22MAI0015
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LAB NO. 1 **22-09-2022**

1. Investigate the fundamental Unix/Linux commands.
2. Obtaining the OS system data file and its associated information.
4. Create utility programs that use I/O system calls to simulate operations such as ls, cp, grep, and others.

Linux commands

1. cd :- Change to new directory

cd command in linux known as change directory command. It is used to change current working directory.

Syntax :-

$ cd [directory]

To move inside a subdirectory : to move inside a subdirectory in linux we use

$ cd [directory_name]

Description :-

In the below example, we have checked number of directories in our home directory and moved inside the " nidhi " directory by using " cd nidhi " command.

2. mkdir :- create new directory

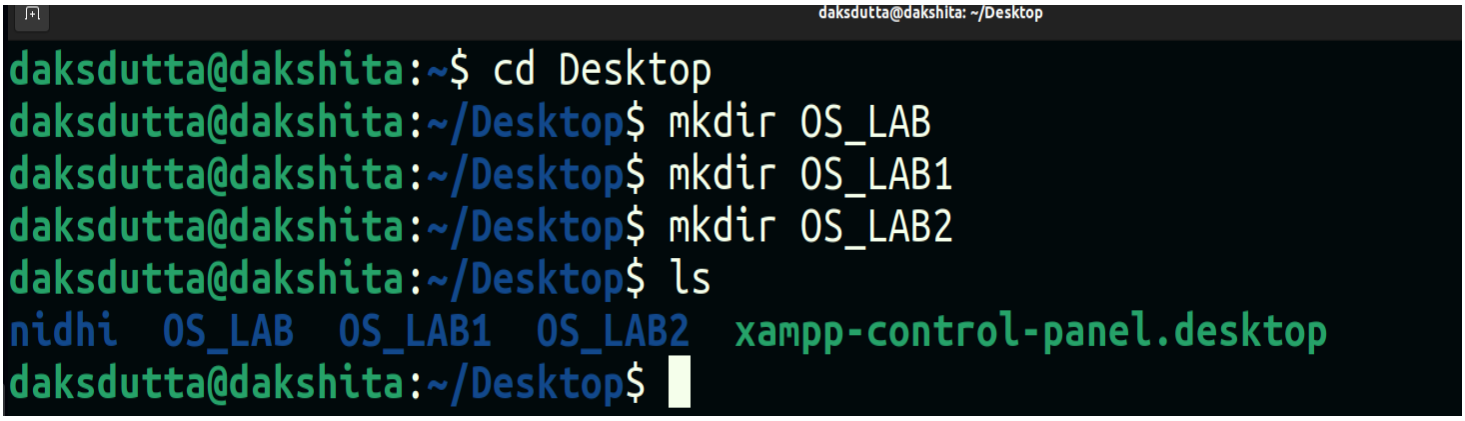
mkdir command in Linux allows the user to create directories (also referred to as folders in some operating systems). This command can create multiple directories at once as well as set the permissions for the directories.

Syntax :-

1. mkdir [options...] [directories ...]
2. mkdir directory name
3. mkdir <directory name>

Description :-

Create a two directories “nidhi1” and “nidhi2” at the current directory and display the directories by ls command.



3. rmdir :- remove empty directory (remove files first)

rmdir command is used remove empty directories from the filesystem in Linux. The rmdir command removes each and every directory specified in the command line only if these directories are empty. So if the specified directory has some directories or files in it then this cannot be removed by *rmdir* command.

Syntax :-

1. rmdir <directory name>
2. *rmdir [-p] [-v | –verbose] [–ignore-fail-on-non-empty] directories ...*

Description :-

In the below example, We have two directories nidhi1 and nidhi2. We execute rmdir command to remove the directory nidhi2. Remove the directory *“nidhi2”* if it is empty. After executing the rmdir command nidhi2 directory is removed.

4. mv : - change name of directory

The mv command is used to move a file or a directory form one location to another location.

