Department of Computer Science and Engineering

Course Code: CSE 336
Course Title: Operating System Lab

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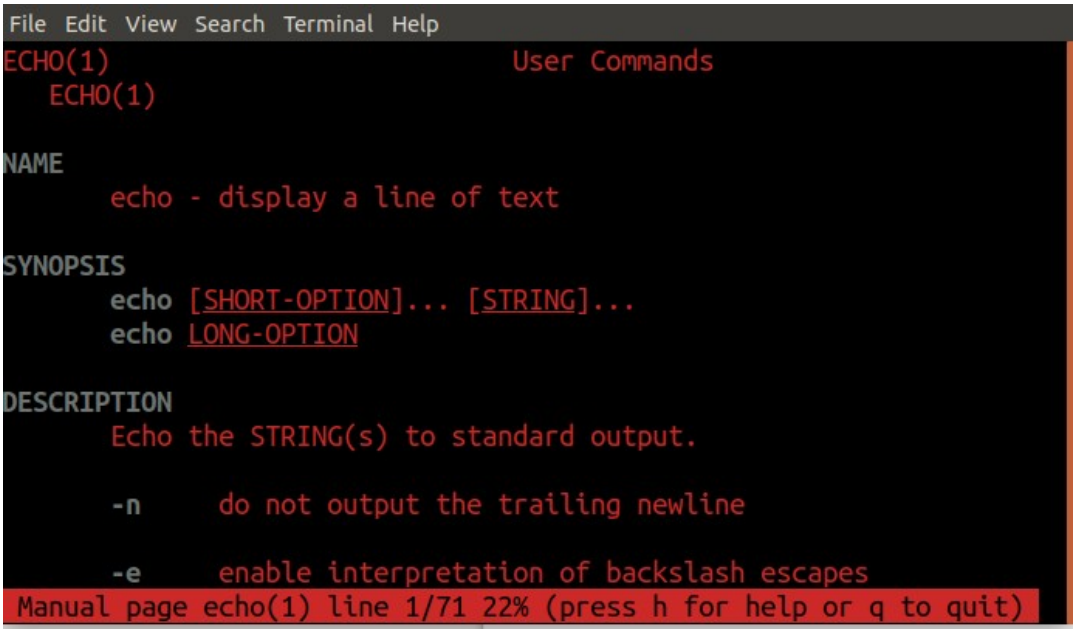
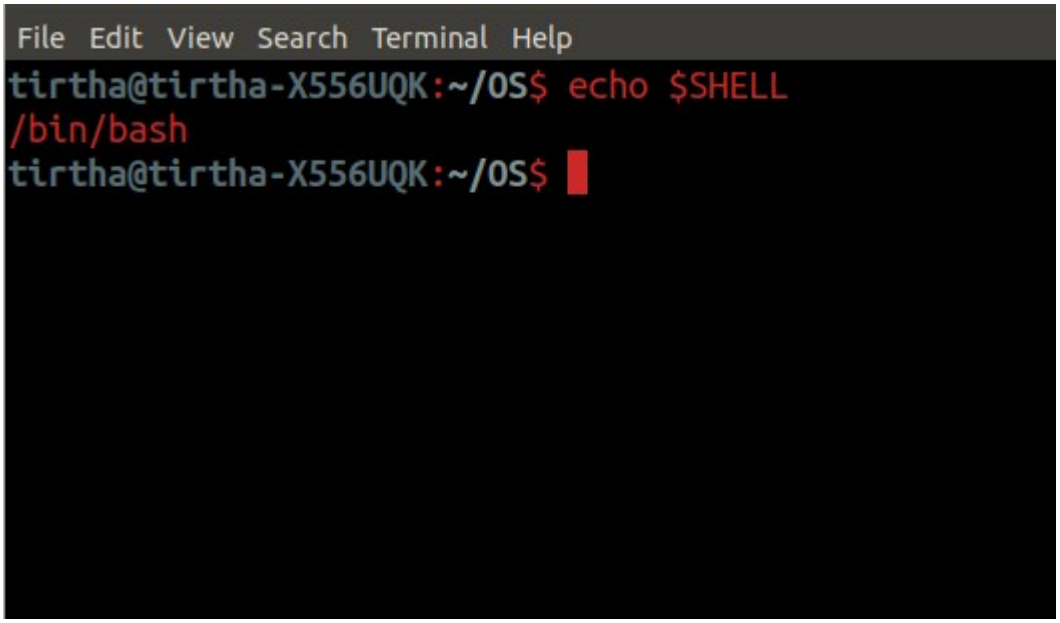
1. The **echo** command is used to display a line of text as output. The ‘echo hello world’ command displays a line of text as output, which is ‘hello world’. If we type the command ‘man echo’ on linux terminal, the following output is showed.



2. The **man man** command was typed and the operation of the **man** command was shown as output. The command **echo $SHELL** shows the name of the login shell that is currently in use.
If we type the command on linux terminal, the following output is shown.



3.

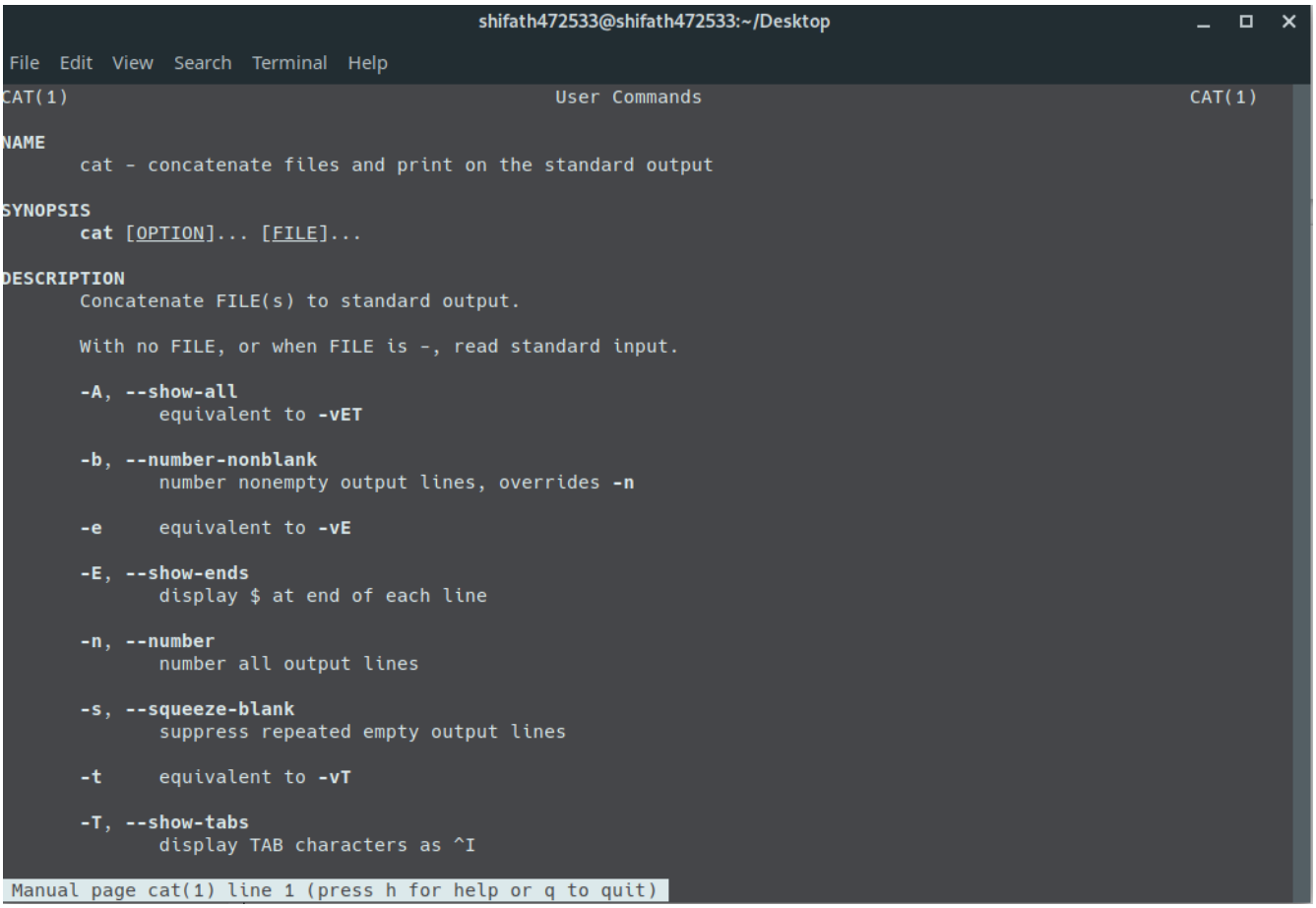
man: man command is used to display the manual of a command or function that we can run on the terminal of linux.It provides a detailed view of the command which includes Name, Synopsis,Description,options,exit,status,return values,errors,files,versions,examples,authors and see also.

Example:

If the following command is typed in linux command shell

$ man cat

Then the output is



who: This command is used to show the following informations.

