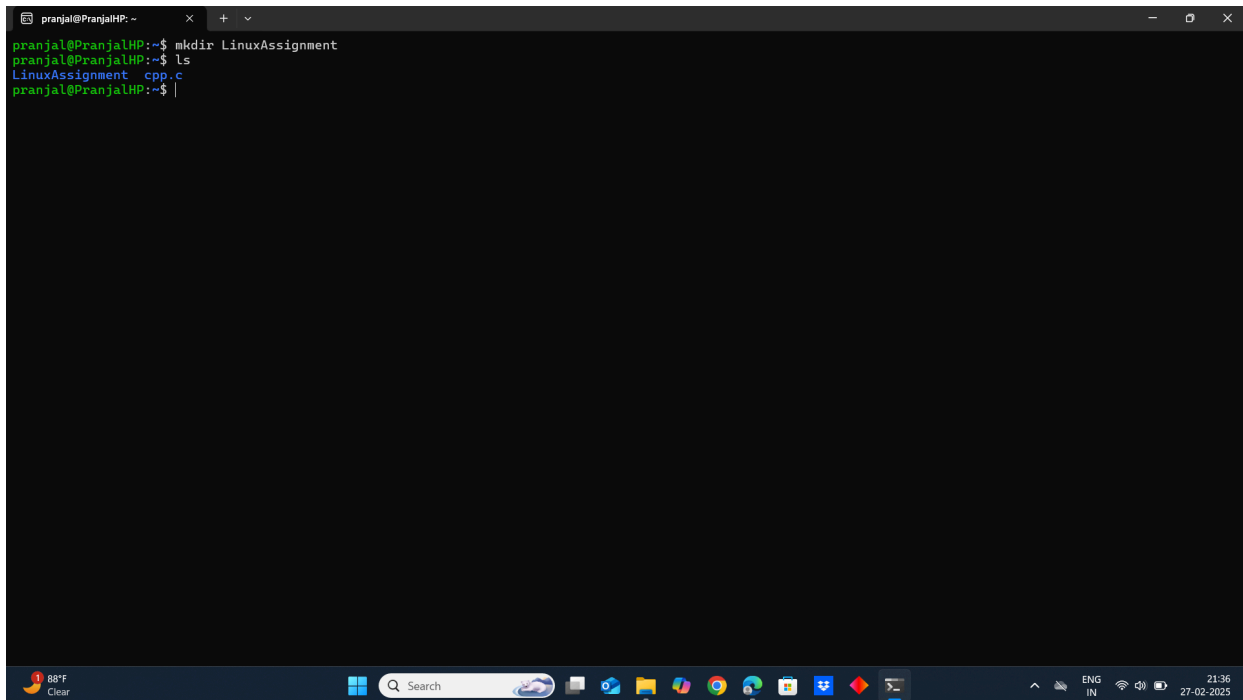


# Concepts of Operating System

## 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.

A screenshot of a Windows terminal window with a dark background. The window title is 'pranjal@PranjalHP: ~'. The terminal shows the following commands and output: 'mkdir LinuxAssignment' is entered, followed by 'ls' which shows 'LinuxAssignment' and 'cpp.c'. The prompt returns to 'pranjal@PranjalHP:~\$'. The Windows taskbar is visible at the bottom, showing the Start button, search bar, and various application icons. The system tray on the right shows the date and time as 21:36 on 27-02-2025.

```
pranjal@PranjalHP: ~  
pranjal@PranjalHP:~$ mkdir LinuxAssignment  
pranjal@PranjalHP:~$ ls  
LinuxAssignment  cpp.c  
pranjal@PranjalHP:~$
```

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

```
pranjal@PranjalHP: ~/LinuxAs...  
pranjal@PranjalHP:~$ mkdir LinuxAssignment  
pranjal@PranjalHP:~$ ls  
LinuxAssignment  cpp.c  
pranjal@PranjalHP:~$ cd LinuxAssignment  
pranjal@PranjalHP:~/LinuxAssignment$ touch file1.txt  
pranjal@PranjalHP:~/LinuxAssignment$ nano file1.txt  
pranjal@PranjalHP:~/LinuxAssignment$ cat file1.txt  
First Assignment !!  
pranjal@PranjalHP:~/LinuxAssignment$ |
```

