

# 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.

```
cdac@Vibhav:~$ cd home
cdac@Vibhav:~/home$ ls -l
total 0
cdac@Vibhav:~/home$ mkdir linuxassignment
cdac@Vibhav:~/home$ ls -l
total 4
drwxr-xr-x 2 cdac cdac 4096 Sep  1 15:55 linuxassignment
cdac@Vibhav:~/home$ ls
linuxassignment
cdac@Vibhav:~/home$
```

**b) File Management:**

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

```
cdac@Vibhav:~/home$ cd linuxassignment
cdac@Vibhav:~/home/linuxassignment$ nano file1.txt
cdac@Vibhav:~/home/linuxassignment$ cat file1.txt
Hey Its Vibhav
cdac@Vibhav:~/home/linuxassignment$ |
```

**c) Directory Management:**

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

```
cdac@Vibhav:~/home/linuxassignment$ mkdir docs
cdac@Vibhav:~/home/linuxassignment$ ls
docs  file1.txt
cdac@Vibhav:~/home/linuxassignment$ |
```

**d) Copy and Move Files:**

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

```
cdac@Vibhav:~/home/linuxassignment$ mkdir docs
cdac@Vibhav:~/home/linuxassignment$ ls
docs  file1.txt
cdac@Vibhav:~/home/linuxassignment$ cp file1.txt docs
cdac@Vibhav:~/home/linuxassignment$ cd docs
cdac@Vibhav:~/home/linuxassignment/docs$ ls
file1.txt
cdac@Vibhav:~/home/linuxassignment/docs$ mv file1.txt file2.txt
cdac@Vibhav:~/home/linuxassignment/docs$ ls
file2.txt
cdac@Vibhav:~/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.

```
cdac@Vibhav:~/home/linuxassignment/docs$ chmod u+rw file2.txt
cdac@Vibhav:~/home/linuxassignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 15 Sep  1 16:55 file2.txt
cdac@Vibhav:~/home/linuxassignment/docs$ chown cdac file2.txt
cdac@Vibhav:~/home/linuxassignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 15 Sep  1 16:55 file2.txt
cdac@Vibhav:~/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@Vibhav:~$ cd home
cdac@Vibhav:~/home$ cd linuxassignment
cdac@Vibhav:~/home/linuxassignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Sep  1 17:02 docs
-rw-r--r-- 1 cdac cdac  15 Sep  1 15:58 file1.txt
cdac@Vibhav:~/home/linuxassignment$ cd docs
cdac@Vibhav:~/home/linuxassignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 15 Sep  1 16:55 file2.txt
cdac@Vibhav:~/home/linuxassignment/docs$ cd..
cdcd..: command not found
cdac@Vibhav:~/home/linuxassignment/docs$ cd ..
cdac@Vibhav:~/home/linuxassignment$ cd ..
cdac@Vibhav:~/home$ cd ..
cdac@Vibhav:~$ ls -l
total 8
drwxr-xr-x 3 cdac cdac 4096 Sep  1 15:55 home
```

g) **File Searching:**

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

```
cdac@Vibhav:~$ find . -type f -name "*.txt"
./home/linuxassignment/file1.txt
./home/linuxassignment/docs/file2.txt
cdac@Vibhav:~$ |
```

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

```
cdac@Vibhav:~$ cd home/linuxassignment
cdac@Vibhav:~/home/linuxassignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Sep  1 17:02 docs
-rw-r--r-- 1 cdac cdac  15 Sep  1 15:58 file1.txt
cdac@Vibhav:~/home/linuxassignment$ grep "Vibhav" file1.txt
Hey Its Vibhav
cdac@Vibhav:~/home/linuxassignment$ |
```

h) **System Information:**

- a. Display the current system date and time.

```
cdac@Vibhav:~$ date
Sun Sep  1 17:18:01 UTC 2024
cdac@Vibhav:~$ |
```

i) **Networking:**

- a. Display the IP address of the system.

```
cdac@Vibhav:~/home/linuxassignment$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.23.165.161 netmask 255.255.240.0 broadcast 172.23.175.255
    inet6 fe80::215:5dff:fe3f:bf98 prefixlen 64 scopeid 0x20<link>
    ether 00:15:5d:3f:bf:98 txqueuelen 1000 (Ethernet)
    RX packets 740 bytes 564810 (564.8 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 360 bytes 25999 (25.9 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 30 bytes 3428 (3.4 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 30 bytes 3428 (3.4 KB)
    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@Vibhav:~/home/linuxassignment$ ping google.com
PING google.com (142.250.192.46) 56(84) bytes of data.
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=1 ttl=110 time=7.70 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=2 ttl=110 time=9.09 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=3 ttl=110 time=13.1 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=4 ttl=110 time=10.7 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=5 ttl=110 time=8.44 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=6 ttl=110 time=9.93 ms
^C
--- google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5010ms
rtt min/avg/max/mdev = 7.700/9.813/13.055/1.739 ms
cdac@Vibhav:~/home/linuxassignment$ |
```

j) **File Compression:**

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