1.Login name of the users .
2.Terminal line numbers
3.Login time of the users in to system
4.Remote host name of the user

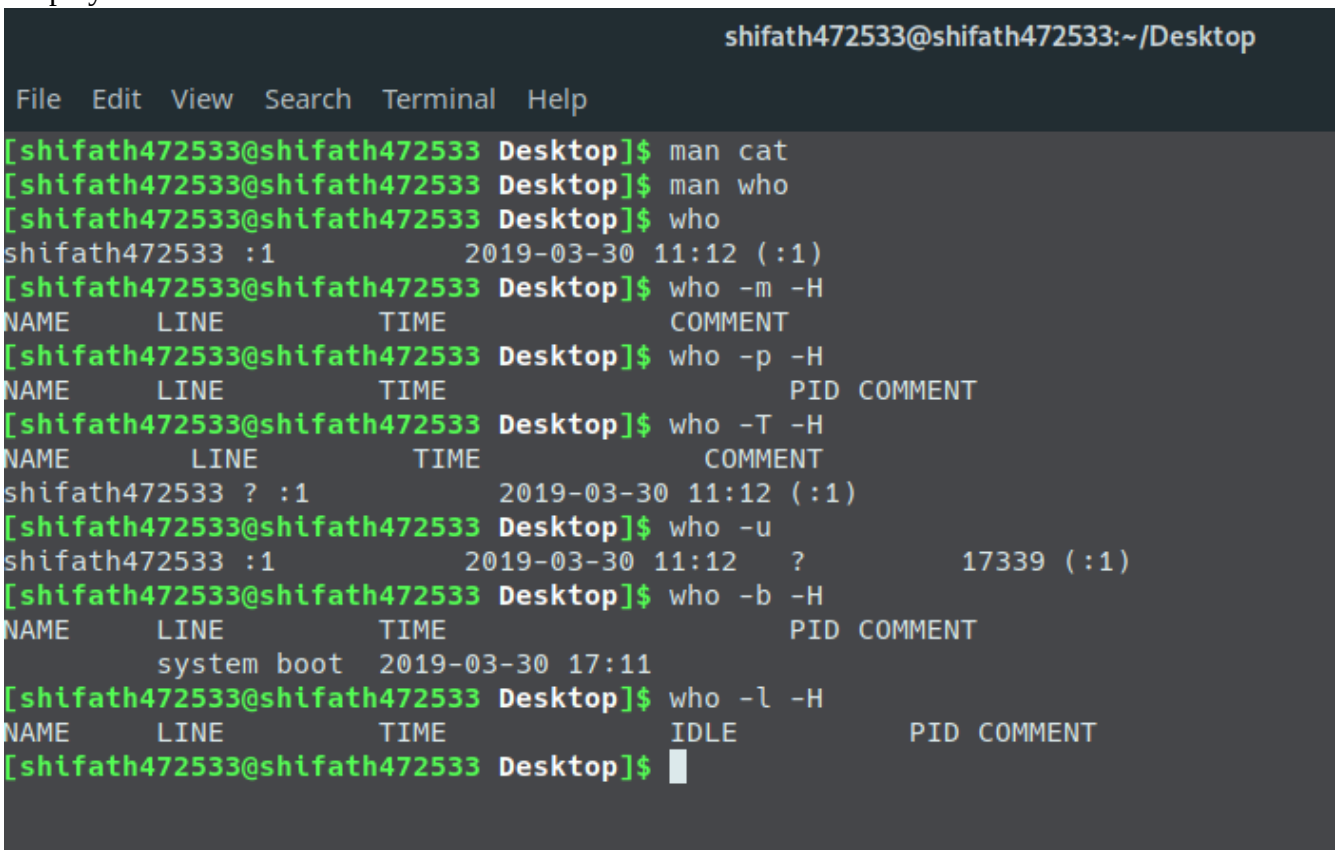
If **who** is run in the shell in this way

$who

then output will be

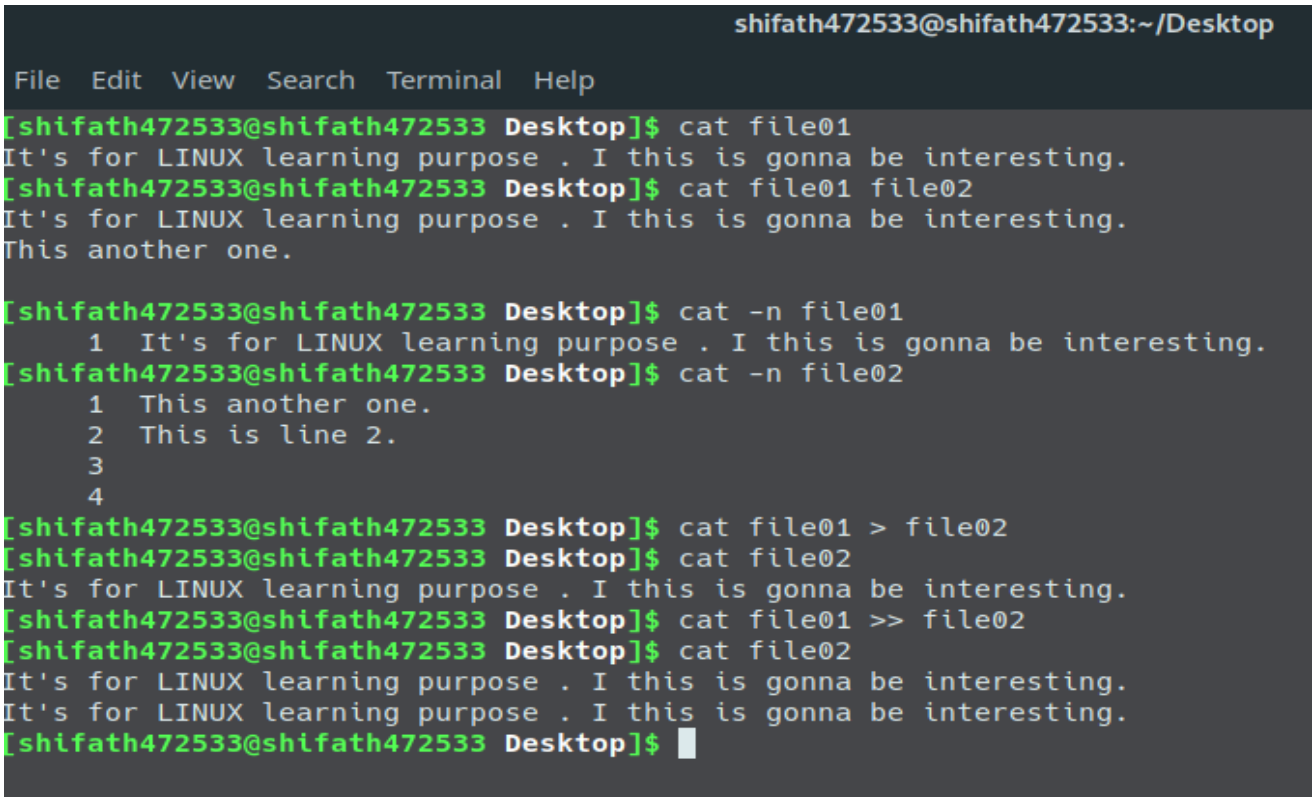
shifath472533 :1 2019-03-30 11:12 (:1)

If the who command with other attribute is typed in the linux command shell then the following output is displayed.



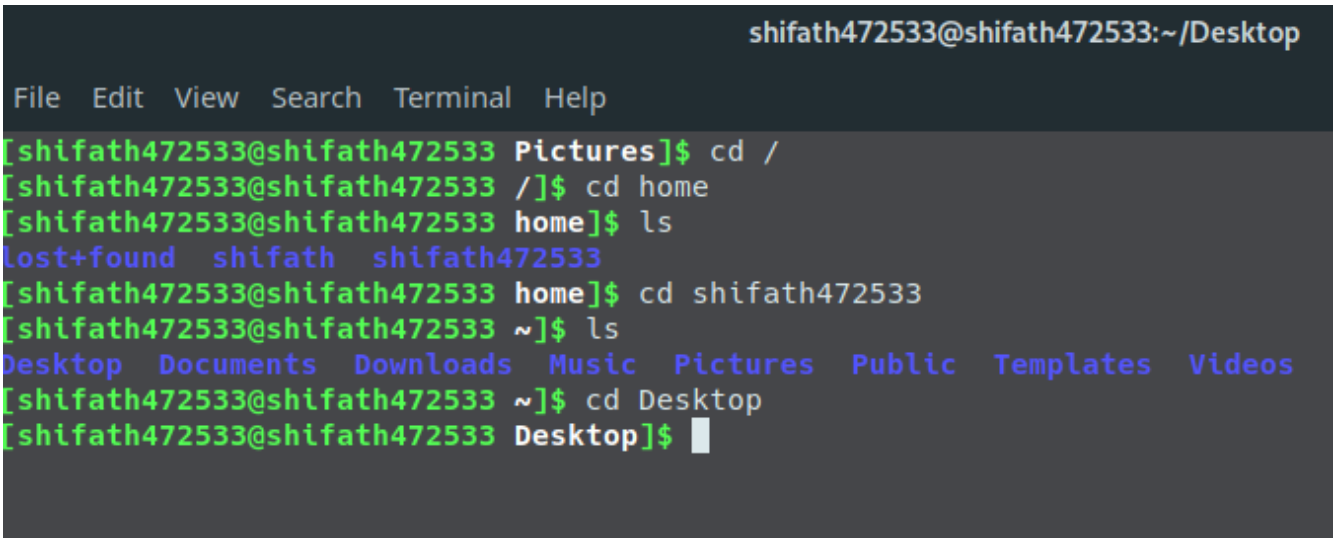
In the command shell different formats of who command is displayed.

cat:
This command reads data from the file and shows their contents as their output. It is used to create,view,concatenate files etc.

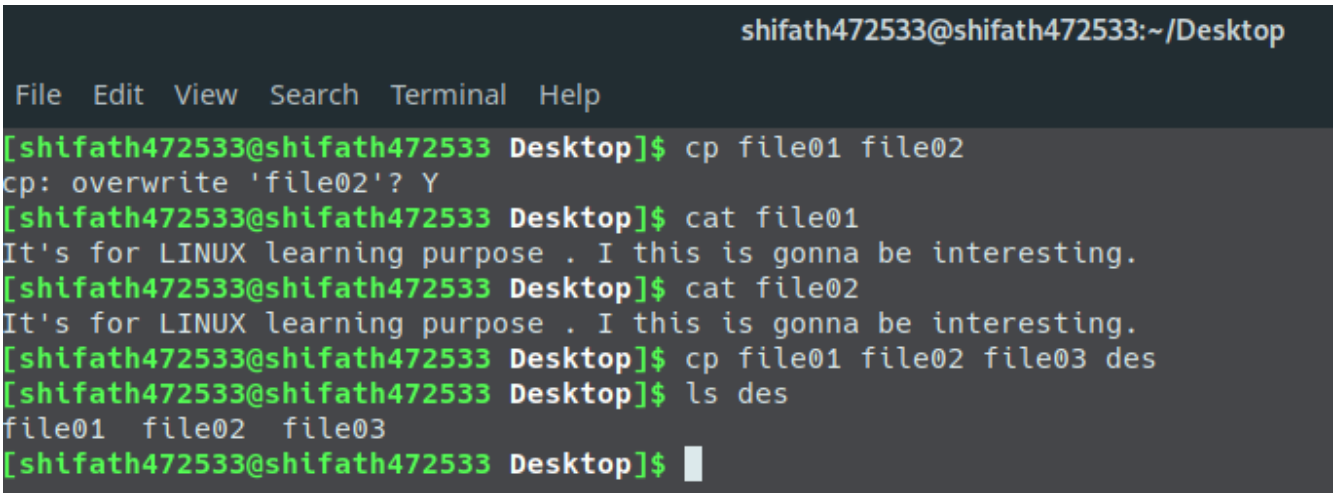


The output for cat command is displayed below -

cd:
This command is used to change the current working directory.
The output of this command is displayed below.



