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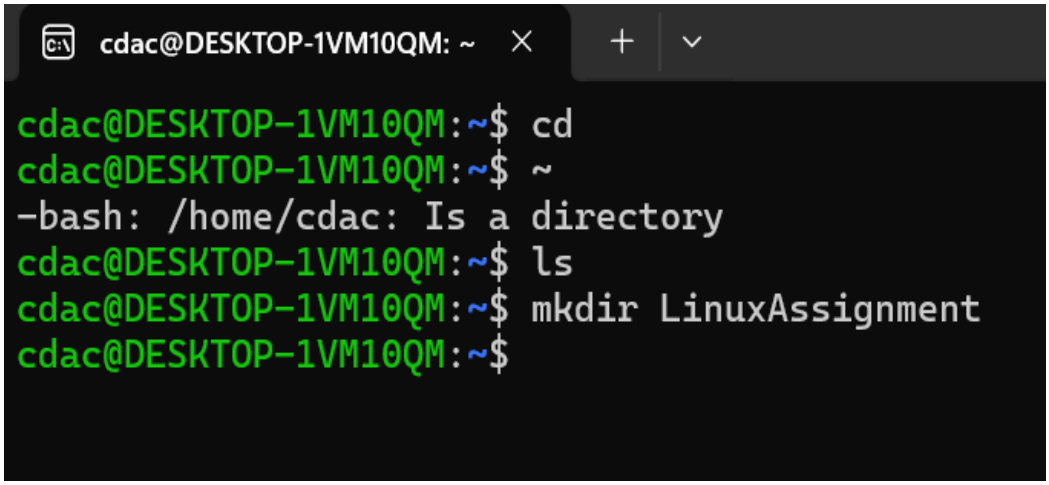
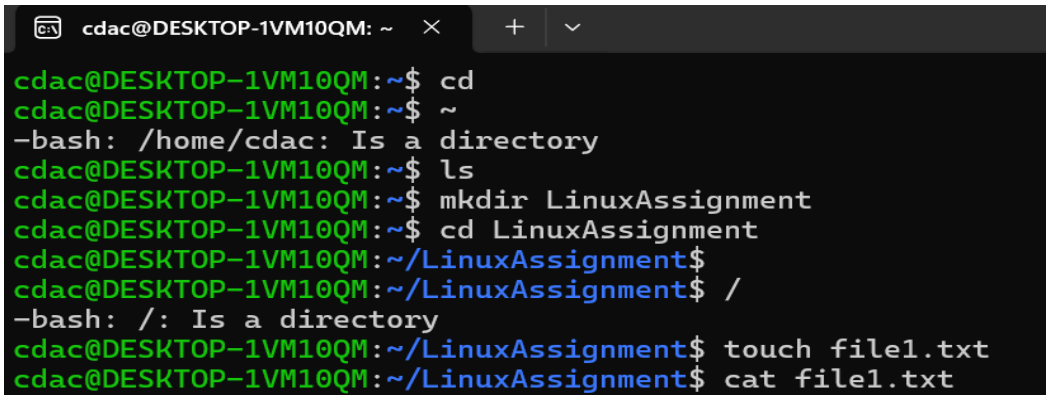
Concepts of Operating System Assignment 1

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.

