

CDAC MUMBAI
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.

Ans :

```
mallikarjun@MAYUR: ~/Linux × + v
mallikarjun@MAYUR:~$ pwd
/home/mallikarjun
mallikarjun@MAYUR:~$ ls
LinuxAssignment
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$
```

b) File Management:

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

Ans :

```
mallikarjun@MAYUR: ~/Linux × + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ nano file1.txt
mallikarjun@MAYUR:~/LinuxAssignment$ ls
file1.txt
mallikarjun@MAYUR:~/LinuxAssignment$ cat file1.txt
my name is Mallikarjun Konchurkar

mallikarjun@MAYUR:~/LinuxAssignment$ |
```

c) Directory Management:

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

Ans :

```
mallikarjun@MAYUR: ~/Linux x + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ mkdir docs
mallikarjun@MAYUR:~/LinuxAssignment$ ls
docs  file1.txt
mallikarjun@MAYUR:~/LinuxAssignment$
```

d) Copy and Move Files:

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

Ans :

```
mallikarjun@MAYUR: ~/Linux x + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ cp file1.txt file2.txt
mallikarjun@MAYUR:~/LinuxAssignment$ mv file2.txt docs
mallikarjun@MAYUR:~/LinuxAssignment$ ls
docs  file1.txt
mallikarjun@MAYUR:~/LinuxAssignment$ cd docs
mallikarjun@MAYUR:~/LinuxAssignment/docs$ ls
file2.txt
mallikarjun@MAYUR:~/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.

Ans :

```
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ ls -l docs/file2.txt
-rw-r--r-- 1 mallikarjun mallikarjun 36 Feb 28 17:24 docs/file2.txt
mallikarjun@MAYUR:~/LinuxAssignment$ chmod 744 docs/file2.txt
mallikarjun@MAYUR:~/LinuxAssignment$ ls -l docs/file2.txt
-rwxr--r-- 1 mallikarjun mallikarjun 36 Feb 28 17:24 docs/file2.txt
mallikarjun@MAYUR:~/LinuxAssignment$ sudo chown $USER:$USER docs/file2.txt
[sudo] password for mallikarjun:
mallikarjun@MAYUR:~/LinuxAssignment$ ls -l docs/file2.txt
-rwxr--r-- 1 mallikarjun mallikarjun 36 Feb 28 17:24 docs/file2.txt
mallikarjun@MAYUR:~/LinuxAssignment$
```

f) Final Checklist:

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

Ans :

```
mallikarjun@MAYUR: ~  
mallikarjun@MAYUR:~$ ls -l ~/LinuxAssignment  
total 8  
drwxr-xr-x 2 mallikarjun mallikarjun 4096 Feb 28 17:24 docs  
-rw-r--r-- 1 mallikarjun mallikarjun 36 Feb 27 22:30 file1.txt  
mallikarjun@MAYUR:~$ ls -l ~/LinuxAssignment/docs  
total 4  
-rw-r--r-- 1 mallikarjun mallikarjun 36 Feb 28 17:24 file2.txt  
mallikarjun@MAYUR:~$ ls -l /  
total 1472  
lrwxrwxrwx 1 root root 7 Jan 7 03:05 bin -> usr/bin  
drwxr-xr-x 2 root root 4096 Apr 18 2022 boot  
drwxr-xr-x 8 root root 2940 Feb 28 17:17 dev  
drwxr-xr-x 82 root root 4096 Feb 28 17:56 etc  
drwxr-xr-x 3 root root 4096 Feb 24 18:30 home  
-rwxr-xr-x 2 root root 1440152 Feb 24 17:51 init  
lrwxrwxrwx 1 root root 7 Jan 7 03:05 lib -> usr/lib  
lrwxrwxrwx 1 root root 9 Jan 7 03:05 lib32 -> usr/lib32  
lrwxrwxrwx 1 root root 9 Jan 7 03:05 lib64 -> usr/lib64  
lrwxrwxrwx 1 root root 10 Jan 7 03:05 libx32 -> usr/libx32  
drwx----- 2 root root 16384 Apr 10 2019 lost+found  
drwxr-xr-x 2 root root 4096 Jan 7 03:05 media  
drwxr-xr-x 6 root root 4096 Feb 24 18:24 mnt  
drwxr-xr-x 2 root root 4096 Jan 7 03:05 opt  
dr-xr-xr-x 194 root root 0 Feb 28 17:56 proc  
drwx----- 2 root root 4096 Jan 7 03:07 root  
drwxr-xr-x 6 root root 120 Feb 28 17:56 run  
lrwxrwxrwx 1 root root 8 Jan 7 03:05 sbin -> usr/sbin  
drwxr-xr-x 2 root root 4096 Oct 11 13:35 snap  
drwxr-xr-x 2 root root 4096 Jan 7 03:05 srv  
dr-xr-xr-x 11 root root 0 Feb 28 17:16 sys  
drwxrwxrwt 2 root root 4096 Feb 27 21:38 tmp  
drwxr-xr-x 14 root root 4096 Jan 7 03:05 usr  
drwxr-xr-x 13 root root 4096 Jan 7 03:07 var  
mallikarjun@MAYUR:~$
```

g) File Searching:

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

Ans :

