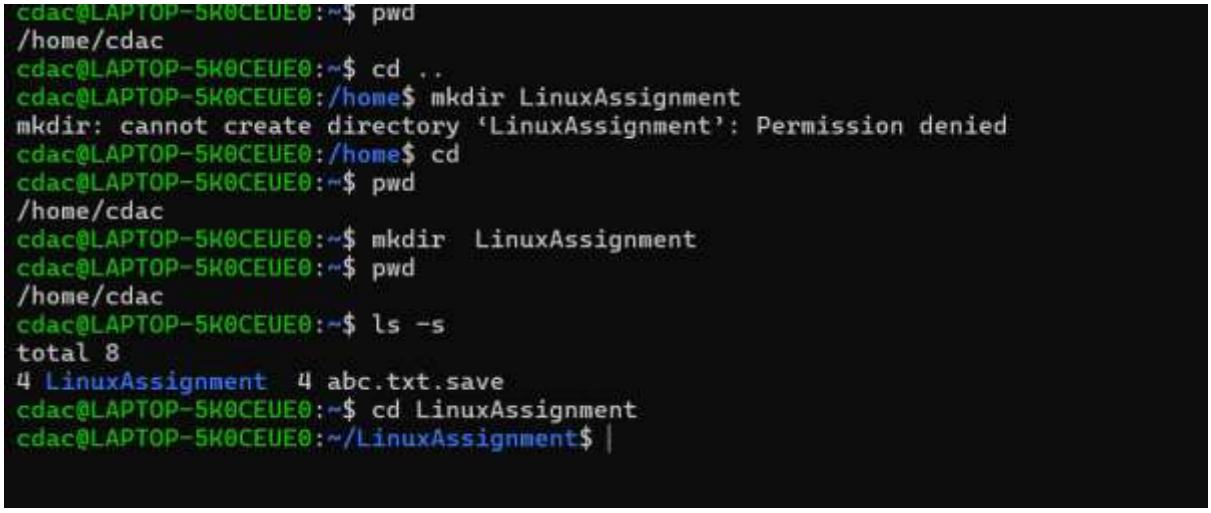
Module 1 : Concepts of Operating System

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.

```
cdac@LAPTOP-5K0CEUE0:~$ pwd
/home/cdac
cdac@LAPTOP-5K0CEUE0:~$ cd ..
cdac@LAPTOP-5K0CEUE0:/home$ mkdir LinuxAssignment
mkdir: cannot create directory 'LinuxAssignment': Permission denied
cdac@LAPTOP-5K0CEUE0:/home$ cd
cdac@LAPTOP-5K0CEUE0:~$ pwd
/home/cdac
cdac@LAPTOP-5K0CEUE0:~$ mkdir  LinuxAssignment
cdac@LAPTOP-5K0CEUE0:~$ pwd
/home/cdac
cdac@LAPTOP-5K0CEUE0:~$ ls -s
total 8
4 LinuxAssignment  4 abc.txt.save
cdac@LAPTOP-5K0CEUE0:~$ cd LinuxAssignment
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ nano file1.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ nano file1.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cat file1.txt
Hello
Hii
Good Morning
this is the Assignment1
operating system
cdac
module1
file1

cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$
```

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

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ mkdir docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cd docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$
```

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

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cp file.txt docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cd docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 58 Aug 28 20:08 file.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ pwd
/home/cdac/LinuxAssignment/docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ mv file.txt file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 58 Aug 28 20:08 file2.txt
```

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.

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls -l
total 12
-rw-r--r-- 1 cdac cdac 10 Aug 28 21:12 file1.txt
-rw------- 1 cdac cdac 11 Aug 28 21:09 file1.txt.save
-rw-r--r-- 1 cdac cdac 58 Aug 28 20:08 file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ chmod u+x file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls -l
total 12
-rw-r--r-- 1 cdac cdac 10 Aug 28 21:12 file1.txt
-rw------- 1 cdac cdac 11 Aug 28 21:09 file1.txt.save
-rwxr--r-- 1 cdac cdac 58 Aug 28 20:08 file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$
```

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cd docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls -l
total 12
-rw-r--r-- 1 cdac cdac 10 Aug 28 21:12 file1.txt
-rw------- 1 cdac cdac 11 Aug 28 21:09 file1.txt.save
-rwxr--r-- 1 cdac cdac 58 Aug 28 20:08 file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ sudo chown $(whoami) file2.txt
[sudo] password for cdac:
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ pwd
/home/cdac/LinuxAssignment/docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls
file1.txt  file1.txt.save  file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls -l
total 12
-rw-r--r-- 1 cdac cdac 10 Aug 28 21:12 file1.txt
-rw------- 1 cdac cdac 11 Aug 28 21:09 file1.txt.save
-rwxr--r-- 1 cdac cdac 58 Aug 28 20:08 file2.txt
cdac@LAPTOP-5K0CEUE0:~/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@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ cd ..
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Aug 28 21:12 docs
-rw-r--r-- 1 cdac cdac   58 Aug 28 20:01 file.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cd ..
cdac@LAPTOP-5K0CEUE0:~$ ls -l
total 8
drwxr-xr-x 3 cdac cdac 4096 Aug 28 20:03 LinuxAssignment
-rw------- 1 cdac cdac    1 Aug 27 19:48 abc.txt.save
cdac@LAPTOP-5K0CEUE0:~$ pwd
/home/cdac
cdac@LAPTOP-5K0CEUE0:~$ ls -l
total 8
drwxr-xr-x 3 cdac cdac 4096 Aug 28 20:03 LinuxAssignment
-rw------- 1 cdac cdac    1 Aug 27 19:48 abc.txt.save
```

g) File Searching:

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

```
cdac@LAPTOP-5K0CEUE0:~$ find . -name "*txt"
./LinuxAssignment/file.txt
./LinuxAssignment/docs/file2.txt
./LinuxAssignment/docs/file1.txt
cdac@LAPTOP-5K0CEUE0:~$
```

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

```
cdac@LAPTOP-5K0CEUE0:~$ cd LinuxAssignment
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cd docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls
file1.txt  file1.txt.save  file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ grep -l cdac file1.txt file2.txt
file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$
```

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

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ date
Wed Aug 28 21:58:34 IST 2024
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$
```

i) Networking:

a. Display the IP address of the system.

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group def
ault 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 d
efault qlen 1000
    link/ether 00:15:5d:55:65:11 brd ff:ff:ff:ff:ff:ff
    inet 172.21.235.21/20 brd 172.21.239.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe55:6511/64 scope link
       valid_lft forever preferred_lft forever
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$
```

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

```
    inet6 fe80::215:5dff:fe55:6511/64 scope link
       valid_lft forever preferred_lft forever
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ping www.google.com
PING www.google.com (142.251.42.36) 56(84) bytes of data.
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=1 ttl=59 time=11.1 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=2 ttl=59 time=11.4 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=3 ttl=59 time=11.5 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=4 ttl=59 time=11.0 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=5 ttl=59 time=11.1 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=6 ttl=59 time=11.6 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=7 ttl=59 time=11.6 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=8 ttl=59 time=11.3 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=9 ttl=59 time=11.2 ms
64 bytes from bom12s20-in-f4.1e100.net (142.251.42.36): icmp_seq=10 ttl=59 time=11.5 ms
^C
--- www.google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9017ms
rtt min/avg/max/mdev = 10.991/11.327/11.568/0.191 ms
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$
```

j) File Compression:

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

```
cdac@LAPTOP-5K0CEUE0:~$ cd LinuxAssignment
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ sudo apt install zip
[sudo] password for cdac:
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, 929 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 6.0-26ubuntu3.1 [174 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/main amd64 zip amd64 3.0-12build2 [176 kB]
Fetched 350 kB in 2s (152 kB/s)
Selecting previously unselected package unzip.
(Reading database ... 24288 files and directories currently installed.)
Preparing to unpack .../unzip_6.0-26ubuntu3.1_amd64.deb ...
Unpacking unzip (6.0-26ubuntu3.1) ...
Selecting previously unselected package zip.
Preparing to unpack .../zip_3.0-12build2_amd64.deb ...
Unpacking zip (3.0-12build2) ...
Setting up unzip (6.0-26ubuntu3.1) ...
Setting up zip (3.0-12build2) ...
Processing triggers for man-db (2.10.2-1) ...
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (deflated 3%)
  adding: docs/file1.txt.save (stored 0%)
  adding: docs/file1.txt (stored 0%)
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ ls -s
total 12
4 docs  4 docs.zip  4 file.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 cdac cdac 4096 Aug 28 21:12 docs
-rw-r--r-- 1 cdac cdac  715 Aug 29 00:03 docs.zip
-rw-r--r-- 1 cdac cdac   58 Aug 28 20:01 file.txt
```

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

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ unzip docs.zip
Archive:  docs.zip
replace docs/file2.txt? [y]es, [n]o, [A]ll, [N]one, [r]ename: n
replace docs/file1.txt.save? [y]es, [n]o, [A]ll, [N]one, [r]ename: n
replace docs/file1.txt? [y]es, [n]o, [A]ll, [N]one, [r]ename: n
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 cdac cdac 4096 Aug 28 21:12 docs
-rw-r--r-- 1 cdac cdac  715 Aug 29 00:03 docs.zip
-rw-r--r-- 1 cdac cdac   58 Aug 28 20:01 file.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ unzip docs.zip
Archive:  docs.zip
replace docs/file2.txt? [y]es, [n]o, [A]ll, [N]one, [r]ename: r
new name: Nfile2.txt
  inflating: Nfile2.txt
replace docs/file1.txt.save? [y]es, [n]o, [A]ll, [N]one, [r]ename: r
new name: nfile1.txt
 extracting: nfile1.txt
replace docs/file1.txt? [y]es, [n]o, [A]ll, [N]one, [r]ename: r
new name: nfile1.txt
replace nfile1.txt? [y]es, [n]o, [A]ll, [N]one, [r]ename: y
 extracting: nfile1.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ ls -s
total 20
4 Nfile2.txt  4 docs  4 docs.zip  4 file.txt  4 nfile1.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cd docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ ls -l
total 12
-rw-r--r-- 1 cdac cdac 10 Aug 28 21:12 file1.txt
-rw------- 1 cdac cdac 11 Aug 28 21:09 file1.txt.save
-rwxr--r-- 1 cdac cdac 58 Aug 28 20:08 file2.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ cd LinuxAssignment
-bash: cd: LinuxAssignment: No such file or directory
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ cd ..
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ ls -l
total 20
-rwxr--r-- 1 cdac cdac   58 Aug 28 20:08 Nfile2.txt
drwxr-xr-x 2 cdac cdac 4096 Aug 28 21:12 docs
-rw-r--r-- 1 cdac cdac  715 Aug 29 00:03 docs.zip
-rw-r--r-- 1 cdac cdac   58 Aug 28 20:01 file.txt
-rw-r--r-- 1 cdac cdac   10 Aug 28 21:12 nfile1.txt
```

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@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ nano filee1.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ cat fileel.txt
cat: fileel.txt: No such file or directory
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ cat filee1.txt
hii
hello
harshu
cdac
programmer
xyz
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ sed 's/xyz/ABC/g' filee1.txt
hii
hello
harshu
cdac
programmer
ABC
cdac@LAPTOP-5K0CEUE0:~/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.

