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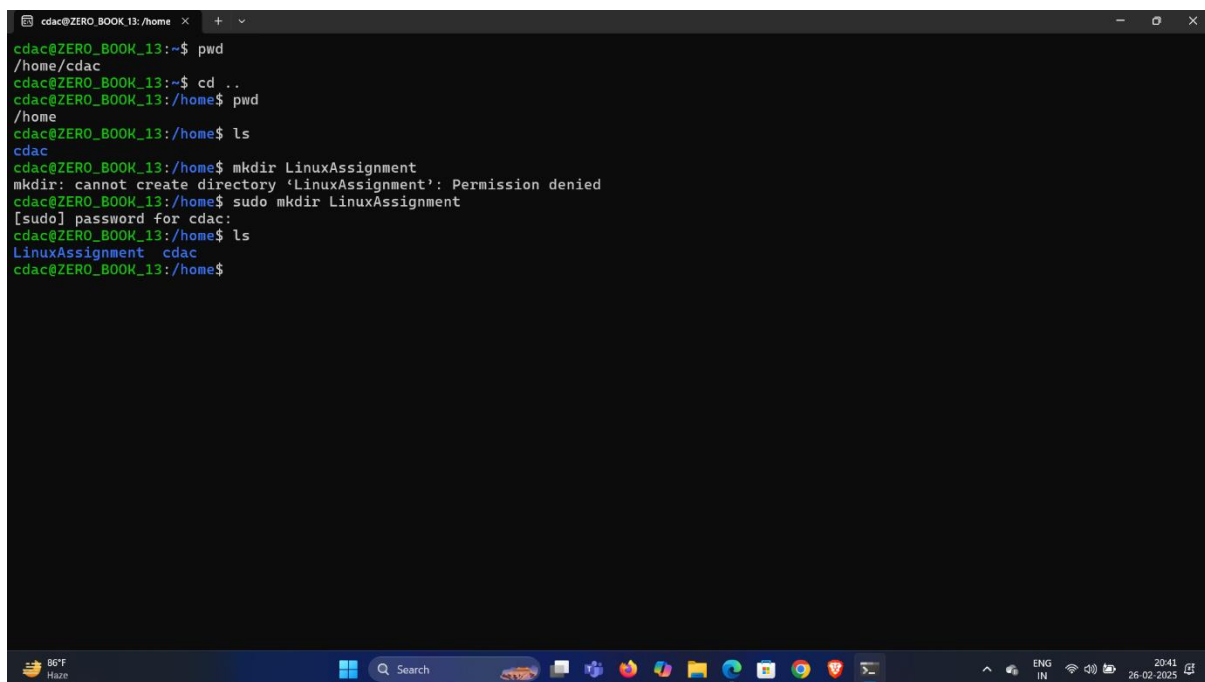
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CDAC MUMBAI

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.