```
mallikarjun@MAYUR: ~  
mallikarjun@MAYUR:~$ find . -type f -name "*.txt"  
./LinuxAssignment/docs/file2.txt  
./LinuxAssignment/file1.txt  
./terminal_output.txt  
mallikarjun@MAYUR:~$
```

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

Ans :

```
mallikarjun@MAYUR: ~  
mallikarjun@MAYUR:~$ cat ~/LinuxAssignment/file1.txt  
my name is Mallikarjun Konchurkar  
  
mallikarjun@MAYUR:~$ grep -i "Mallikarjun" ~/LinuxAssignment/file1.txt  
my name is Mallikarjun Konchurkar  
mallikarjun@MAYUR:~$
```

h) System Information:

a. Display the current system date and time.

Ans :

```
mallikarjun@MAYUR: ~  
mallikarjun@MAYUR:~$ date  
Fri Feb 28 18:31:46 IST 2025  
mallikarjun@MAYUR:~$
```

i) Networking:

a. Display the IP address of the system.

Ans :

```
mallikarjun@MAYUR: ~  
mallikarjun@MAYUR:~$ hostname -I  
172.25.246.78  
mallikarjun@MAYUR:~$
```

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

Ans :

```
mallikarjun@MAYUR: ~  
mallikarjun@MAYUR:~$ 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=53 time=101 ms  
64 bytes from 8.8.8.8: icmp_seq=2 ttl=53 time=77.6 ms  
64 bytes from 8.8.8.8: icmp_seq=3 ttl=53 time=236 ms  
64 bytes from 8.8.8.8: icmp_seq=4 ttl=53 time=157 ms  
64 bytes from 8.8.8.8: icmp_seq=5 ttl=53 time=289 ms  
^C  
--- 8.8.8.8 ping statistics ---  
5 packets transmitted, 5 received, 0% packet loss, time 4006ms  
rtt min/avg/max/mdev = 77.634/172.138/289.417/80.030 ms  
mallikarjun@MAYUR:~$
```

j) File Compression:

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

Ans :

```
mallikarjun@MAYUR: ~/Linux x + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ zip -r docs1.zip docs
updating: docs/ (stored 0%)
updating: docs/file2.txt (stored 0%)
mallikarjun@MAYUR:~/LinuxAssignment$ ls
docs docs1.zip file1.txt
mallikarjun@MAYUR:~/LinuxAssignment$
```

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

Ans :

```
mallikarjun@MAYUR: ~/Linux x + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ ls
docs docs1.zip extracted_docs file1.txt
mallikarjun@MAYUR:~/LinuxAssignment$ unzip docs1.zip -d new_docs
Archive: docs1.zip
  creating: new_docs/docs/
  extracting: new_docs/docs/file2.txt
mallikarjun@MAYUR:~/LinuxAssignment$ ls
docs docs1.zip extracted_docs file1.txt new_docs
mallikarjun@MAYUR:~/LinuxAssignment$ |
```

k) File Editing:

- Open the "file1.txt" file in a text editor and add some text to it.

Ans :

