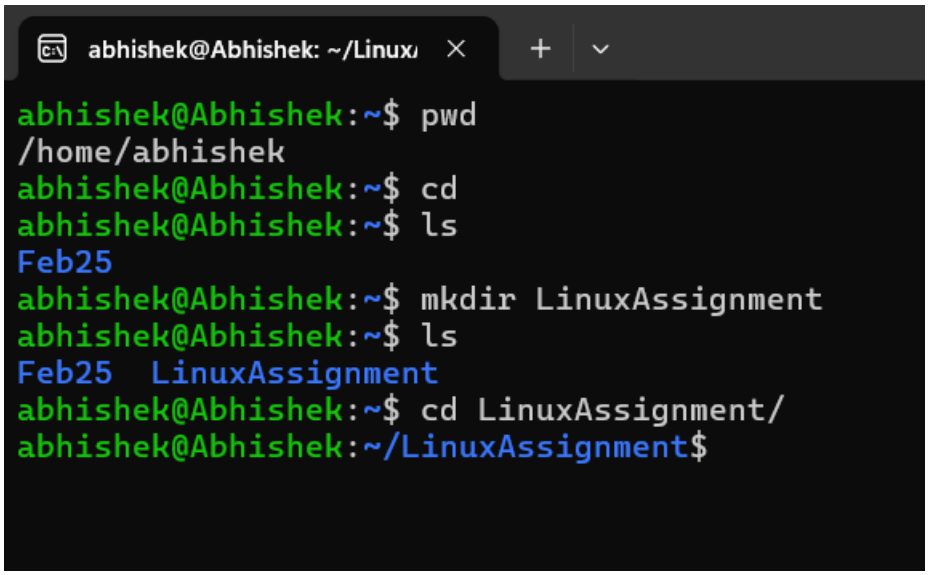
CDAC MUMBAI

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 .
   abhishek@Abhishek:~$ pwd
   /home/abhishek
   abhishek@Abhishek:~$ cd
   abhishek@Abhishek:~$ ls
   Feb25
   abhishek@Abhishek:~$ mkdir LinuxAssignment
   abhishek@Abhishek:~$ ls
   Feb25 LinuxAssignment
   abhishek@Abhishek:~$ cd LinuxAssignment/
   abhishek@Abhishek:~/LinuxAssignment$



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

   Ans .
   abhishek@Abhishek:~/LinuxAssignment$ touch file1.txt
   abhishek@Abhishek:~/LinuxAssignment$ ls
   file1.txt
   abhishek@Abhishek:~/LinuxAssignment$ nano file1.txt
   abhishek@Abhishek:~/LinuxAssignment$ cat file1.txt

Abhishek Khursange
Cdac Mumbai
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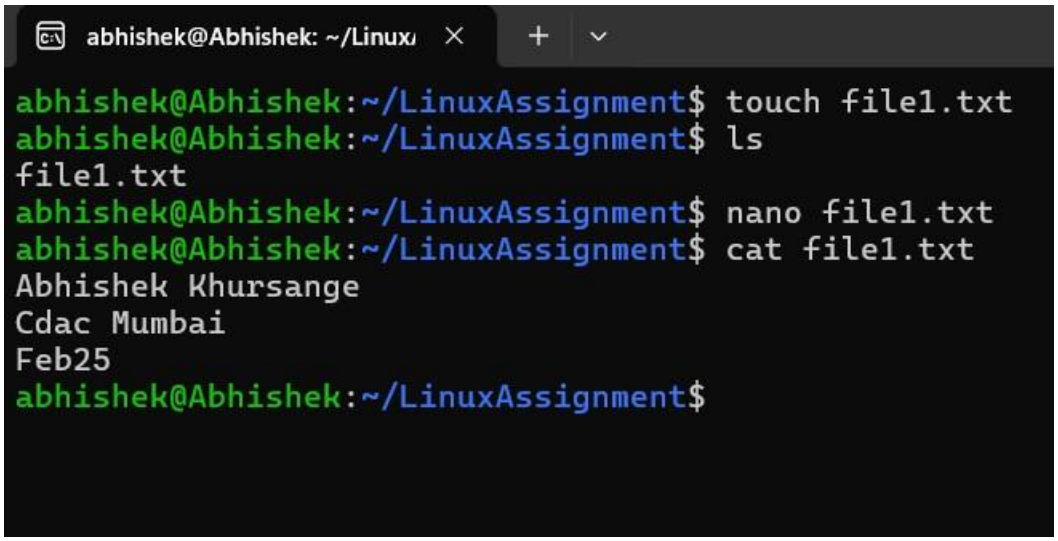
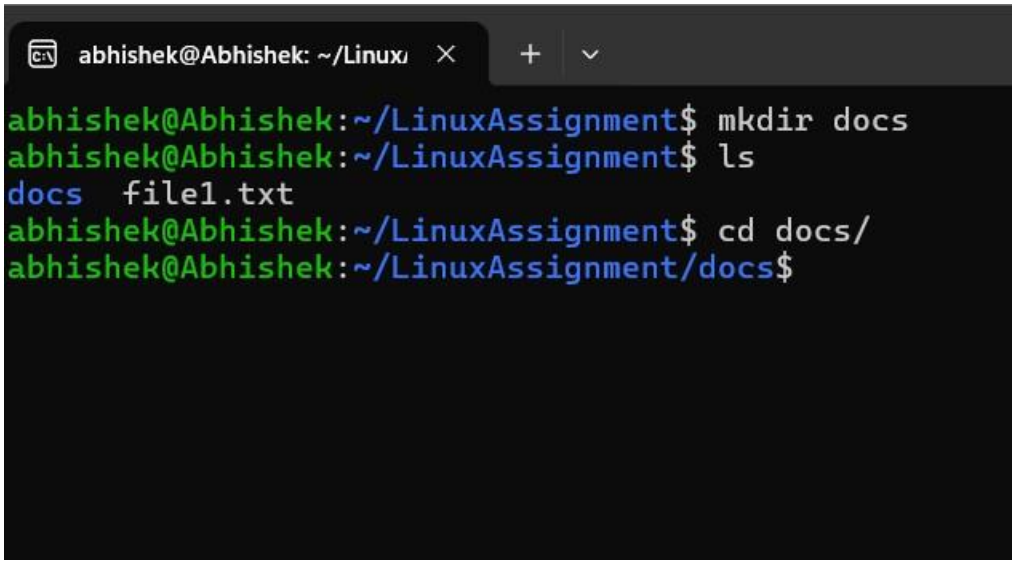
abhishek@Abhishek:~/LinuxAssignment$



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

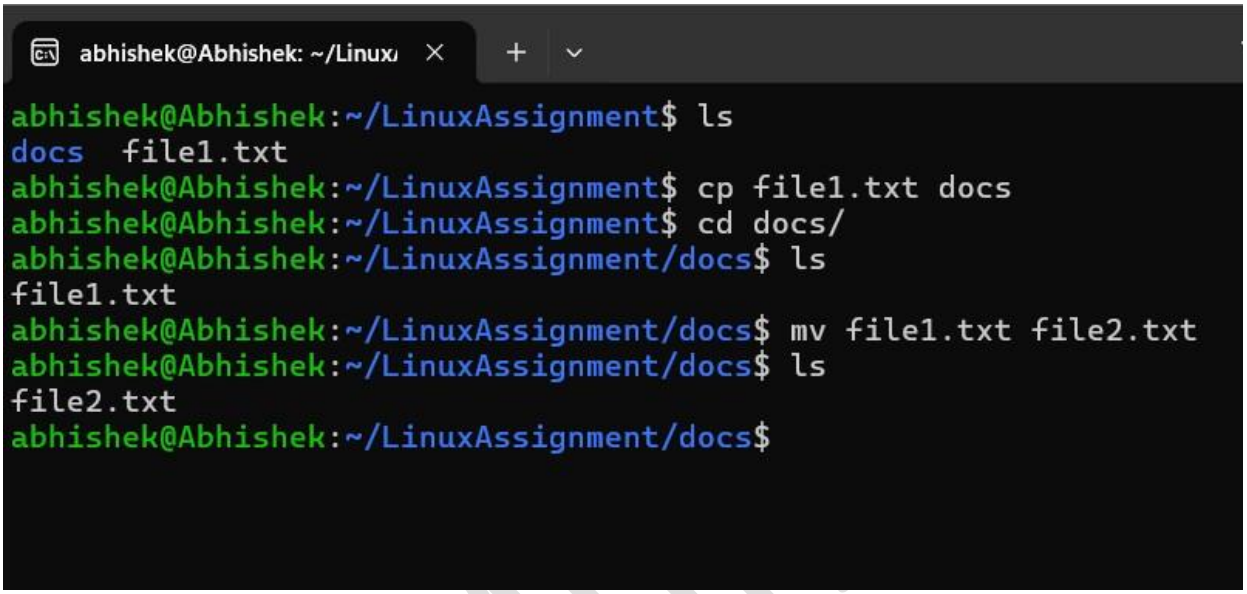
Ans.
abhishek@Abhishek:~/LinuxAssignment$ mkdir docs
abhishek@Abhishek:~/LinuxAssignment$ ls
docs file1.txt
abhishek@Abhishek:~/LinuxAssignment$ cd docs/
abhishek@Abhishek:~/LinuxAssignment/docs$



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

Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ ls
docs  file1.txt
abhishek@Abhishek:~/LinuxAssignment$ cp file1.txt docs
abhishek@Abhishek:~/LinuxAssignment$ cd docs/
abhishek@Abhishek:~/LinuxAssignment/docs$ ls
file1.txt
abhishek@Abhishek:~/LinuxAssignment/docs$ mv file1.txt file2.txt
abhishek@Abhishek:~/LinuxAssignment/docs$ ls
file2.txt
abhishek@Abhishek:~/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.

