

# Concepts of Operating System

## Assignment 1

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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@DESKTOP-B7Q28RG: ~/Linux_Assignment
cdac@DESKTOP-B7Q28RG:~$ ls
Linux_Assignment
cdac@DESKTOP-B7Q28RG:~$ mkdir Linux_Assignment_1
cdac@DESKTOP-B7Q28RG:~$ ls
Linux_Assignment  Linux_Assignment_1
cdac@DESKTOP-B7Q28RG:~$ cd Linux_Assignment
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$
```

b) File Management:

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

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ touch file1
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
file1
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ cat file1
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ nano file1
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ cat file1
Hello Good morning!!
I'm Darshan Dhongade
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$
```

c) Directory Management:

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

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ mkdir docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
docs  file1
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$
```

d) Copy and Move Files:

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

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ mkdir docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
docs  file1
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ cp /home/cdac/Linux_Assignment/file1 /home/cdac/Linux_Assignment/docs/file2
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
docs  file1
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ cd docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ ls
file2
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat file2
Hello Good morning!!
I'm Darshan Dhongade
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/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@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ ls -l
total 4
-rw-r--r-- 1 cdac cdac 42 Feb 27 12:49 file2
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ chmod u+x file2
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ ls -l file2
-rwxr--r-- 1 cdac cdac 42 Feb 27 12:49 file2
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ chown cdac file2
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ ls -l file2
-rwxr--r-- 1 cdac cdac 42 Feb 27 12:49 file2
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/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@DESKTOP-B7Q28RG: ~
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ ls -l
total 4
-rwxr--r-- 1 cdac cdac 42 Feb 27 12:49 file2
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cd..
cd..: command not found
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cd ..
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls -l
total 8
drwxr-xr-x 2 cdac cdac 4096 Feb 27 12:49 docs
-rw-r--r-- 1 cdac cdac 42 Feb 27 12:35 file1
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ cd ..
cdac@DESKTOP-B7Q28RG:~$ ls -l
total 8
drwxr-xr-x 3 cdac cdac 4096 Feb 27 12:47 Linux_Assignment
drwxr-xr-x 2 cdac cdac 4096 Feb 27 12:22 Linux_Assignment_1
cdac@DESKTOP-B7Q28RG:~$
```

g) File Searching:

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

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ find . -type f -name "*.txt"
./docs/file2.txt
./file.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$
```

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

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat file2.txt
Hello Good morning!!
I'm Darshan Dhongade
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ grep "Good morning" file2.txt
Hello Good morning!!
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```

h) System Information:

a. Display the current system date and time.

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ date +"%d/%m%Y" && date +"%T"
27/022025
16:54:16
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```

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).

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ 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: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:a0:91:db brd ff:ff:ff:ff:ff:ff
    inet 172.22.216.194/20 brd 172.22.223.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fea0:91db/64 scope link
        valid_lft forever preferred_lft forever
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ ping google.com
PING google.com (142.250.183.110) 56(84) bytes of data.
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=1 ttl=115 time=225 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=2 ttl=115 time=37.3 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=3 ttl=115 time=33.1 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=4 ttl=115 time=35.1 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=5 ttl=115 time=144 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=6 ttl=115 time=32.2 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=7 ttl=115 time=56.0 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=8 ttl=115 time=46.2 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=9 ttl=115 time=164 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=10 ttl=115 time=58.2 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=11 ttl=115 time=72.9 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=12 ttl=115 time=28.0 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=13 ttl=115 time=57.0 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=14 ttl=115 time=40.7 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=15 ttl=115 time=57.7 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=16 ttl=115 time=130 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=17 ttl=115 time=43.0 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=18 ttl=115 time=107 ms
64 bytes from bom12s13-in-f14.1e100.net (142.250.183.110): icmp_seq=19 ttl=115 time=59.8 ms
```

j) File Compression:

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

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment
cdac@DESKTOP-B7Q28RG:~$ cd Linux_Assignment
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
docs  file.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ sudo apt install zip
[sudo] password for cdac:
Sorry, try again.
[sudo] password for cdac:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
zip is already the newest version (3.0-13ubuntu0.2).
0 upgraded, 0 newly installed, 0 to remove and 87 not upgraded.
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ zip -r docsl.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file2.txt (stored 0%)
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
docs  docsl.zip  file.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$
```

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

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
docs  docs1.zip  file.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ unzip docs1.zip -d newdocs
Archive: docs1.zip
  creating: newdocs/docs/
  extracting: newdocs/docs/file2.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$ ls
docs  docs1.zip  file.txt  newdocs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment$
```

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@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat file2.txt
Hello Good morning!!
I'm Darshan Dhongade
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ sed -i 's/morning/night/g' file2.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat file2.txt
Hello Good night!!
I'm Darshan Dhongade
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```

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@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ touch data.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ nano data.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ head -10 data.txt
Darshan
Lakshit
Mrunal
Sanika
Harsh
Darpan
Kisan
Maya
Shubham
Ruturaj
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```

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@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ tail -5 data.txt
Maya
Shubham
Ruturaj
Nayan
Himanshu
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```

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@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ head -15 numbers.txt
1
2
5
6
9
8
3
210
15
22
36
96
4
5
55
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```

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

```
cdac@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ tail -3 numbers.txt
96
4
5
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```

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@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ touch input.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ nano input.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat input.txt
this is lower case
THIS IS UPPERCASE
1234567890
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ tr [:lower:] [:upper:] < input.txt > output.txt
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat output.txt
THIS IS LOWER CASE
THIS IS UPPERCASE
1234567890
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```

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@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
Sanika
Harsh
Darpan
Kisan
Maya
Shubham
Ruturaj
Nayan
Himanshu
Darshan
Darpan
Maya
Lakshit
Mrunal
Saket
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat data.txt | sort | uniq
Darpan
Darshan
Harsh
Himanshu
Kisan
Lakshit
Maya
Mrunal
Nayan
Ruturaj
Saket
Sanika
Shubham
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ Z_
```

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@DESKTOP-B7Q28RG: ~/Linux_Assignment/docs
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat fruits
apple
banana
banana
watermelon
peach
mango
mango
banana
banana
grapes
grapes
banana
lemon
orange
orange
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$ cat fruits | sort | uniq -c
  1 apple
  5 banana
  2 grapes
  1 lemon
  2 mango
  2 orange
  1 peach
  1 watermelon
cdac@DESKTOP-B7Q28RG:~/Linux_Assignment/docs$
```