cp:
cp is used to copy files or a group of files or directory.
The output of the cp command is given below



ps:
This command is used to show the currently running processes with their PIDs and some other details like TTY,TIME,CMD etc.

```
shifath472533@shifath472533:~/Desktop
File  Edit  View  Search  Terminal  Help
[shifath472533@shifath472533 Desktop]$ ps
  PID TTY          TIME CMD
  661 pts/0    00:00:00 bash
11089 pts/0    00:00:00 ps
[shifath472533@shifath472533 Desktop]$ ps -A
  PID TTY          TIME CMD
    1 ?        00:00:07 systemd
    2 ?        00:00:00 kthreadd
    3 ?        00:00:00 rcu_gp
    4 ?        00:00:00 rcu_par_gp
    6 ?        00:00:00 kworker/0:0H
    8 ?        00:00:00 mm_percpu_wq
    9 ?        00:00:00 ksoftirqd/0
   10 ?        00:00:01 rcu_preempt
```

Here , ps -a command shows all the running processes.

ls:
This command displays the directory contents of files and directories.

```
shifath472533@shifath472533:~/Desktop
File  Edit  View  Search  Terminal  Help
[shifath472533@shifath472533 Desktop]$ ls des
file01  file02  file03
[shifath472533@shifath472533 Desktop]$ ls
des  file01  file02  file03
[shifath472533@shifath472533 Desktop]$
```

By using ‘ls des’ command we can see all the files in des directory.
mv:
This command renames a file or folder or moves group of files to different directories.
Output:

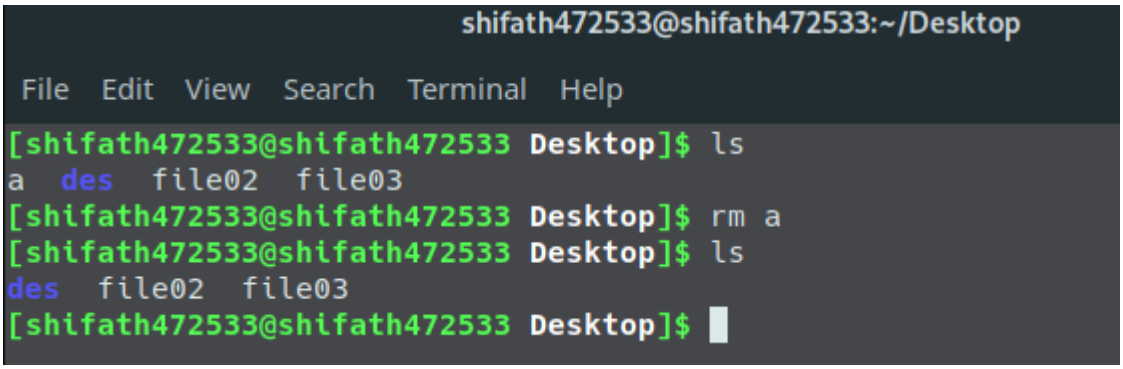
```
shifath472533@shifath472533:~/Desktop
File  Edit  View  Search  Terminal  Help
[shifath472533@shifath472533 Desktop]$ ls
des  file01  file02  file03
[shifath472533@shifath472533 Desktop]$ mv file01 a
[shifath472533@shifath472533 Desktop]$ ls
a  des  file02  file03
[shifath472533@shifath472533 Desktop]$
```

Here ‘file01’ is renamed to ‘a’.

rm:

This command is used to remove references to objects from the file system.

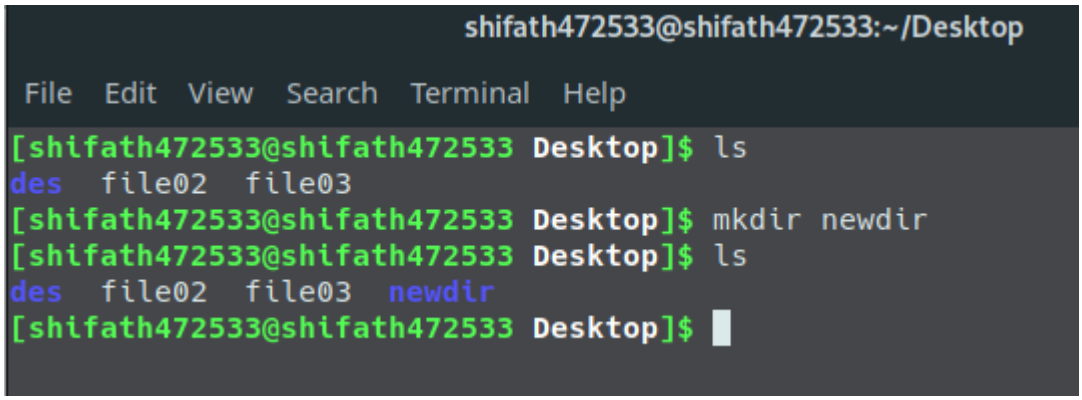
Output:



Here file ‘a’ is removed.

mkdir:

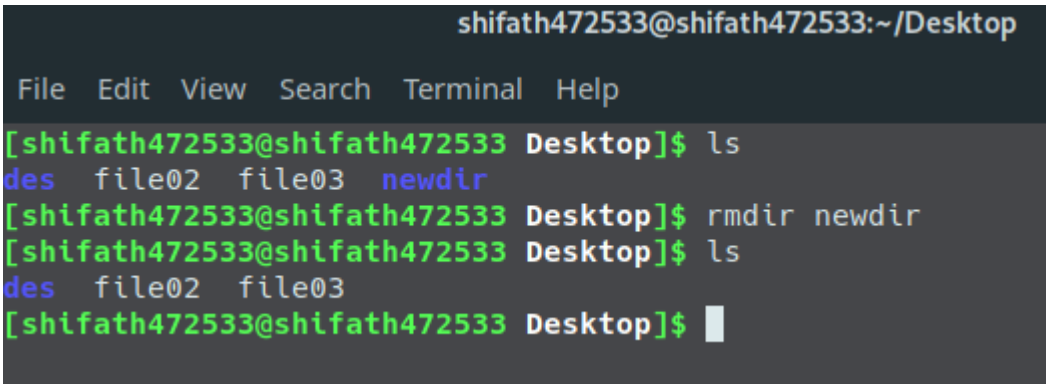
This command is used to create new directories.



Here new directory ‘newdir’ has been created.

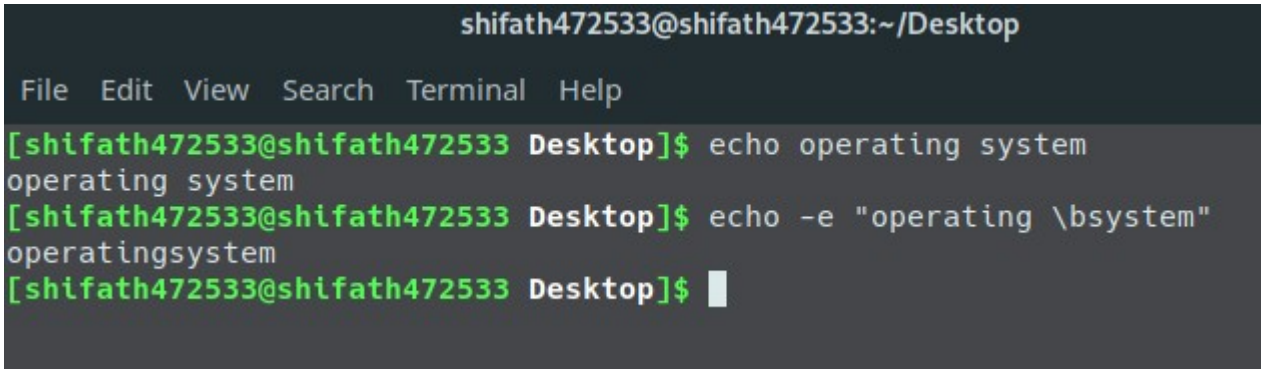
rmdir:

This command is used to remove empty directory. If there is another diectory inside the directory then it can’t be removed by this command.



Here the empty directory ‘newdir’ has been removed by this command.