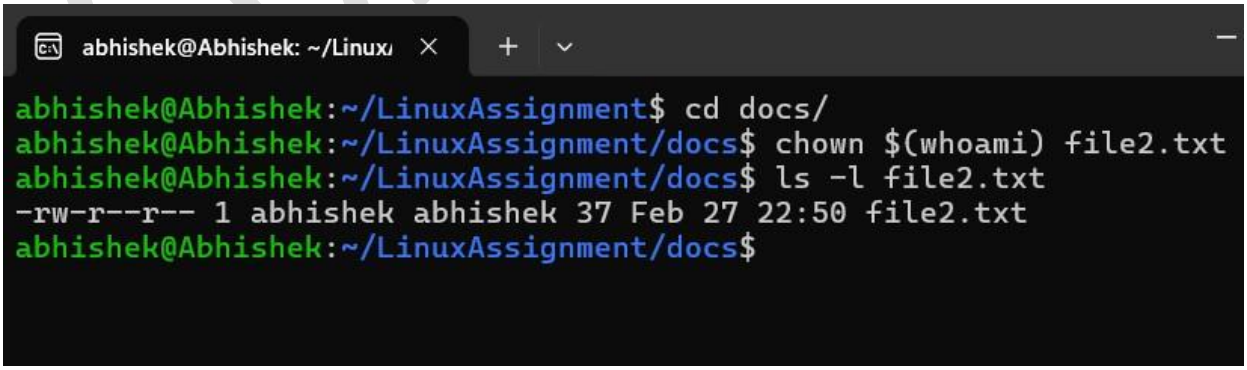
Ans. abhishek@Abhishek:~/LinuxAssignment$ cd docs/

abhishek@Abhishek:~/LinuxAssignment/docs$ chown $(whoami) file2.txt

abhishek@Abhishek:~/LinuxAssignment/docs$ ls -l file2.txt

-rw-r--r-- 1 abhishek abhishek 37 Feb 27 22:50 file2.txt

abhishek@Abhishek:~/LinuxAssignment/docs$

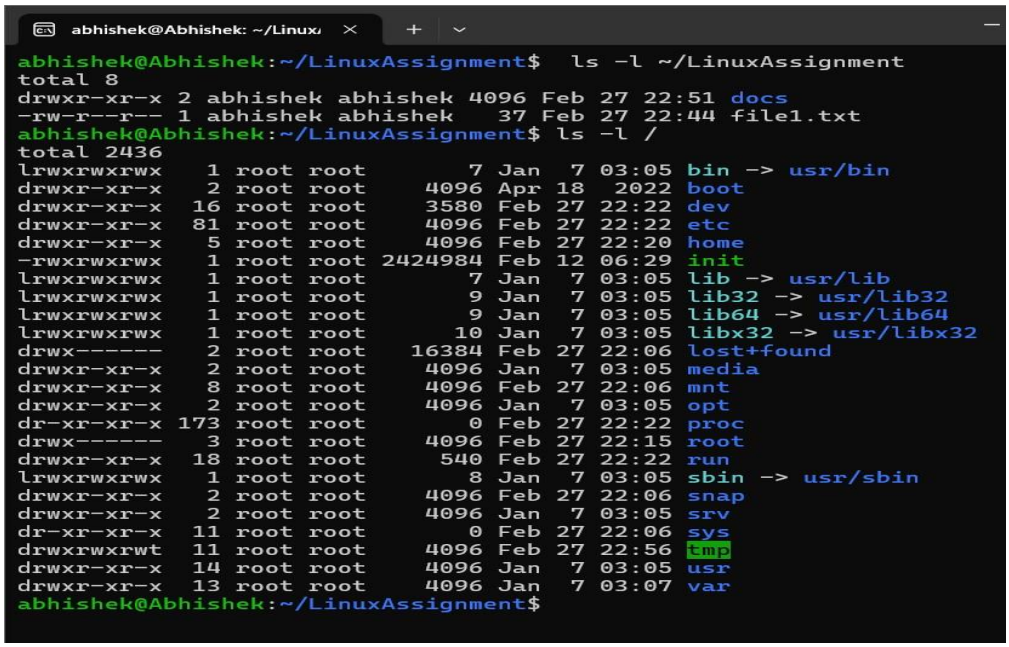


f) Final Checklist:

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

Ans.

```
abhishek@Abhishek:~/LinuxAssignment$  ls -l ~/LinuxAssignment
total 8
drwxr-xr-x 2 abhishek abhishek 4096 Feb 27 22:51 docs
-rw-r--r-- 1 abhishek abhishek   37 Feb 27 22:44 file1.txt
abhishek@Abhishek:~/LinuxAssignment$ ls -l /
total 2436
lrwxrwxrwx   1 root root       7 Jan  7 03:05 bin -> usr/bin
drwxr-xr-x   2 root root    4096 Apr 18  2022 boot
drwxr-xr-x  16 root root    3580 Feb 27 22:22 dev
drwxr-xr-x  81 root root    4096 Feb 27 22:22 etc
drwxr-xr-x   5 root root    4096 Feb 27 22:20 home
-rwxrwxrwx   1 root root 2424984 Feb 12 06:29 init
lrwxrwxrwx   1 root root       7 Jan  7 03:05 lib -> usr/lib
lrwxrwxrwx   1 root root       9 Jan  7 03:05 lib32 -> usr/lib32
lrwxrwxrwx   1 root root       9 Jan  7 03:05 lib64 -> usr/lib64
lrwxrwxrwx   1 root root      10 Jan  7 03:05 libx32 -> usr/libx32
drwx------   2 root root   16384 Feb 27 22:06 lost+found
drwxr-xr-x   2 root root    4096 Jan  7 03:05 media
drwxr-xr-x   8 root root    4096 Feb 27 22:06 mnt
drwxr-xr-x   2 root root    4096 Jan  7 03:05 opt
dr-xr-xr-x 173 root root       0 Feb 27 22:22 proc
drwx------   3 root root    4096 Feb 27 22:15 root
drwxr-xr-x  18 root root     540 Feb 27 22:22 run
lrwxrwxrwx   1 root root       8 Jan  7 03:05 sbin -> usr/sbin
drwxr-xr-x   2 root root    4096 Feb 27 22:06 snap
drwxr-xr-x   2 root root    4096 Jan  7 03:05 srv
dr-xr-xr-x  11 root root       0 Feb 27 22:06 sys
drwxrwxrwt  11 root root    4096 Feb 27 22:56 tmp
drwxr-xr-x  14 root root    4096 Jan  7 03:05 usr
drwxr-xr-x  13 root root    4096 Jan  7 03:07 var
abhishek@Abhishek:~/LinuxAssignment$
```

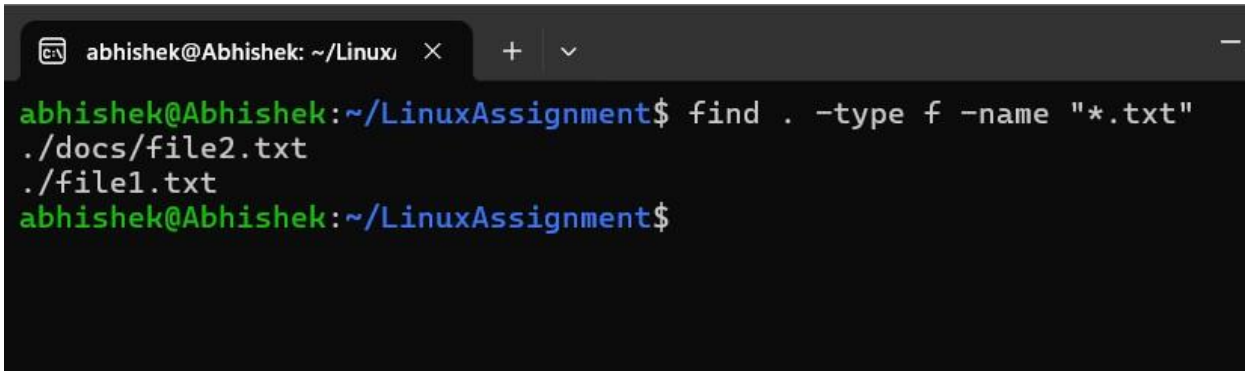


g) File Searching:

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

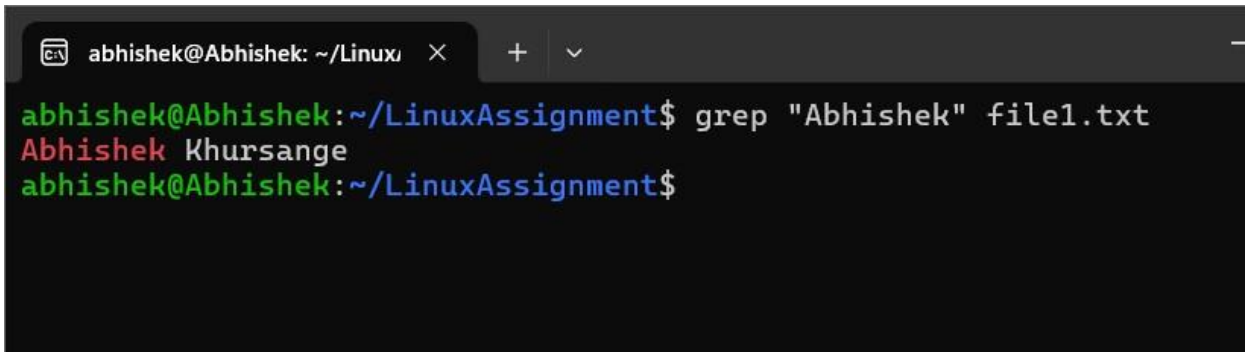
Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ find . -type f -name "*.txt"
./docs/file2.txt
./file1.txt
abhishek@Abhishek:~/LinuxAssignment$
```



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

Ans. abhishek@Abhishek:~/LinuxAssignment$ grep "Abhishek" file1.txt
Abhishek Khursange
abhishek@Abhishek:~/LinuxAssignment$

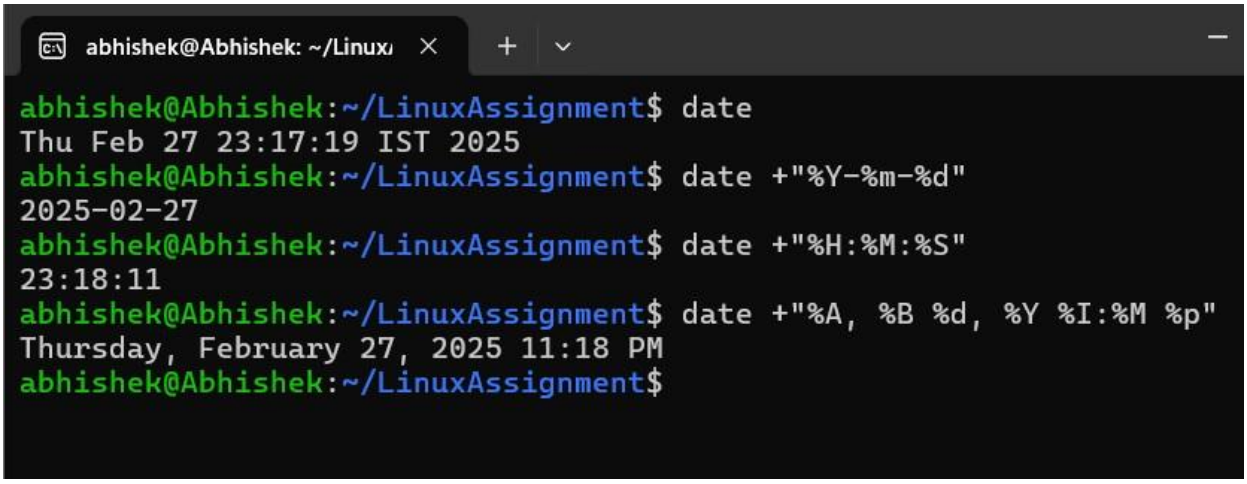


h) System Information:

a. Display the current system date and time.

Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ date
Thu Feb 27 23:17:19 IST 2025
abhishek@Abhishek:~/LinuxAssignment$ date +"%Y-%m-%d"
2025-02-27
abhishek@Abhishek:~/LinuxAssignment$ date +"%H:%M:%S"
23:18:11
abhishek@Abhishek:~/LinuxAssignment$ date +"%A, %B %d, %Y %I:%M %p"
Thursday, February 27, 2025 11:18 PM
abhishek@Abhishek:~/LinuxAssignment$
```



i) Networking:

a. Display the IP address of the system.

Ans.

abhishek@Abhishek:~/LinuxAssignment$ ipconfig.exe

Windows IP Configuration

Ethernet adapter vEthernet (WSL (Hyper-V firewall)):

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::ab7d:9aac:7fdc:c9bd%30
IPv4 Address. . . . . : 172.17.224.1
Subnet Mask . . . . . : 255.255.240.0
Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 1:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

Wireless LAN adapter Local Area Connection* 2:

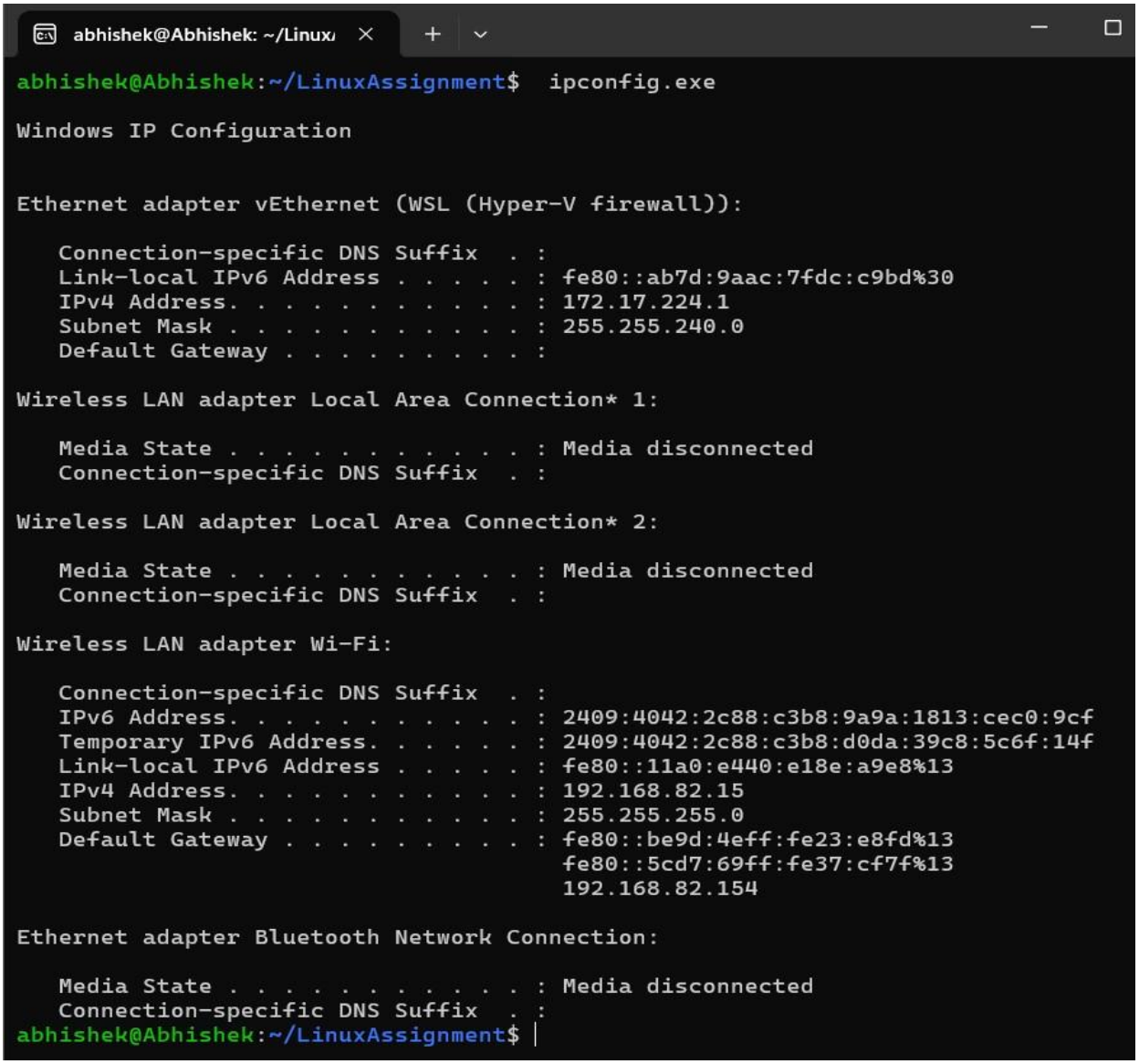
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . :
IPv6 Address. . . . . : 2409:4042:2c88:c3b8:9a9a:1813:cec0:9cf
Temporary IPv6 Address. . . . . : 2409:4042:2c88:c3b8:d0da:39c8:5c6f:14f
Link-local IPv6 Address . . . . . : fe80::11a0:e440:e18e:a9e8%13
IPv4 Address. . . . . : 192.168.82.15
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : fe80::be9d:4eff:fe23:e8fd%13
fe80::5cd7:69ff:fe37:cf7f%13
192.168.82.154