Syntax :-

mv <file name> <directory path>

Description :-

```
daksdutta@dakshita:~/Desktop$ ls
OS_LAB  OS_LAB1  OS_LAB2  xampp-control-panel.desktop
daksdutta@dakshita:~/Desktop$ mv OS_LAB OS_LAB3
daksdutta@dakshita:~/Desktop$ ls
OS_LAB1  OS_LAB2  OS_LAB3  xampp-control-panel.desktop
daksdutta@dakshita:~/Desktop$
```

5.pwd :- show current directory

The pwd command is used to display the location of the current working directory.

Syntax :-

pwd

Description :-

```
daksdutta@dakshita:~/Desktop$ pwd
/home/daksdutta/Desktop
daksdutta@dakshita:~/Desktop$
```

6. date :- show date and time

The date command is used to display date, time, time zone, and more.

Syntax :-

date

Description :-

```
daksdutta@dakshita:~/Desktop$ date
Saturday 15 October 2022 09:34:51 PM IST
daksdutta@dakshita:~/Desktop$
```

7. history :- list of previously executed commands

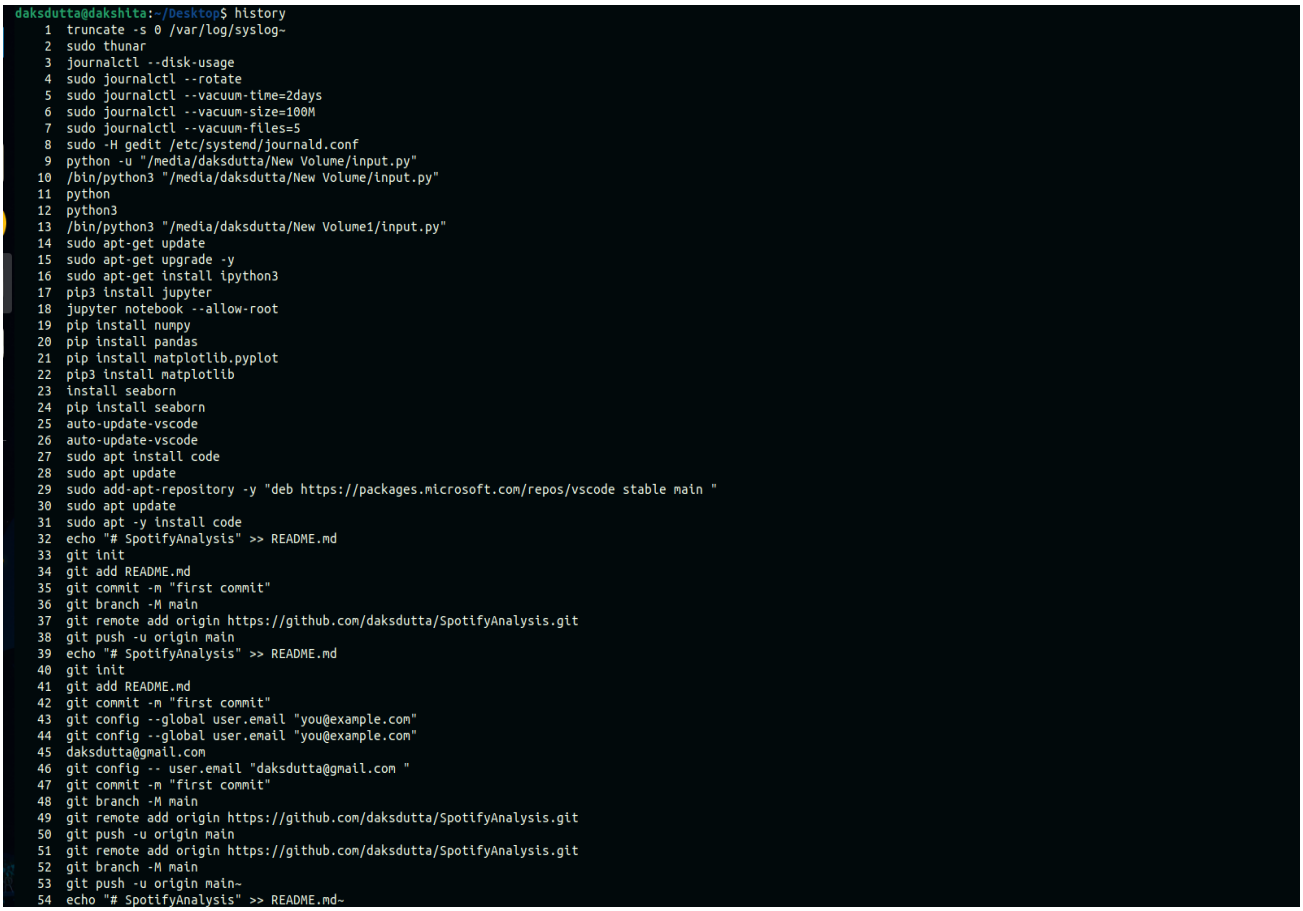
history command is used to view the previously executed command. This feature was not available in the Bourne shell. Bash and Korn support this feature in which every command executed is treated as the event and is associated with an event number using