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

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

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

```
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
file1.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# pwd
/home/LinuxAssignment
root@ZERO_BOOK_13:/home/LinuxAssignment# mkdir docs
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
docs  file1.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cp file1.txt ./docs/file2.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
docs  file1.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cd docs/
root@ZERO_BOOK_13:/home/LinuxAssignment/docs# ls
file2.txt
root@ZERO_BOOK_13:/home/LinuxAssignment/docs# cat file2.txt
Hello World
Welcome to
CDAC Mumbai
root@ZERO_BOOK_13:/home/LinuxAssignment/docs#
```
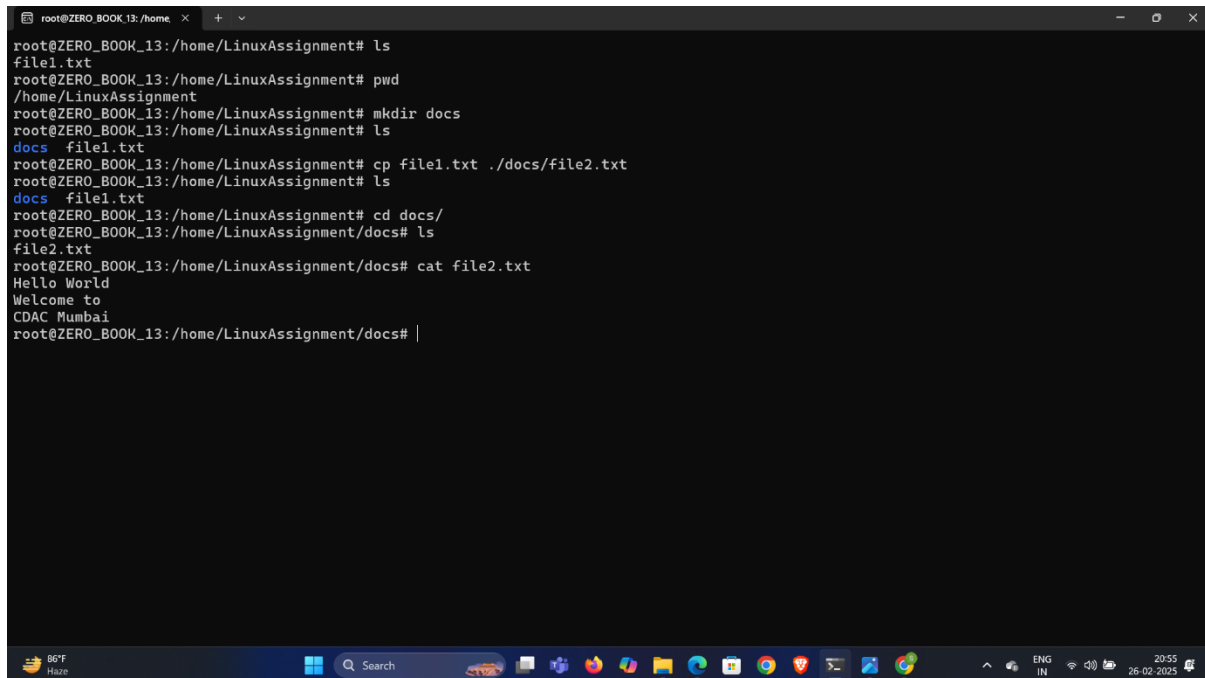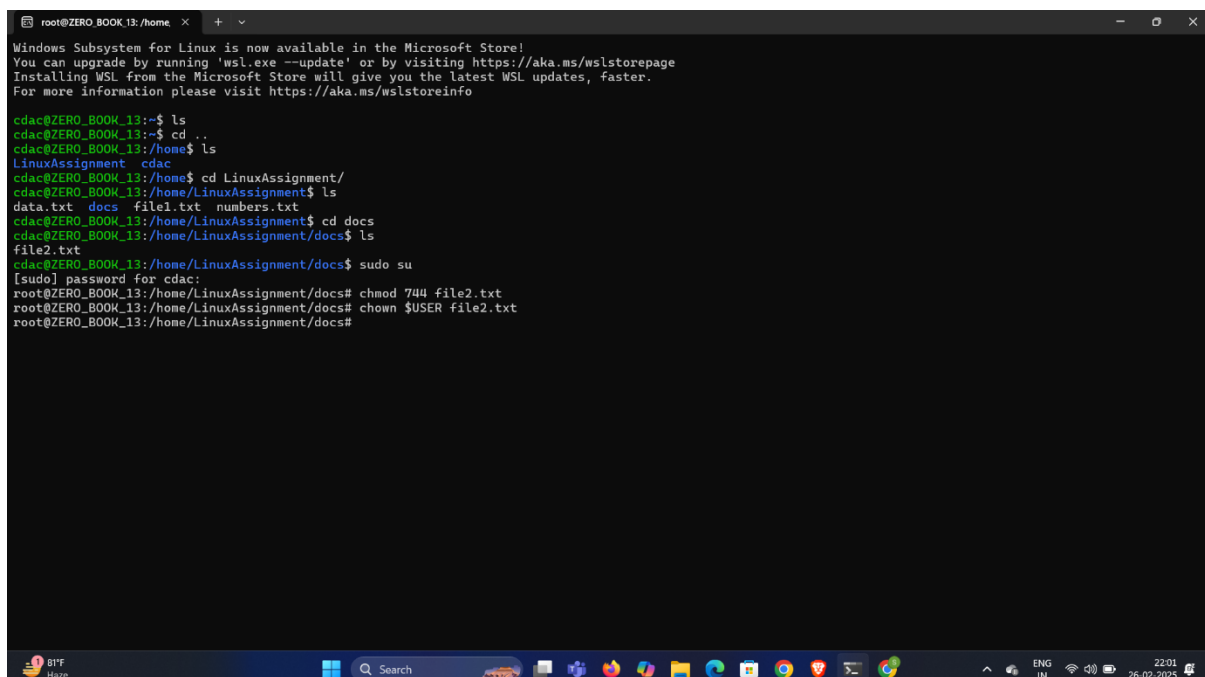
e) Permissions and Ownership:
    a. Change the permissions of "file2.txt" to allow read, write, and execute permissions for the owner and only read permissions for others. Then, change the owner of "file2.txt" to the current user.

```
Windows Subsystem for Linux is now available in the Microsoft Store!
You can upgrade by running 'wsl.exe --update' or by visiting https://aka.ms/wslstorepage
Installing WSL from the Microsoft Store will give you the latest WSL updates, faster.
For more information please visit https://aka.ms/wslstoreinfo

cdac@ZERO_BOOK_13:~$ ls
cdac@ZERO_BOOK_13:~$ cd ..
cdac@ZERO_BOOK_13:/home$ ls
LinuxAssignment  cdac
cdac@ZERO_BOOK_13:/home$ cd LinuxAssignment/
cdac@ZERO_BOOK_13:/home/LinuxAssignment$ ls
data.txt  docs  file1.txt  numbers.txt
cdac@ZERO_BOOK_13:/home/LinuxAssignment$ cd docs
cdac@ZERO_BOOK_13:/home/LinuxAssignment/docs$ ls
file2.txt
cdac@ZERO_BOOK_13:/home/LinuxAssignment/docs$ sudo su
[sudo] password for cdac:
root@ZERO_BOOK_13:/home/LinuxAssignment/docs# chmod 744 file2.txt
root@ZERO_BOOK_13:/home/LinuxAssignment/docs# chown $USER file2.txt
root@ZERO_BOOK_13:/home/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@ZERO_BOOK_13:~$ sudo su
[sudo] password for cdac:
root@ZERO_BOOK_13:/home/cdac# pwd
/home/cdac
root@ZERO_BOOK_13:/home/cdac# cd ..
root@ZERO_BOOK_13:/home# ls
LinuxAssignment  cdac
root@ZERO_BOOK_13:/home# cd LinuxAssignment/
root@ZERO_BOOK_13:/home/LinuxAssignment# ls -l
total 16
-rw-r--r-- 1 root root   87 Feb 26 15:30 data.txt
drwxr-xr-x 2 root root 4096 Feb 26 15:25 docs
-rw-r--r-- 1 root root   36 Feb 26 15:18 file1.txt
-rw-r--r-- 1 root root   36 Feb 26 15:37 numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cd docs/
root@ZERO_BOOK_13:/home/LinuxAssignment/docs# ls -l
total 4
-rwxr--r-- 1 root root 36 Feb 26 15:25 file2.txt
root@ZERO_BOOK_13:/home/LinuxAssignment/docs# cd
root@ZERO_BOOK_13:~# pwd
/root
root@ZERO_BOOK_13:~# cd /
root@ZERO_BOOK_13:/# pwd
/
root@ZERO_BOOK_13:/# ls -l
total 804
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   8 root root     2940 Feb 27 09:27 dev
drwxr-xr-x  87 root root     4096 Feb 27 09:27 etc
drwxr-xr-x   4 root root     4096 Feb 26 15:11 home
-rwxr-xr-x   2 root root  1440152 Sep 17 11:41 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 12:40 mnt
drwxr-xr-x   2 root root     4096 Jan  6 20:13 opt
dr-xr-xr-x 250 root root        0 Feb 27 09:27 proc
```
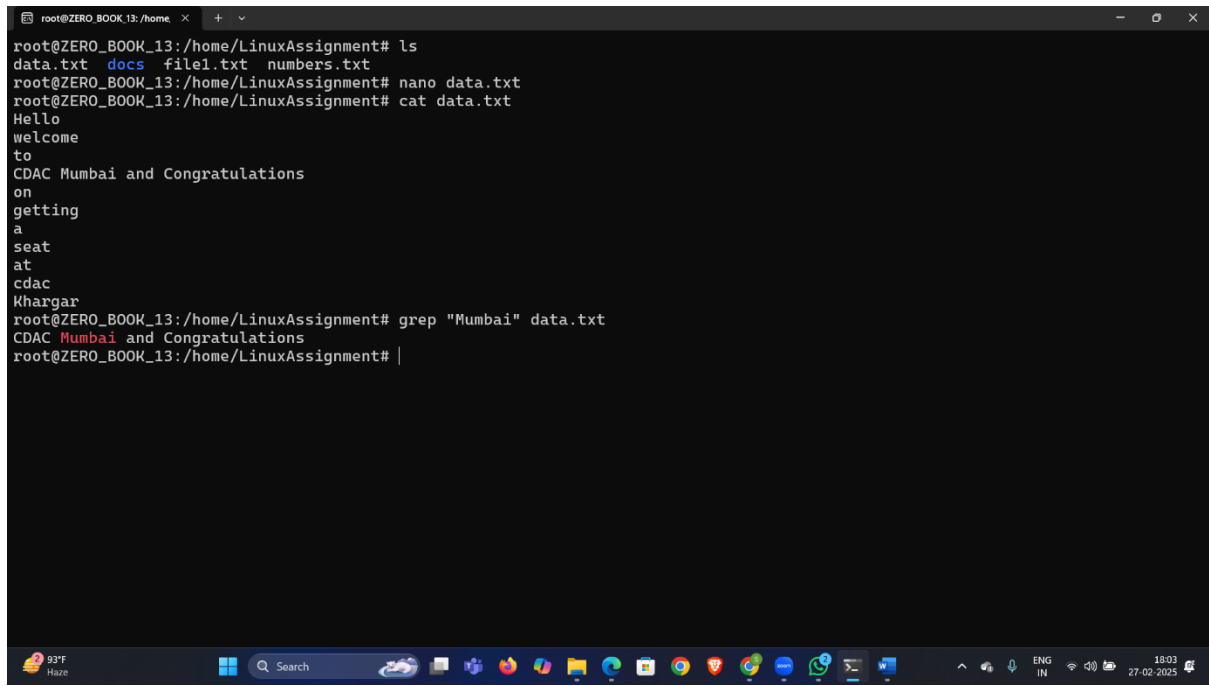
g) File Searching:
    a. Search for all files with the extension ".txt" in the current directory and its
        subdirectories.

```
root@ZERO_BOOK_13:/home# ls
LinuxAssignment  cdac
root@ZERO_BOOK_13:/home# cd LinuxAssignment/
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
data.txt  docs  file1.txt  numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cd docs
root@ZERO_BOOK_13:/home/LinuxAssignment/docs# ls
file2.txt
root@ZERO_BOOK_13:/home/LinuxAssignment/docs# cd ../..
root@ZERO_BOOK_13:/home# ls
LinuxAssignment  cdac
root@ZERO_BOOK_13:/home# find . -type f -name "*.txt"
./LinuxAssignment/data.txt
./LinuxAssignment/docs/file2.txt
./LinuxAssignment/numbers.txt
./LinuxAssignment/file1.txt
root@ZERO_BOOK_13:/home#
```