Ethernet adapter Bluetooth Network Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
abhishek@Abhishek:~/LinuxAssignment$



b. Ping a remote server to check connectivity (provide a remote server address to ping). j) File Compression:
Ans.
abhishek@Abhishek:~/LinuxAssignment$ ping -c 4 google.com
PING google.com (142.250.67.206) 56(84) bytes of data.
64 bytes from bom12s08-in-f14.1e100.net (142.250.67.206): icmp_seq=1 ttl=110 time=89.3 ms
64 bytes from bom12s08-in-f14.1e100.net (142.250.67.206): icmp_seq=2 ttl=110 time=64.5 ms
64 bytes from bom12s08-in-f14.1e100.net (142.250.67.206): icmp_seq=3 ttl=110 time=105 ms
64 bytes from bom12s08-in-f14.1e100.net (142.250.67.206): icmp_seq=4 ttl=110 time=79.5 ms

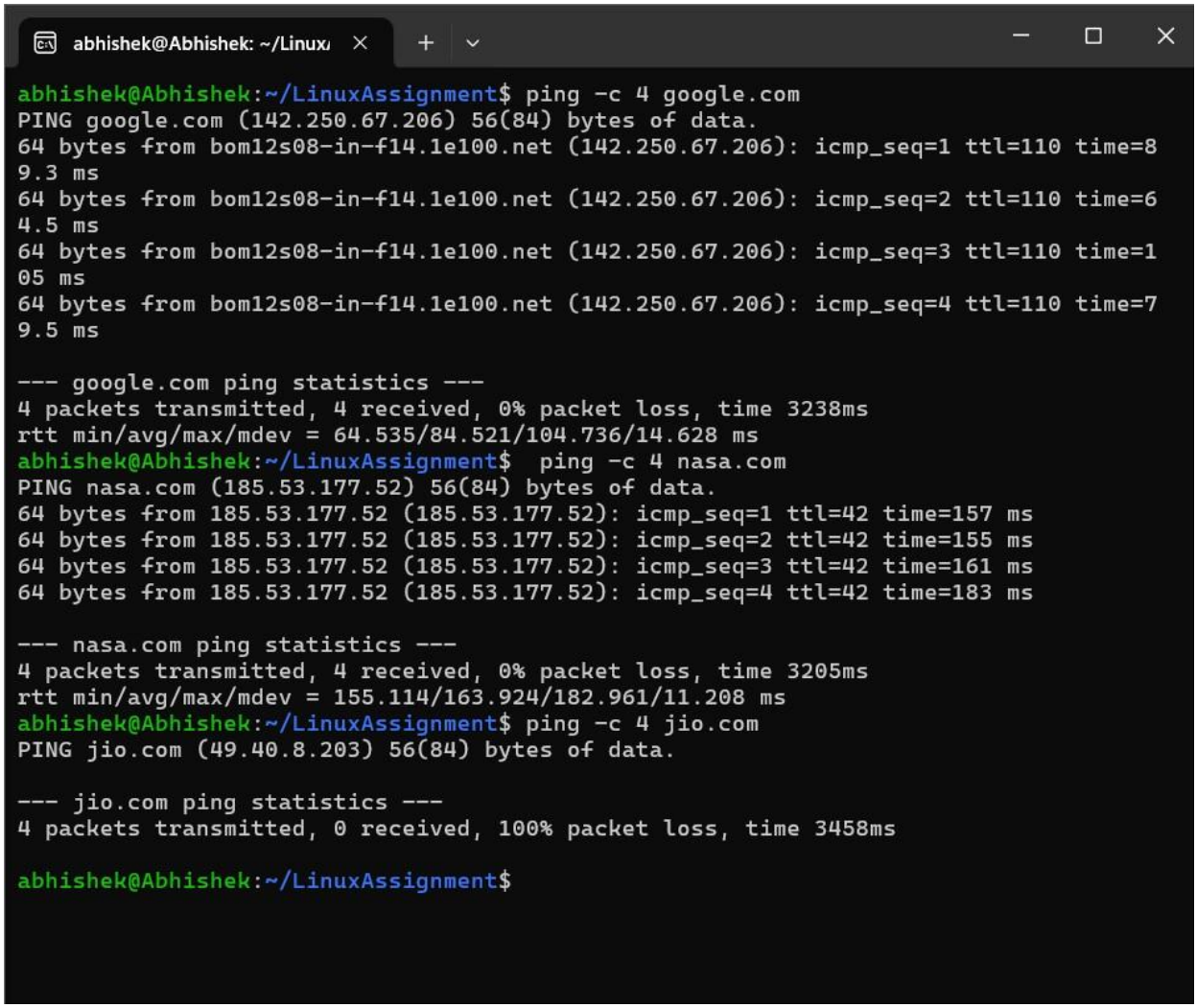
--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3238ms

rtt min/avg/max/mdev = 64.535/84.521/104.736/14.628 ms
abhishek@Abhishek:~/LinuxAssignment$ ping -c 4 nasa.com
PING nasa.com (185.53.177.52) 56(84) bytes of data.
64 bytes from 185.53.177.52 (185.53.177.52): icmp_seq=1 ttl=42 time=157 ms
64 bytes from 185.53.177.52 (185.53.177.52): icmp_seq=2 ttl=42 time=155 ms
64 bytes from 185.53.177.52 (185.53.177.52): icmp_seq=3 ttl=42 time=161 ms
64 bytes from 185.53.177.52 (185.53.177.52): icmp_seq=4 ttl=42 time=183 ms

--- nasa.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3205ms
rtt min/avg/max/mdev = 155.114/163.924/182.961/11.208 ms
abhishek@Abhishek:~/LinuxAssignment$ ping -c 4 jio.com
PING jio.com (49.40.8.203) 56(84) bytes of data.

--- jio.com ping statistics ---
4 packets transmitted, 0 received, 100% packet loss, time 3458ms

abhishek@Abhishek:~/LinuxAssignment$

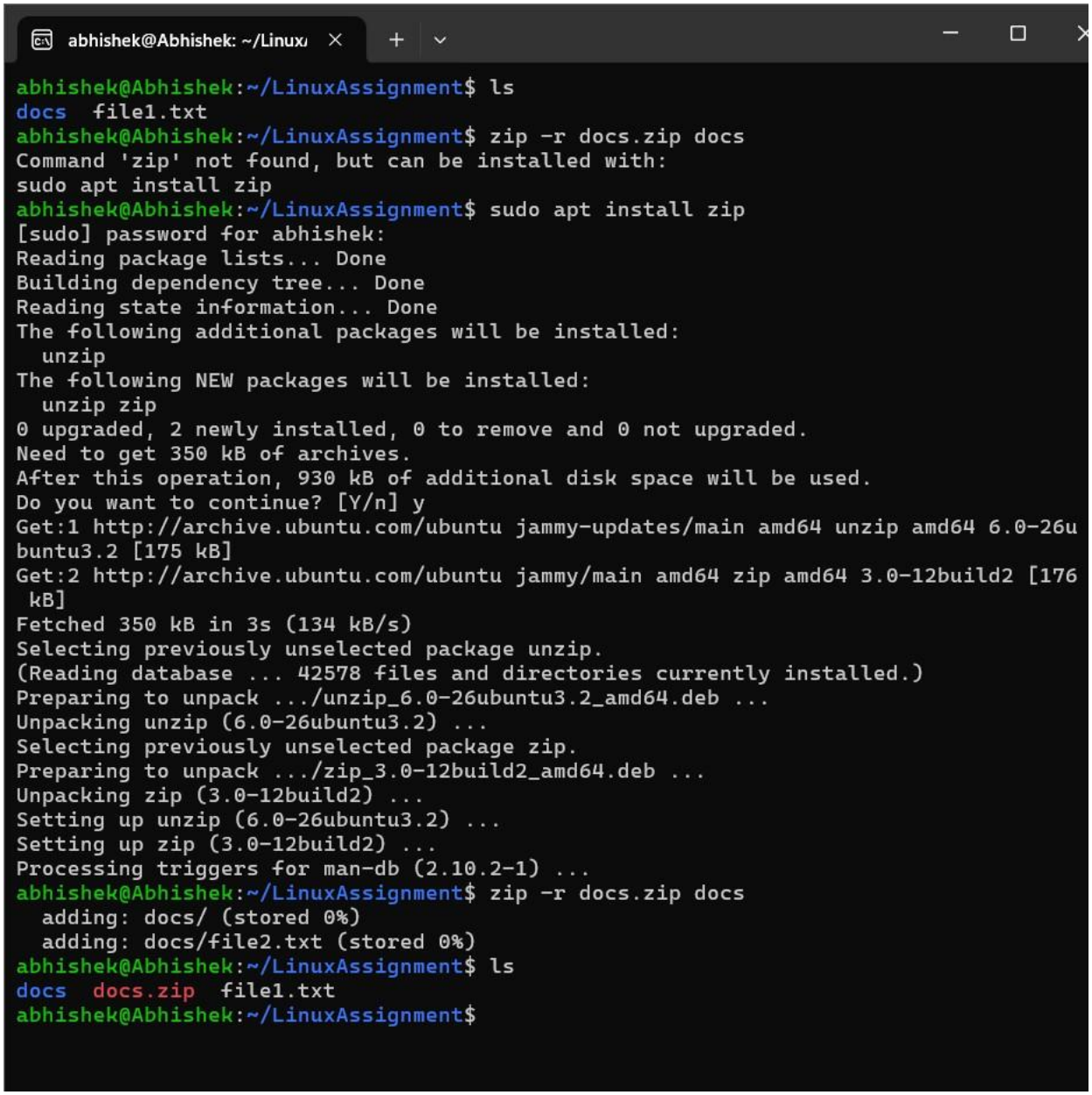


j) File Compression:

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

Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ ls
docs  file1.txt
abhishek@Abhishek:~/LinuxAssignment$ zip -r docs.zip docs
Command 'zip' not found, but can be installed with:
sudo apt install zip
abhishek@Abhishek:~/LinuxAssignment$ sudo apt install zip
[sudo] password for abhishek:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  unzip
The following NEW packages will be installed:
  unzip zip
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 350 kB of archives.
After this operation, 930 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 unzip amd64 6.0-26ubuntu3.2 [175
kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/main amd64 zip amd64 3.0-12build2 [176 kB]
Fetched 350 kB in 3s (134 kB/s)
Selecting previously unselected package unzip.
(Reading database ... 42578 files and directories currently installed.)
Preparing to unpack .../unzip_6.0-26ubuntu3.2_amd64.deb ...
Unpacking unzip (6.0-26ubuntu3.2) ...
Selecting previously unselected package zip.
Preparing to unpack .../zip_3.0-12build2_amd64.deb ...
Unpacking zip (3.0-12build2) ...
Setting up unzip (6.0-26ubuntu3.2) ...
Setting up zip (3.0-12build2) ...
Processing triggers for man-db (2.10.2-1) ...
abhishek@Abhishek:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
abhishek@Abhishek:~/LinuxAssignment$ ls
docs  docs.zip  file1.txt
abhishek@Abhishek:~/LinuxAssignment$
```

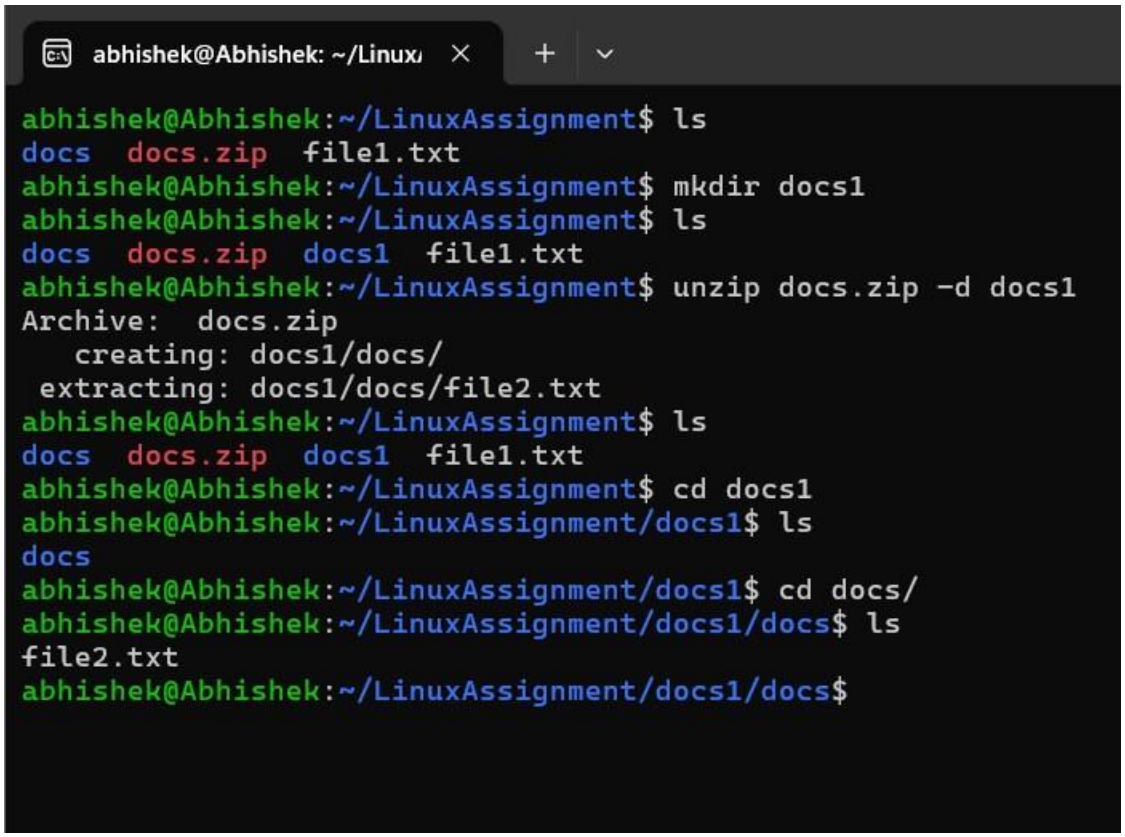


b. Extract the contents of the zip file into a new directory.

Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ ls
docs  docs.zip  file1.txt
abhishek@Abhishek:~/LinuxAssignment$ mkdir docs1
abhishek@Abhishek:~/LinuxAssignment$ ls
docs  docs.zip  docs1  file1.txt
abhishek@Abhishek:~/LinuxAssignment$ unzip docs.zip -d docs1
Archive:  docs.zip
   creating: docs1/docs/
 extracting: docs1/docs/file2.txt
abhishek@Abhishek:~/LinuxAssignment$ ls
docs  docs.zip  docs1  file1.txt
abhishek@Abhishek:~/LinuxAssignment$ cd docs1
abhishek@Abhishek:~/LinuxAssignment/docs1$ ls
docs
abhishek@Abhishek:~/LinuxAssignment/docs1$ cd docs/
abhishek@Abhishek:~/LinuxAssignment/docs1/docs$ ls
```

file2.txt
abhishek@Abhishek:~/LinuxAssignment/docs1/docs$



k) File Editing:

a. Open the "file1.txt" file in a text editor and add some text to it.
   Ans.
   abhishek@Abhishek:~/LinuxAssignment$ ls
   docs docs.zip docs1 file1.txt
   abhishek@Abhishek:~/LinuxAssignment$ nano file1.txt
   abhishek@Abhishek:~/LinuxAssignment$ cat file1.txt
   Abhishek Khursange
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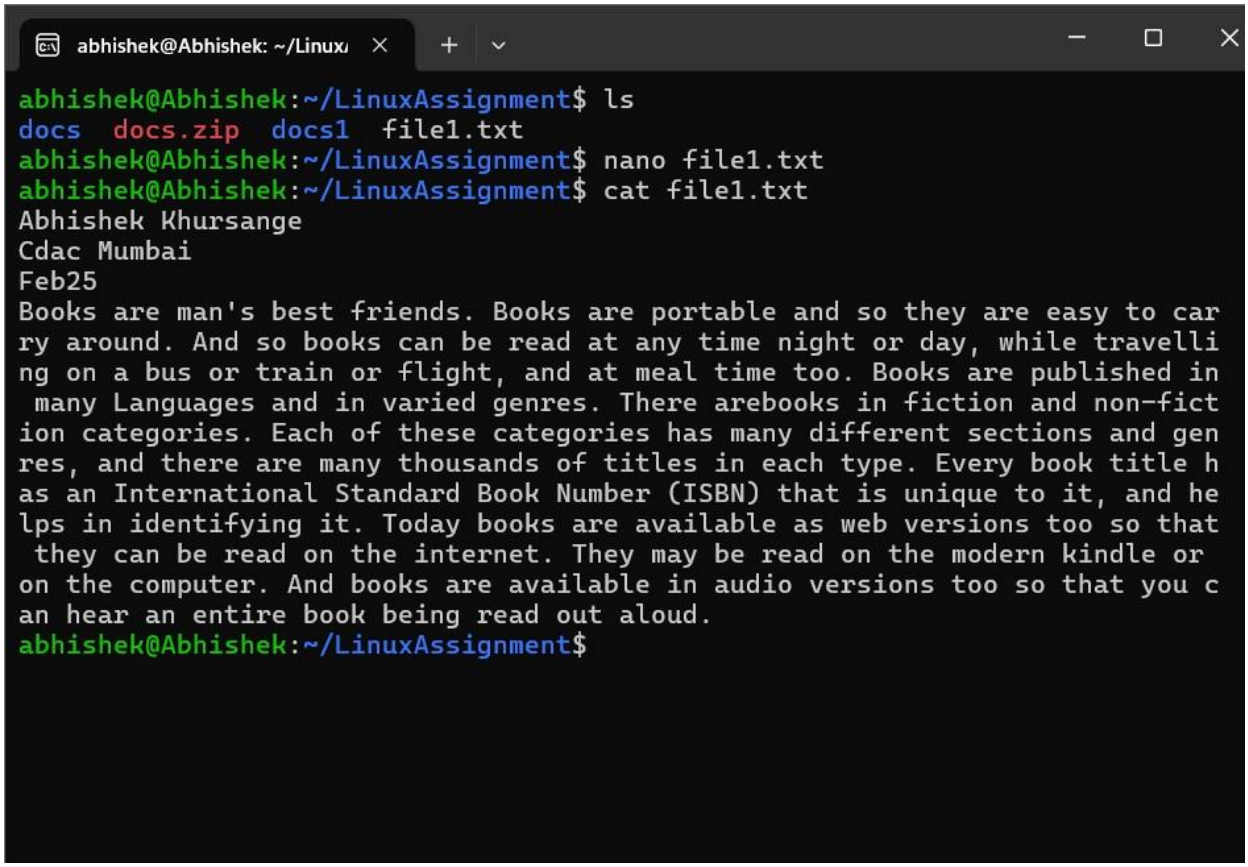
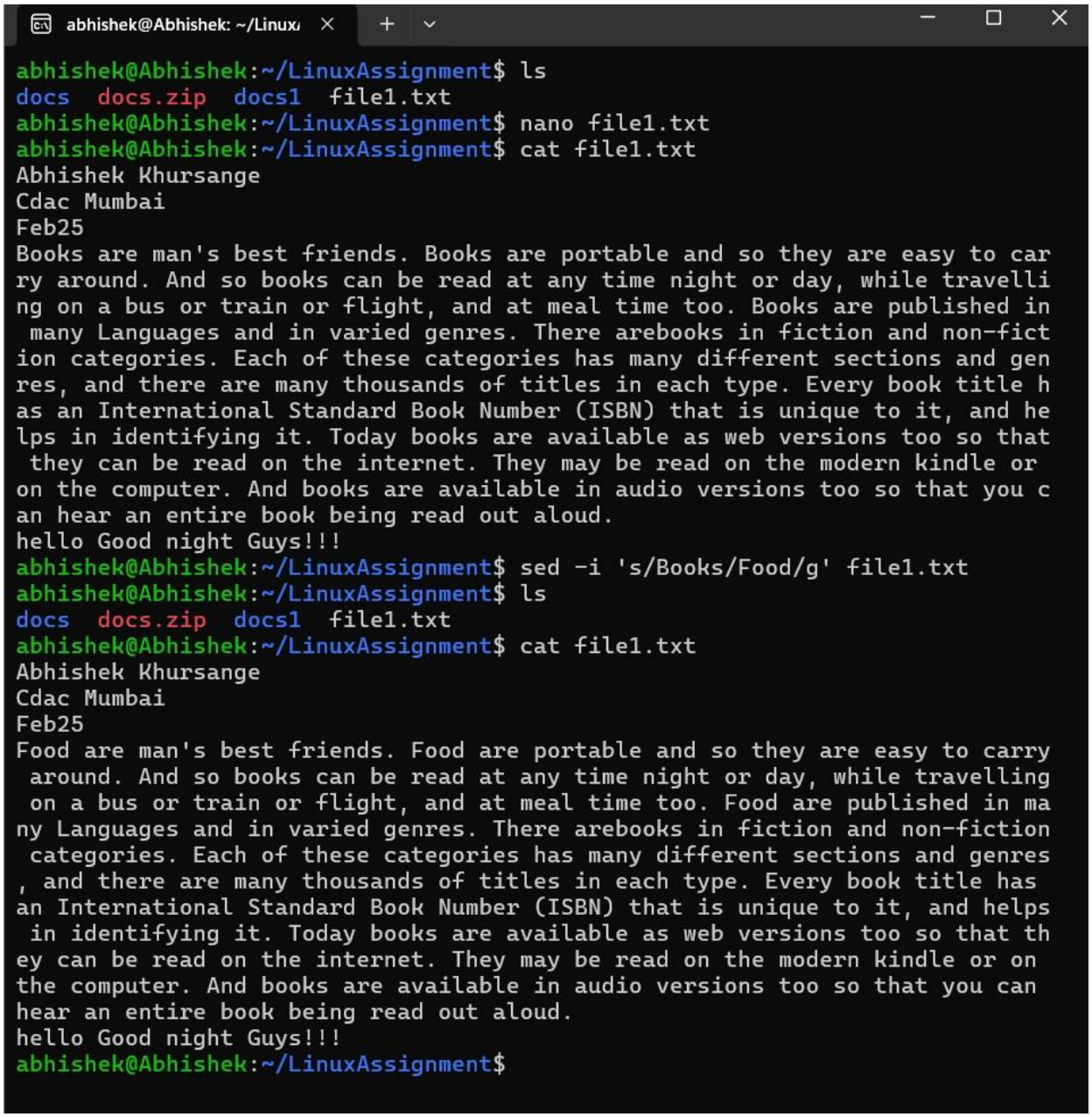
   Feb25
   Books are man's best friends. Books are portable and so they are easy to carry around. And so books can be read at any time night or day, while travelling on a bus or train or flight, and at meal time too. Books are published in many Languages and in varied genres. There arebooks in fiction and non-fiction categories. Each of these categories has many different sections and genres, and there are many thousands of titles in each type. Every book title has an International Standard Book Number (ISBN) that is unique to it, and helps in identifying it. Today books are available as web versions too so that they can be read on the internet. They may be read on the modern kindle or on the computer. And books are available in audio versions too so that you can hear an entire book being read out aloud.
   abhishek@Abhishek:~/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).
Ans.

abhishek@Abhishek:~/LinuxAssignment$ ls
docs docs.zip docs1 file1.txt
abhishek@Abhishek:~/LinuxAssignment$ nano file1.txt
abhishek@Abhishek:~/LinuxAssignment$ cat file1.txt
Abhishek Khursange
Cdac Mumbai
Feb25
Books are man's best friends. Books are portable and so they are easy to carry around. And so books can be read at any time night or day, while travelling on a bus or train or flight, and at meal time too. Books are published in many Languages and in varied genres. There arebooks in fiction and non-fiction categories. Each of these categories has many different sections and genres, and there are many thousands of titles in each type. Every book title has an International Standard Book Number (ISBN) that is unique to it, and helps in identifying it. Today books are available as web versions too so that they can be read on the internet. They may be read on the modern kindle or on the computer. And books are available in audio versions too so that you can hear an entire book being read out aloud.
hello Good night Guys!!!
abhishek@Abhishek:~/LinuxAssignment$ sed -i 's/Books/Food/g' file1.txt
abhishek@Abhishek:~/LinuxAssignment$ ls
docs docs.zip docs1 file1.txt
abhishek@Abhishek:~/LinuxAssignment$ cat file1.txt
Abhishek Khursange
Cdac Mumbai

Feb25
Food are man's best friends. Food are portable and so they are easy to carry around. And so books can be read at any time night or day, while travelling on a bus or train or flight, and at meal time too. Food are published in many Languages and in varied genres. There arebooks in fiction and non-fiction categories. Each of these categories has many different sections and genres, and there are many thousands of titles in each type. Every book title has an International Standard Book Number (ISBN) that is unique to it, and helps in identifying it. Today books are available as web versions too so that they can be read on the internet. They may be read on the modern kindle or on the computer. And books are available in audio versions too so that you can hear an entire book being read out aloud.
hello Good night Guys!!!
abhishek@Abhishek:~/LinuxAssignment$