```
mallikarjun@MAYUR: ~/Linux x + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ ls
docs docs1.zip extracted_docs file1.txt new_docs
mallikarjun@MAYUR:~/LinuxAssignment$ nano file1.txt
mallikarjun@MAYUR:~/LinuxAssignment$ cat file1.txt
welcome to the new world of programming

mallikarjun@MAYUR:~/LinuxAssignment$
```

- Replace a specific word in the "file1.txt" file with another word

Ans :

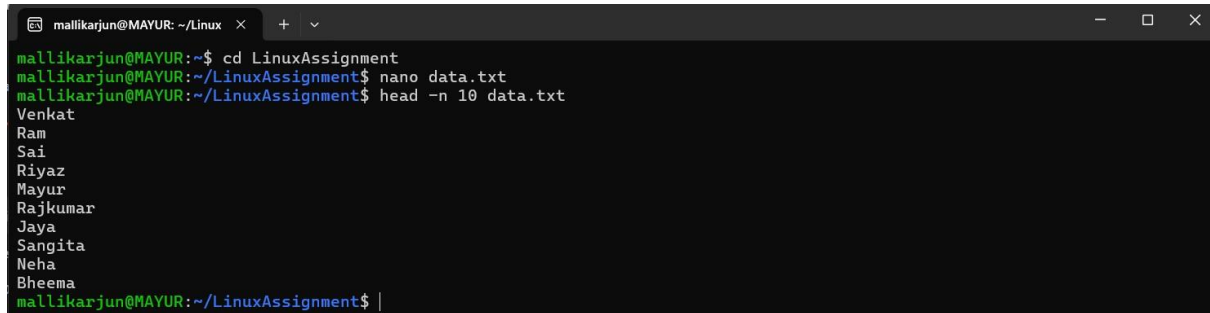
```
mallikarjun@MAYUR: ~/Linux x + v
mallikarjun@MAYUR:~$ cd ~/LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ sed -i 's/programming/coding/g' file1.txt
mallikarjun@MAYUR:~/LinuxAssignment$ cat file1.txt
welcome to the new world of coding

mallikarjun@MAYUR:~/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.

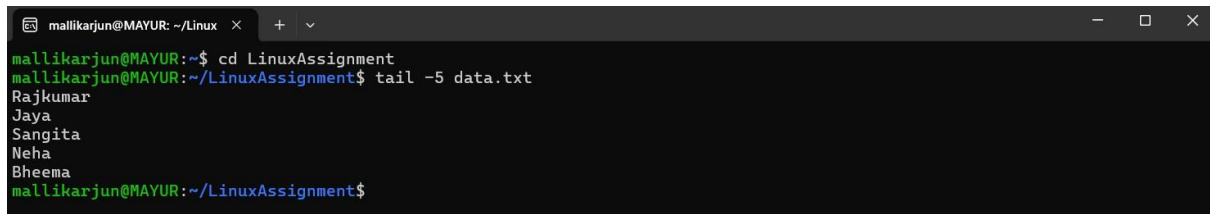
Ans :