```
This message is shown once a day. To disable it please create the
/home/cdac/.hushlogin file.
cdac@LAPTOP-5K0CEUE0:~$ cd LinuxAssignment
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cd docs
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ nano data.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ head
^X^X^C
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ head data.txt
Hello
hi
BYE
SEE YOU
HAVE A NICE DAY
good morning
Daily Task
Assignment
Lecture
Make Notes
cdac@LAPTOP-5K0CEUE0:~/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.

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ tail -6 data.txt
Hacker rank
Leetcode
GFG
Prep Insta
Hacker Earth

cdac@LAPTOP-5K0CEUE0:~/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.

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ nano numbers.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ head -15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$
```

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

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment/docs$ tail -3 numbers.txt
18
19
20
cdac@LAPTOP-5K0CEUE0:~/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."

```
cdac@LAPTOP-5K0CEUE0:~$ nano shp1.sh
cdac@LAPTOP-5K0CEUE0:~$ cd LinuxAssignment
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ nano inputtxt.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cat inputtxt.txt
hello
hi
harshu
happy

cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ tr a-z A-Z < inputtxt.txt
HELLO
HI
HARSHU
HAPPY

cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ nano output.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ tr a-z A-Z <inputtxt.txt >>output.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cat output.tx
t
HELLO
HI
HARSHU
HAPPY
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$
```

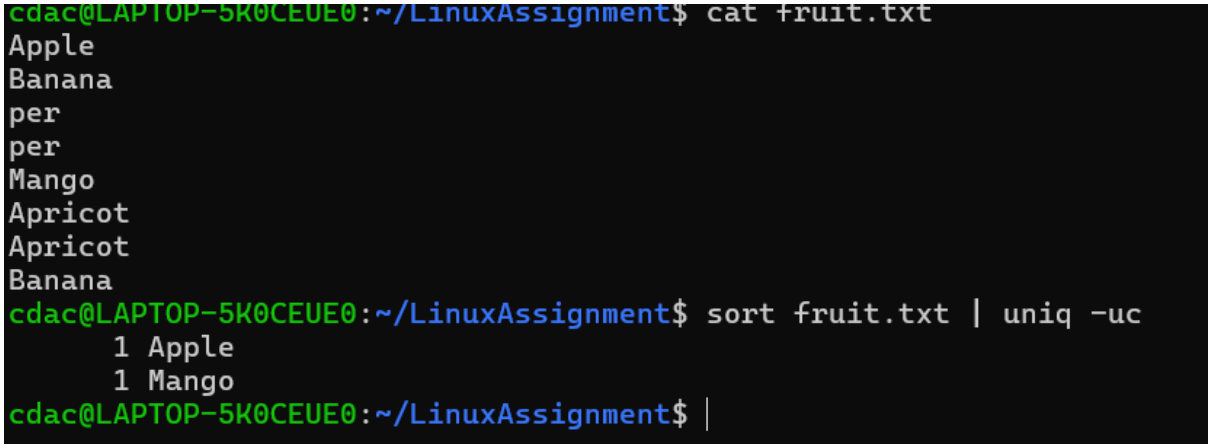
f. In a file named "duplicate.txt," there are several lines of text, some of which are duplicates. Use a command to display only the unique lines from "duplicate.txt."

```
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ ^C
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ nano duplicate.txt
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cat duplicate.txt
hi
Harshada
hello
hello
Wellcome
google
world
hi

cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ sort duplicate.txt | uniq -u

Harshada
Wellcome
google
world
cdac@LAPTOP-5K0CEUE0:~/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."


cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ cat fruit.txt
Apple
Banana
per
per
Mango
Apricot
Apricot
Banana
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$ sort fruit.txt | uniq -uc
1 Apple
1 Mango
cdac@LAPTOP-5K0CEUE0:~/LinuxAssignment$