which they can be recalled and changed if required. These commands are saved in a history file. In Bash shell history command shows the whole list of the command.

Syntax :-

```
$ history
```

Description :-



```
 84  sudo apt-get install r-base
 85  lsb_release -a
 86  apt install r-base
 87  sudo apt install r-base
 88  cd "/media/daksdutta/New Volume/MCA/Data Structure/" && g++ 22MCA0313DA1.cpp -o 22MCA0313DA1 && "/media/daksdutta/New Volume/MCA/Data Structure/"22MCA0313DA1
 89  cd "/media/daksdutta/New Volume/MCA/Data Structure/" && g++ testing.cpp -o testing && "/media/daksdutta/New Volume/MCA/Data Structure/"testing
 90  cd "/media/daksdutta/New Volume/MCA/Data Structure/" && g++ 22MCA0313DA1.cpp -o 22MCA0313DA1 && "/media/daksdutta/New Volume/MCA/Data Structure/"22MCA0313DA1
 91  cd "/media/daksdutta/New Volume/MCA/Data Structure/" && g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile && "/media/daksdutta/New Volume/MCA/Data Structure/"tempCodeRu
 92  cd "/media/daksdutta/New Volume/MCA/Data Structure/" && g++ 22MCA0313DA1.cpp -o 22MCA0313DA1 && "/media/daksdutta/New Volume/MCA/Data Structure/"22MCA0313DA1
 93  cd "/media/daksdutta/New Volume/MCA/DS Practice/" && g++ Stack.cpp -o Stack && "/media/daksdutta/New Volume/MCA/DS Practice/"Stack
 94  unzip oracle-xe-11.2.0-1.0.x86_64.rpm.zip
 95  sudo apt-get install alien libaio1 unixodbc
 96  sudo alien --scripts -d oracle-xe-11.2.0-1.0.x86_64.rpm
 97  cd Disk1
 98  sudo apt-get install alien libaio1 unixodbc
 99  sudo alien --scripts -d oracle-xe-11.2.0-1.0.x86_64.rpm
100  sudo apt get alien
101  sudo apt-get install alien
102  sudo apt insstall unrar
103  sudo apt install unrar
104  unzip oracle-xe-11.2.0-1.0.x86_64.rpm.zip
105  unzip oracle-xe-11.2.0-1.0.x86_64.rpm.zip
106  unzip oracle-xe-11.2.0-1.0.x86_64.rpm.zip
107  sudo dpkg --install oracle-xe_11.2.0-2_amd64.deb
108  sqlplus
109  sudo apt-get install alien libaio1 unixodbc
110  tty
111  finger
112  sudo apt install finger
113  finfer
114  sudo apt install
115  finger
116  sudo apt install finger
117  finger
118  sudo apt install finger
119  finger
120  sudo apt install finger
121  --fix-missing
122  apt-get update
123  finger
124  cd Desktop
125  mkdir nidhi
126  cd Desktop
127  mkdir OS_LAB
128  mkdir OS_LAB1
129  mkdir OS_LAB2
130  ls
131  rmdir nidhi
132  ls
133  mv OS_LAB OS_LAB3
134  ls
135  pwd
136  date
137  history
aksdutta@dakshita:~/Desktop$ finger
```

8. cal month year :- Prints a calendar for the specified month of the specified year.