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

```
pranjal@PranjalHP: ~/LinuxAs...  
pranjal@PranjalHP:~$ mkdir LinuxAssignment  
pranjal@PranjalHP:~$ ls  
LinuxAssignment  cpp.c  
pranjal@PranjalHP:~$ cd LinuxAssignment  
pranjal@PranjalHP:~/LinuxAssignment$ touch file1.txt  
pranjal@PranjalHP:~/LinuxAssignment$ nano file1.txt  
pranjal@PranjalHP:~/LinuxAssignment$ cat file1.txt  
First Assignment !!  
pranjal@PranjalHP:~/LinuxAssignment$ mkdir docs  
pranjal@PranjalHP:~/LinuxAssignment$ ls  
docs  file1.txt  
pranjal@PranjalHP:~/LinuxAssignment$ |
```

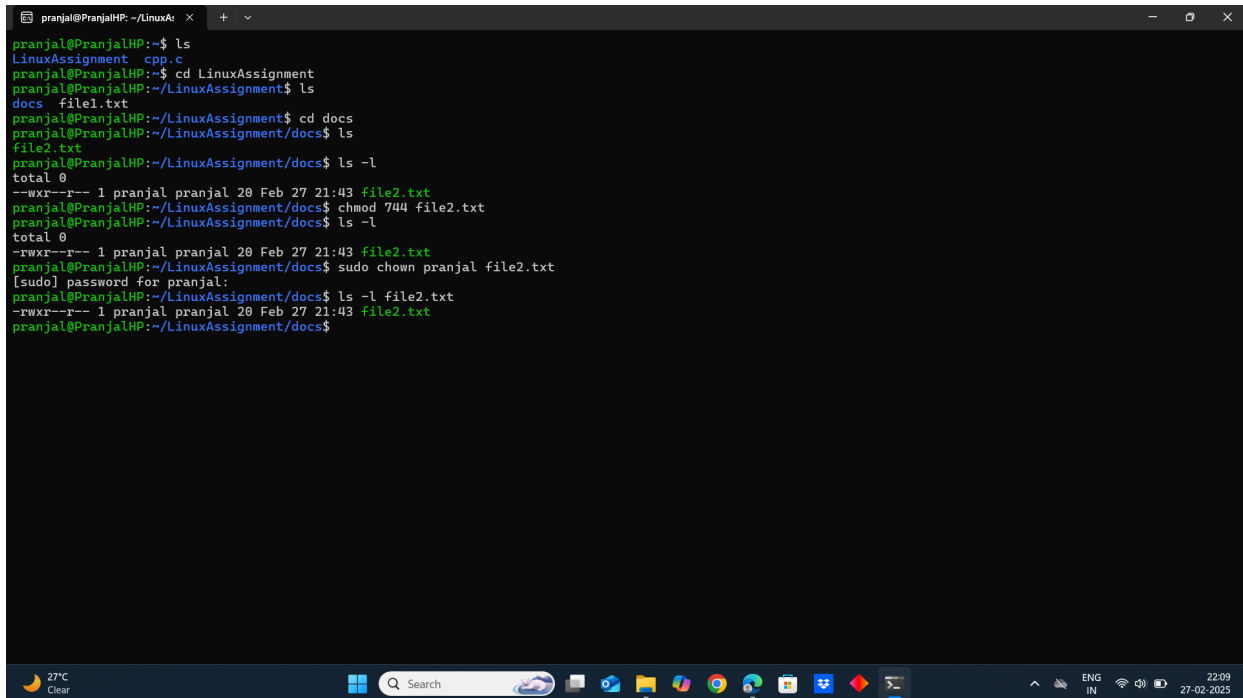
d) Copy and Move Files: a. Copy the "file1.txt" file into the "docs" directory and rename it to "file2.txt".

```
pranjal@PranjalHP: ~/LinuxAssi x + v
pranjal@PranjalHP:~$ mkdir LinuxAssignment
pranjal@PranjalHP:~$ ls
LinuxAssignment  cpp.c
pranjal@PranjalHP:~$ cd LinuxAssignment
pranjal@PranjalHP:~/LinuxAssignment$ touch file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ nano file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat file1.txt
First Assignment !!
pranjal@PranjalHP:~/LinuxAssignment$ mkdir docs
pranjal@PranjalHP:~/LinuxAssignment$ ls
docs  file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ cp file1.txt docs/file2.txt
pranjal@PranjalHP:~/LinuxAssignment$ ls
docs  file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat file1.txt
First Assignment !!
pranjal@PranjalHP:~/LinuxAssignment$ |
```

```
pranjal@PranjalHP: ~/LinuxAssi x + v
pranjal@PranjalHP:~$ ls
LinuxAssignment  cpp.c
pranjal@PranjalHP:~$ cd LinuxAssignment
pranjal@PranjalHP:~/LinuxAssignment$ ls
docs  file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat file1.txt
First Assignment !!
pranjal@PranjalHP:~/LinuxAssignment$ cd docs
pranjal@PranjalHP:~/LinuxAssignment/docs$ ls
file2.txt
pranjal@PranjalHP:~/LinuxAssignment/docs$ cat file2.txt
First Assignment !!
pranjal@PranjalHP:~/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.

A terminal window titled 'pranjal@PranjalHP: ~/LinuxAssignment' showing a series of commands and their outputs. The user navigates to the 'LinuxAssignment' directory, then to a subdirectory 'docs'. They list files, showing 'file2.txt'. They then change permissions of 'file2.txt' to '744' using 'chmod'. Finally, they use 'sudo chown pranjal file2.txt' to change the owner to 'pranjal'. The terminal output shows the file details and permissions at each step.

