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.

```
rutuja@Rutuja:~$ cd ~
rutuja@Rutuja:~$ ls
aaa.txt  abc.cpp  cdac  test.txt
rutuja@Rutuja:~$ mkdir LinuxAssignment
rutuja@Rutuja:~$ cd LinuxAssignment
rutuja@Rutuja:~/LinuxAssignment$
```

b) File Management:

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

```
rutuja@Rutuja:~$ mkdir LinuxAssignment
rutuja@Rutuja:~$ cd LinuxAssignment
rutuja@Rutuja:~/LinuxAssignment$ touch file.txt
rutuja@Rutuja:~/LinuxAssignment$ touch file1.txt
rutuja@Rutuja:~/LinuxAssignment$ cat file1.txt
rutuja@Rutuja:~/LinuxAssignment$ cat > file1.txt
Hello..!
I'm Rutuja Pravin Gholap
I'm from Shivjanmabhoomi.
2025 Batch passout from Sanjivani College of Engineering.
Degree: BTech in Computer Engineering
Currently Pursuing PG-DAC from CDAC Kharghar, Mumbai.rutuja@Rutuja:~/LinuxAssignment$ cat file1.txt
Hello..!
I'm Rutuja Pravin Gholap
I'm from Shivjanmabhoomi.
2025 Batch passout from Sanjivani College of Engineering.
Degree: BTech in Computer Engineering
```

c) Directory Management:

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

```
rutuja@Rutuja:~/LinuxAssignment$ mkdir docs
rutuja@Rutuja:~/LinuxAssignment$ pwd
/home/rutuja/LinuxAssignment
rutuja@Rutuja:~/LinuxAssignment$ ls
docs  file.txt  file1.txt
rutuja@Rutuja:~/LinuxAssignment$
```

d) Copy and Move Files:

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

```
rutuja@Rutuja:~/LinuxAssignment$ cp file1.txt docs/file2.txt
rutuja@Rutuja:~/LinuxAssignment$ cat file2.txt
cat: file2.txt: No such file or directory
rutuja@Rutuja:~/LinuxAssignment$ ls
docs  file.txt  file1.txt
rutuja@Rutuja:~/LinuxAssignment$ cat docs/file2.txt
Hello..!
I'm Rutuja Pravin Gholap
I'm from Shivjanmabhoomi.
2025 Batch passout from Sanjivani College of Engineering.
Degree: BTech in Computer Engineering
```

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.

```
rutuja@Rutuja:~/LinuxAssignment$ chmod 744 docs/file2.txt
```

```
rutuja@Rutuja:~/LinuxAssignment$ ls -l docs/file2.txt
-rwxr--r-- 1 rutuja rutuja 210 Aug 18 13:32 docs/file2.txt
rutuja@Rutuja:~/LinuxAssignment$ sudo chown $USER docs/file2.txt
[sudo] password for rutuja:
rutuja@Rutuja:~/LinuxAssignment$ ls -l docs/file2.txt
-rwxr--r-- 1 rutuja rutuja 210 Aug 18 13:32 docs/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.

```
rutuja@Rutuja:~/LinuxAssignment$ ls -l ~/LinuxAssignment      # list contents of LinuxAssignment
total 8
drwxr-xr-x 2 rutuja rutuja 4096 Aug 18 13:32 docs
-rw-r--r-- 1 rutuja rutuja    0 Aug 18 13:25 file.txt
-rw-r--r-- 1 rutuja rutuja  210 Aug 18 13:29 file1.txt
rutuja@Rutuja:~/LinuxAssignment$ ls -l /
total 2740
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  15 root root    3860 Aug 20 14:11 dev
drwxr-xr-x  88 root root    4096 Aug 20 14:12 etc
drwxr-xr-x   3 root root    4096 Aug 18 03:08 home
-rwxrwxrwx   1 root root 2724480 Jul 31 14:56 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 Aug 18 02:53 lost+found
drwxr-xr-x   2 root root    4096 Aug  5 16:55 media
drwxr-xr-x   7 root root    4096 Aug 18 02:54 mnt
drwxr-xr-x   2 root root    4096 Aug  5 16:55 opt
dr-xr-xr-x 216 root root       0 Aug 20 14:11 proc
drwx------   4 root root    4096 Aug 18 04:19 root
drwxr-xr-x  19 root root     560 Aug 20 14:12 run
lrwxrwxrwx   1 root root       8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x   2 root root    4096 Mar 31  2024 sbin.usr-is-merged
```

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).

```
rutuja@Rutuja:~/LinuxAssignment$ find . -name "*.txt"
./docs/file2.txt
./file.txt
./file1.txt
rutuja@Rutuja:~/LinuxAssignment$ grep "Linux" file1.txt
rutuja@Rutuja:~/LinuxAssignment$
```

h) System Information:

a. Display the current system date and time.

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).