g) File Searching:

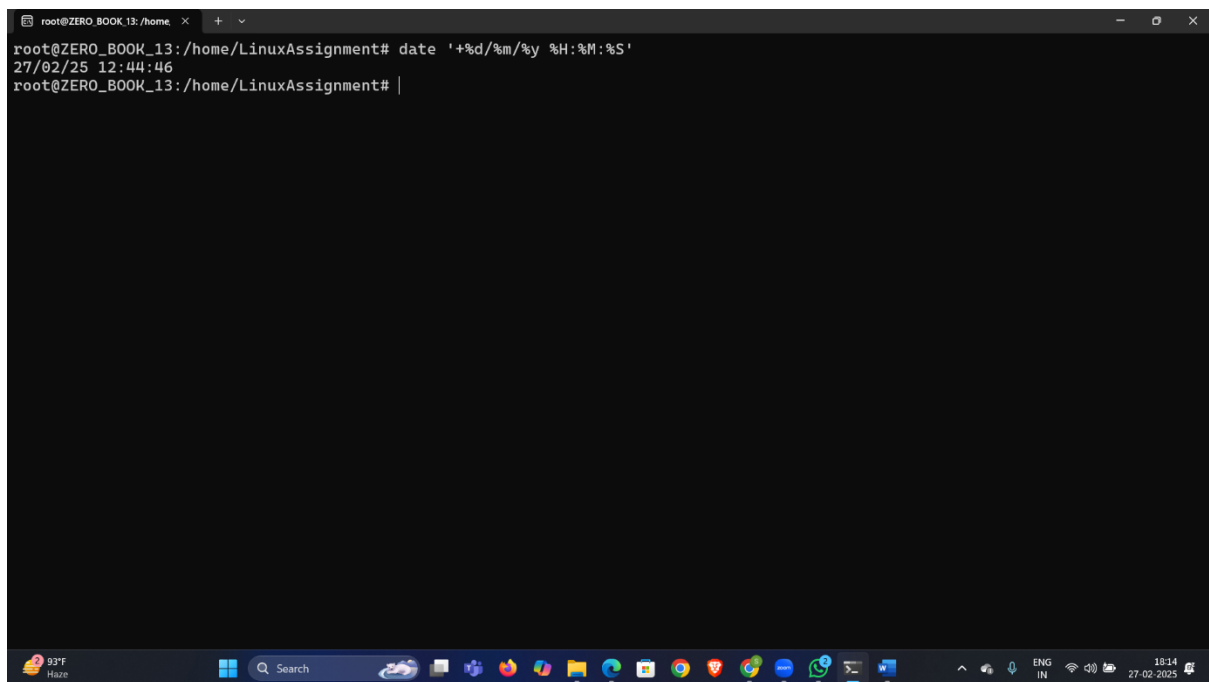 b) Display lines containing a specific word in a file (provide a file name and the specific word to search).

```
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
data.txt  docs  file1.txt  numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# nano data.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cat data.txt
Hello
welcome
to
CDAC Mumbai and Congratulations
on
getting
a
seat
at
cdac
Khargar
root@ZERO_BOOK_13:/home/LinuxAssignment# grep "Mumbai" data.txt
CDAC Mumbai and Congratulations
root@ZERO_BOOK_13:/home/LinuxAssignment#
```