The cal command displays a well-presented calendar on the terminal. Just enter the word cal on your terminal prompt.The cal command is used to display the current month's calendar with the current date highlighted.

Syntax :-

Cal < month year>

Description :-

```
$ cal 11 2022
November 2022
Su Mo Tu We Th Fr Sa
       1  2  3  4  5
 6  7  8  9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30

$
```

9. Man:- show online documentation by program name

man command in Linux is used to display the user manual of any command that we can run on the terminal. It provides a detailed view of the command which includes NAME, SYNOPSIS, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUES, ERRORS, FILES, VERSIONS, EXAMPLES, AUTHORS.

Syntax :-

$man [OPTION]... [COMMAND NAME]...

Description :-

10. w, who :- who is on the system and what they are doing

w command in Linux is used to show who is logged on and what they are doing. This command shows the information about the users currently on the machine and their processes.

Syntax :-

w [options] user [...]

Description :-

```
$ w -i
18:17:33 up 4 days, 23:45, 32 users,  load average: 2.90, 2.58, 1.75
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
$ w -o
18:17:40 up 4 days, 23:45, 32 users,  load average: 2.67, 2.54, 1.74
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
$ w -f
18:17:55 up 4 days, 23:45, 32 users,  load average: 2.23, 2.45, 1.72
USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
$ w phoenixnap
18:18:15 up 4 days, 23:46, 32 users,  load average: 1.81, 2.34, 1.70
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
$ w --help
Usage:
```

```
$ w --help
Usage:
 w [options]

Options:
 -h, --no-header     do not print header
 -u, --no-current    ignore current process username
 -s, --short         short format
 -f, --from          show remote hostname field
 -o, --old-style     old style output
 -i, --ip-addr       display IP address instead of hostname (if possible)

     --help     display this help and exit
 -V, --version  output version information and exit
```

```
$ w -i
18:17:33 up 4 days, 23:45, 32 users,  load average: 2.90, 2.58, 1.75
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
```

```
$ w -u
18:17:13 up 4 days, 23:45, 32 users,  load average: 3.56, 2.68, 1.77
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
```

11. who am i :- who is logged onto this terminal

whoami command is used both in *Unix Operating System* and as well as in *Windows Operating System*.

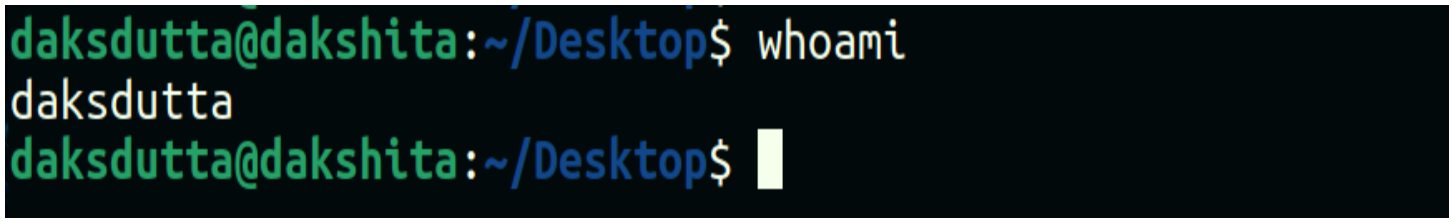
- It is basically the concatenation of the strings “who”,”am”,”i” as whoami.

- It displays the username of the current user when this command is invoked.
- It is similar as running the id command with the options -un.

Syntax :-

$ whoami

Description :-



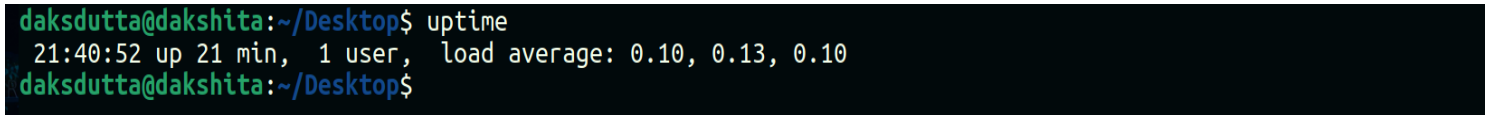
12. uptime :- show one line summary of system status

It is used to find out how long the system is active (running). This command returns set of values that involve, the current time, and the amount of time system is in running state, number of users currently logged into, and the load time for the past 1, 5 and 15 minutes respectively.