```
pranjal@PranjalHP:~$ ls
LinuxAssignment  cpp.c
pranjal@PranjalHP:~$ cd LinuxAssignment
pranjal@PranjalHP:~/LinuxAssignment$ ls
docs  file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ cd docs
pranjal@PranjalHP:~/LinuxAssignment/docs$ ls
file2.txt
pranjal@PranjalHP:~/LinuxAssignment/docs$ ls -l
total 0
--wxr--r-- 1 pranjal pranjal 20 Feb 27 21:43 file2.txt
pranjal@PranjalHP:~/LinuxAssignment/docs$ chmod 744 file2.txt
pranjal@PranjalHP:~/LinuxAssignment/docs$ ls -l
total 0
-rwxr--r-- 1 pranjal pranjal 20 Feb 27 21:43 file2.txt
pranjal@PranjalHP:~/LinuxAssignment/docs$ sudo chown pranjal file2.txt
[sudo] password for pranjal:
pranjal@PranjalHP:~/LinuxAssignment/docs$ ls -l file2.txt
-rwxr--r-- 1 pranjal pranjal 20 Feb 27 21:43 file2.txt
pranjal@PranjalHP:~/LinuxAssignment/docs$
```

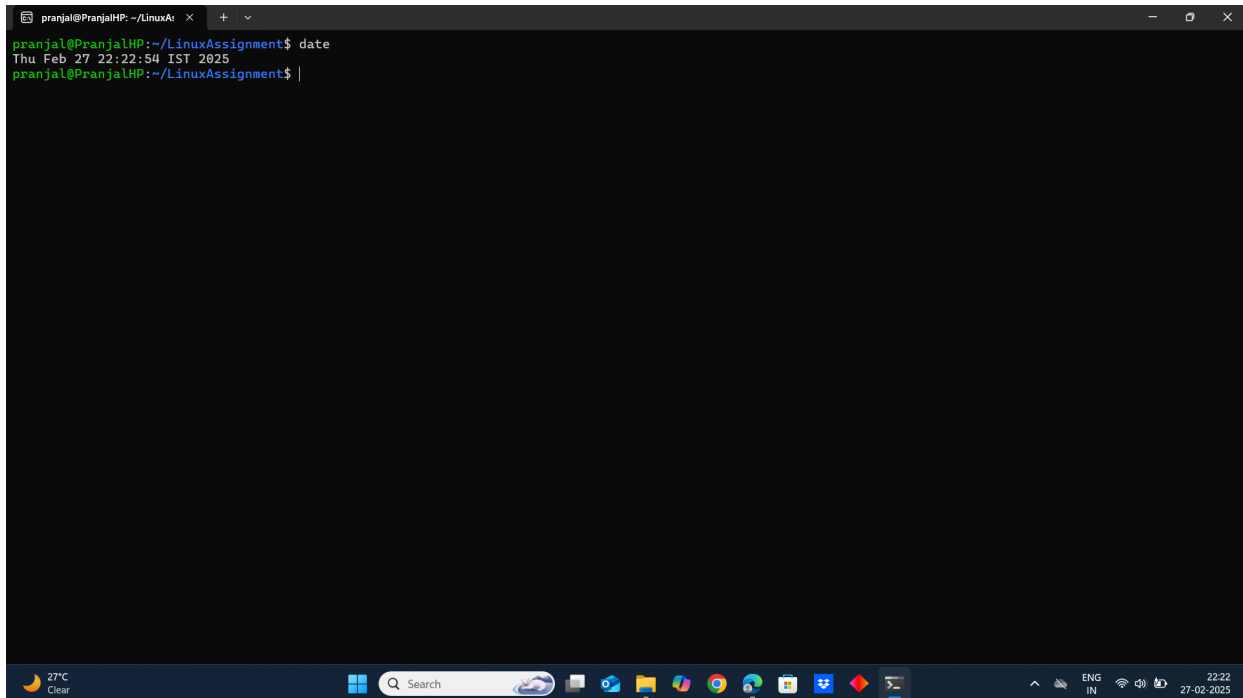
f) Final Checklist: a. Finally, list the contents of the "LinuxAssignment" directory and the root directory to ensure that all operations were performed correctly.