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

```
root@ZERO_BOOK_13:/home/LinuxAssignment# date '+%d/%m/%y %H:%M:%S'
27/02/25 12:44:46
root@ZERO_BOOK_13:/home/LinuxAssignment#
```
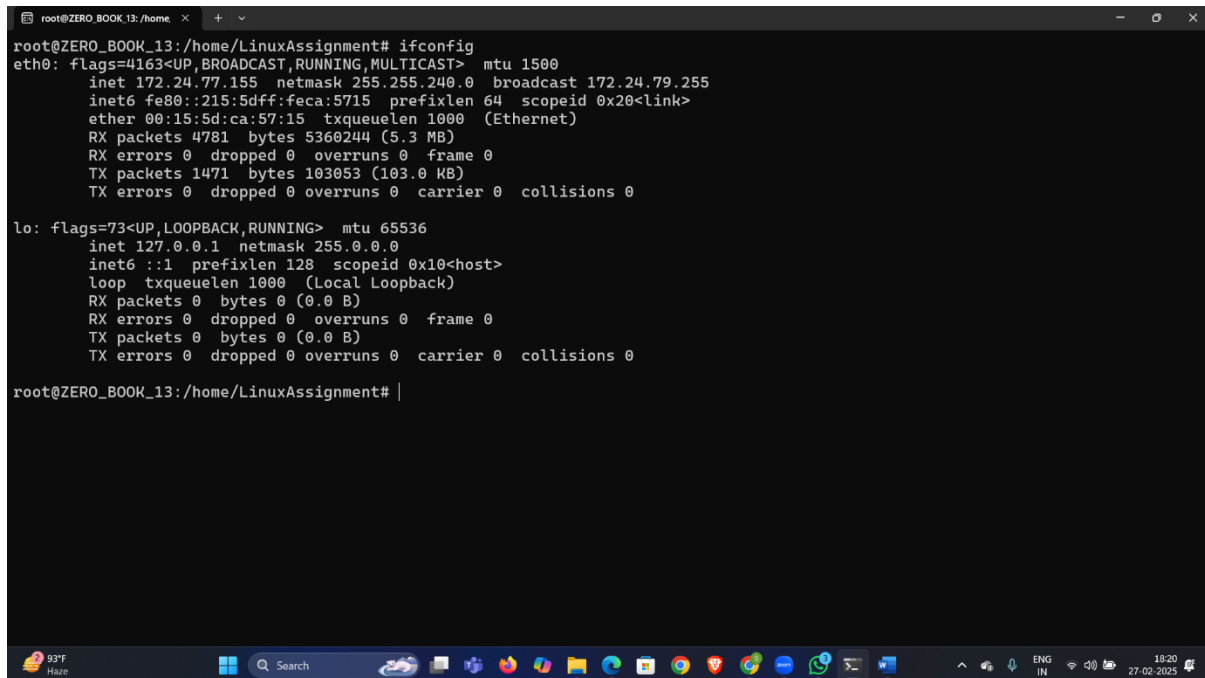
i) Networking:
   a. Display the IP address of the system.

```
root@ZERO_BOOK_13:/home/LinuxAssignment# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.24.77.155  netmask 255.255.240.0  broadcast 172.24.79.255
        inet6 fe80::215:5dff:feca:5715  prefixlen 64  scopeid 0x20<link>
        ether 00:15:5d:ca:57:15  txqueuelen 1000  (Ethernet)
        RX packets 4781  bytes 5360244 (5.3 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1471  bytes 103053 (103.0 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

root@ZERO_BOOK_13:/home/LinuxAssignment#
```
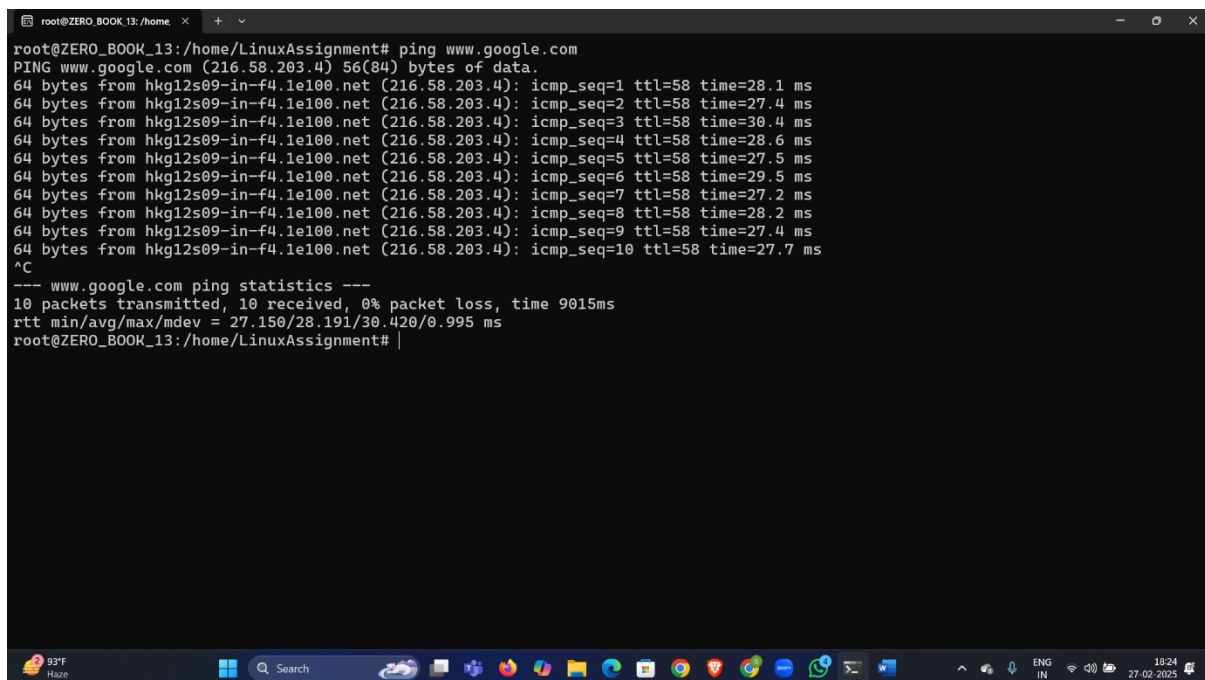
i) Networking:

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

```
root@ZERO_BOOK_13:/home/LinuxAssignment# ping www.google.com
PING www.google.com (216.58.203.4) 56(84) bytes of data.
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=1 ttl=58 time=28.1 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=2 ttl=58 time=27.4 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=3 ttl=58 time=30.4 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=4 ttl=58 time=28.6 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=5 ttl=58 time=27.5 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=6 ttl=58 time=29.5 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=7 ttl=58 time=27.2 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=8 ttl=58 time=28.2 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=9 ttl=58 time=27.4 ms
64 bytes from hkg12s09-in-f4.1e100.net (216.58.203.4): icmp_seq=10 ttl=58 time=27.7 ms
^C
--- www.google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9015ms
rtt min/avg/max/mdev = 27.150/28.191/30.420/0.995 ms
root@ZERO_BOOK_13:/home/LinuxAssignment#
```
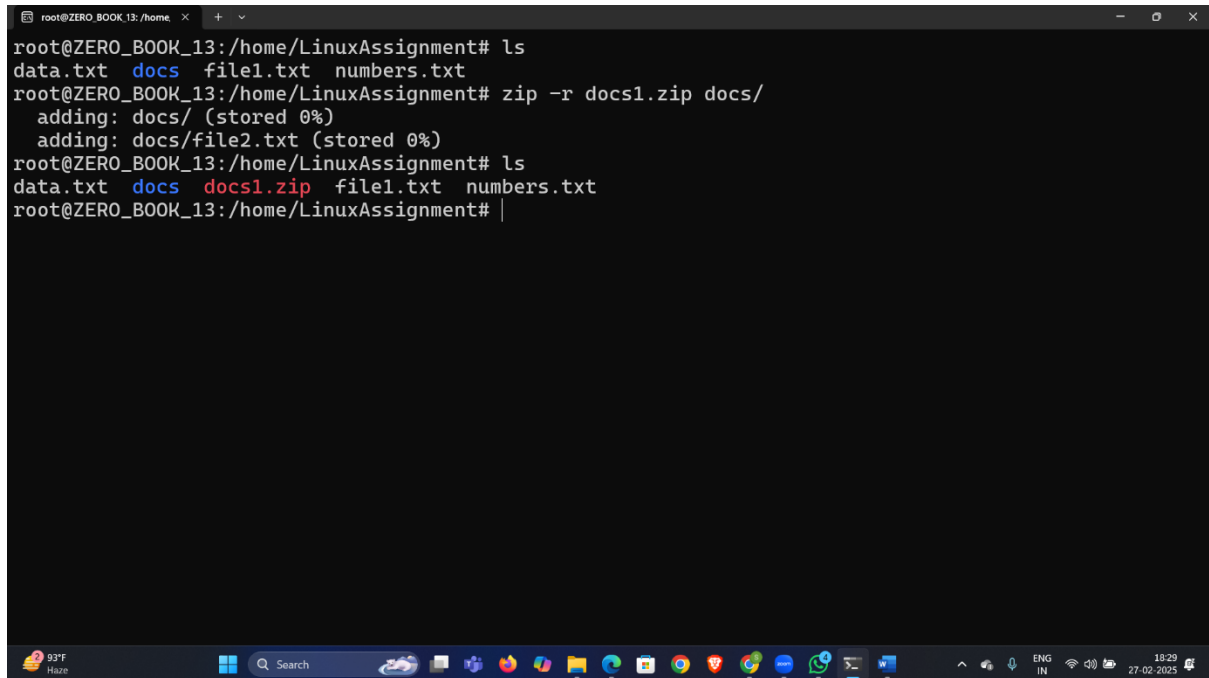
j) File Compression:

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


```
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
data.txt  docs  file1.txt  numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# zip -r docs1.zip docs/
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
data.txt  docs  docs1.zip  file1.txt  numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment#
```
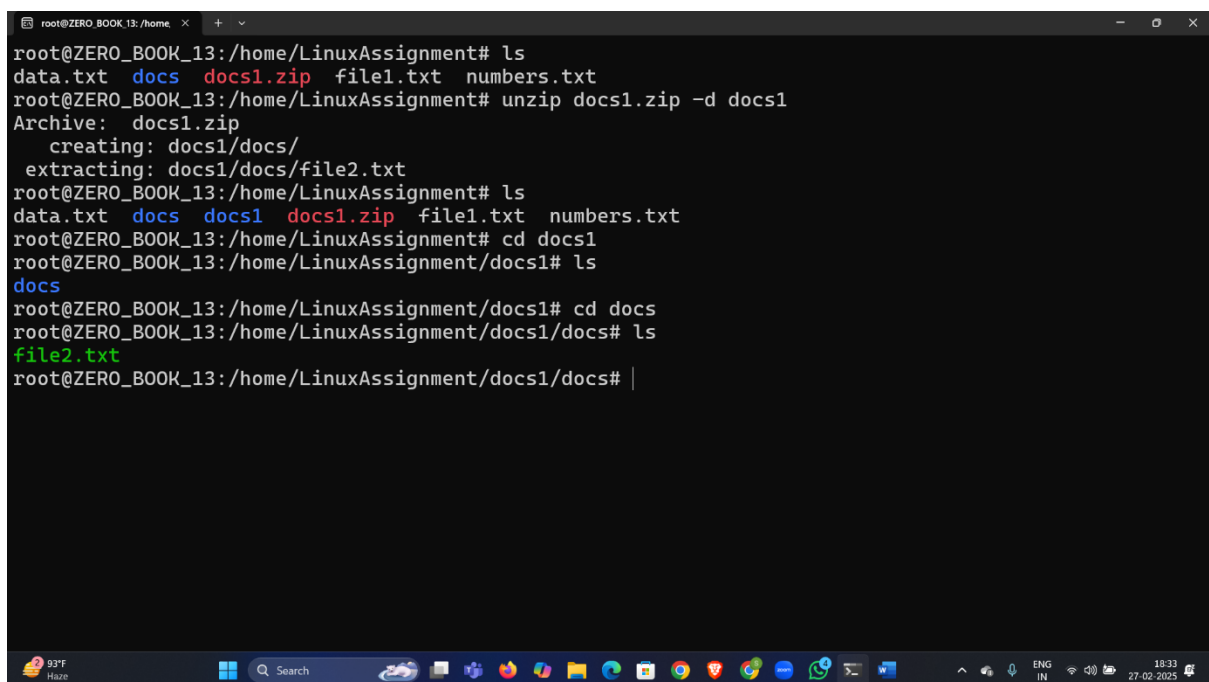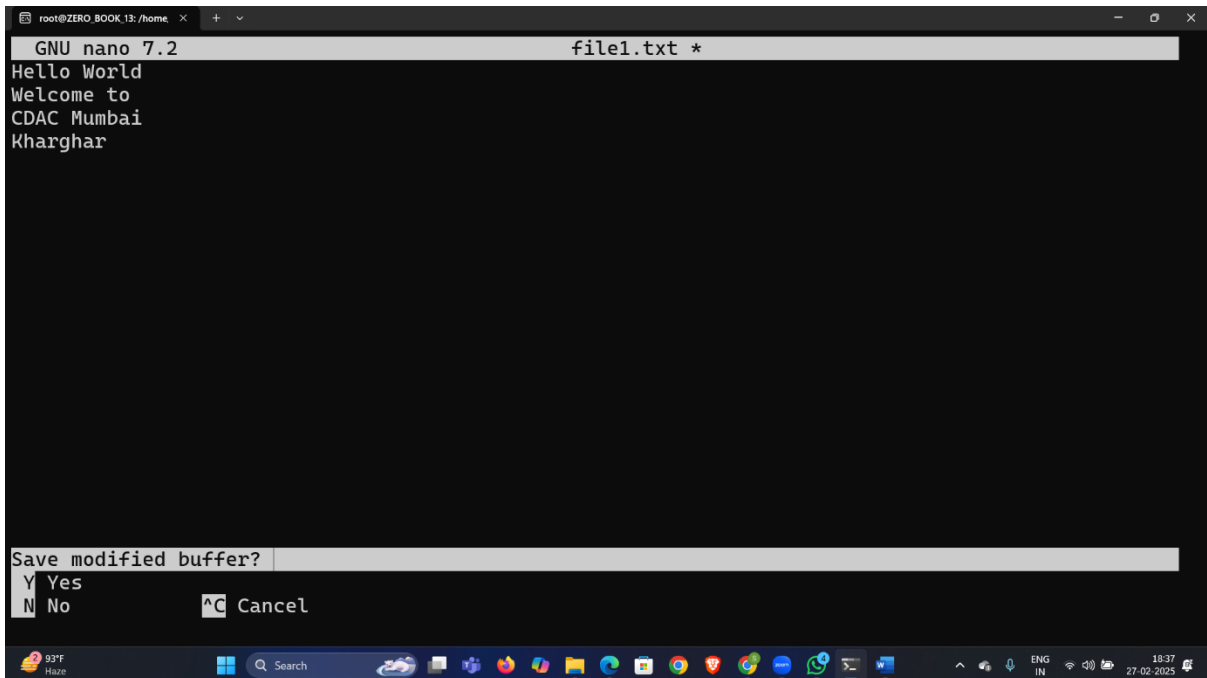
j) File Compression:
   b. Extract the contents of the zip file into a new directory.


```
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
data.txt  docs  docs1.zip  file1.txt  numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# unzip docs1.zip -d docs1
Archive:  docs1.zip
   creating: docs1/docs/
 extracting: docs1/docs/file2.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
data.txt  docs  docs1  docs1.zip  file1.txt  numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cd docs1
root@ZERO_BOOK_13:/home/LinuxAssignment/docs1# ls
docs
root@ZERO_BOOK_13:/home/LinuxAssignment/docs1# cd docs
root@ZERO_BOOK_13:/home/LinuxAssignment/docs1/docs# ls
file2.txt
root@ZERO_BOOK_13:/home/LinuxAssignment/docs1/docs#
```