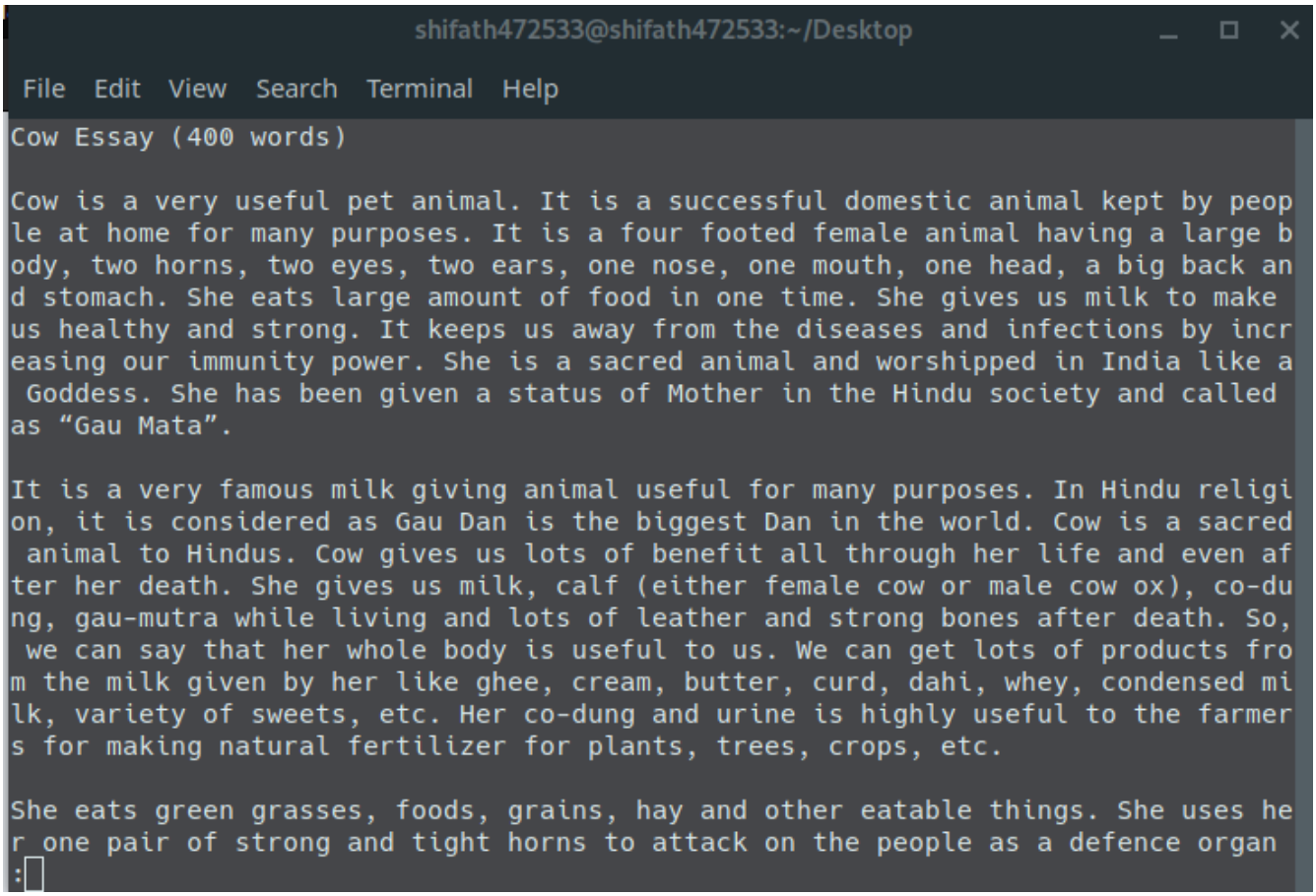
echo:
This command displays a line of text or string .
Output:



Here a string “operating system” has been displayed by this command.

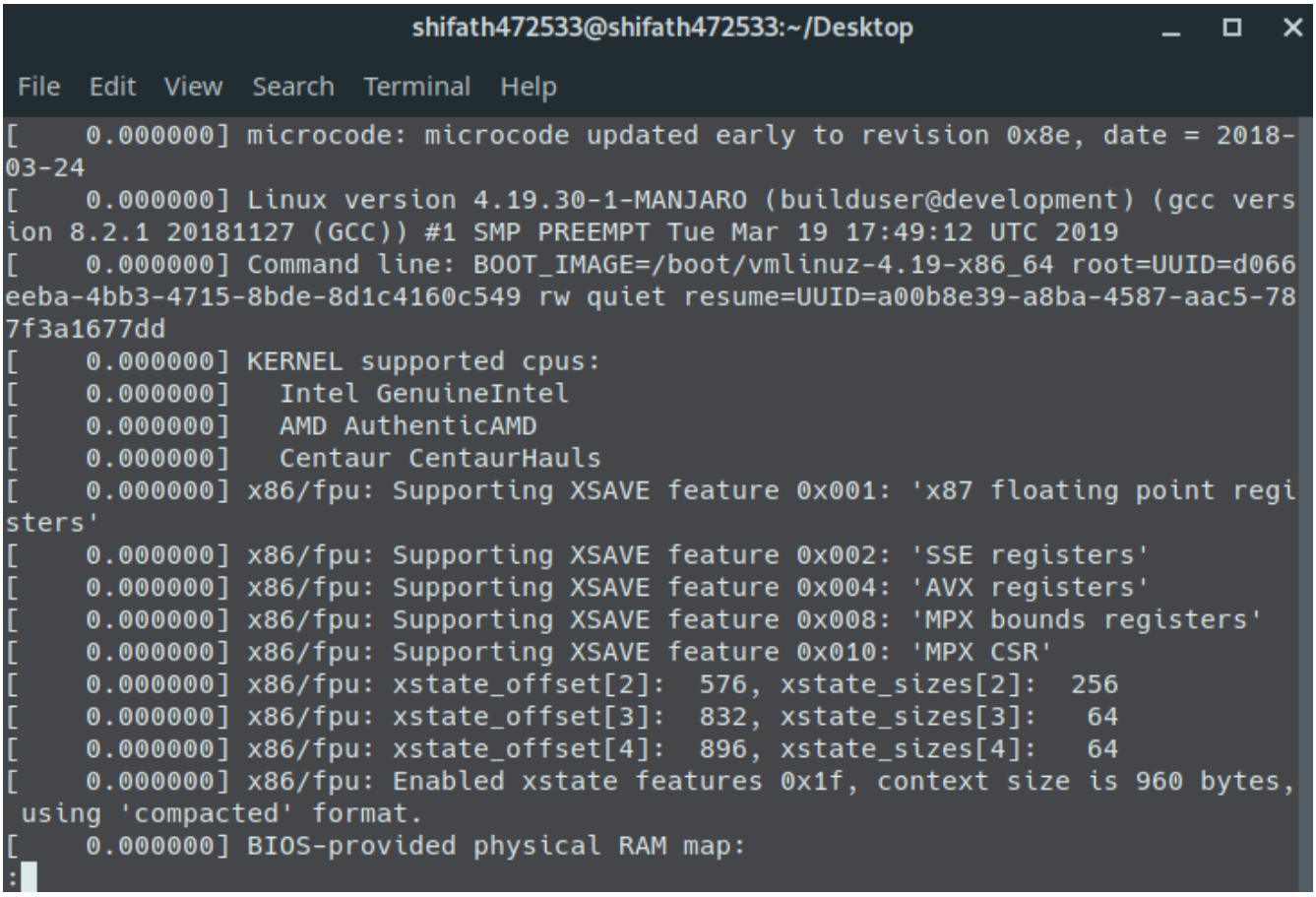
More:
This command is used to view large text files to display one screen at a time. It is also used sometimes with some other command after a pipe.

After writing the command “more -d cow” the output is like below. Here ‘cow’ is the text file.



less:
This command is used to read contents of a text files one page per time.

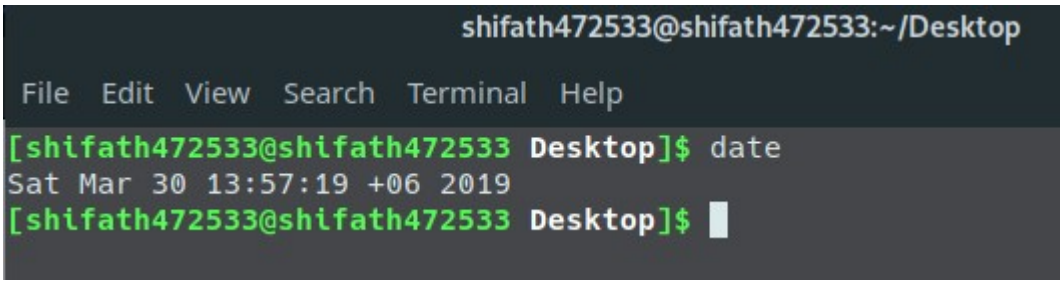
If the “dmesg | less” command is typed then the output is as follows:



date:

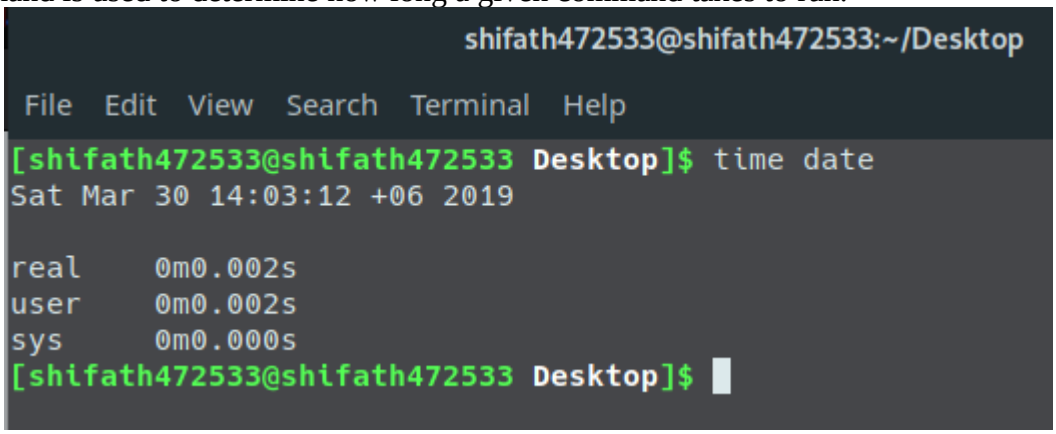
This command is used to display system date and time.

Output:



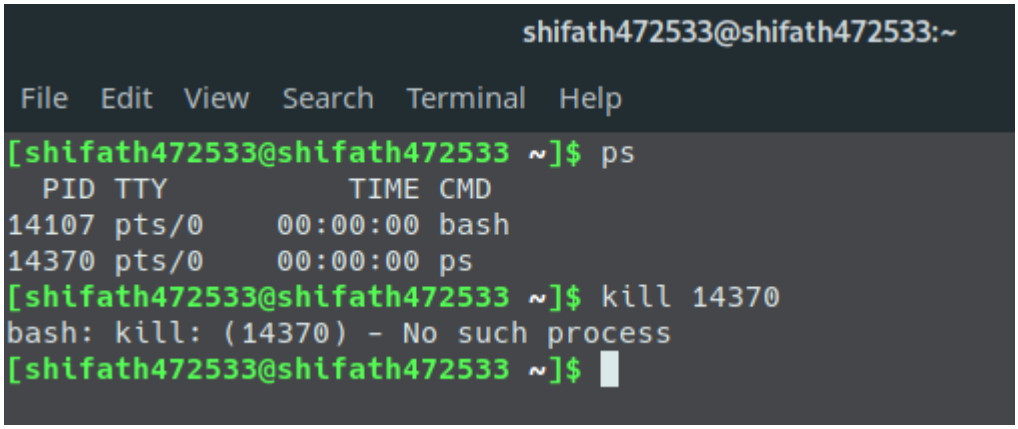
time:

This command is used to determine how long a given command takes to run.