```
pranjal@PranjalHP: ~/LinuxAsi x + v
pranjal@PranjalHP:~$ ls
LinuxAssignment  cpp.c
pranjal@PranjalHP:~$ cd LinuxAssignment
pranjal@PranjalHP:~/LinuxAssignment$ ls
docs  file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ cd docs
pranjal@PranjalHP:~/LinuxAssignment/docs$ ls
file2.txt
pranjal@PranjalHP:~/LinuxAssignment/docs$ ls -l
total 0
-rwxr--r-- 1 pranjal pranjal 20 Feb 27 21:43 file2.txt
pranjal@PranjalHP:~/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).

```
pranjal@PranjalHP: ~/LinuxAsi x + v
pranjal@PranjalHP:~$ ls
LinuxAssignment  cpp.c
pranjal@PranjalHP:~$ cd LinuxAssignment
pranjal@PranjalHP:~/LinuxAssignment$ find . -name "*.txt"
./docs/file2.txt
./file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ grep "Assignment" file1.txt
First Assignment !!
pranjal@PranjalHP:~/LinuxAssignment$
```

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



The image shows a terminal window titled 'pranjal@PranjalHP: ~/LinuxAssignment'. The prompt is 'pranjal@PranjalHP:~/LinuxAssignment\$'. The user has entered the command 'date', and the output is 'Thu Feb 27 22:22:54 IST 2025'. The terminal window is open on a Windows desktop. The taskbar at the bottom shows the Windows logo, a search bar, and several application icons including File Explorer, Microsoft Edge, and Google Chrome. The system tray on the right shows the date and time as '22:22 27-02-2025'.

```
pranjal@PranjalHP:~/LinuxAssignment$ date
Thu Feb 27 22:22:54 IST 2025
pranjal@PranjalHP:~/LinuxAssignment$ |
```