k) File Editing:

   a. Open the "file1.txt" file in a text editor and add some text to it.
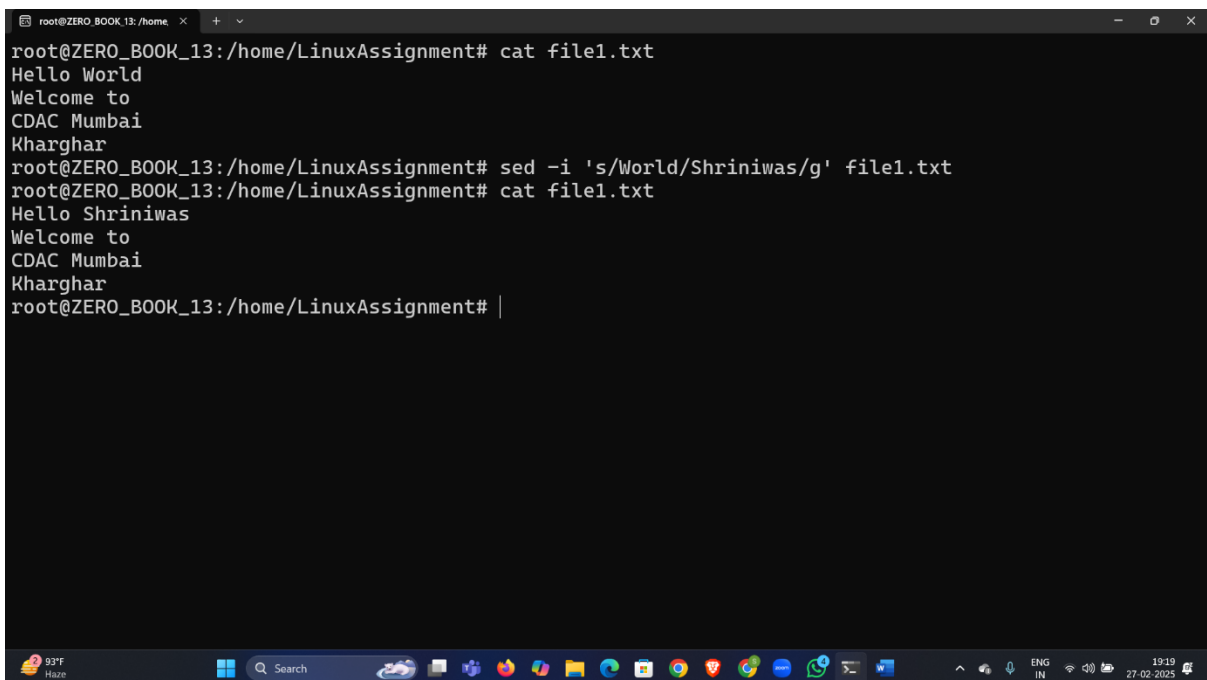
k) File Editing:

