

# 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.

```
root@LAPTOP-5GTRTE2A:/home# ls
cdac  user2
root@LAPTOP-5GTRTE2A:/home# mkdir LinuxAssignment
root@LAPTOP-5GTRTE2A:/home# ls
LinuxAssignment  cdac  user2
root@LAPTOP-5GTRTE2A:/home# cd LinuxAssignment/
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# |
```

**b) File Management:**

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

```
LinuxAssignment  cdac  user2
root@LAPTOP-5GTRTE2A:/home# cd LinuxAssignment/
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# touch file1.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# ls -l
total 0
-rw-r--r-- 1 root root 0 Aug 28 18:57 file1.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# ls
file1.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment#
```

**c) Directory Management:**

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

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# mkdir docs
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# ls
docs  file1.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment#
```

**d) Copy and Move Files:**

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

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# cp file1.txt docs/
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# cd docs/
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# ls
file1.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# mv file1.txt file2.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# ls
file2.txt
root@LAPTOP-5GTRTE2A:/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.

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# ls -l
total 0
-rw-r--r-- 1 root root 0 Aug 28 19:16 file2.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# chmod u+rwx file2.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# ls -l
total 0
-rwxr--r-- 1 root root 0 Aug 28 19:16 file2.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# su root
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# sudo adduser user1
Adding user `user1' ...
Adding new group `user1' (1001) ...
Adding new user `user1' (1001) with group `user1' ...
Creating home directory `/home/user1' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for user1
Enter the new value, or press ENTER for the default
    Full Name []: user1
    Room Number []: 123
    Work Phone []: 234
    Home Phone []: 345
    Other []: 456
Is the information correct? [Y/n] y
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# su user1
user1@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs$
```

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# chmod u+rwx file2.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# chown root file2.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs# ls -l
total 0
-rwxr--r-- 1 root root 0 Aug 28 19:16 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.

```
user1@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs$ ls
file2.txt
user1@LAPTOP-5GTRTE2A:/home/LinuxAssignment/docs$ cd ..
user1@LAPTOP-5GTRTE2A:/home/LinuxAssignment$ ls
docs  file1.txt
user1@LAPTOP-5GTRTE2A:/home/LinuxAssignment$ cd ..
user1@LAPTOP-5GTRTE2A:/home$ ls
LinuxAssignment  cdac  user1  user2
user1@LAPTOP-5GTRTE2A:/home$
```

### 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).

```
root@LAPTOP-5GTRTE2A:/home# find . -name "*.txt"
./file1.txt
./LinuxAssignment/file1.txt
./LinuxAssignment/docs/file2.txt
./file.txt
root@LAPTOP-5GTRTE2A:/home#
```



#### h) System Information:

- Display the current system date and time.

```
root@LAPTOP-5GTRTE2A:/home# date
Wed Aug 28 20:08:18 IST 2024
root@LAPTOP-5GTRTE2A:/home#
```

#### i) Networking:

- Display the IP address of the system.
- Ping a remote server to check connectivity (provide a remote server address to ping).

```
root@LAPTOP-5GTRTE2A:/home# hostname -I
172.23.123.207
root@LAPTOP-5GTRTE2A:/home# ping www.google.com
PING www.google.com (142.250.192.132) 56(84) bytes of data.
64 bytes from bom12s18-in-f4.1e100.net (142.250.192.132): icmp_seq=1 ttl=111 time=41.2 ms
64 bytes from bom12s18-in-f4.1e100.net (142.250.192.132): icmp_seq=2 ttl=111 time=34.0 ms
64 bytes from bom12s18-in-f4.1e100.net (142.250.192.132): icmp_seq=3 ttl=111 time=42.1 ms
^C
--- www.google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 34.040/39.117/42.146/3.612 ms
root@LAPTOP-5GTRTE2A:/home#
```

#### j) File Compression:

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

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# zip -r docs.zip docs
updating: docs/ (stored 0%)
updating: docs/file2.txt (stored 0%)
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# unzip docs.zip -d new_Directory
Archive:  docs.zip
  creating: new_Directory/docs/
  extracting: new_Directory/docs/file2.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment#
```

#### k) File Editing:

- Open the "file1.txt" file in a text editor and add some text to it.
- Replace a specific word in the "file1.txt" file with another word (provide the original word and the word to replace it with).

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# nano file1.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# sed -i 's/Hey!/Hello/g' file1.txt
```

**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.

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# nano data.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# head data.txt
Apple
Mango
Orange
Litchi
Cheery
Blackberry
Watermelon
Melon
Papaya
Pineapple
root@LAPTOP-5GTRTE2A:/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.

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# tail -5 data.txt
Watermelon
Melon
Papaya
Pineapple
Strawberry
root@LAPTOP-5GTRTE2A:/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.

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# nano numbers.txt
root@LAPTOP-5GTRTE2A:/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".

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# tail -3 numbers.txt
14
15
16
```

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."

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# nano input.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# touch output.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# tr 'a-z' 'A-Z' < input.txt > output.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# nano 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."

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# nano duplicate.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# sort duplicate.txt | uniq
Good
Good Morning
Hello
Hey!
Morning
root@LAPTOP-5GTRTE2A:/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."

```
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# nano fruits.txt
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment# sort fruits.txt | uniq -c
  2 Apple
  2 Blackberry
  4 Litchi
  2 Mango
  1 Papaya
root@LAPTOP-5GTRTE2A:/home/LinuxAssignment#
```

### Submission Guidelines:

- Document each step of your solution and any challenges faced.
- Upload it on your GitHub repository

### Additional Tips:

- Experiment with different options and parameters of each command to explore their functionalities.