Syntax :-

uptime [-options]

Description :-



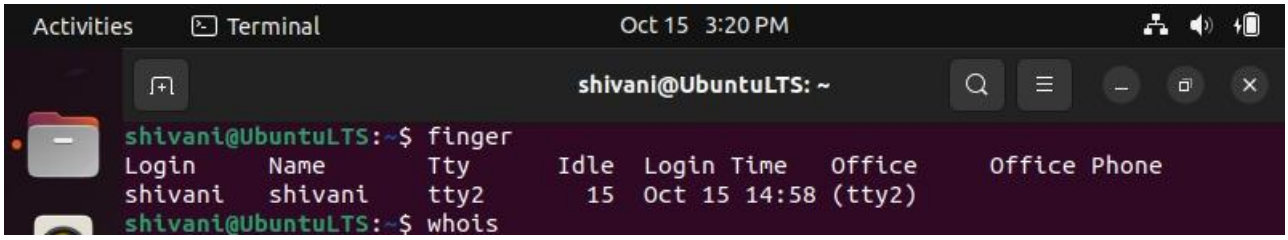
13. finger :- find out info about a user@system

The **finger** command looks up and displays information about system users.

Syntax :-

Finger [-Imsp] [user ...][user@host ...]

Description :-



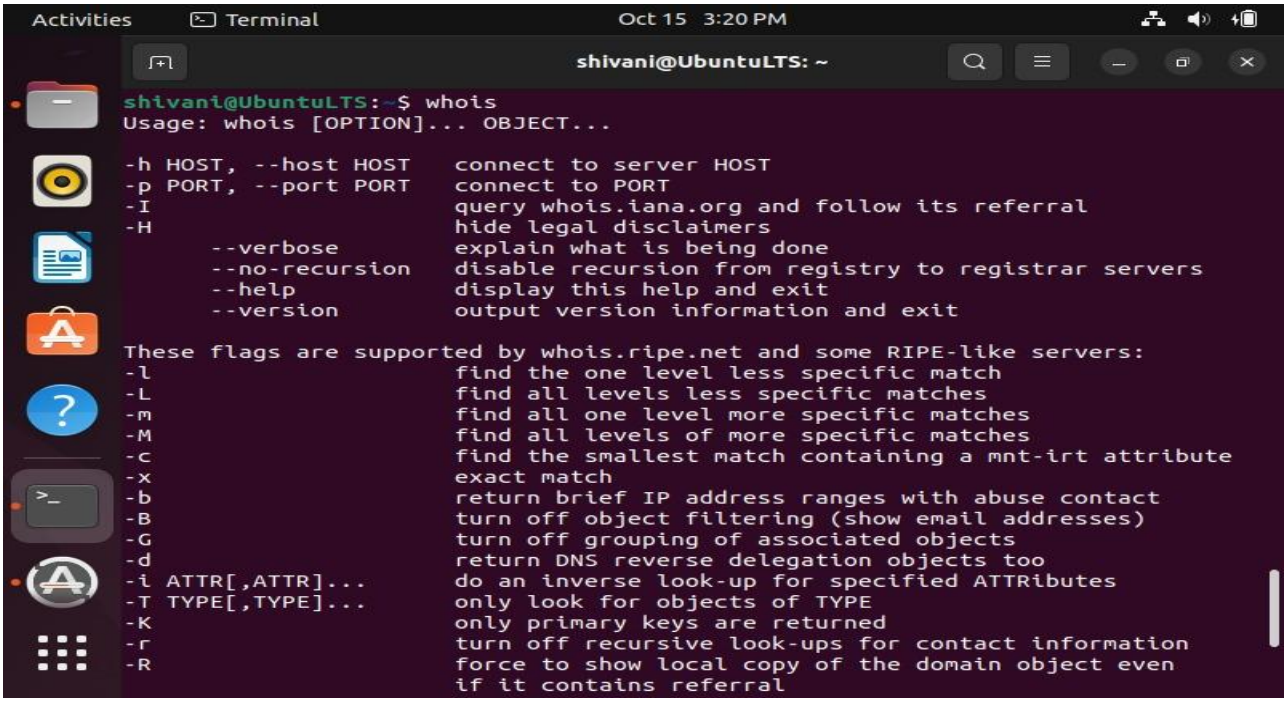
14. whois :- look up information in the Stanford Directory