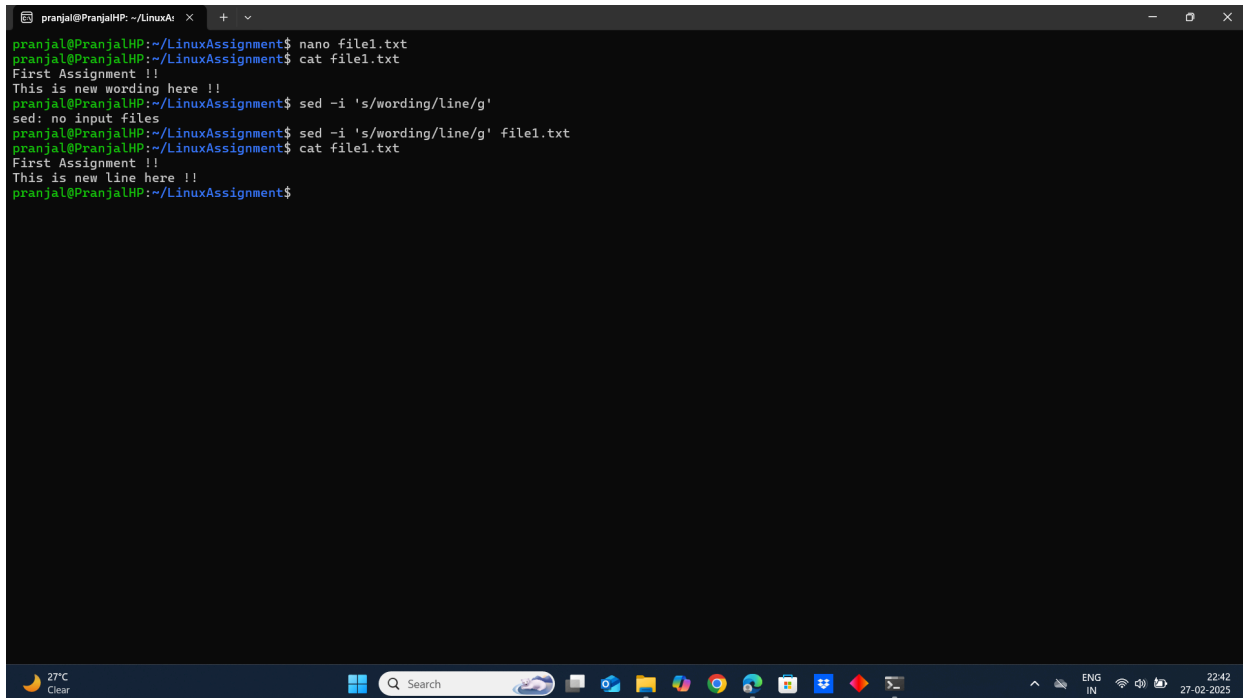
i) Networking: a. Display the IP address of the system. b. Ping a remote server to check connectivity (provide a remote server address to ping).

```
pranjal@PranjalHP: ~/LinuxAssignment$ hostname -I
192.168.56.1 192.168.1.4
pranjal@PranjalHP:~/LinuxAssignment$ ping google.com
PING google.com (142.250.195.14) 56(84) bytes of data:
64 bytes from dell2s09-in-f14.1e100.net (142.250.195.14): icmp_seq=1 ttl=58 time=41.1 ms
64 bytes from dell2s09-in-f14.1e100.net (142.250.195.14): icmp_seq=2 ttl=58 time=41.1 ms
64 bytes from dell2s09-in-f14.1e100.net (142.250.195.14): icmp_seq=3 ttl=58 time=40.9 ms
64 bytes from dell2s09-in-f14.1e100.net (142.250.195.14): icmp_seq=4 ttl=58 time=41.1 ms
64 bytes from dell2s09-in-f14.1e100.net (142.250.195.14): icmp_seq=5 ttl=58 time=40.8 ms
64 bytes from dell2s09-in-f14.1e100.net (142.250.195.14): icmp_seq=6 ttl=58 time=40.7 ms
64 bytes from dell2s09-in-f14.1e100.net (142.250.195.14): icmp_seq=7 ttl=58 time=39.9 ms
^C
--- google.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6007ms
rtt min/avg/max/mdev = 39.910/40.808/41.135/0.398 ms
pranjal@PranjalHP:~/LinuxAssignment$
```

j) File Compression: a. Compress the "docs" directory into a zip file. b. Extract the contents of the zip file into a new directory.

```
pranjal@PranjalHP: ~/LinuxAssignment$ zip -r docs.zip docs
adding: docs/ (stored 0%)
adding: docs/file2.txt (stored 0%)
pranjal@PranjalHP:~/LinuxAssignment$ unzip docs.zip -d extracted_docs/
Archive: docs.zip
  creating: extracted_docs/docs/
  extracting: extracted_docs/docs/file2.txt
pranjal@PranjalHP:~/LinuxAssignment$ ls
docs  docs.zip  extracted_docs  file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ ls -l
total 0
drwxr-xr-x 1 pranjal pranjal 4096 Feb 27 21:43 docs
-rw-r--r-- 1 pranjal pranjal 336 Feb 27 22:36 docs.zip
drwxr-xr-x 1 pranjal pranjal 4096 Feb 27 22:37 extracted_docs
-rw-r--r-- 1 pranjal pranjal 20 Feb 27 21:38 file1.txt
pranjal@PranjalHP:~/LinuxAssignment$
```

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).