b. Replace a specific word in the "file1.txt" file with another word (provide the original word and the word to replace it with).
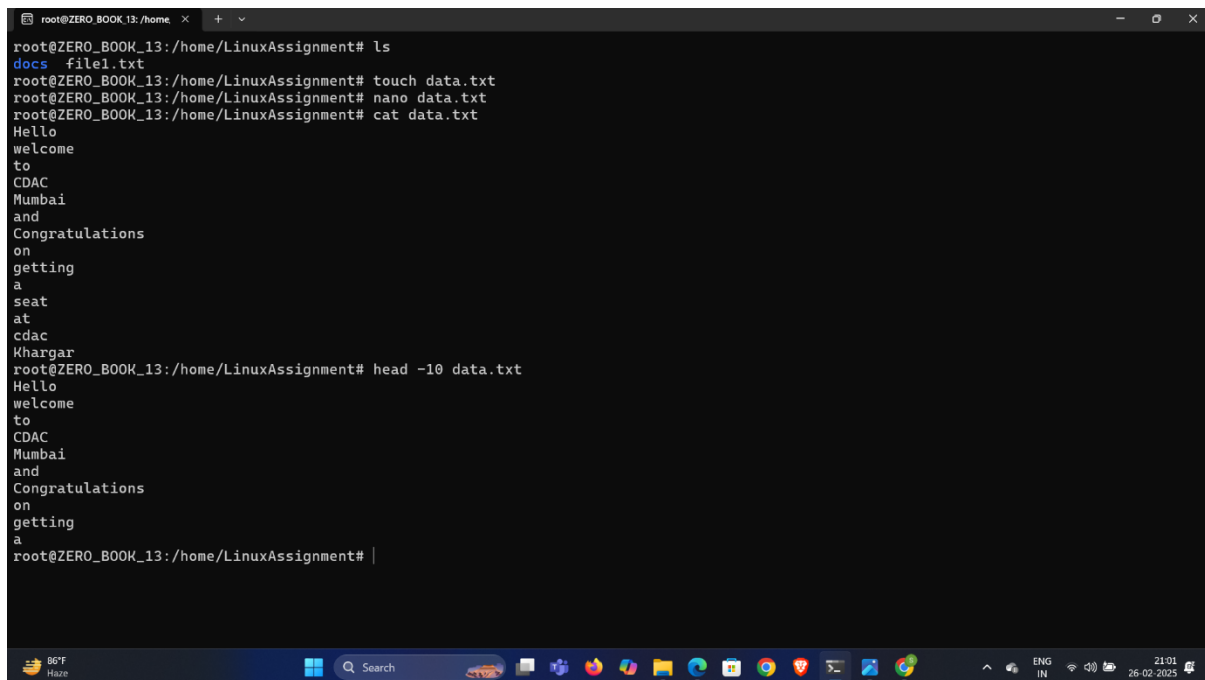
Problem 2: Read the instructions carefully and answer accordingly. If there is any need to insert some data then do that as well.
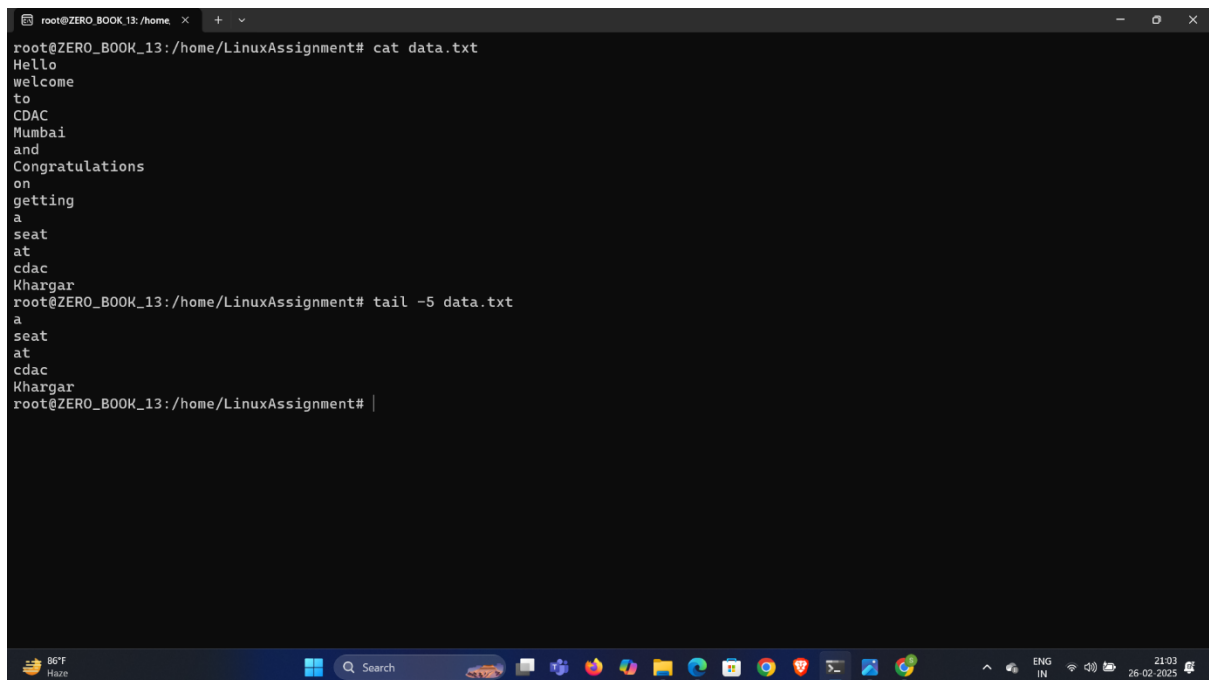
a. Suppose you have a file named "data.txt" containing important information. Display the first 10 lines of this file to quickly glance at its contents using a command.

