

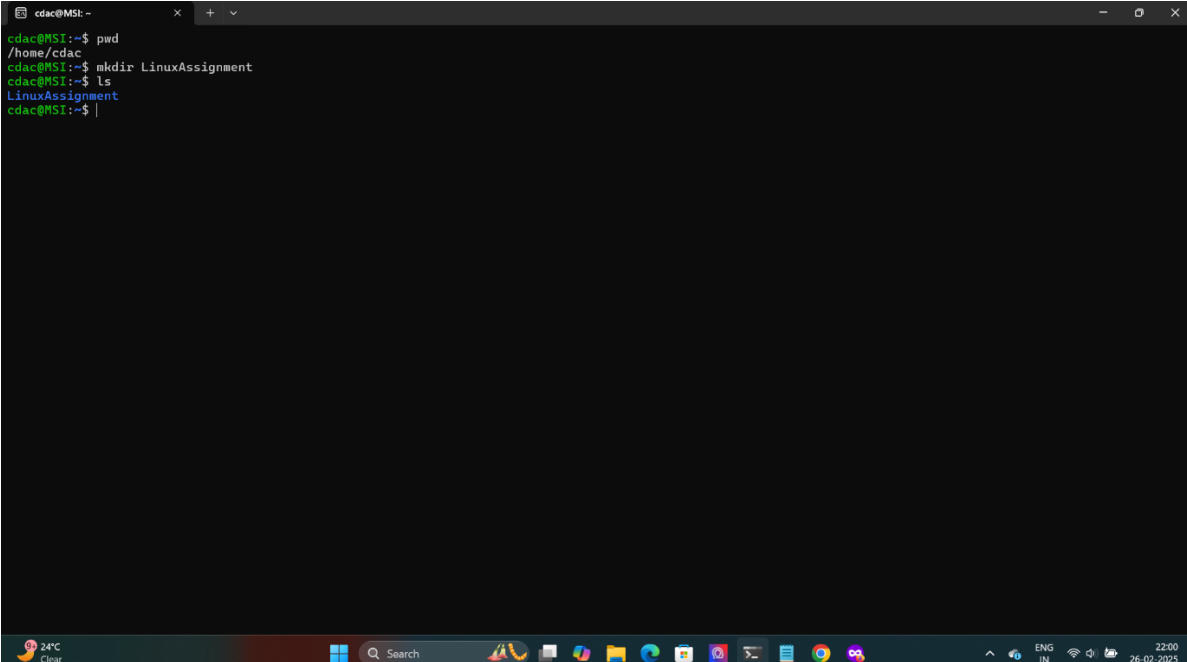
# CDAC MUMBAI

## 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.

A screenshot of a Windows terminal window with a dark background. The terminal shows a series of commands and their outputs. The first command is 'pwd', which outputs '/home/cdac'. The second command is 'mkdir LinuxAssignment', which outputs nothing. The third command is 'ls', which outputs 'LinuxAssignment'. The terminal window has a title bar that says 'cdac@MSI: ~'. The Windows taskbar is visible at the bottom, showing the Start button, a search bar, and several application icons. The system tray on the right shows the date and time as '26-02-2025 22:00' and the language as 'ENG IN'.

```
cdac@MSI: ~  
cdac@MSI:~$ pwd  
/home/cdac  
cdac@MSI:~$ mkdir LinuxAssignment  
cdac@MSI:~$ ls  
LinuxAssignment  
cdac@MSI:~$
```

b) File Management:

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

```
cdac@MSI: ~/LinuxAssignment$ pwd
/home/cdac
cdac@MSI:~$ mkdir LinuxAssignment
cdac@MSI:~$ ls
LinuxAssignment
cdac@MSI:~$ cd LinuxAssignment
cdac@MSI:~/LinuxAssignment$ touch file.txt
cdac@MSI:~/LinuxAssignment$ nano file.txt
cdac@MSI:~/LinuxAssignment$ cat file.txt
hey
How is the OS module going? :)
cdac@MSI:~/LinuxAssignment$
```

c) Directory Management:

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

```
cdac@MSI:~/LinuxAssignment$ pwd
/home/cdac
cdac@MSI:~$ mkdir LinuxAssignment
cdac@MSI:~$ ls
LinuxAssignment
cdac@MSI:~$ cd LinuxAssignment
cdac@MSI:~/LinuxAssignment$ touch file.txt
cdac@MSI:~/LinuxAssignment$ nano file.txt
cdac@MSI:~/LinuxAssignment$ cat file.txt
hey
How is the OS module going? :)
cdac@MSI:~/LinuxAssignment$ mkdir docs
cdac@MSI:~/LinuxAssignment$ ls
docs  file.txt
cdac@MSI:~/LinuxAssignment$
```

d) Copy and Move Files:

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

```
cdac@MSI: ~/LinuxAssignment$ pwd
/home/cdac
cdac@MSI:~/LinuxAssignment$ mkdir LinuxAssignment
cdac@MSI:~/LinuxAssignment$ ls
LinuxAssignment
cdac@MSI:~/LinuxAssignment$ cd LinuxAssignment
cdac@MSI:~/LinuxAssignment$ touch file.txt
cdac@MSI:~/LinuxAssignment$ nano file.txt
cdac@MSI:~/LinuxAssignment$ cat file.txt
hey
How is the OS module going? :)
cdac@MSI:~/LinuxAssignment$ mkdir docs
cdac@MSI:~/LinuxAssignment$ ls
docs file.txt
cdac@MSI:~/LinuxAssignment$ cp file.txt docs/
cdac@MSI:~/LinuxAssignment$ cd docs
cdac@MSI:~/LinuxAssignment/docs$ ls
file.txt
cdac@MSI:~/LinuxAssignment/docs$ mv file.txt file2.txt
cdac@MSI:~/LinuxAssignment/docs$ ls
file2.txt
cdac@MSI:~/LinuxAssignment/docs$
```

e) Permissions and Ownership:

- 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@MSI:~/LinuxAssignment$ ls -l
total 8
drwxr-xr-x 3 cdac cdac 4096 Feb 27 12:53 LinuxAssignment
-rw-r--r-- 1 cdac cdac 41 Feb 27 12:50 sh1
cdac@MSI:~/LinuxAssignment$ chmod 777 data2.txt
chmod: cannot access 'data2.txt': No such file or directory
cdac@MSI:~/LinuxAssignment$ cd LinuxAssignment
cdac@MSI:~/LinuxAssignment$ chmod 744 data2.txt
cdac@MSI:~/LinuxAssignment$ ls -l data2.txt
-rwxr--r-- 1 cdac cdac 113 Feb 27 12:53 data2.txt
cdac@MSI:~/LinuxAssignment$ ls -l
total 40
-rw-r--r-- 1 cdac cdac 113 Feb 26 17:49 data.txt
-rwxr--r-- 1 cdac cdac 113 Feb 27 12:53 data2.txt
drwxr-xr-x 2 cdac cdac 4096 Feb 26 16:48 docs
-rw-r--r-- 1 cdac cdac 193 Feb 26 17:36 docs.tar.gz
-rw-r--r-- 1 cdac cdac 22 Feb 26 17:57 duplicate.txt
-rw-r--r-- 1 cdac cdac 60 Feb 26 17:46 file.txt
-rw-r--r-- 1 cdac cdac 56 Feb 26 17:59 fruit.txt
-rw-r--r-- 1 cdac cdac 26 Feb 26 17:54 input.txt
-rw-r--r-- 1 cdac cdac 51 Feb 26 17:52 numbers.txt
-rw-r--r-- 1 cdac cdac 26 Feb 26 17:55 output.txt
cdac@MSI:~/LinuxAssignment$ chown pm-user data2.txt
chown: invalid user: 'pm-user'
cdac@MSI:~/LinuxAssignment$ chown $(whoami) data2.txt
cdac@MSI:~/LinuxAssignment$ ls -l
total 40
-rw-r--r-- 1 cdac cdac 113 Feb 26 17:49 data.txt
-rwxr--r-- 1 cdac cdac 113 Feb 27 12:53 data2.txt
drwxr-xr-x 2 cdac cdac 4096 Feb 26 16:48 docs
-rw-r--r-- 1 cdac cdac 193 Feb 26 17:36 docs.tar.gz
-rw-r--r-- 1 cdac cdac 22 Feb 26 17:57 duplicate.txt
-rw-r--r-- 1 cdac cdac 60 Feb 26 17:46 file.txt
-rw-r--r-- 1 cdac cdac 56 Feb 26 17:59 fruit.txt
-rw-r--r-- 1 cdac cdac 26 Feb 26 17:54 input.txt
-rw-r--r-- 1 cdac cdac 51 Feb 26 17:52 numbers.txt
-rw-r--r-- 1 cdac cdac 26 Feb 26 17:55 output.txt
cdac@MSI:~/LinuxAssignment$ chown user-1 data2.txt
chown: invalid user: 'user-1'
cdac@MSI:~/LinuxAssignment$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
```