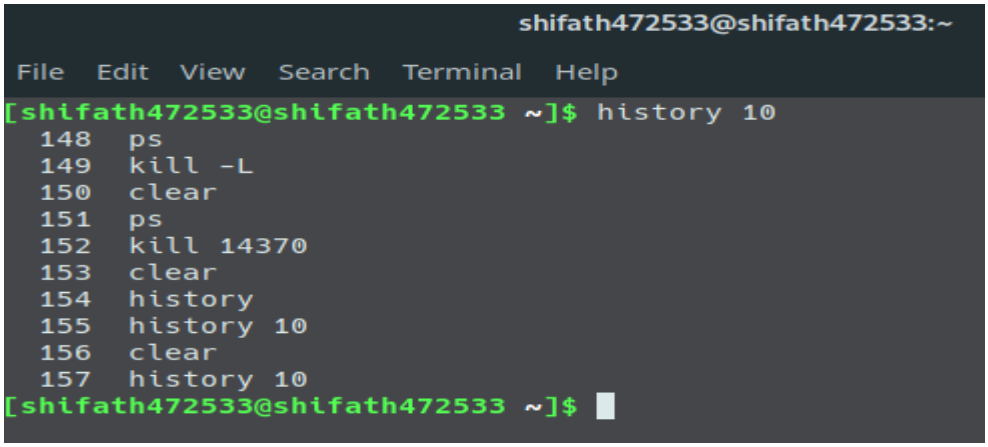
Here ‘real’ shows the total time to execute the call. And ‘user’ shows time in user mode and ‘sys’ shows the time in kernel mode.

kill:
This command is used to terminate process manually.
Output:



By this command process ps with PID - ‘14370’ has been terminated manually.

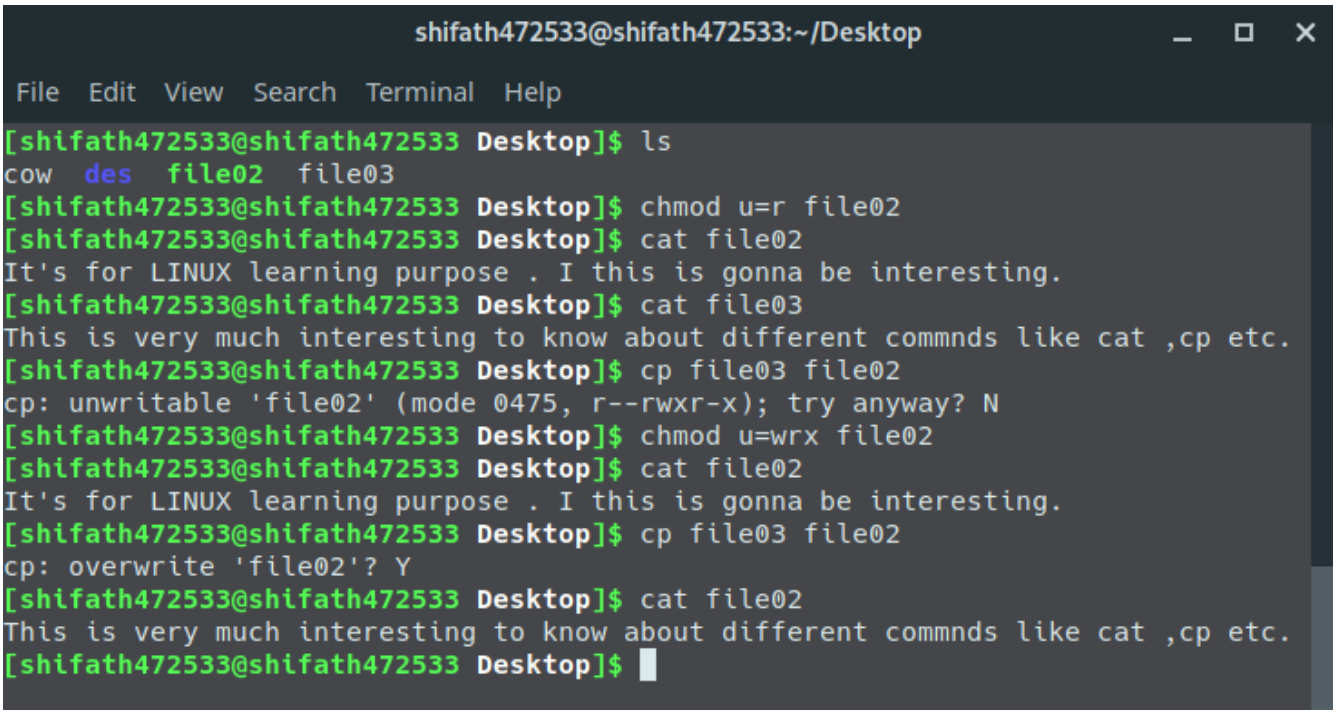
history:
This command is used to view the previously executed commands.



Here the historyof last 10 processes executed has been shown.

chmod:
This command is used to change the permissions of a file or directory.

Example output:

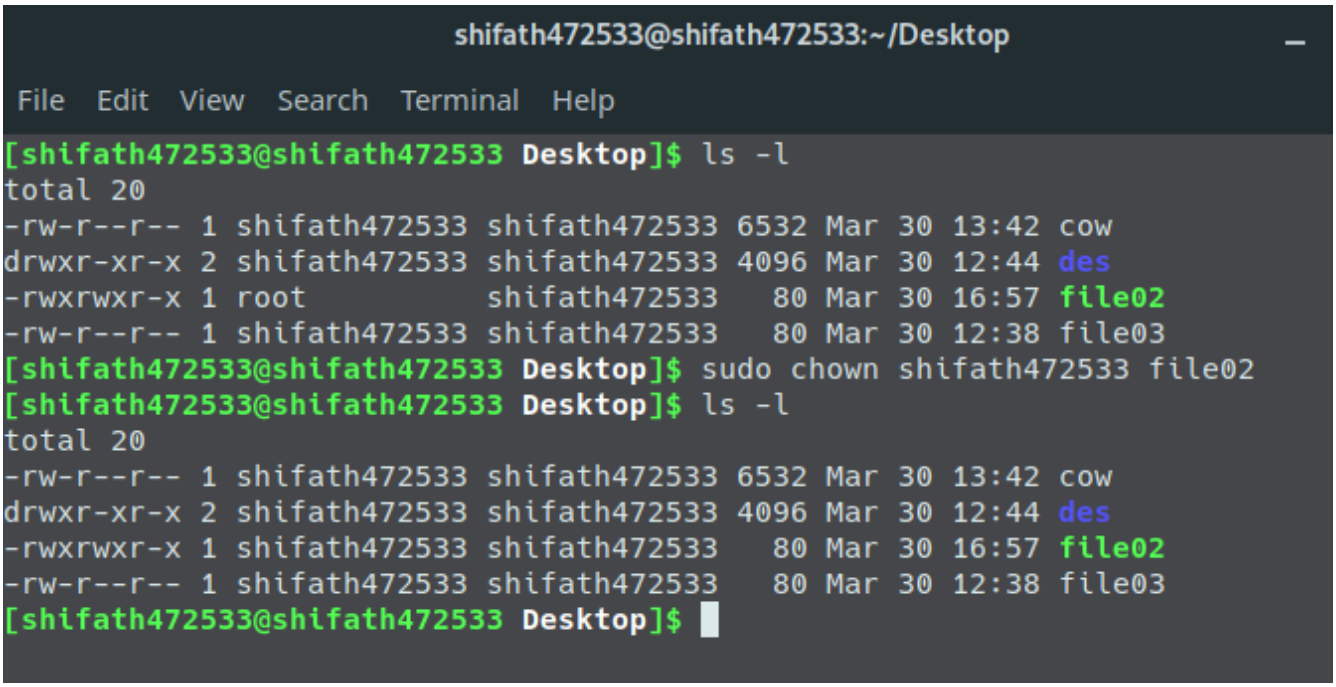


Here the user permission has been changed.

chown:

This command changes the owner of a file or dieectory. It is faster and easier than changing permission.

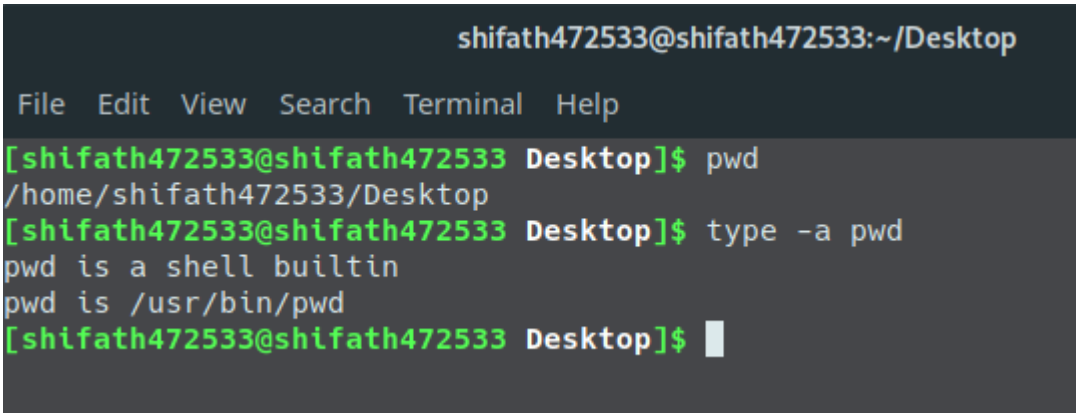
Example Output:



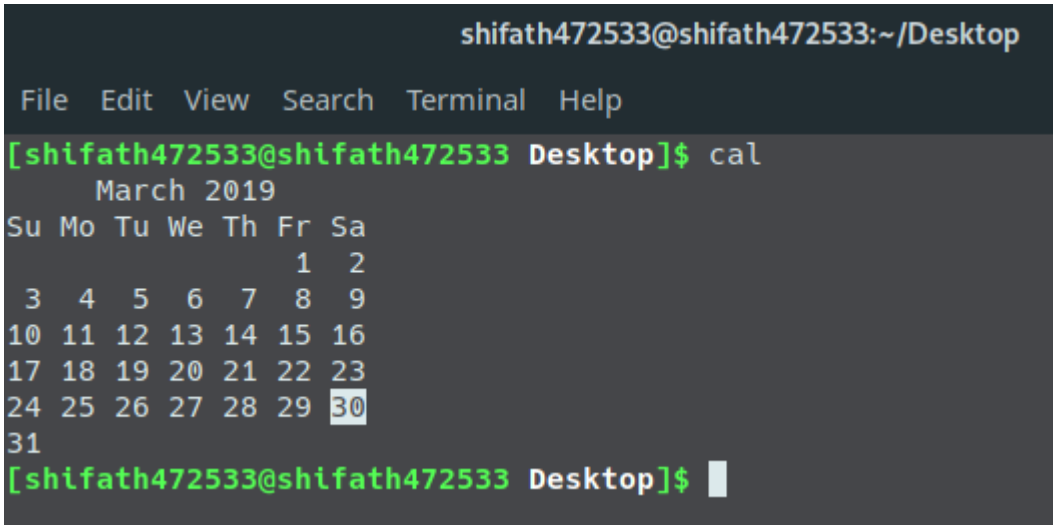
Here in the beginning, we can see by “ls -l” command that the owner of the file “file02” is “root”. By |”chown” command we have changed the owner and set to “shifath472533”. Again by “ls -l” command we can see that the owner of “file02” has been changed.

finger :
This command is used to display informations about users.

pwd:
This command print the name of the current working directory.
Eample output:



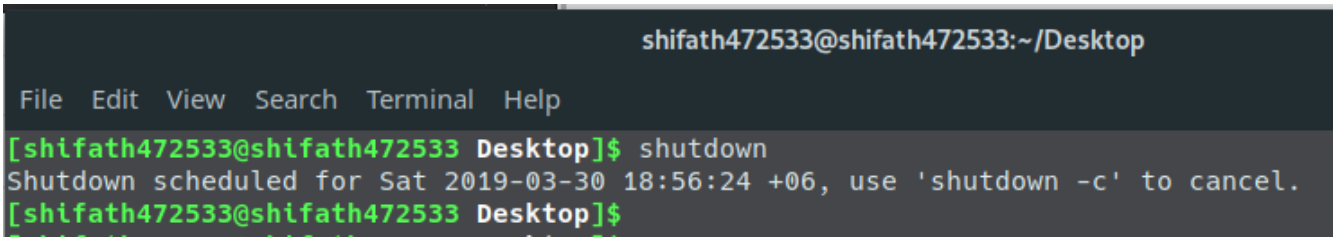
Here, the by this command the current directory is displayed.
cal:
This command is used to display the calendar of a specific month or a whole year.
For only “cal|” command the calendar of current month is displayed.
Example output:



Here , by **cal** command the calendar of the current month has been displayed and in 2nd case calendar by **cal 2019** command the calendar of whole year is displayed.

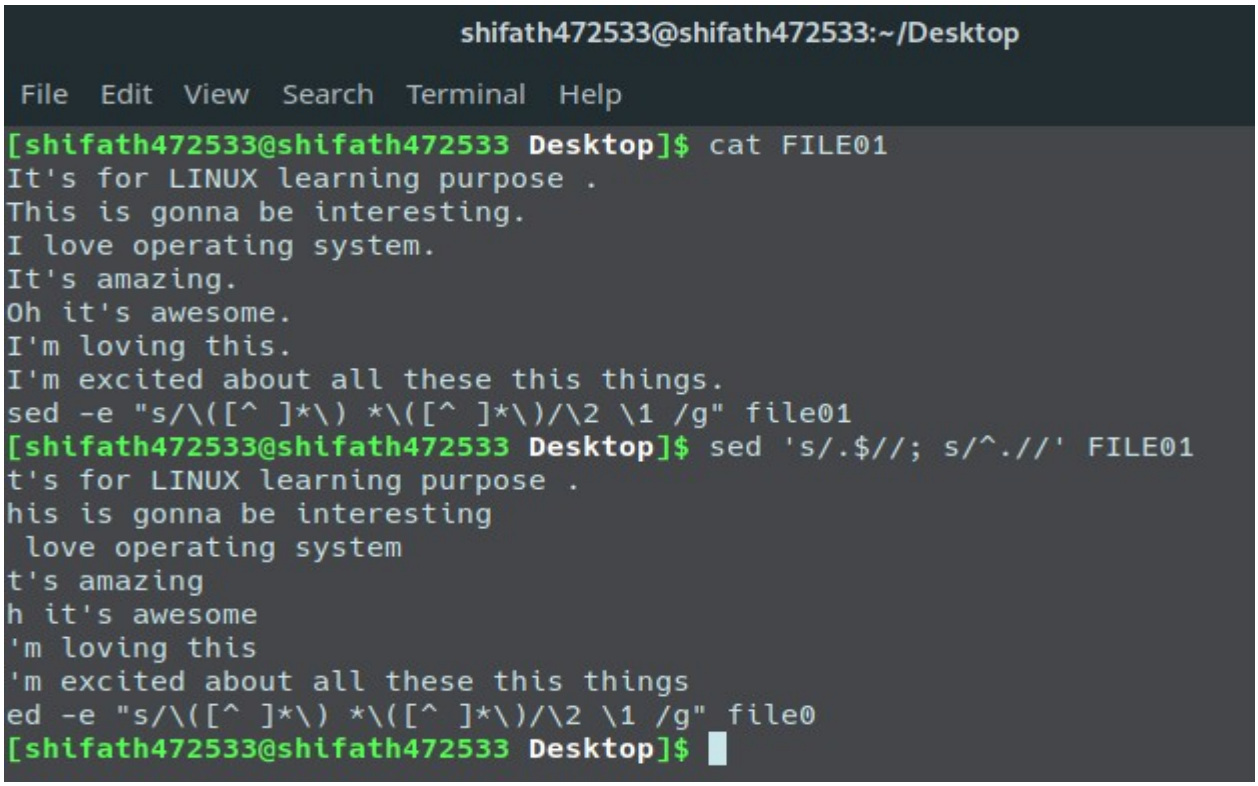
Logout:
This command allows to logout from a session.

shutdown:
This command shuts down the machine. It can controlled by time in **HH:MM** format or "+m" (here, m is no. of minutes).
Example output:

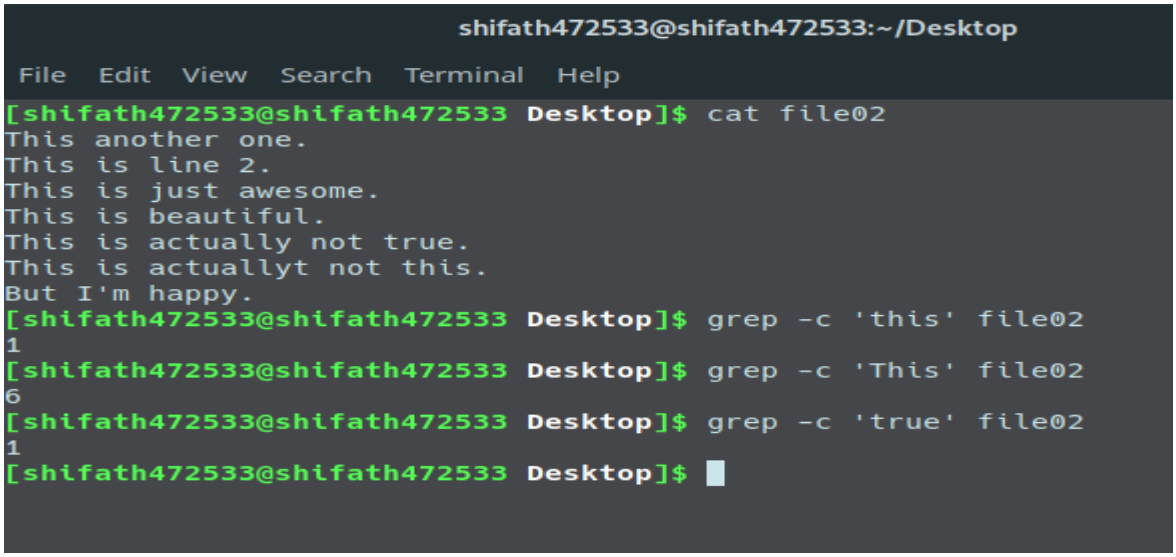


Here , after entering shutdown command the pc shuts down after 1 minute.

4. **sed** command is used to delete the first and last character in each line of a file .
Output:



grep command is used to find how many lines of a file contain a given word. Here the file name and the word are provided as inputs.
Output:

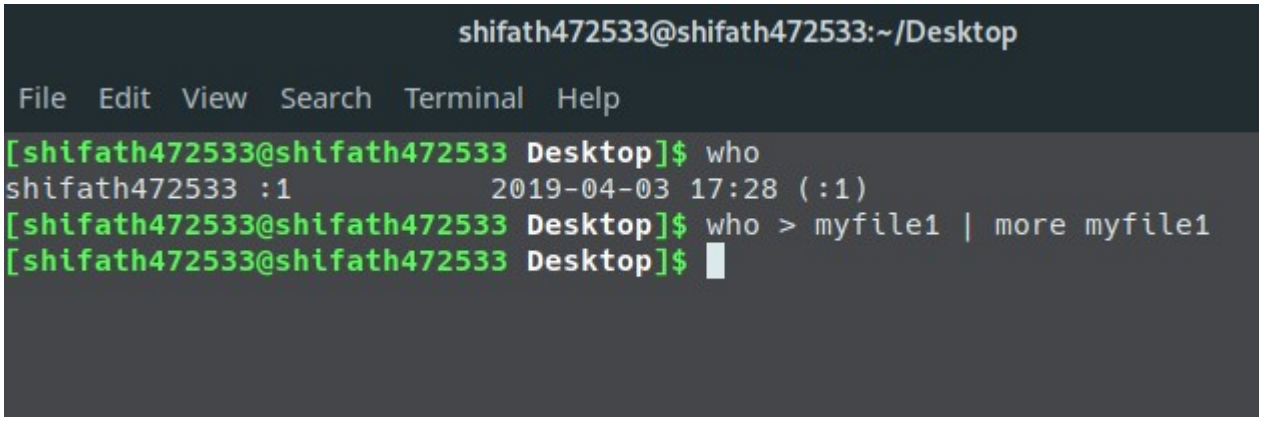


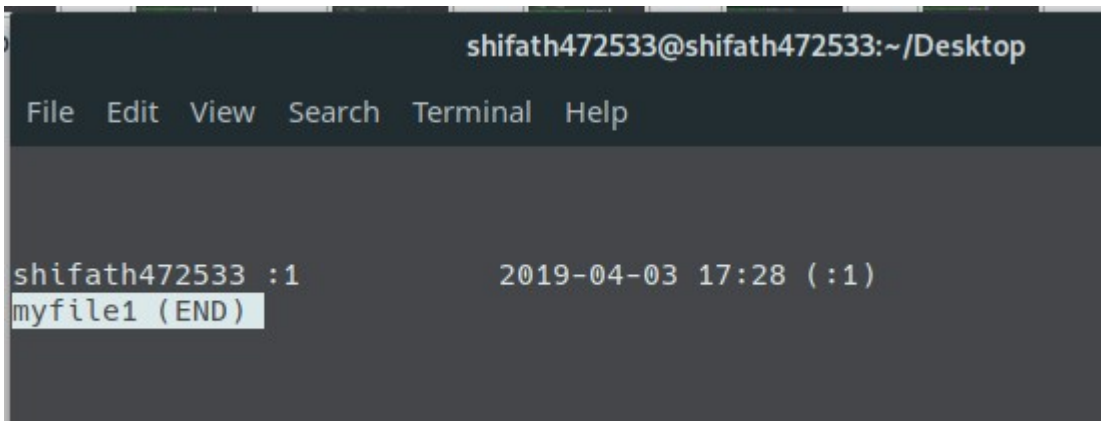
awk is a scripting language used for manipulating data and generating reports. The **awk** command programming language requires no compiling, and allows the user to use variables, numeric functions, string functions, and logical operators.

By default **awk** prints every line of data from the specified file.
$ awk '{print}' os.txt

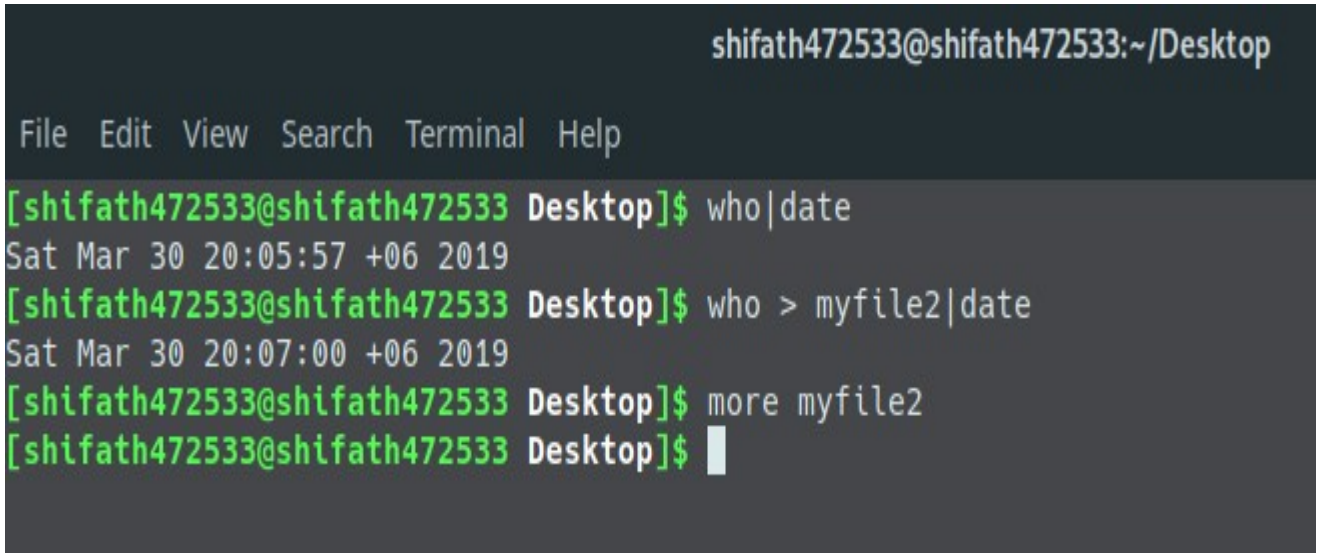
Here, it's printing the value of os.txt.

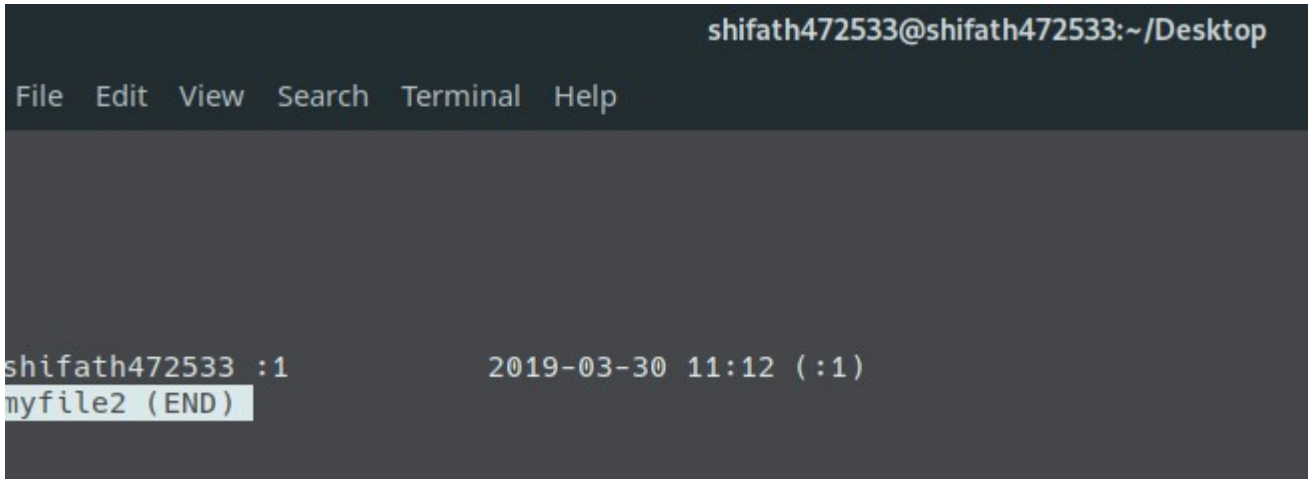
5.who command was used and redirected to a file myfile1 and more command was used to see the contents of myfile1.Output is given below.





6.The **date** and **who** command was used in sequence such that the output of date is displayed and the output of who command is redirected to a file myfile2 and more command was used to display myfile2. Output is given below:





7. **sed** command is used to swap the first and second words in each line in a file.Output is given below.

```
shifath472533@shifath472533:~/Desktop
File  Edit  View  Search  Terminal  Help
[shifath472533@shifath472533 Desktop]$ cat file01
It's for LINUX learning purpose .
This is gonna be interesting.
I love operating system.
It's amazing.
[shifath472533@shifath472533 Desktop]$ sed -e "s/\([^ ]*\) *\([^ ]*\)/\2 \1 /g" file01
for It's LINUX  learning  purpose  .
is This gonna  be  interesting.
love I operating  system.
amazing. It's
[shifath472533@shifath472533 Desktop]$
```

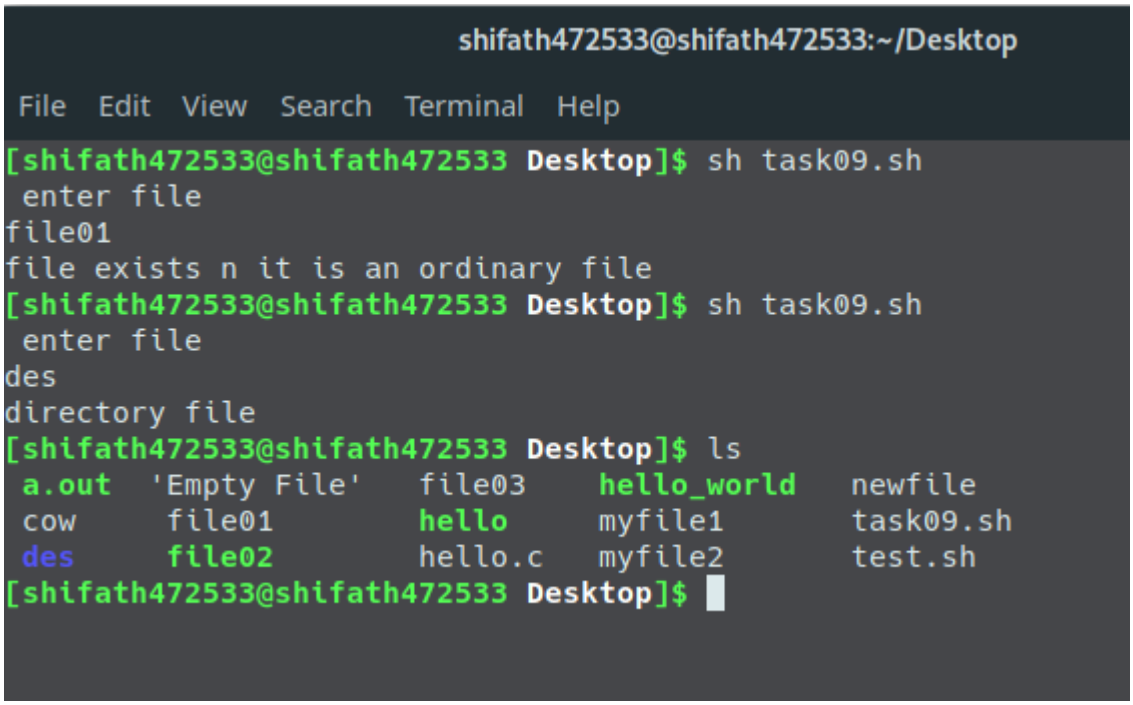
8.A shell script program and a c program has been written to display hello world and their time is compared.

```
Open   hell...  ~/Des...   Save
#include<stdio.h>

int main()
{
    printf("HELLO WORLD\n");
    return 0;
}
```

