Concepts of Operating System

Assignment 01

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.**

Answer:

```
cdac@Patil:~$ pwd
/home/cdac
cdac@Patil:~$ ls
Feb25  demo3  linked  myfile.txt
cdac@Patil:~$ mkdir LinuxAssignment
cdac@Patil:~$ ls
Feb25  LinuxAssignment  demo3  linked  myfile.txt
cdac@Patil:~$ cd LinuxAssignment/
cdac@Patil:~/LinuxAssignment$ ls
cdac@Patil:~/LinuxAssignment$
```

b) File Management:

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

Answer:

```
cdac@Patil:~$ pwd
/home/cdac
cdac@Patil:~$ ls
Feb25  demo3  linked  myfile.txt
cdac@Patil:~$ mkdir LinuxAssignment
cdac@Patil:~$ ls
Feb25  LinuxAssignment  demo3  linked  myfile.txt
cdac@Patil:~$ cd LinuxAssignment/
cdac@Patil:~/LinuxAssignment$ ls
cdac@Patil:~/LinuxAssignment$
cdac@Patil:~/LinuxAssignment$ touch file1.txt
cdac@Patil:~/LinuxAssignment$ ls
file1.txt
cdac@Patil:~/LinuxAssignment$
```

C) **Directory Management:**

a) **Create a new directory named "docs" inside the "LinuxAssignment" directory**

```
cdac@Patil:~/LinuxAssignment$ mkdir docs
cdac@Patil:~/LinuxAssignment$ ls -l
total 4
drwxr-xr-x 2 cdac cdac 4096 Feb 27 17:33 docs
-rw-r--r-- 1 cdac cdac    0 Feb 27 17:30 file1.txt
cdac@Patil:~/LinuxAssignment$
```

D) **Copy and Move Files:**

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

```
cdac@Patil:~/LinuxAssignment$ cp file1.txt docs/file2.txt
cdac@Patil:~/LinuxAssignment$ ls
docs  file1.txt
cdac@Patil:~/LinuxAssignment$ ls -l
total 4
drwxr-xr-x 2 cdac cdac 4096 Feb 27 17:40 docs
-rw-r--r-- 1 cdac cdac    0 Feb 27 17:30 file1.txt
cdac@Patil:~/LinuxAssignment$
```

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@Patil:~/LinuxAssignment$ chmod 744 docs/file2.txt
cdac@Patil:~/LinuxAssignment$ chown $(whoami) docs/file2,txt
chown: cannot access 'docs/file2,txt': No such file or directory
cdac@Patil:~/LinuxAssignment$ chown $(whoami) docs/file2.txt
cdac@Patil:~/LinuxAssignment$ ls -l
total 4
drwxr-xr-x 2 cdac cdac 4096 Feb 27 17:40 docs
-rw-r--r-- 1 cdac cdac    0 Feb 27 17:30 file1.txt
cdac@Patil:~/LinuxAssignment$
```

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@Patil:~/LinuxAssignment$ ls -l ~/LinuxAssignment/docs
total 0
-rwxr--r-- 1 cdac cdac 0 Feb 27 17:40 file2.txt
cdac@Patil:~/LinuxAssignment$ ls -l /
total 1472
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   8 root root    2940 Feb 27 14:43 dev
drwxr-xr-x  84 root root    4096 Feb 27 14:43 etc
drwxr-xr-x   3 root root    4096 Feb 24 17:46 home
-rwxr-xr-x   3 root root 1440152 May  7  2022 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 Apr 10  2019 lost+found
drwxr-xr-x   2 root root    4096 Jan  7 03:05 media
drwxr-xr-x   6 root root    4096 Feb 24 17:45 mnt
drwxr-xr-x   2 root root    4096 Jan  7 03:05 opt
dr-xr-xr-x 174 root root       0 Feb 27 14:43 proc
drwx------   2 root root    4096 Jan  7 03:07 root
drwxr-xr-x   7 root root     140 Feb 27 16:15 run
lrwxrwxrwx   1 root root       8 Jan  7 03:05 sbin -> usr/sbin
drwxr-xr-x   2 root root    4096 Oct 11 13:35 snap
drwxr-xr-x   2 root root    4096 Jan  7 03:05 srv
dr-xr-xr-x  11 root root       0 Feb 27 14:43 sys
drwxrwxrwt   4 root root    4096 Feb 26 19:40 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
cdac@Patil:~/LinuxAssignment$
```

g)File Searching:

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

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

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

```
cdac@Patil:~/LinuxAssignment$ nano file1.txt
cdac@Patil:~/LinuxAssignment$ cat file1.txt
Ashwin
patil
rohan
kiran
vaibhavi
vaibhav
cdac@Patil:~/LinuxAssignment$ grep "Ashwin" file1.txt
Ashwin
cdac@Patil:~/LinuxAssignment$ grep - i "Ashwin" file1.txt
grep: i: No such file or directory
grep: Ashwin: No such file or directory
cdac@Patil:~/LinuxAssignment$ grep -i "Ashwin" file1.txt
Ashwin
cdac@Patil:~/LinuxAssignment$
```

h) System Information:

a). Display the current system date and time.

```
cdac@Patil:~/LinuxAssignment$ date
Thu Feb 27 18:10:36 IST 2025
cdac@Patil:~/LinuxAssignment$
```

i) Networking:

a) Display the IP address of the system.

```
cdac@Patil:~/LinuxAssignment$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.22.17.73  netmask 255.255.240.0  broadcast 172.22.31.25
5
        inet6 fe80::215:5dff:fea8:b640  prefixlen 64  scopeid 0x20<link>
        ether 00:15:5d:a8:b6:40  txqueuelen 1000  (Ethernet)
        RX packets 1462  bytes 220915 (220.9 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 39  bytes 3090 (3.0 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
```

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

```
cdac@Patil:~/LinuxAssignment$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=52 time=57.9 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=52 time=69.2 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=52 time=76.5 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=52 time=64.5 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=52 time=72.5 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=52 time=60.9 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=52 time=57.4 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=52 time=56.0 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=52 time=56.3 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=52 time=48.2 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=52 time=47.9 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=52 time=55.1 ms
64 bytes from 8.8.8.8: icmp_seq=13 ttl=52 time=48.4 ms
64 bytes from 8.8.8.8: icmp_seq=14 ttl=52 time=52.0 ms

^C--- 8.8.8.8 ping statistics ---
14 packets transmitted, 14 received, 0% packet loss, time 13021ms
rtt min/avg/max/mdev = 47.900/58.778/76.517/8.709 ms
cdac@Patil:~/LinuxAssignment$
```

j) File Compression:

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

```
cdac@Patil:~/LinuxAssignment$ zip -r docs1.zip docs
updating: docs/ (stored 0%)
updating: docs/file2.txt (stored 0%)
cdac@Patil:~/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 cdac cdac 4096 Feb 27 17:40 docs
-rw-r--r-- 1 cdac cdac  316 Feb 27 18:25 docs1.zip
-rw-r--r-- 1 cdac cdac   44 Feb 27 18:08 file1.txt
cdac@Patil:~/LinuxAssignment$
```

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

```
cdac@Patil:~/LinuxAssignment$ zip -r docs1.zip docs
updating: docs/ (stored 0%)
updating: docs/file2.txt (stored 0%)
cdac@Patil:~/LinuxAssignment$ ls -l
total 12
drwxr-xr-x 2 cdac cdac 4096 Feb 27 17:40 docs
-rw-r--r-- 1 cdac cdac  316 Feb 27 18:25 docs1.zip
-rw-r--r-- 1 cdac cdac   44 Feb 27 18:08 file1.txt
cdac@Patil:~/LinuxAssignment$ unzip docs1.zip docs2
Archive:  docs1.zip
caution: filename not matched:  docs2
cdac@Patil:~/LinuxAssignment$ mkdir docs2
cdac@Patil:~/LinuxAssignment$ unzip docs1.zip docs2
Archive:  docs1.zip
caution: filename not matched:  docs2
cdac@Patil:~/LinuxAssignment$ unzip docs1.zip -d docs2
Archive:  docs1.zip
   creating: docs2/docs/
 extracting: docs2/docs/file2.txt
cdac@Patil:~/LinuxAssignment$ ls -l
total 16
drwxr-xr-x 2 cdac cdac 4096 Feb 27 17:40 docs
-rw-r--r-- 1 cdac cdac  316 Feb 27 18:25 docs1.zip
drwxr-xr-x 3 cdac cdac 4096 Feb 27 18:27 docs2
-rw-r--r-- 1 cdac cdac   44 Feb 27 18:08 file1.txt
cdac@Patil:~/LinuxAssignment$
```

k) File Editing:

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

```
cdac@Patil:~/LinuxAssignment$ nano text2.txt
cdac@Patil:~/LinuxAssignment$ cat text2.txt
Ashwin
patil
Abhishek
Devansh

cdac@Patil:~/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).