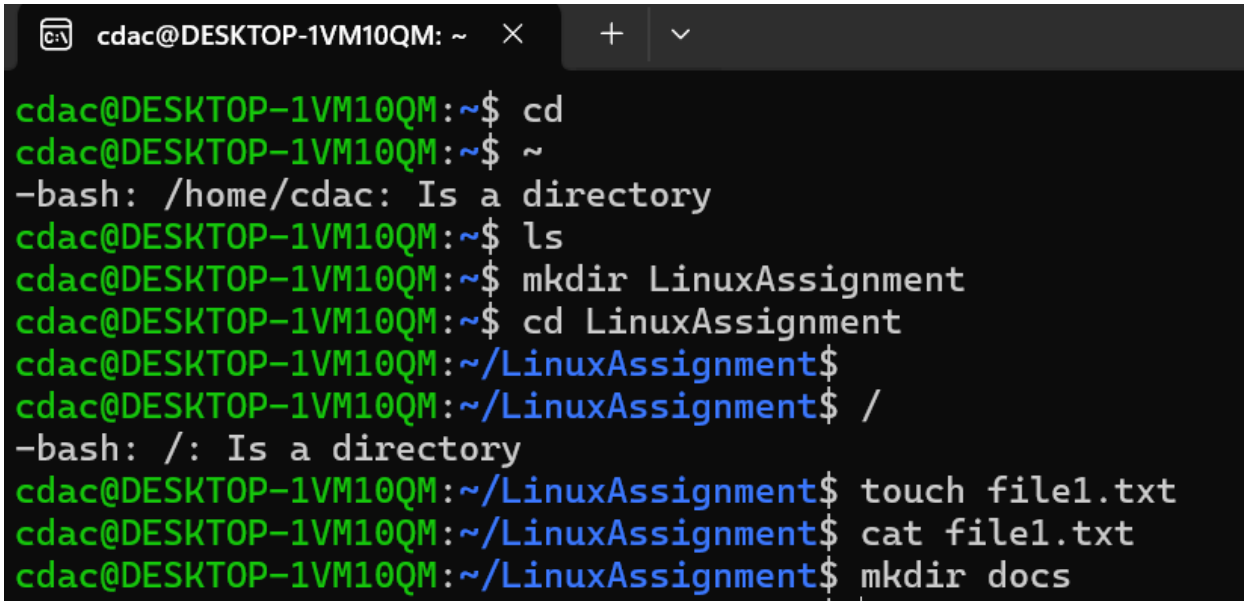


b) File Management:
   a. Inside the "LinuxAssignment" directory, create a new file named "file1.txt". Display its contents.



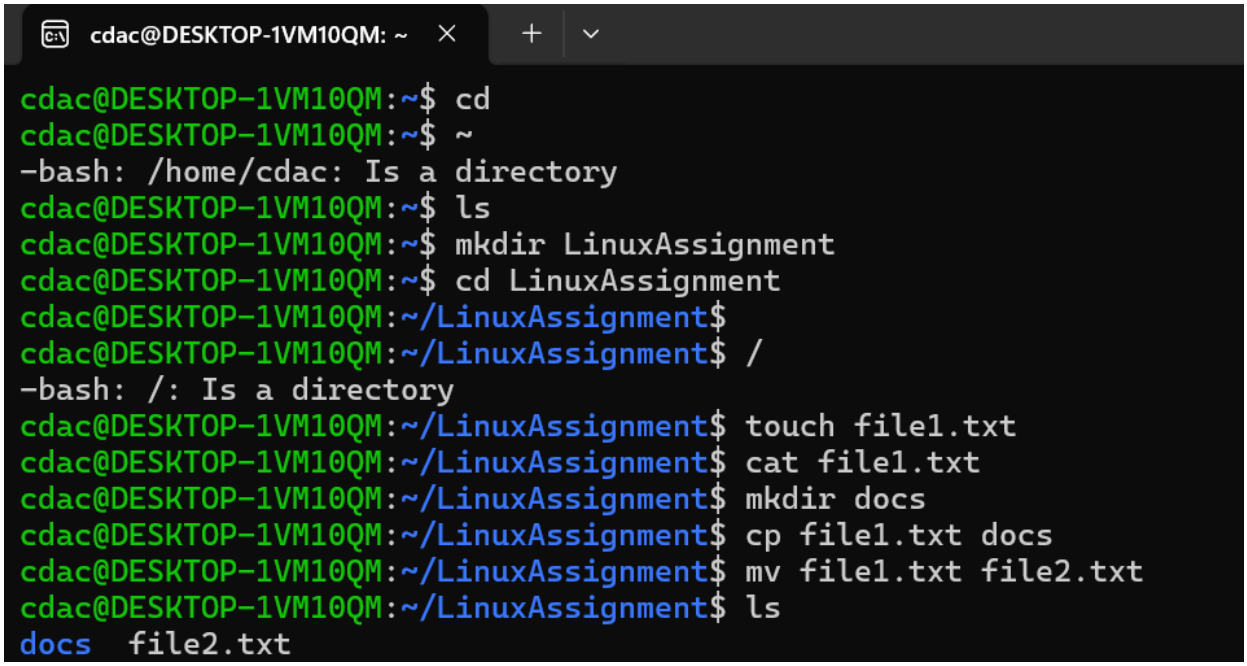
c) Directory Management:

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



d) Copy and Move Files:

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



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-1VM10QM: ~
cdac@DESKTOP-1VM10QM:~$ cd
cdac@DESKTOP-1VM10QM:~$ ~
-bash: /home/cdac: Is a directory
cdac@DESKTOP-1VM10QM:~$ ls
cdac@DESKTOP-1VM10QM:~$ mkdir LinuxAssignment
cdac@DESKTOP-1VM10QM:~$ cd LinuxAssignment
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ /
-bash: /: Is a directory
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ touch file1.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat file1.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ mkdir docs
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cp file1.txt docs
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ mv file1.txt file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ ls
docs  file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ chmod 744 file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ chown $(whoami) 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.

```
cdac@DESKTOP-1VM10QM: ~
cdac@DESKTOP-1VM10QM:~$ cd
cdac@DESKTOP-1VM10QM:~$ ~
-bash: /home/cdac: Is a directory
cdac@DESKTOP-1VM10QM:~$ ls
cdac@DESKTOP-1VM10QM:~$ mkdir LinuxAssignment
cdac@DESKTOP-1VM10QM:~$ cd LinuxAssignment
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ /
-bash: /: Is a directory
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ touch file1.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat file1.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ mkdir docs
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cp file1.txt docs
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ mv file1.txt file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ ls
docs  file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ chmod 744 file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ chown $(whoami) file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ ls
docs  file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ ls /
bin             boot  etc   init  lib.usr-is-merged  lost+found  mnt  proc  run   sbin.usr-is-merged  srv  tmp  var
bin.usr-is-merged  dev   home  lib   lib64             media       opt  root  sbin  snap                sys  usr
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cd
cdac@DESKTOP-1VM10QM:~$ ls
LinuxAssignment
cdac@DESKTOP-1VM10QM:~$ ls /
bin             boot  etc   init  lib.usr-is-merged  lost+found  mnt  proc  run   sbin.usr-is-merged  srv  tmp  var
bin.usr-is-merged  dev   home  lib   lib64             media       opt  root  sbin  snap                sys  usr
cdac@DESKTOP-1VM10QM:~$
```

g) File Searching:
   a. Search for all files with the extension ".txt" in the current directory and its subdirectories.

```
cdac@DESKTOP-1VM10QM:~$ cd LinuxAssignment
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ find . -type f -name "*.txt"
./docs/file1.txt
./file2.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$
```

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

```
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ grep "example" file1.txt
grep: file1.txt: No such file or directory
```

h) System Information:
   a. Display the current system date and time.

```
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ date
Fri Feb 28 18:07:23 UTC 2025
```

i) Networking:
   a. Display the IP address of the system.

```
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ hostname -I
172.31.45.121
```

   b. Ping a remote server to check connectivity (provide a remote server address to ping).

```
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ ping google.com -c 4
PING google.com (142.250.183.46) 56(84) bytes of data.
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=1 ttl=115 time=12.9 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=2 ttl=115 time=10.5 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=3 ttl=115 time=14.0 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=4 ttl=115 time=12.9 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 10.515/12.597/14.028/1.284 ms
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ ping facebook.com -c 4
PING facebook.com (157.240.237.35) 56(84) bytes of data.
64 bytes from edge-star-mini-shv-02-pnq1.facebook.com (157.240.237.35): icmp_seq=1 ttl=54 time=20.2 ms
64 bytes from edge-star-mini-shv-02-pnq1.facebook.com (157.240.237.35): icmp_seq=2 ttl=54 time=21.7 ms
64 bytes from edge-star-mini-shv-02-pnq1.facebook.com (157.240.237.35): icmp_seq=3 ttl=54 time=30.4 ms

--- facebook.com ping statistics ---
4 packets transmitted, 3 received, 25% packet loss, time 3008ms
rtt min/avg/max/mdev = 20.200/24.119/30.439/4.511 ms
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$
```