b. Now, to check the end of the file for any recent additions, display the last 5 lines of "data.txt" using another command.
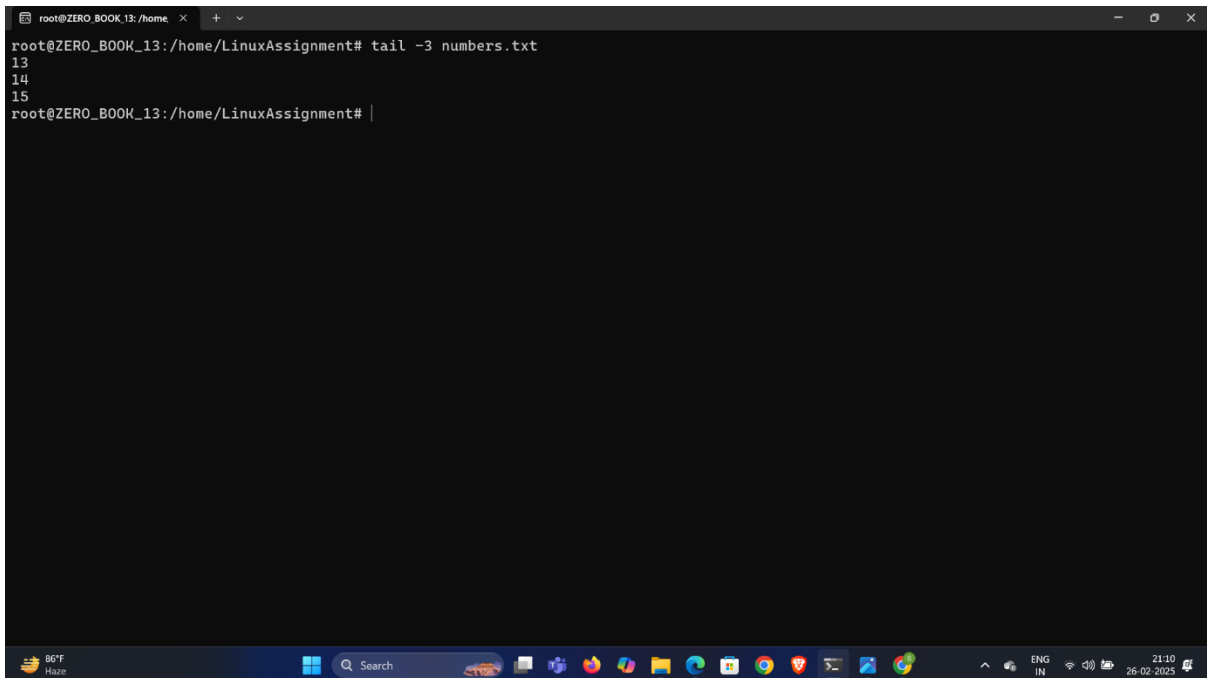
```
root@ZERO_BOOK_13:/home/LinuxAssignment# cat data.txt
Hello
welcome
to
CDAC
Mumbai
and
Congratulations
on
getting
a
seat
at
cdac
Khargar
root@ZERO_BOOK_13:/home/LinuxAssignment# tail -5 data.txt
a
seat
at
cdac
Khargar
root@ZERO_BOOK_13:/home/LinuxAssignment#
```

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.

```
root@ZERO_BOOK_13:/home/LinuxAssignment# touch numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# nano numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# head -15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
root@ZERO_BOOK_13:/home/LinuxAssignment#
```
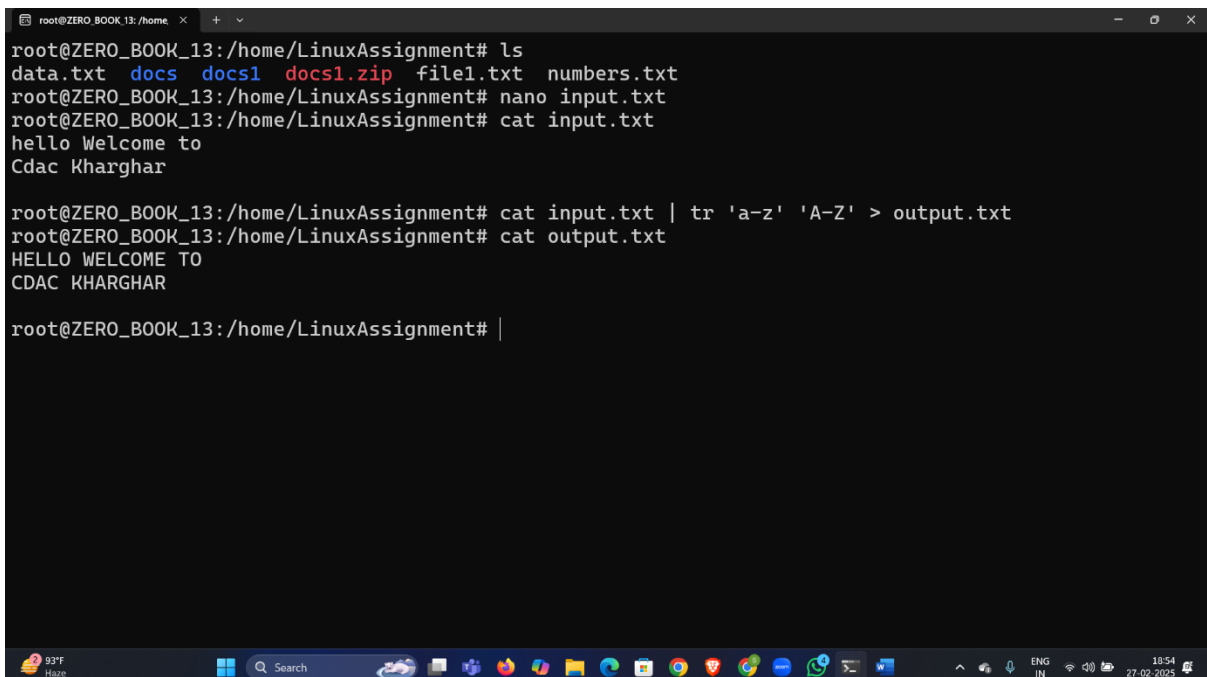
d. To focus on the last few numbers of the dataset, display the last 3 lines of "numbers.txt".

```
root@ZERO_BOOK_13:/home/LinuxAssignment# tail -3 numbers.txt
13
14
15
root@ZERO_BOOK_13:/home/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."

```
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
data.txt  docs  docs1  docs1.zip  file1.txt  numbers.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# nano input.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cat input.txt
hello Welcome to
Cdac Kharghar

root@ZERO_BOOK_13:/home/LinuxAssignment# cat input.txt | tr 'a-z' 'A-Z' > output.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cat output.txt
HELLO WELCOME TO
CDAC KHARGHAR

root@ZERO_BOOK_13:/home/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."

```
root@ZERO_BOOK_13:/home/LinuxAssignment# cat duplicate.txt
Mumbai
Delhi
Mumbai
Gujrat
Delhi
Hyderabad
Gujrat
root@ZERO_BOOK_13:/home/LinuxAssignment# cat duplicate.txt | sort | uniq
Delhi
Gujrat
Hyderabad
Mumbai
root@ZERO_BOOK_13:/home/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."

```
root@ZERO_BOOK_13:/home/LinuxAssignment# nano fruit.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# ls
data.txt  docs1      duplicate.txt  fruit.txt   numbers.txt
docs      docs1.zip  file1.txt      input.txt   output.txt
root@ZERO_BOOK_13:/home/LinuxAssignment# cat fruit.txt
Mango
Apple
Grapes
Apple
Avacado
Grapes
Mango
Apple
Apple
Avacado
root@ZERO_BOOK_13:/home/LinuxAssignment# cat fruit.txt | sort | uniq -c
      4 Apple
      2 Avacado
      2 Grapes
      2 Mango
root@ZERO_BOOK_13:/home/LinuxAssignment#
```