```
cdac@Patil:~/LinuxAssignment$ sed -i 's/rohan/ramesh/g' file1.txt
cdac@Patil:~/LinuxAssignment$ cat file1.txt
Ashwin
patil
ramesh
kiran
vaibhavi
vaibhav
cdac@Patil:~/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.

```
cdac@Patil:~$ mkdir test
cdac@Patil:~$ cd test
cdac@Patil:~/test$ touch file1.txt
cdac@Patil:~/test$ ls -l
total 0
-rw-r--r-- 1 cdac cdac 0 Feb 27 18:52 file1.txt
cdac@Patil:~/test$ nano file1.txt
cdac@Patil:~/test$ head -10 file1.txt
Line 1: Important data
Line 2: More information
Line 3: Some details
Line 4: four line
Line 5: five line
Line 6: six line
Line 7: seven line
Line 8: Eight line
Line 9: nine line
Line 10: Last of the first ten lines
cdac@Patil:~/test$
```

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@Patil:~/test$ cat file1.txt
Line 1: Important data
Line 2: More information
Line 3: Some details
Line 4: four line
Line 5: five line
Line 6: six line
Line 7: seven line
Line 8: Eight line
Line 9: nine line
Line 10: Last of the first ten lines
cdac@Patil:~/test$ tail -5 file1.txt
Line 6: six line
Line 7: seven line
Line 8: Eight line
Line 9: nine line
Line 10: Last of the first ten lines
cdac@Patil:~/test$
```

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@Patil:~/test$ head -n 15 number.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
cdac@Patil:~/test$
```

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

```
cdac@Patil:~/test$ tail -n 3 number.txt
17
18
19
cdac@Patil:~/test$
```

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@Patil:~/test$ touch input.txt
cdac@Patil:~/test$ nano input.txt
cdac@Patil:~/test$ cat input.txt
Welcome to the website. If you're here, you're likely looking to find ra
ndom words. Random Word Generator is the perfect tool to help you do thi
s. While this tool isn't a word creator, it is a word generator that wil
l generate random words for a variety of activities or uses. Even better
, it allows you to adjust the parameters of the random words to best fit
 your needs.
```

```
cdac@Patil:~/test$ tr 'a-z' 'A-Z' <input.txt > output.txt
cdac@Patil:~/test$
```

```
cdac@Patil:~/test$ cat output.txt
WELCOME TO THE WEBSITE. IF YOU'RE HERE, YOU'RE LIKELY LOOKING TO FIND RA
NDOM WORDS. RANDOM WORD GENERATOR IS THE PERFECT TOOL TO HELP YOU DO THI
S. WHILE THIS TOOL ISN'T A WORD CREATOR, IT IS A WORD GENERATOR THAT WIL
L GENERATE RANDOM WORDS FOR A VARIETY OF ACTIVITIES OR USES. EVEN BETTER
, IT ALLOWS YOU TO ADJUST THE PARAMETERS OF THE RANDOM WORDS TO BEST FIT
 YOUR NEEDS.
```

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."

G)

```
cdac@Patil:~/test$ touch duplication.txt
cdac@Patil:~/test$ nanao duplication.txt
Command 'nanao' not found, did you mean:
  command 'nano' from deb nano (6.2-1ubuntu0.1)
Try: sudo apt install <deb name>
cdac@Patil:~/test$ nano duplication.txt
cdac@Patil:~/test$ cat duplication.txt | sort | uniq > duplicate.txt.
cdac@Patil:~/test$ cat duplicate.txt
cat: duplicate.txt: No such file or directory
cdac@Patil:~/test$ ls
duplicate.txt.   file1.txt  number.txt
duplication.txt  input.txt  output.txt
cdac@Patil:~/test$ cat duplicate.txt.

Andhra Pradesh
Arunachal Pradesh
Assam
Bihar
Chhattisgarh
Goa
Gujarat
Haryana
Himachal Pradesh
Jharkhand
Karnataka
cdac@Patil:~/test$
```

H) 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@Patil:~/test$ nano fruit.txt
cdac@Patil:~/test$
cdac@Patil:~/test$ cat fruit.txt | uniq -c
      1 apple
      1 banana
      1 apple
      1 orange
      1 banana
      1 apple
      1 grape
      1 orange
      1 banana
cdac@Patil:~/test$ cat fruit.txt | sort | uniq -c
      3 apple
      3 banana
      1 grape
      2 orange
cdac@Patil:~/test$
```