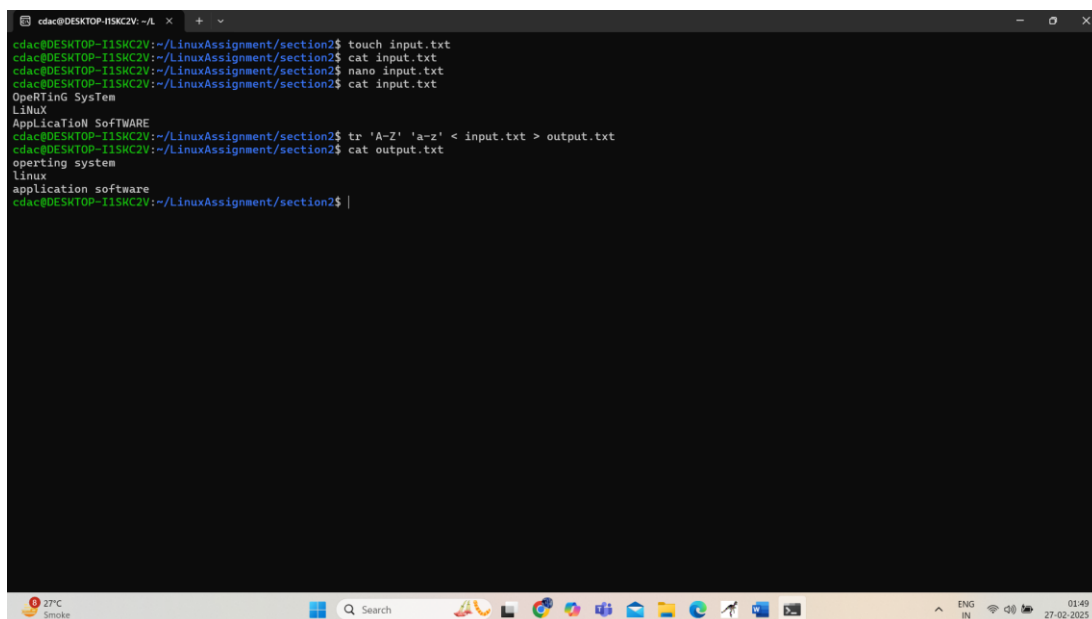
⇒ `tail -3 numbers.txt`

A terminal window titled 'cdac@DESKTOP-I15KC2V - /LinuxAssignment/section2' showing a series of commands and their outputs. The commands include 'touch numbers.txt', 'cat numbers.txt', 'nano numbers.txt', 'head -15 numbers.txt', and 'tail -3 numbers.txt'. The output of 'head -15 numbers.txt' shows a list of even numbers from 2 to 30. The output of 'tail -3 numbers.txt' shows the last three numbers: 46, 48, and 50. The terminal window has a taskbar at the bottom with a search bar and various application icons.

```
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ touch numbers.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ cat numbers.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ nano numbers.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ head -15 numbers.txt
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ tail -3 numbers.txt
46
48
50
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ |
```

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."

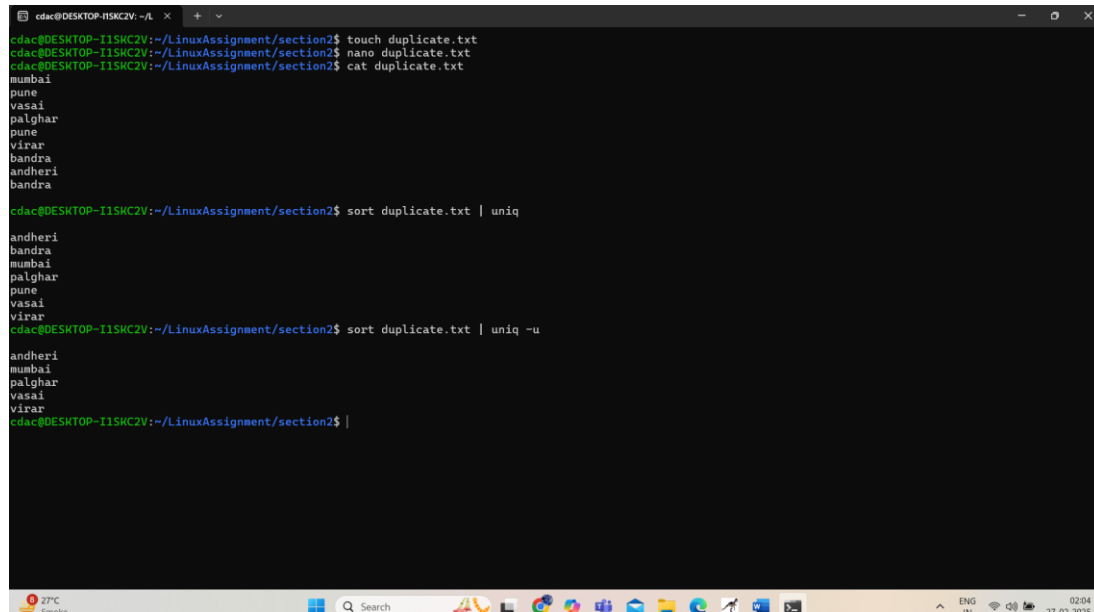
⇒ `tr 'A-Z' 'a-z' < input.txt > output.txt`