```
rutuja@Rutuja:~/LinuxAssignment$ date
Wed Aug 20 14:23:50 UTC 2025
rutuja@Rutuja:~/LinuxAssignment$ hostname -I
172.27.34.85
rutuja@Rutuja:~/LinuxAssignment$ ping -c 4 google.com
PING google.com (142.250.71.110) 56(84) bytes of data.
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=1 ttl=118 time=15.9 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=2 ttl=118 time=15.6 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=3 ttl=118 time=15.3 ms
64 bytes from pnbomb-ad-in-f14.1e100.net (142.250.71.110): icmp_seq=4 ttl=118 time=15.2 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3223ms
rtt min/avg/max/mdev = 15.173/15.495/15.922/0.297 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.

```
rutuja@Rutuja:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (deflated 22%)
rutuja@Rutuja:~/LinuxAssignment$ unzip docs.zip -d extracted_docs
Archive:  docs.zip
   creating: extracted_docs/docs/
  inflating: extracted_docs/docs/file2.txt
rutuja@Rutuja:~/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).

```
rutuja@Rutuja:~/LinuxAssignment$ vi file01.txt
rutuja@Rutuja:~/LinuxAssignment$ cat file01
cat: file01: No such file or directory
rutuja@Rutuja:~/LinuxAssignment$ cat file01.txt
#!/bin/bash
echo "Hello Linux"
echo "This is my assignment 1."
rutuja@Rutuja:~/LinuxAssignment$ vi file01.txt
rutuja@Rutuja:~/LinuxAssignment$ sed -i 's/Linux/Unix/g' file1.txt
rutuja@Rutuja:~/LinuxAssignment$ cat file01.txt
#!/bin/bash
echo "Hello Linux"
echo "This is my assignment 1."
rutuja@Rutuja:~/LinuxAssignment$ sed -i 's/Linux/Unix/g' file01.txt
rutuja@Rutuja:~/LinuxAssignment$ cat file01.txt
#!/bin/bash
echo "Hello Unix"
echo "This is my assignment 1."
rutuja@Rutuja:~/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.

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

```
rutuja@Rutuja:~/LinuxAssignment$ vi data.txt
rutuja@Rutuja:~/LinuxAssignment$ head -n 10 data.txt
My attitude is that if you push me towards a weakness, I will turn that weak
ness into a strength.
Hard days are the best because that's when champions are made.
You can motivate by fear, and you can motivate by reward. But those methods
are only temporary. The only lasting thing is self motivation.
If it doesn't challenge you, it won't change you.
If you only ever give 90% in training then you will only ever give 90% when
it matters.
He who is not courageous enough to take risks will accomplish nothing in lif
e.
Find the good. It's all around you. Find it, showcase it, and you'll start b
elieving it.
What makes something special is not just what you have to gain, but what you
 feel there is to lose.
Talent is God given. Be humble. Fame is man-given. Be grateful. Conceit is s
elf-given.
One thing about championship teams is that they're resilient. No matter what
 is thrown at them, no matter how deep the hole, they find a way to bounce b
ack and overcome adversity.
rutuja@Rutuja:~/LinuxAssignment$ tail -n 5 data.txt
He who is not courageous enough to take risks will accomplish nothing in lif
e.
Find the good. It's all around you. Find it, showcase it, and you'll start b
elieving it.
What makes something special is not just what you have to gain, but what you
 feel there is to lose.
Talent is God given. Be humble. Fame is man-given. Be grateful. Conceit is s
elf-given.
One thing about championship teams is that they're resilient. No matter what
 is thrown at them, no matter how deep the hole, they find a way to bounce b
ack and overcome adversity.
rutuja@Rutuja:~/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.

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

```
rutuja@Rutuja:~/LinuxAssignment$ vi numbers.txt
rutuja@Rutuja:~/LinuxAssignment$ head -n 15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
rutuja@Rutuja:~/LinuxAssignment$ tail -n 3 numbers.txt
18
19
20
rutuja@Rutuja:~/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."

```
rutuja@Rutuja:~/LinuxAssignment$ vi input.txt
rutuja@Rutuja:~/LinuxAssignment$ tr 'a-z' 'A-Z' < input.txt > output.txt
rutuja@Rutuja:~/LinuxAssignment$ cat input.txt
linux is powerful open source Platform
bash scripting is Interseting
this is an example file
convert me to uppercase.
rutuja@Rutuja:~/LinuxAssignment$ cat output.txt
LINUX IS POWERFUL OPEN SOURCE PLATFORM
BASH SCRIPTING IS INTERSETING
THIS IS AN EXAMPLE FILE
CONVERT ME TO UPPERCASE.
rutuja@Rutuja:~/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."

```
rutuja@Rutuja:~/LinuxAssignment$ vi duplicate.txt
rutuja@Rutuja:~/LinuxAssignment$ cat duplicate.txt
Hello Students
Linux is open source
Hello students
Bash is powerful
Linux is open source
Unique Line
rutuja@Rutuja:~/LinuxAssignment$ sort duplicate.txt | uniq > unique.txt
rutuja@Rutuja:~/LinuxAssignment$ cat unique.txt
Bash is powerful
Hello Students
Hello students
Linux is open source
Unique Line
```

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."

```
rutuja@Rutuja:~/LinuxAssignment$ vi fruits.txt
rutuja@Rutuja:~/LinuxAssignment$ cat fruits.txt
mango
banana
apple
pineapple
grapes

rutuja@Rutuja:~/LinuxAssignment$ sort fruit.txt | uniq -c
sort: cannot read: fruit.txt: No such file or directory
rutuja@Rutuja:~/LinuxAssignment$ sort fruits.txt | uniq -c
      1
      1 apple
      1 banana
      1 grapes
      1 mango
      1 pineapple
```