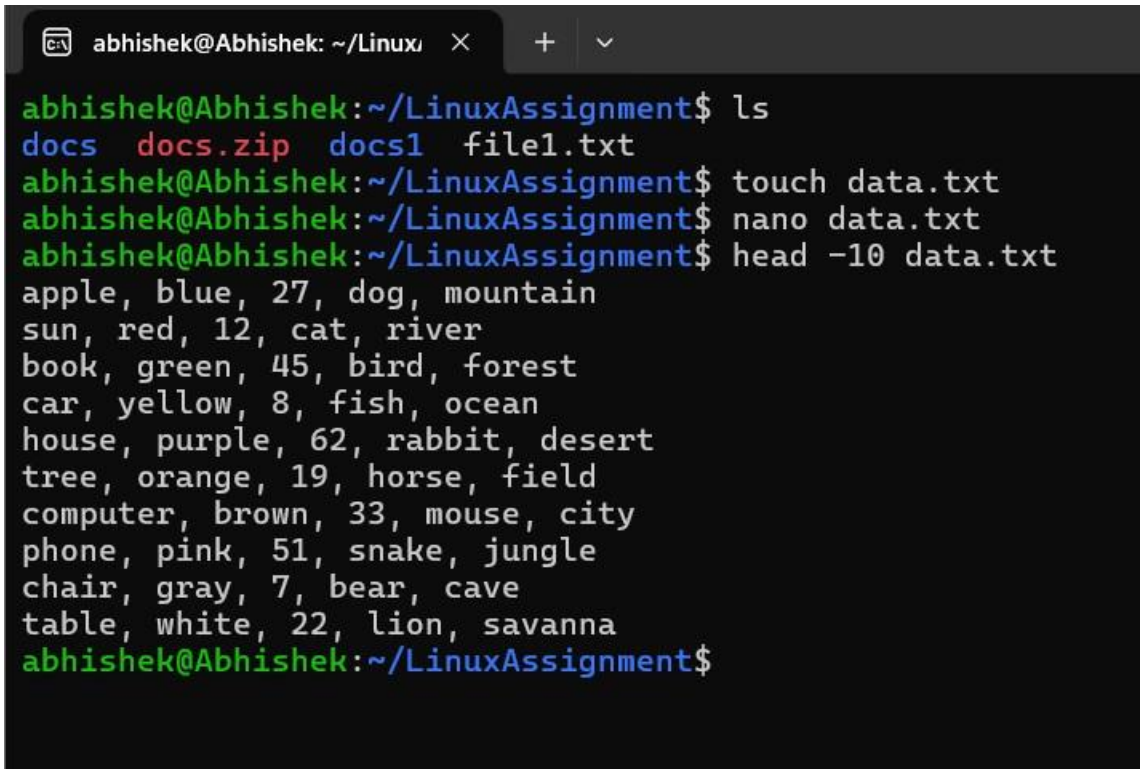


Problem 2: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.

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.

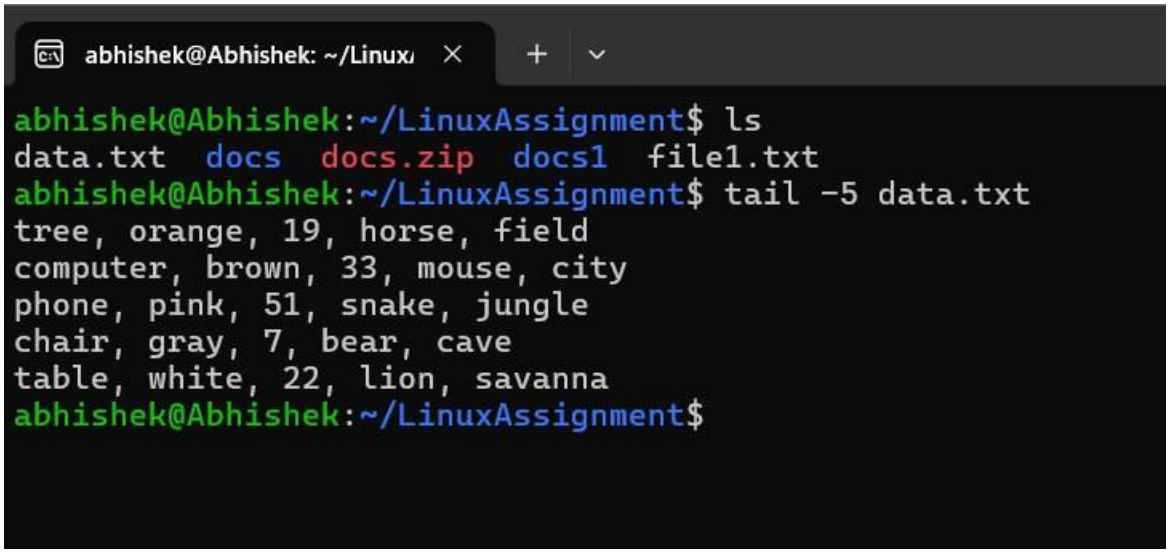
Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ ls
docs  docs.zip  docs1  file1.txt
abhishek@Abhishek:~/LinuxAssignment$ touch data.txt
abhishek@Abhishek:~/LinuxAssignment$ nano data.txt
abhishek@Abhishek:~/LinuxAssignment$ head -10 data.txt
apple, blue, 27, dog, mountain
sun, red, 12, cat, river
book, green, 45, bird, forest
car, yellow, 8, fish, ocean
house, purple, 62, rabbit, desert
tree, orange, 19, horse, field
computer, brown, 33, mouse, city
phone, pink, 51, snake, jungle
chair, gray, 7, bear, cave
table, white, 22, lion, savanna
abhishek@Abhishek:~/LinuxAssignment$
```



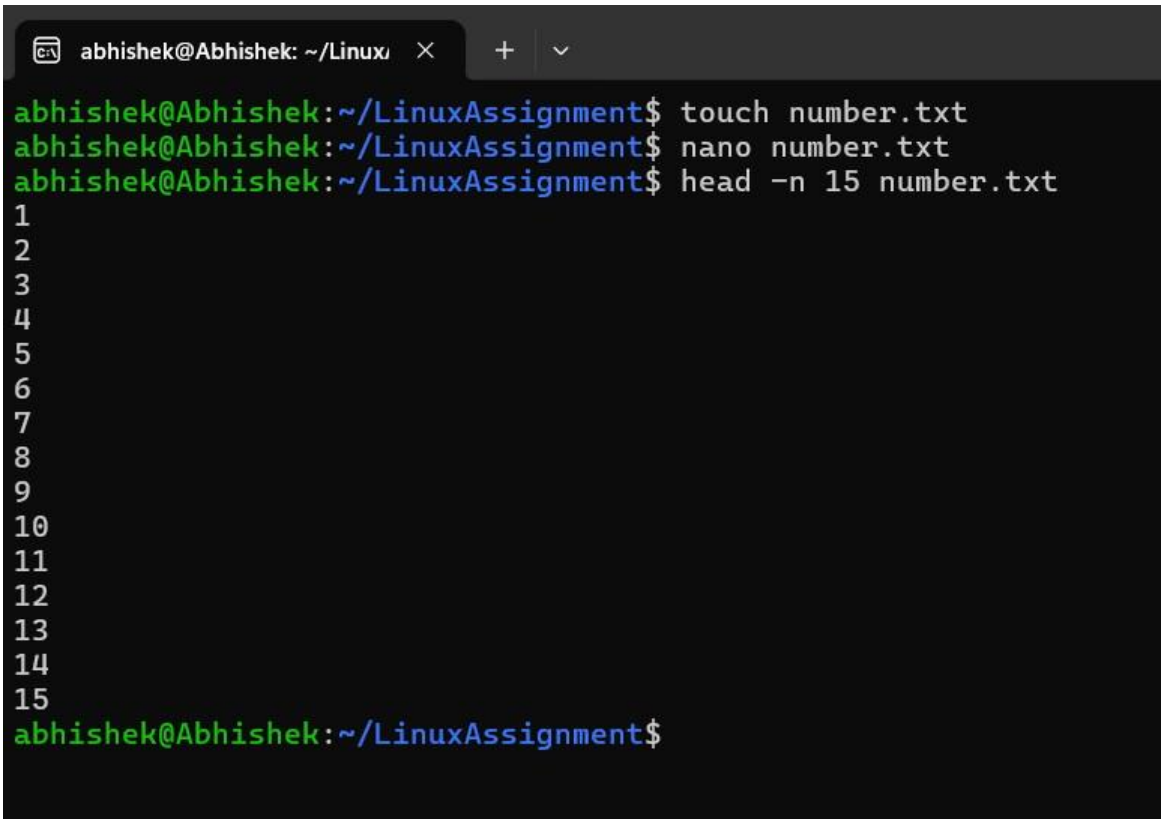
b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command.
Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ ls
data.txt  docs  docs.zip  docs1  file1.txt
abhishek@Abhishek:~/LinuxAssignment$ tail -5 data.txt
tree, orange, 19, horse, field
computer, brown, 33, mouse, city
phone, pink, 51, snake, jungle
chair, gray, 7, bear, cave
table, white, 22, lion, savanna
abhishek@Abhishek:~/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.
Ans.

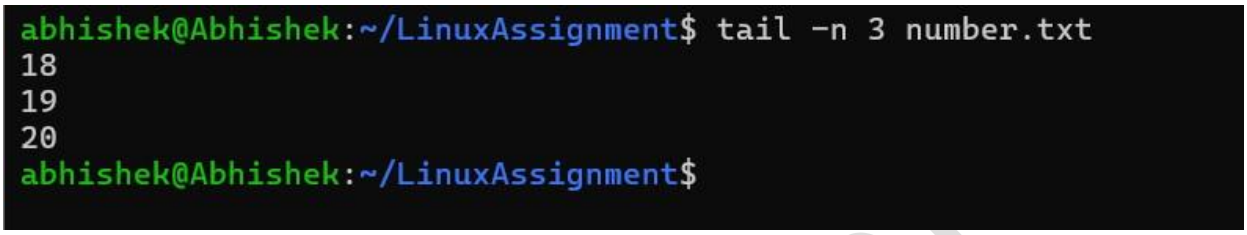
```
abhishek@Abhishek:~/LinuxAssignment$ touch number.txt
abhishek@Abhishek:~/LinuxAssignment$ nano number.txt
abhishek@Abhishek:~/LinuxAssignment$ head -n 15 number.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
abhishek@Abhishek:~/LinuxAssignment$
```


abhishek@Abhishek: ~/Linux
abhishek@Abhishek:~/LinuxAssignment$ touch number.txt
abhishek@Abhishek:~/LinuxAssignment$ nano number.txt
abhishek@Abhishek:~/LinuxAssignment$ head -n 15 number.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
abhishek@Abhishek:~/LinuxAssignment$

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

Ans.

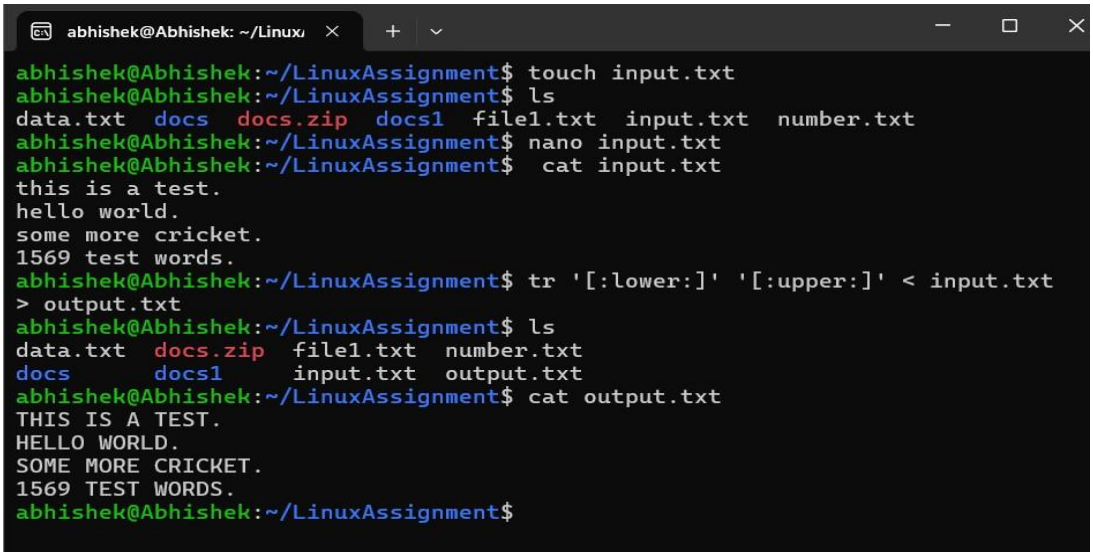
```
abhishek@Abhishek:~/LinuxAssignment$ tail -n 3 number.txt
18
19
20
abhishek@Abhishek:~/LinuxAssignment$
```



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."

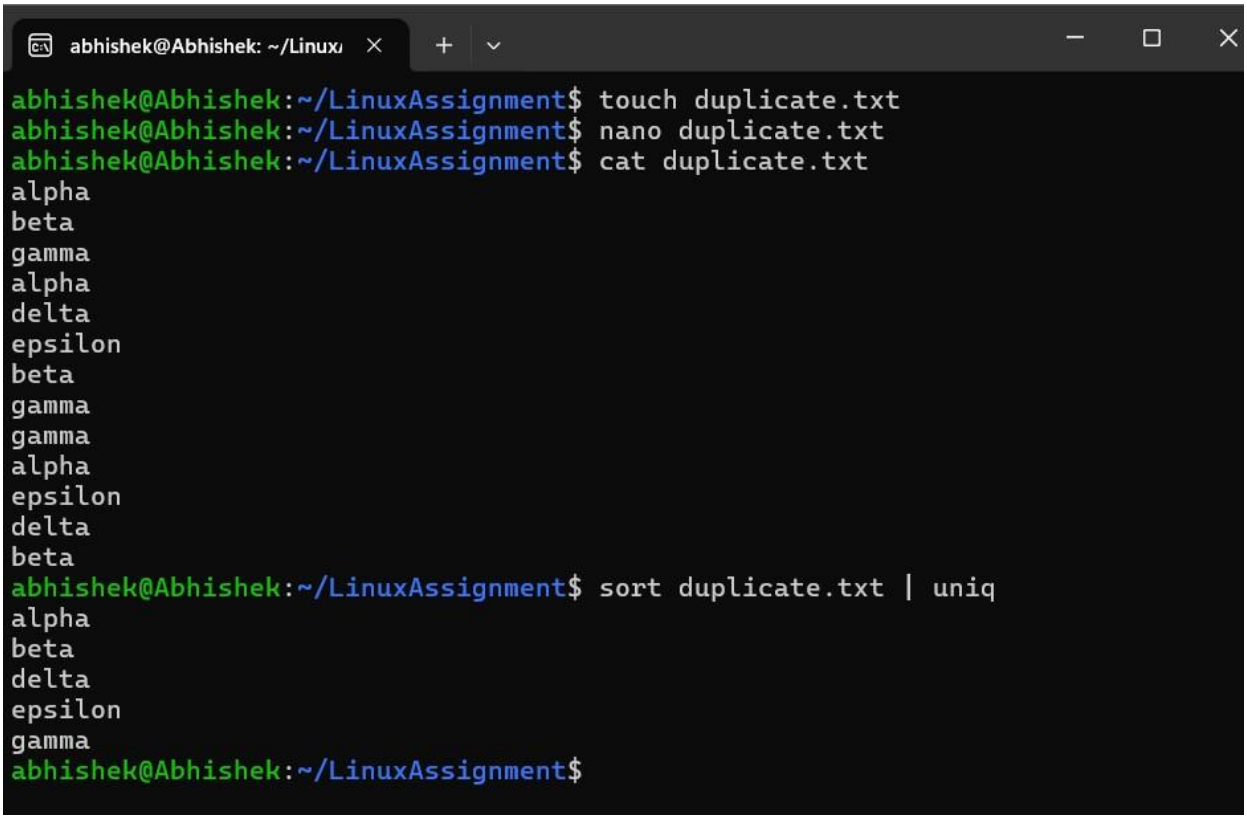
Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ touch input.txt
abhishek@Abhishek:~/LinuxAssignment$ ls
data.txt  docs  docs.zip  docs1  file1.txt  input.txt  number.txt
abhishek@Abhishek:~/LinuxAssignment$ nano input.txt
abhishek@Abhishek:~/LinuxAssignment$  cat input.txt
this is a test.
hello world.
some more cricket.
1569 test words.
abhishek@Abhishek:~/LinuxAssignment$ tr '[:lower:]' '[:upper:]' < input.txt > output.txt
abhishek@Abhishek:~/LinuxAssignment$ ls
data.txt  docs.zip  file1.txt  number.txt
docs      docs1     input.txt  output.txt
abhishek@Abhishek:~/LinuxAssignment$ cat output.txt
THIS IS A TEST.
HELLO WORLD.
SOME MORE CRICKET.
1569 TEST WORDS.
abhishek@Abhishek:~/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."
Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ touch duplicate.txt
abhishek@Abhishek:~/LinuxAssignment$ nano duplicate.txt
abhishek@Abhishek:~/LinuxAssignment$ cat duplicate.txt
alpha
beta
gamma
alpha
delta
epsilon
beta
gamma
gamma
alpha
epsilon
delta
beta
abhishek@Abhishek:~/LinuxAssignment$ sort duplicate.txt | uniq
alpha
beta
delta
epsilon
gamma
abhishek@Abhishek:~/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."

Ans.

