

# 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.

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6: ~/LinuxAssignment
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

irteza-cdac@LAPTOP-8UEU85D6:~$ ls
irteza-cdac@LAPTOP-8UEU85D6:~$ mkdir -p LinuxAssignment
irteza-cdac@LAPTOP-8UEU85D6:~$ cd LinuxAssignment
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$
```

**b) File Management:**

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

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6: ~/LinuxAssignment
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

irteza-cdac@LAPTOP-8UEU85D6:~$ touch file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~$ cat file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~$ cd LinuxAssignmnet
-bash: cd: LinuxAssignmnet: No such file or directory
irteza-cdac@LAPTOP-8UEU85D6:~$ cd LinuxAssignment
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ touch file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cat > file1.txt
This is my 1st txt file in LinuxAssignment.
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cat file1.txt
This is my 1st txt file in LinuxAssignment.
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$
```

c) **Directory Management:**

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

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6:~$ cd LinuxAssignment
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ mkdir docs
mkdir: cannot create directory 'docs': File exists
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ ls
docs docs.zip file.txt file1.txt new_docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$
```

d) **Copy and Move Files:**

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

**Solution:**

```
Select irteza-cdac@LAPTOP-8UEU85D6: ~/LinuxAssignment/docs
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

irteza-cdac@LAPTOP-8UEU85D6:~$ cd LinuxAssignment
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ ls
docs file.txt file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cp file1.txt docs/file2.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cd docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ cat docs/file2.txt
cat: docs/file2.txt: No such file or directory
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ ls
file1.txt file2.txt
irteza-cdac@LAPTOP-8UEU85D6:~/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.

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ chmod 744 file2.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ chown irteza-cdac file.txt
chown: cannot access 'file.txt': No such file or directory
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ chown irteza-cdac file2.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ ls -l file2.txt
-rwxr--r-- 1 irteza-cdac irteza-cdac 44 Feb 27 05:55 file2.txt
irteza-cdac@LAPTOP-8UEU85D6:~/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.

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ ls -l ~/LinuxAssignment
total 12
drwxr-xr-x 2 irteza-cdac irteza-cdac 4096 Feb 27 05:54 docs
-rw-r--r-- 1 irteza-cdac irteza-cdac  27 Feb 27 05:50 file.txt
-rw-r--r-- 1 irteza-cdac irteza-cdac  44 Feb 27 05:50 file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cd docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ ls -l ~/LinuxAssignment
total 12
drwxr-xr-x 2 irteza-cdac irteza-cdac 4096 Feb 27 05:54 docs
-rw-r--r-- 1 irteza-cdac irteza-cdac  27 Feb 27 05:50 file.txt
-rw-r--r-- 1 irteza-cdac irteza-cdac  44 Feb 27 05:50 file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ _
```

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).

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6:~$ find . -type f -name "*.txt"
./LinuxAssignment/file.txt
./LinuxAssignment/docs/file1.txt
./LinuxAssignment/docs/file2.txt
./LinuxAssignment/file1.txt
./file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~$ cd LinuxAssignment
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ ls
docs file.txt file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ grep "This" file1.txt
This is my 1st txt file in LinuxAssignment.
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ grep "This" file.txt
"This is the 1st txt file".
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cd docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ grep "This" file2.txt
This is my 1st txt file in LinuxAssignment.
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/docs$ _
```

h) **System Information:**

- a. Display the current system date and time.

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6:~$ date
Thu Feb 27 06:18:59 UTC 2025
```

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).

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6:~$ date
Thu Feb 27 06:18:59 UTC 2025
irteza-cdac@LAPTOP-8UEU85D6:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default 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
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: bond0: <BROADCAST,MULTICAST,MASTER> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 26:6f:28:6a:2c:cf brd ff:ff:ff:ff:ff:ff
3: dummy0: <BROADCAST,NOARP> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 5e:2d:ba:b9:5e:ff brd ff:ff:ff:ff:ff:ff
4: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:a4:d9:b9 brd ff:ff:ff:ff:ff:ff
    inet 172.28.149.45/20 brd 172.28.159.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fea4:d9b9/64 scope link
        valid_lft forever preferred_lft forever
5: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/ipip 0.0.0.0 brd 0.0.0.0
6: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
irteza-cdac@LAPTOP-8UEU85D6:~$ hostname -I
172.28.149.45
irteza-cdac@LAPTOP-8UEU85D6:~$ ping -c 4 google.com
PING google.com (142.250.192.238) 56(84) bytes of data:
64 bytes from del11s13-in-f14.1e100.net (142.250.192.238): icmp_seq=1 ttl=111 time=149 ms
64 bytes from del11s13-in-f14.1e100.net (142.250.192.238): icmp_seq=2 ttl=111 time=56.7 ms
64 bytes from del11s13-in-f14.1e100.net (142.250.192.238): icmp_seq=3 ttl=111 time=69.7 ms
64 bytes from del11s13-in-f14.1e100.net (142.250.192.238): icmp_seq=4 ttl=111 time=93.0 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 56.735/92.189/149.329/35.452 ms
irteza-cdac@LAPTOP-8UEU85D6:~$
```

j) **File Compression:**

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

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ zip -r docs.zip docs
adding: docs/ (stored 0%)
adding: docs/file1.txt (stored 0%)
adding: docs/file2.txt (stored 0%)
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ mkdir new_docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ ls
docs  docs.zip  file.txt  file1.txt  new_docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ unzip docs.zip -d new_docs
Archive:  docs.zip
  creating: new_docs/docs/
  extracting: new_docs/docs/file1.txt
  extracting: new_docs/docs/file2.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cd new_docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/new_docs$ ls
docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/new_docs$ cd docs
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/new_docs/docs$ ls
file1.txt  file2.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment/new_docs/docs$
```

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).

**Solution:**

```
irteza-cdac@LAPTOP-8UEU85D6:~$ cd LinuxAssignmnet
-bash: cd: LinuxAssignmnet: No such file or directory
irteza-cdac@LAPTOP-8UEU85D6:~$ cd LinuxAssignment
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ nano file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ sed -i 's/This/That/h' file1.txt
sed: -e expression #1, char 13: unknown option to `s'
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cat file1.txt
This is my 1st txt file in LinuxAssignment.
This is im editing 2nd time for file editing.
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ sed -i 's/This/That/Ig' file1.txt
irteza-cdac@LAPTOP-8UEU85D6:~/LinuxAssignment$ cat file1.txt
That is my 1st txt file in LinuxAssignment.
That is im editing 2nd time for file editing.
irteza-cdac@LAPTOP-8UEU85D6:~/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.

Ans: `head -10 data.txt`

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

Ans: `tail -5 data.txt`

- 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.

Ans: `head -15 numbers.txt`

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

Ans: `tail -3 numbers.txt`

- 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."

Ans: `tr '[:lower:]' '[:upper:]' < input.txt > output.txt`

- 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."

Ans: `sort duplicate.txt | uniq`

- 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."

Ans: `sort fruit.txt | uniq -c`

**Challenges faced:**

Initially, I didn't face any major problems. The only issue I encountered was that `zip` and `unzip` were not installed on the system, causing the compression command to fail. I resolved this by installing them using the above commands.