```
cdac@MSI:~/LinuxAssignment$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
_apt:x:42:65534:/:/nonexistent:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:998:998:systemd Network Management:/:/usr/sbin/nologin
systemd-timesync:x:996:996:systemd Time Synchronization:/:/usr/sbin/nologin
dhcpcd:x:100:65534:DHCP Client Daemon,,,:/usr/lib/dhcpcd:/bin/false
messagebus:x:101:101:/:/nonexistent:/usr/sbin/nologin
syslog:x:102:102:/:/nonexistent:/usr/sbin/nologin
systemd-resolve:x:991:991:systemd Resolver:/:/usr/sbin/nologin
uuidd:x:103:103:/:run/uuidd:/usr/sbin/nologin
landscape:x:104:105:/:var/lib/landscape:/usr/sbin/nologin
polkitd:x:990:990:User for polkitd:/:/usr/sbin/nologin
cdac:x:1000:1000:,:/home/cdac:/bin/bash
cdac@MSI:~/LinuxAssignment$ sudo useradd user-1
[sudo] password for cdac:
cdac@MSI:~/LinuxAssignment$ sudo chown user-1 data2.txt
cdac@MSI:~/LinuxAssignment$ ls -l data2.txt
-rwxr--r-- 1 user-1 cdac 113 Feb 27 12:53 data2.txt
cdac@MSI:~/LinuxAssignment$
```

f) Final Checklist:

- Finally, list the contents of the "LinuxAssignment" directory and the root directory to ensure that all operations were performed correctly.

```
cdac@MSI:~/LinuxAssignment$ ls -l
total 40
-rw-r--r-- 1 cdac cdac 113 Feb 26 17:49 data.txt
-rw-r--r-- 1 cdac cdac 113 Feb 27 12:53 data2.txt
drwxr-xr-x 2 cdac cdac 4096 Feb 26 16:48 docs
-rw-r--r-- 1 cdac cdac 193 Feb 26 17:36 docs.tar.gz
-rw-r--r-- 1 cdac cdac 22 Feb 26 17:57 duplicate.txt
-rw-r--r-- 1 cdac cdac 60 Feb 26 17:46 file.txt
-rw-r--r-- 1 cdac cdac 56 Feb 26 17:59 fruit.txt
-rw-r--r-- 1 cdac cdac 26 Feb 26 17:54 input.txt
-rw-r--r-- 1 cdac cdac 51 Feb 26 17:52 numbers.txt
-rw-r--r-- 1 cdac cdac 26 Feb 26 17:55 output.txt
cdac@MSI:~/LinuxAssignment$ ls -l
total 40
-rw-r--r-- 1 cdac cdac 113 Feb 26 17:49 data.txt
-rw-r--r-- 1 cdac cdac 113 Feb 27 12:53 data2.txt
drwxr-xr-x 2 cdac cdac 4096 Feb 26 16:48 docs
-rw-r--r-- 1 cdac cdac 193 Feb 26 17:36 docs.tar.gz
-rw-r--r-- 1 cdac cdac 22 Feb 26 17:57 duplicate.txt
-rw-r--r-- 1 cdac cdac 60 Feb 26 17:46 file.txt
-rw-r--r-- 1 cdac cdac 56 Feb 26 17:59 fruit.txt
-rw-r--r-- 1 cdac cdac 26 Feb 26 17:54 input.txt
-rw-r--r-- 1 cdac cdac 51 Feb 26 17:52 numbers.txt
-rw-r--r-- 1 cdac cdac 26 Feb 26 17:55 output.txt
cdac@MSI:~/LinuxAssignment$ cd ..
cdac@MSI:~$ ls -l
total 8
drwxr-xr-x 3 cdac cdac 4096 Feb 27 12:53 LinuxAssignment
-rw-r--r-- 1 cdac cdac 41 Feb 27 12:50 sh1
cdac@MSI:~$
```

g) File Searching:

- Search for all files with the extension ".txt" in the current directory and its subdirectories.
- Display lines containing a specific word in a file (provide a file name and the specific word to search).

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

h) System Information:

- a. Display the current system date and time.

```
cdac@MSI: ~  
cdac@MSI:~$ date  
Wed Feb 26 17:01:09 UTC 2025  
cdac@MSI:~$
```

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).
- j) File Compression:

```
cdac@MSI: ~$ hostname -I
172.17.206.223
cdac@MSI:~$ 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=118 time=13.0 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=118 time=12.8 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=118 time=28.7 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=118 time=9.28 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=118 time=15.9 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=118 time=41.5 ms
^C
--- 8.8.8.8 ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 6544ms
rtt min/avg/max/mdev = 9.279/20.201/41.520/11.329 ms
cdac@MSI:~$
```

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