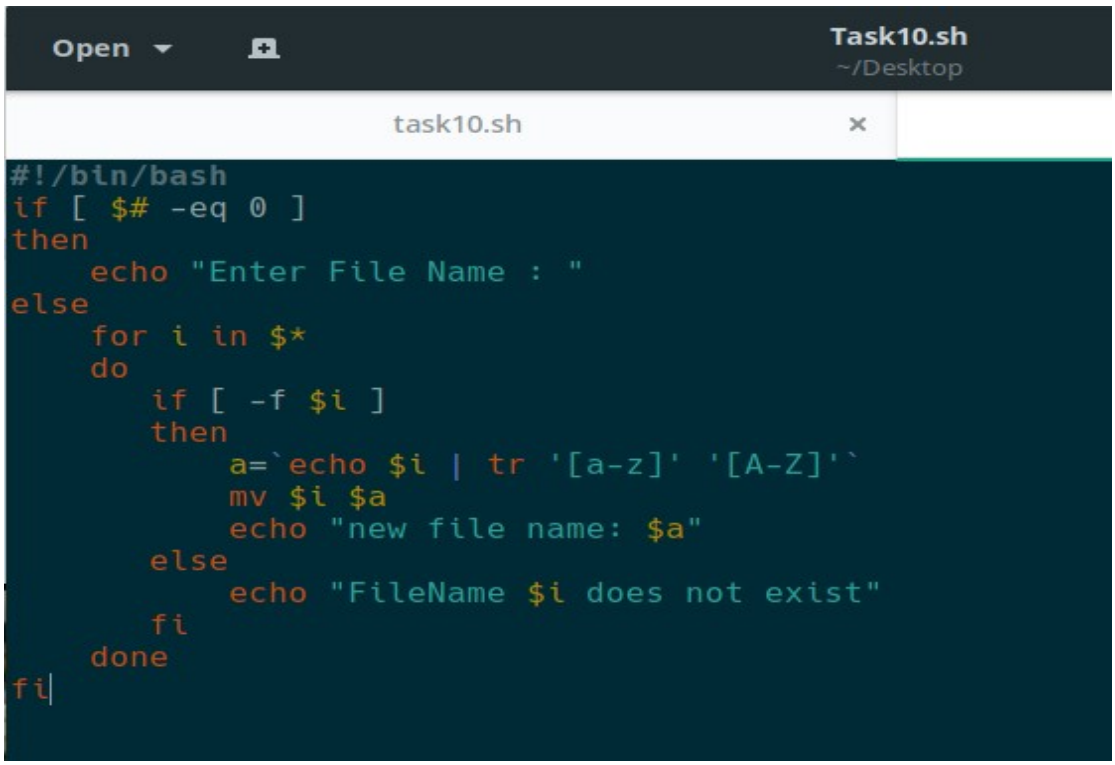
Output is given below

```
shifath472533@shifath472533:~/Desktop
File  Edit  View  Search  Terminal  Help
[shifath472533@shifath472533 Desktop]$ gcc hello.c
[shifath472533@shifath472533 Desktop]$ gcc -o hello hello.c
[shifath472533@shifath472533 Desktop]$ ./hello
HELLO WORLD
[shifath472533@shifath472533 Desktop]$ time ./hello
HELLO WORLD

real    0m0.004s
user    0m0.000s
sys     0m0.004s
[shifath472533@shifath472533 Desktop]$ time sh test.sh
HELLO WORLD

real    0m0.020s
user    0m0.011s
sys     0m0.009s
[shifath472533@shifath472533 Desktop]$
```

9.A shell script is written which takes a command line as argument and reports whether it is directory, a file or something else. Output is given below



10. A shell script is written that determines the period for which a specified user is working on the system is given below



output :

```
shifath472533@shifath472533:~/Desktop
File  Edit  View  Search  Terminal  Help
[shifath472533@shifath472533 Desktop]$ ls
 a.out          file01   hello.c       myfile3     task10.sh   task13.sh
 cow            file02   hello_world   newfile     Task10.sh   task14.sh
 des            file03   myfile1       newline     task11.sh   test.sh
'Empty File'    hello    myfile2       task09.sh   task12.sh   upper.sh
[shifath472533@shifath472533 Desktop]$ sh task10.sh file01
new file name: FILE01
[shifath472533@shifath472533 Desktop]$
```

11. A shell script is written that determines the period for which a specified user is working on the system is given below

```
Open ▾                                  per.sh
                                        ~/
echo ENTER USERNAME
read $username
last $username
```

Output:

```
tirtha@tirtha-X556UQK: ~/OS
File  Edit  View  Search  Terminal  Help
tirtha@tirtha-X556UQK:~/OS$ sh per.sh
ENTER USERNAME
per.sh: 2: read: arg count
tirtha   :0           :0                Tue Jul  2 14:40   still logged in
reboot   system boot  4.15.0-54-generi Tue Jul  2 14:39   still running
tirtha   :0           :0                Tue Jul  2 03:54 - down   (02:03)
reboot   system boot  4.15.0-54-generi Tue Jul  2 03:51 - 05:57  (02:06)

wtmp begins Tue Jul  2 03:51:27 2019
tirtha@tirtha-X556UQK:~/OS$
```

12.A shell script is written that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers is given below

Open per.sh ~/

```
FILE=$1
start=$2
end=$3

if[! -f $FILE];then
        echo "$FILE is not a valid file"
        exit 1
fi

str='wc -l $FILE'
array=( $str )
totalLines=${array[0]}

if[[$end -le $totalLines && $totalLines -gt 0]];then
        sed -n "${start},${end}p" $FILE
else
        echo "Range out of bounds"
fi
```

Output:

shifath472533@shifath472533:~/Desktop

File Edit View Search Terminal Help

```
[shifath472533@shifath472533 Desktop]$ cat FILE01
It's for LINUX learning purpose .
This is gonna be interesting.
I love operating system.
It's amazing.
Oh it's awesome.
I'm loving this.
I'm excited about all these this things.
sed -e "s/\([^ ]*\) *\([^ ]*\)/\2 \1 /g" file01
[shifath472533@shifath472533 Desktop]$ sh task12.sh FILE01 2 5
This is gonna be interesting.
I love operating system.
It's amazing.
Oh it's awesome.
[shifath472533@shifath472533 Desktop]$
```

13.A shell script that deletes all lines containing a specified word in one or more files supplied as a arguments to it is given below

```
word=$1
cnt=0

for i in $*
do
    if [ $cnt -eq 0 ]
    then
        cnt=1
        continue
    elif [ -f $i ]
    then
        echo "After deleting lines containing '$word' in '$i' "
        grep -v "$word" $i
    else
        echo "FileName $i does not exist"
        continue
    fi
done
```

Output:

```
shifath472533@shifath472533:~/Desktop
File  Edit  View  Search  Terminal  Help
[shifath472533@shifath472533 Desktop]$ cat FILE02
This another one.
This is line 2.
This is just awesome.
This is beautiful.
This is actually not true.
This is actuallyt not this.
But I'm happy.


[shifath472533@shifath472533 Desktop]$ sh task13.sh This FILE02
After deleting lines containing 'This' in 'FILE02'
But I'm happy.


[shifath472533@shifath472533 Desktop]$
```

14. A shell script is written that extract a sub-string from a given string is given below

task14.1.sh

```
echo "Enter string :"
read str
len=$(echo ${#str})

echo "Length of the given string is " $len
```

Output:

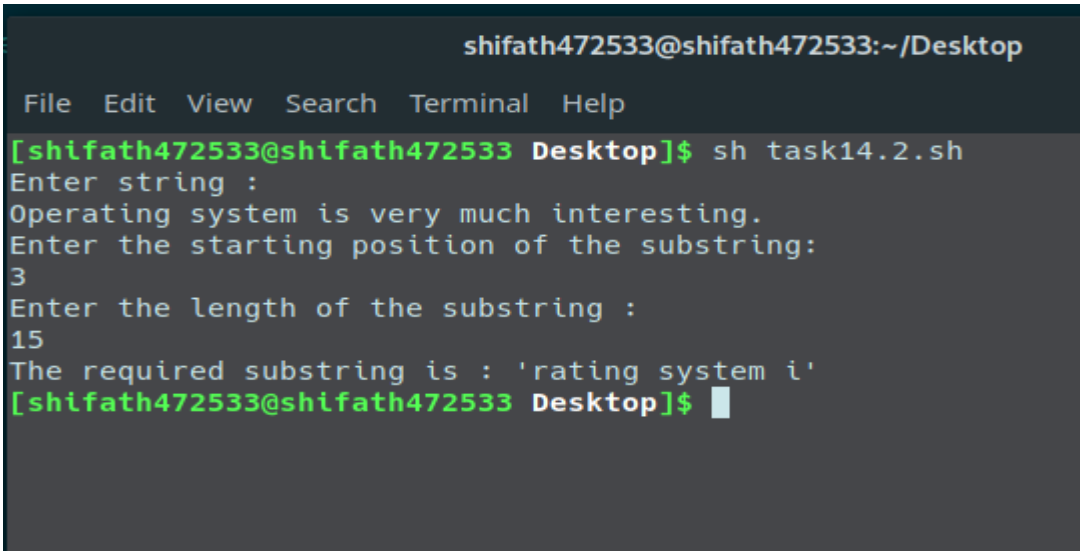
```
shifath472533@shifath472533:~/Desktop
File  Edit  View  Search  Terminal  Help
[shifath472533@shifath472533 Desktop]$ sh task14.1.sh
Enter string :
Operating system is very much interesting.
Length of the given string is  42
[shifath472533@shifath472533 Desktop]$
```

A shell script that find the length of a given string is given below

Open task14.2.sh ~/Desktop

```
echo "Enter string : "
read str
echo "Enter the starting position of the substring:"
read pos
echo "Enter the length of the substring :"
read len
st=$(echo ${str:pos:len})

echo "The required substring is : '"$st"'"
```

Output:


shifath472533@shifath472533:~/Desktop
File Edit View Search Terminal Help
[shifath472533@shifath472533 Desktop]$ sh task14.2.sh
Enter string :
Operating system is very much interesting.
Enter the starting position of the substring:
3
Enter the length of the substring :
15
The required substring is : 'rating system i'
[shifath472533@shifath472533 Desktop]$