J) File Compression:

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

```
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ zip -r docs.zip docs
  adding: docs/ (stored 0%)
  adding: docs/file1.txt (stored 0%)
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ mkdir extract_file
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ unzip docs.zip -d extract_file
Archive:  docs.zip
   creating: extract_file/docs/
 extracting: extract_file/docs/file1.txt
```

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-1VM10QM:~/LinuxAssignment$ nano file1.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat file1.txt
HELLO
CDAC FEB 2025
MY NAME IS VAIBHAV KAPSE
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ sed -i 's/HELLO/GOOD MORNING/g' file1.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat file1.txt
GOOD MORNING
CDAC FEB 2025
MY NAME IS VAIBHAV KAPSE
```

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-1VM10QM:~/LinuxAssignment$ touch data.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat data.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ nano data.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat data.txt
HELLOO
I AM DOING CDAC
MY FIRST NAME IS VAIBHAV
MY SECOND NAME IS VAIJNATH
MY LAST NAME IS KAPSE
I DID MY GRADUATION IN BTECH FROM VIT PUNE
I am a curious individual who loves learning new things.
I enjoy exploring different technologies and tools.
Problem-solving excites me, and I thrive when faced with challenges.
I am always open to new ideas and perspectives.
I like to stay organized and manage my tasks efficiently.
I value both collaboration and independent work.
I appreciate creativity and innovation in various fields.
Reading and exploring new knowledge are some of my hobbies.
I enjoy engaging in meaningful conversations with people.

cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ head -n 10 data.txt
HELLOO
I AM DOING CDAC
MY FIRST NAME IS VAIBHAV
MY SECOND NAME IS VAIJNATH
MY LAST NAME IS KAPSE
I DID MY GRADUATION IN BTECH FROM VIT PUNE
I am a curious individual who loves learning new things.
I enjoy exploring different technologies and tools.
```

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-1VM10QM:~/LinuxAssignment$ tail -n 5 data.txt
I value both collaboration and independent work.
I appreciate creativity and innovation in various fields.
Reading and exploring new knowledge are some of my hobbies.
I enjoy engaging in meaningful conversations with people.
```

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-1VM10QM:~/LinuxAssignment$ touch numbers.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ nano numbers.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat numbers.txt
10010
1500
1
2000
50000
6000
5000
7000
1256
59863
11546
15540
2541321
151542313
21653
20000
3024
255000
10000
101202
5000
```

```
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ head -n 15 numbers.txt
10010
1500
1
2000
50000
6000
5000
7000
1256
59863
11546
15540
2541321
151542313
21653
```

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

```
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ tail -n 3 numbers.txt
10000
101202
5000
```

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-1VM10QM:~/LinuxAssignment$ touch input.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ nano input.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat input.txt
i am doing pg diploma from cdac mumbai
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ tr '[:lower:]' '[:upper:]' < input.txt > output.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat input.txt
i am doing pg diploma from cdac mumbai
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat output.txt
I AM DOING PG DIPLOMA FROM CDAC MUMBAI
cdac@DESKTOP-1VM10QM:~/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@DESKTOP-1VM10QM:~/LinuxAssignment$ touch duplicate.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ nano duplicate.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat duplicate.txt
apple
banana
apple
orange
banana
grape
apple
kiwi
grape
pear
orange
banana
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ sort duplicate.txt | uniq
apple
banana
grape
kiwi
mango
orange
pear
```

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-1VM10QM:~/LinuxAssignment$ touch fruit.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ nano fruit.txt
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ cat fruit.txt
bannna
apple
jackfruit
grapes
sitaphal
apple
jackfruit
apple
bannna
apple
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$ sort fruit.txt | uniq -c
      4 apple
      2 bannna
      1 grapes
      2 jackfruit
      1 sitaphal
cdac@DESKTOP-1VM10QM:~/LinuxAssignment$
```