```
cdac@MSI: ~$ hostname -I
172.17.206.223
cdac@MSI:~$ 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=118 time=13.0 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=118 time=12.8 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=118 time=28.7 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=118 time=9.28 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=118 time=15.9 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=118 time=41.5 ms
^C
--- 8.8.8.8 ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 6544ms
rtt min/avg/max/mdev = 9.279/20.201/41.520/11.329 ms
cdac@MSI:~$ cd LinuxAssignments
-bash: cd: LinuxAssignments: No such file or directory
cdac@MSI:~$ ls
LinuxAssignment
cdac@MSI:~$ cd LinuxAssignment
cdac@MSI:~/LinuxAssignment$ zip -r docs.zip docs/
Command 'zip' not found, but can be installed with:
sudo apt install zip
cdac@MSI:~/LinuxAssignment$ tar -czvf docs.tar.gz docs/
docs/
docs/file2.txt
cdac@MSI:~/LinuxAssignment$ ls
docs  docs.tar.gz  file.txt
cdac@MSI:~/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).

```
cdac@MSI: ~/$ hostname -I
172.17.206.223
cdac@MSI:~$ 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=118 time=13.0 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=118 time=12.8 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=118 time=28.7 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=118 time=9.28 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=118 time=15.9 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=118 time=41.5 ms
^C
--- 8.8.8.8 ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 6544ms
rtt min/avg/max/mdev = 9.279/20.201/41.520/11.329 ms
cdac@MSI:~$ cd LinuxAssignments
-bash: cd: LinuxAssignments: No such file or directory
cdac@MSI:~$ ls
LinuxAssignment
cdac@MSI:~$ cd LinuxAssignment
cdac@MSI:~/LinuxAssignment$ zip -r docs.zip docs/
Command 'zip' not found, but can be installed with:
sudo apt install zip
cdac@MSI:~/LinuxAssignment$ tar -czvf docs.tar.gz docs/
docs/
docs/file2.txt
cdac@MSI:~/LinuxAssignment$ ls
docs docs.tar.gz file.txt
cdac@MSI:~/LinuxAssignment$ nano file.txt
cdac@MSI:~/LinuxAssignment$ cat file.txt
hey
How is the OS module going? :)
just adding extra text..
cdac@MSI:~/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@MSI:~/LinuxAssignment$ nano data.txt
cdac@MSI:~/LinuxAssignment$ cat data.txt
hey
I am cdac student!
To explore new things
and stay updated
with latest trends
I am pursuing this course.
;)

cdac@MSI:~/LinuxAssignment$ head -n 10 data.txt
hey
I am cdac student!
To explore new things
and stay updated
with latest trends
I am pursuing this course.
;)

cdac@MSI:~/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@MSI: ~/LinuxAssignment$ tail -5 data.txt
and stay updated
with latest trends
I am pursuing this course.
;)

cdac@MSI:~/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@MSI:~/LinuxAssignment$ nano numbers.txt
cdac@MSI:~/LinuxAssignment$ cat numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
cdac@MSI:~/LinuxAssignment$ head -15 numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
cdac@MSI:~/LinuxAssignment$ |
```

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



```
cdac@MSI: ~/LinuxAssignment$ cat numbers.txt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
cdac@MSI:~/LinuxAssignment$ tail -3 numbers.txt
18
19
20
cdac@MSI:~/LinuxAssignment$ |
```

- 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@MSI:~/LinuxAssignment$ nano input.txt
cdac@MSI:~/LinuxAssignment$ tr 'a-z' 'A-Z' < input.txt > output.txt
cdac@MSI:~/LinuxAssignment$ cat output.txt
YOO!! HOW ARE YOU DOING!!
cdac@MSI:~/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@MSI: ~/LinuxAssignment$ nano duplicate.txt
cdac@MSI:~/LinuxAssignment$ uniq duplicate.txt
3434
Hello
334
Hello

cdac@MSI:~/LinuxAssignment$ sort duplicate.txt | uniq
334
3434
Hello
cdac@MSI:~/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@MSI:~/LinuxAssignment$ nano fruit.txt
cdac@MSI:~/LinuxAssignment$ cat fruits.txt
cat: fruits.txt: No such file or directory
cdac@MSI:~/LinuxAssignment$ cat fruit.txt
mango
banana
guava
strawberry
mango
apple
banana
apple
cdac@MSI:~/LinuxAssignment$ sort fruits.txt | uniq -c
sort: cannot read: fruits.txt: No such file or directory
cdac@MSI:~/LinuxAssignment$ sort fruits.txt | uniq
sort: cannot read: fruits.txt: No such file or directory
cdac@MSI:~/LinuxAssignment$ sort fruit.txt | uniq -c
  2 apple
  2 banana
  1 guava
  1 mango
  1 mango
  1 strawberry
cdac@MSI:~/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.