A terminal window titled 'mallikarjun@MAYUR: ~/Linux' with a dark background. The user enters 'cd LinuxAssignment', then 'nano data.txt' to create a file. After exiting nano, they run 'head -n 10 data.txt' to display the first 10 lines of the file. The output shows a list of names: Venkat, Ram, Sai, Riyaz, Mayur, Rajkumar, Jaya, Sangita, Neha, and Bheema. The prompt returns to the shell.

```
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ nano data.txt
mallikarjun@MAYUR:~/LinuxAssignment$ head -n 10 data.txt
Venkat
Ram
Sai
Riyaz
Mayur
Rajkumar
Jaya
Sangita
Neha
Bheema
mallikarjun@MAYUR:~/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.

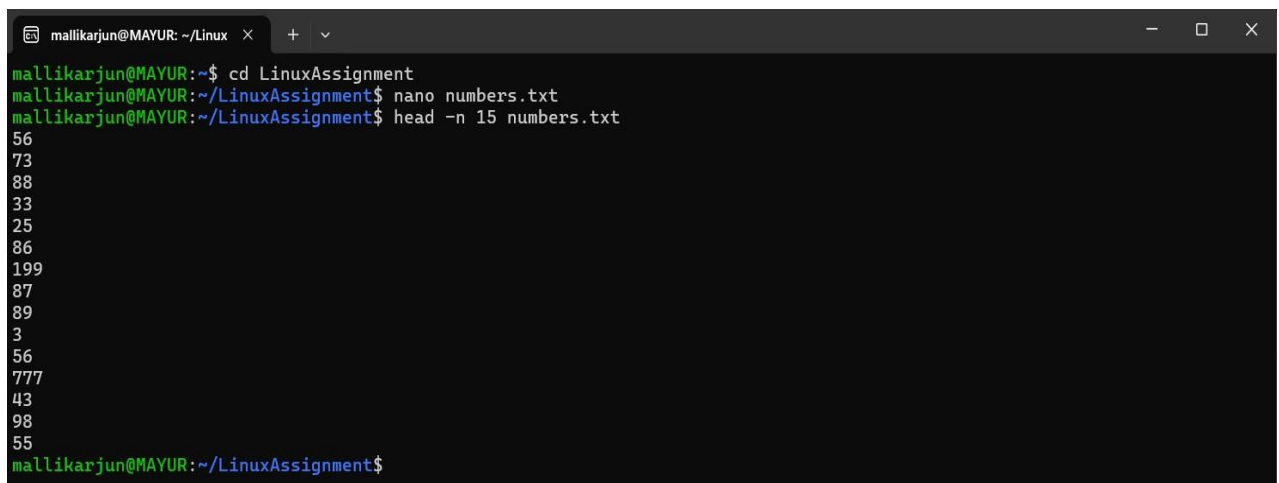
Ans :

A terminal window titled 'mallikarjun@MAYUR: ~/Linux' with a dark background. The user is in the 'LinuxAssignment' directory and runs 'tail -5 data.txt' to view the last 5 lines of the file. The output shows the last five names: Rajkumar, Jaya, Sangita, Neha, and Bheema. The prompt returns to the shell.

```
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ tail -5 data.txt
Rajkumar
Jaya
Sangita
Neha
Bheema
mallikarjun@MAYUR:~/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.

Ans :

A terminal window titled 'mallikarjun@MAYUR: ~/Linux' with a dark background. The user enters 'cd LinuxAssignment', then 'nano numbers.txt' to create a file. After exiting nano, they run 'head -n 15 numbers.txt' to display the first 15 lines of the file. The output shows a list of numbers: 56, 73, 88, 33, 25, 86, 199, 87, 89, 3, 56, 777, 43, 98, and 55. The prompt returns to the shell.

```
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ nano numbers.txt
mallikarjun@MAYUR:~/LinuxAssignment$ head -n 15 numbers.txt
56
73
88
33
25
86
199
87
89
3
56
777
43
98
55
mallikarjun@MAYUR:~/LinuxAssignment$
```


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

Ans :

```
mallikarjun@MAYUR: ~/Linux X + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ tail -n 3 numbers.txt
56
87
908
mallikarjun@MAYUR:~/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."

Ans :