A terminal window titled 'pranjal@PranjalHP: ~/LinuxAssi' shows a series of commands and their outputs. The user runs 'nano file1.txt', then 'cat file1.txt' which displays 'First Assignment !!' and 'This is new wording here !!'. Next, the user runs 'sed -i 's/wording/line/g'', which results in 'sed: no input files'. Then, the user runs 'sed -i 's/wording/line/g' file1.txt', followed by 'cat file1.txt' which now displays 'First Assignment !!' and 'This is new line here !!'. The terminal ends with the prompt 'pranjal@PranjalHP:~/LinuxAssignment\$'. The Windows taskbar at the bottom shows the date as 27-02-2025 and time as 22:42.

```
pranjal@PranjalHP:~/LinuxAssi$ nano file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat file1.txt
First Assignment !!
This is new wording here !!
pranjal@PranjalHP:~/LinuxAssignment$ sed -i 's/wording/line/g'
sed: no input files
pranjal@PranjalHP:~/LinuxAssignment$ sed -i 's/wording/line/g' file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat file1.txt
First Assignment !!
This is new line here !!
pranjal@PranjalHP:~/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.



```
pranjal@PranjalHP: ~/LinuxAssi x + v
pranjal@PranjalHP:~/LinuxAssignment$ ls
docs docs.zip extracted_docs file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ touch data.txt
pranjal@PranjalHP:~/LinuxAssignment$ nano d
data.txt docs/ docs.zip
pranjal@PranjalHP:~/LinuxAssignment$ nano data.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat data.txt
line one
line two
line three
line four
line five
line six
line seven
line eight
line nine
line ten
pranjal@PranjalHP:~/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.

```
pranjal@PranjalHP: ~/LinuxAssi x + v
pranjal@PranjalHP:~/LinuxAssignment$ ls
docs docs.zip extracted_docs file1.txt
pranjal@PranjalHP:~/LinuxAssignment$ touch data.txt
pranjal@PranjalHP:~/LinuxAssignment$ nano d
data.txt docs/ docs.zip
pranjal@PranjalHP:~/LinuxAssignment$ nano data.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat data.txt
line one
line two
line three
line four
line five
line six
line seven
line eight
line nine
line ten
pranjal@PranjalHP:~/LinuxAssignment$ tail -n 5 data.txt
line six
line seven
line eight
line nine
line ten
pranjal@PranjalHP:~/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.

```
pranjal@PranjalHP: ~/LinuxAssi x + v
pranjal@PranjalHP:~/LinuxAssignment$ cat numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
pranjal@PranjalHP:~/LinuxAssignment$ head -n 15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
pranjal@PranjalHP:~/LinuxAssignment$ |
```

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