```
cdac@Vibhav:~/home/linuxassignment$ zip -r docs.zip docs
adding: docs/ (stored 0%)
adding: docs/file2.txt (stored 0%)
```

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

```
cdac@Vibhav:~/home/linuxassignment$ ls
docs docs.zip file1.txt
cdac@Vibhav:~/home/linuxassignment$ mkdir docs1
cdac@Vibhav:~/home/linuxassignment$ unzip docs.zip -d docs1
Archive: docs.zip
  creating: docs1/docs/
  extracting: docs1/docs/file2.txt
cdac@Vibhav:~/home/linuxassignment$ ls
docs docs.zip docs1 file1.txt
cdac@Vibhav:~/home/linuxassignment$ cd docs1
cdac@Vibhav:~/home/linuxassignment/docs1$ ls
docs
cdac@Vibhav:~/home/linuxassignment/docs1$ |
```

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@Vibhav:~/home/linuxassignment$ cat file1.txt
Hey Its Vibhav
cdac@Vibhav:~/home/linuxassignment$ sed -i 's/Vibhav/Vaibhav/g' file1.txt
cdac@Vibhav:~/home/linuxassignment$ cat file1.txt
Hey Its Vaibhav
cdac@Vibhav:~/home/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@Vibhav:~/home/linuxassignment$ nano data.txt
cdac@Vibhav:~/home/linuxassignment$ head -10 data.txt
The Advanced Medium Combat Aircraft (AMCA) is an Indian single-seat, twin-engine, all-weather fifth-generation stealth,
multirole combat aircraft being developed for the Indian Air Force and the Indian Navy.
The Mark-1 variant of the aircraft will be a fifth generation fighter while the Mark-2 variant will have sixth-generati
on technologies.
The aircraft is designed by the Aeronautical Development Agency (ADA)
A Special Purpose Vehicle (SPV) consisting of ADA, Hindustan Aeronautics Limited (HAL) and a private company is being fo
rmed for the development and production of AMCA.
In March 2024, the project received approval from India's Cabinet Committee on Security for the prototype development.
AMCA is designed as a single-seat, twin-engine combat aircraft.
The AMCA Mark 1 will come equipped with 5th generation technologies.
Mark 2 will have the incremental 6th generation technology upgrades.
The AMCA is intended to perform a multitude of missions.
Including Air supremacy, Ground-Strike, Suppression of Enemy Air Defenses (SEAD) and Electronic Warfare (EW) missions.
cdac@Vibhav:~/home/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.

```
cdac@Vibhav:~/home/linuxassignment$ tail -5 data.txt
The AMCA Mark 1 will come equipped with 5th generation technologies.
Mark 2 will have the incremental 6th generation technology upgrades.
The AMCA is intended to perform a multitude of missions.
Including Air supremacy, Ground-Strike, Suppression of Enemy Air Defenses (SEAD) and Electronic Warfare (EW) missions.
It is intended to supplant the Sukhoi Su-30MKI air superiority fighter, which forms the backbone of the IAF fighter flee
t.
cdac@Vibhav:~/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.

```
cdac@Vibhav:~/home/linuxassignment$ head -15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
```

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

```
cdac@Vibhav:~/home/linuxassignment$ tail -5 numbers.txt
11
12
13
14
15
```

- 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@Vibhav:~/home/linuxassignment$ nano input.txt
cdac@Vibhav:~/home/linuxassignment$ cat input.txt
Hi Vibhav Here
Have a good day
Bye.
cdac@Vibhav:~/home/linuxassignment$ touch output.txt
cdac@Vibhav:~/home/linuxassignment$ tr 'a-z' 'A-Z' <input.txt> output.txt
cdac@Vibhav:~/home/linuxassignment$ cat output.txt
HI VIBHAV HERE
HAVE A GOOD DAY
BYE.
cdac@Vibhav:~/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."

```
cdac@Vibhav:~/home/linuxassignment$ nano duplicate.txt
cdac@Vibhav:~/home/linuxassignment$ cat duplicate.txt
Hi
Hello
Hi
cdac@Vibhav:~/home/linuxassignment$ sort duplicate.txt | uniq
Hello
Hi
cdac@Vibhav:~/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."

```
cdac@Vibhav:~/home/linuxassignment$ nano fruits.txt
cdac@Vibhav:~/home/linuxassignment$ cat fruits.txt
Avocado
Banana
Blueberry
Blackberry
Blackcurrant
Banana
Blueberry
cdac@Vibhav:~/home/linuxassignment$ sort fruits.txt | uniq -c
  1 Avocado
  2 Banana
  1 Blackberry
  1 Blackcurrant
  2 Blueberry
cdac@Vibhav:~/home/linuxassignment$ |
```