```
mallikarjun@MAYUR: ~/Linux X + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ nano input.txt
mallikarjun@MAYUR:~/LinuxAssignment$ cat input.txt
this is lowercase text
THIS IS UPPERCASE TEXT
This is @$%#*Special Character TEXT
mallikarjun@MAYUR:~/LinuxAssignment$ tr 'a-z' 'A-Z' < input.txt > output.txt
mallikarjun@MAYUR:~/LinuxAssignment$ cat output.txt
THIS IS LOWERCASE TEXT
THIS IS UPPERCASE TEXT
THIS IS @$%#*SPECIAL CHARACTER TEXT
mallikarjun@MAYUR:~/LinuxAssignment$
```

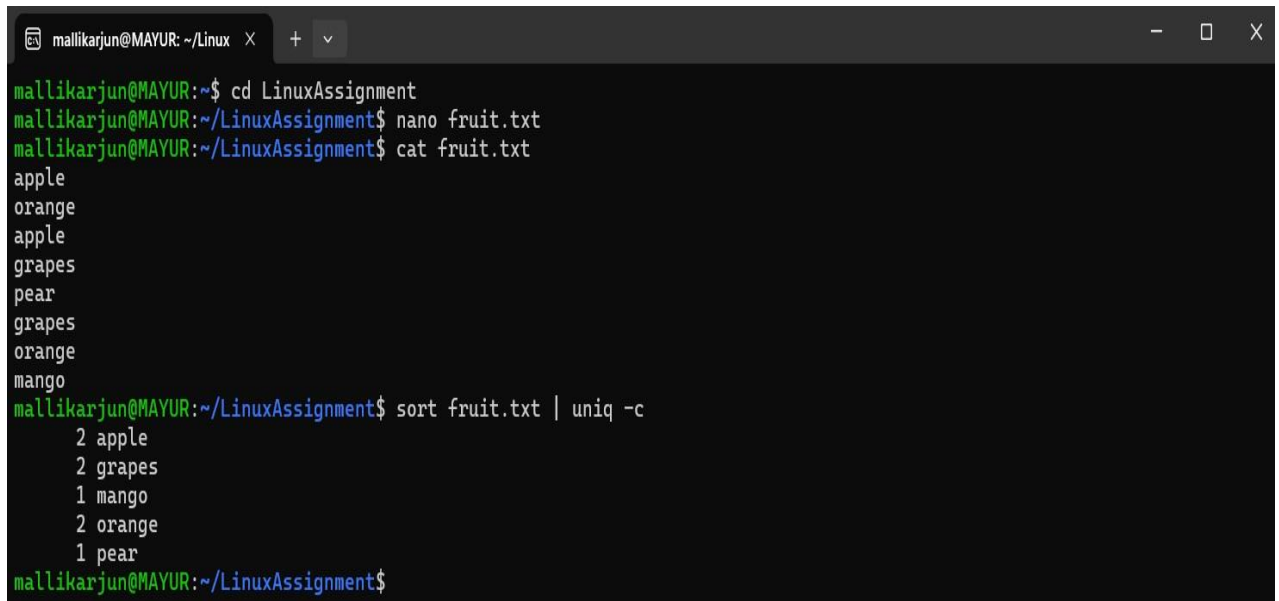
f. In a file named "duplicate.txt," there are several lines of text, some of which are duplicates. Use a command to display only the unique lines from "duplicate.txt."

Ans :

```
mallikarjun@MAYUR: ~/Linux X + v
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ cat duplicate.txt
mango
orange
cherry
kiwi
watermelon
kiwi
orange
grapes
muskmelon
pear
muskmelon
mallikarjun@MAYUR:~/LinuxAssignment$ cat duplicate.txt | sort | uniq
cherry
grapes
kiwi
mango
muskmelon
orange
pear
watermelon
mallikarjun@MAYUR:~/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."

Ans :

A terminal window titled 'mallikarjun@MAYUR: ~/Linux' shows a series of commands and their outputs. The user navigates to the 'LinuxAssignment' directory, creates a file 'fruit.txt' using 'nano', and displays its contents with 'cat'. The file contains a list of fruits: apple, orange, apple, grapes, pear, grapes, orange, and mango. Then, the user runs 'sort fruit.txt | uniq -c', which sorts the list and counts the occurrences of each fruit. The output shows: 2 apple, 2 grapes, 1 mango, 2 orange, and 1 pear.

```
mallikarjun@MAYUR:~$ cd LinuxAssignment
mallikarjun@MAYUR:~/LinuxAssignment$ nano fruit.txt
mallikarjun@MAYUR:~/LinuxAssignment$ cat fruit.txt
apple
orange
apple
grapes
pear
grapes
orange
mango
mallikarjun@MAYUR:~/LinuxAssignment$ sort fruit.txt | uniq -c
  2 apple
  2 grapes
  1 mango
  2 orange
  1 pear
mallikarjun@MAYUR:~/LinuxAssignment$
```