```
pranjal@PranjalHP: ~/LinuxAssi x + v
pranjal@PranjalHP:~/LinuxAssignment$ cat numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
pranjal@PranjalHP:~/LinuxAssignment$ tail -n 3 numbers.txt
18
19
20
pranjal@PranjalHP:~/LinuxAssignment$ |
```

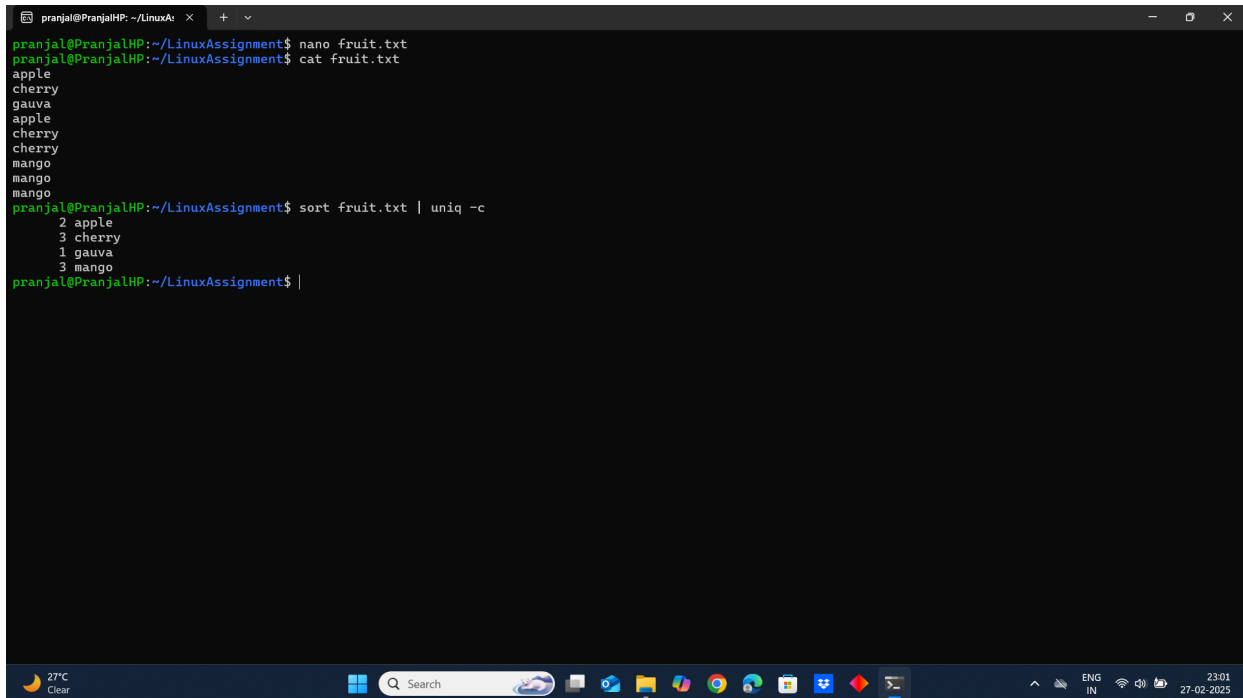
e. Imagine you have a file named "input.txt" with text content. Use a command to translate all lowercase letters to uppercase in "input.txt" and save the modified text in a new file named "output.txt."

```
pranjal@PranjalHP: ~/LinuxAssi x + v
pranjal@PranjalHP:~/LinuxAssignment$ nano input.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat input.txt
first assignment of cos
pranjal@PranjalHP:~/LinuxAssignment$ tr '[:lower:]' '[:upper:]' < input.txt > output.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat output.txt
FIRST ASSIGNMENT OF COS
pranjal@PranjalHP:~/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."

```
pranjal@PranjalHP: ~/LinuxAssi x + v
pranjal@PranjalHP:~/LinuxAssignment$ nano duplicate.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat duplicate.txt
india
pak
india
china
japan
pak
nepal
bhutan
pranjal@PranjalHP:~/LinuxAssignment$ sort duplicate.txt | uniq
bhutan
china
india
japan
nepal
pak
pranjal@PranjalHP:~/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."



```
pranjal@PranjalHP: ~/LinuxAs
pranjal@PranjalHP:~/LinuxAssignment$ nano fruit.txt
pranjal@PranjalHP:~/LinuxAssignment$ cat fruit.txt
apple
cherry
gauva
apple
cherry
cherry
mango
mango
mango
pranjal@PranjalHP:~/LinuxAssignment$ sort fruit.txt | uniq -c
  2 apple
  3 cherry
  1 gauva
  3 mango
pranjal@PranjalHP:~/LinuxAssignment$ |
```

The screenshot shows a terminal window with the following content:

- Terminal title: pranjal@PranjalHP: ~/LinuxAs
- Command: `pranjal@PranjalHP:~/LinuxAssignment$ nano fruit.txt`
- Command: `pranjal@PranjalHP:~/LinuxAssignment$ cat fruit.txt`
- Output of `cat fruit.txt`:  
apple  
cherry  
gauva  
apple  
cherry  
cherry  
mango  
mango  
mango
- Command: `pranjal@PranjalHP:~/LinuxAssignment$ sort fruit.txt | uniq -c`
- Output of `sort fruit.txt | uniq -c`:  
 2 apple  
 3 cherry  
 1 gauva  
 3 mango
- Command: `pranjal@PranjalHP:~/LinuxAssignment$ |`

The terminal window is running on a Windows 10 desktop. The taskbar at the bottom shows the Start button, a search bar, and several application icons. The system tray on the right indicates the temperature is 27°C, the language is ENG IN, and the date is 27-02-2025.