```
abhishek@Abhishek:~/LinuxAssignment$ touch fruit.txt
abhishek@Abhishek:~/LinuxAssignment$ nano fruit.txt
abhishek@Abhishek:~/LinuxAssignment$ cat fruit.txt
apple
banana
apple
orange
banana
grape
apple
grape
mango
orange
mango
banana
pineapple
pear
kiwi
apple
pear
kiwi
grape
melon
melon
banana
abhishek@Abhishek:~/LinuxAssignment$ sort fruit.txt | uniq -c
      4 apple
      4 banana
      3 grape
      2 kiwi
      2 mango
      2 melon
      2 orange
      2 pear
      1 pineapple
abhishek@Abhishek:~/LinuxAssignment$
```

```
abhishek@Abhishek:~/LinuxAssignment$ touch fruit.txt
abhishek@Abhishek:~/LinuxAssignment$ nano fruit.txt
abhishek@Abhishek:~/LinuxAssignment$ cat fruit.txt
apple
banana
apple
orange
banana
grape
apple
grape
mango
orange
mango
banana
pineapple
pear
kiwi
apple
pear
kiwi
grape
melon
melon
banana
abhishek@Abhishek:~/LinuxAssignment$ sort fruit.txt | uniq -c
      4 apple
      4 banana
      3 grape
      2 kiwi
      2 mango
      2 melon
      2 orange
      2 pear
      1 pineapple
abhishek@Abhishek:~/LinuxAssignment$
```

Submission Guidelines:

- Document each step of your solution and any challenges faced.
- Upload it on your GitHub repository

Additional Tips:

- Experiment with different options and parameters of each command to explore their functionalities.