A terminal window titled 'cdac@DESKTOP-I15KC2V - /LinuxAssignment/section2' showing a series of commands and their outputs. The commands include 'touch input.txt', 'cat input.txt', 'nano input.txt', 'cat input.txt', 'tr 'A-Z' 'a-z' < input.txt > output.txt', and 'cat output.txt'. The output of 'cat input.txt' shows the text 'Linux Application Software'. The output of 'cat output.txt' shows the text 'linux application software'. The terminal window has a taskbar at the bottom with a search bar and various application icons.

```
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ touch input.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ cat input.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ nano input.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ cat input.txt
Linux
Application Software
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ tr 'A-Z' 'a-z' < input.txt > output.txt
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ cat output.txt
linux
application software
cdac@DESKTOP-I15KC2V:~/LinuxAssignment/section2$ |
```

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."

⇒ `sort duplicate.txt | uniq`



```
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ touch duplicate.txt
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ nano duplicate.txt
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ cat duplicate.txt
mumbai
pune
vasai
palghar
pune
virar
bandra
andheri
bandra

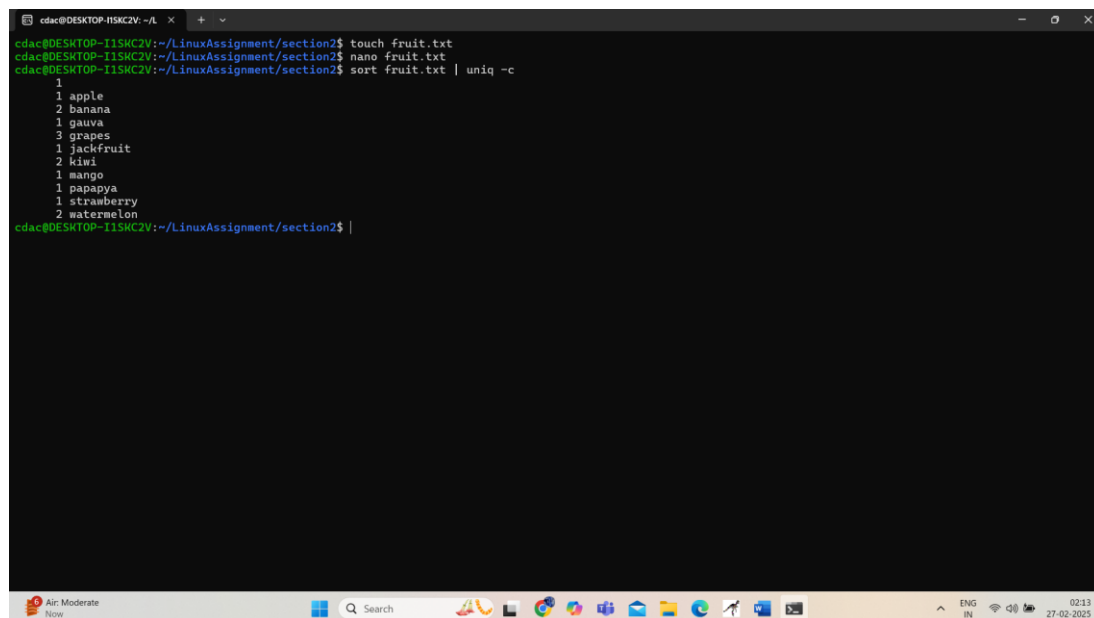
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ sort duplicate.txt | uniq
andheri
bandra
mumbai
palghar
pune
vasai
virar

cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ sort duplicate.txt | uniq -u
andheri
mumbai
palghar
vasai
virar

cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ |
```

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."

⇒ `sort fruit.txt | uniq -c`



```
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ touch fruit.txt
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ nano fruit.txt
cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ sort fruit.txt | uniq -c
 1 apple
 2 banana
 1 guava
 3 grapes
 1 jackfruit
 2 kiwi
 1 mango
 1 papaya
 1 strawberry
 2 watermelon

cdac@DESKTOP-I1SKC2V: ~/LinuxAssignment/section2$ |
```