The whois command displays information about a website's record. You may get all the information about a website regarding its registration and owner's information.

Syntax :-

whois <**websiteName**>

Description :-



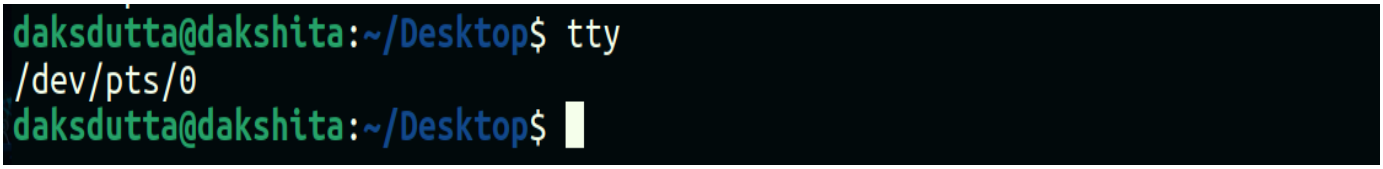
15. tty :- know the terminal name.

The **tty** command of terminal basically prints the file name of the terminal connected to standard input. **tty** is short of teletype, but popularly known as a terminal it allows you to interact with the system by passing on the data (you input) to the system, and displaying the output produced by the system.

Syntax :-

tty [OPTION]....

Description :-



16. uname :- print system information

Linux command to get basic information about the OS. The uname commands allow you to know some basic information which comes really handy when you work on multiple systems. In general, if you're working with a single computer, you won't really need it as often as someone who is a network administrator.

Syntax :-

uname

Description :-

```
daksdutta@dakshita:~/Desktop$ uname
Linux
daksdutta@dakshita:~/Desktop$
```

17. cat :- view files

Cat(concatenate) command is very frequently used in Linux. It reads data from the file and gives their content as output. It helps us to create, view, concatenate files. So let us see some frequently used cat commands.

Syntax :-

```
$cat filename
```

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
nidhi1.txt,nidhi2.txt,nidhi3.txt  nidhi.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ cat nidhi.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ cat > nidhi.txt
this is operating system lab 1 work assignment given by scope faculty.
os works as interface between user and application program.
os manages all the resources of system.
os is also known as resource manager.
^C
daksdutta@dakshita:~/Desktop/OS_LAB1$ cat nidhi.txt
this is operating system lab 1 work assignment given by scope faculty.
os works as interface between user and application program.
os manages all the resources of system.
os is also known as resource manager.
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

18. cp :- copy files

The cp command is used to copy a file or directory.

Syntax :-

To copy in the same directory:

cp <existing file name> <new file name>

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ cp nidhi.txt nidhi1.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ cat nidhi1.txt
this is operating system lab 1 work assignment given by scope faculty.
os works as interface between user and application program.
os manages all the resources of system.
os is also known as resource manager.
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
```

19. ls :- list files in a directory and their attributes

The ls command is used to display a list of content of a directory.

Syntax :-

ls

Description :-

```
daksdutta@dakshita:~/Desktop$ cd OS_LAB1
daksdutta@dakshita:~/Desktop/OS_LAB1$ touch nidhi.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ touch nidhi.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ cat nidhi1.txt
cat: nidhi1.txt: No such file or directory
daksdutta@dakshita:~/Desktop/OS_LAB1$ touch nidhi1.txt,nidhi2.txt,nidhi3.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
nidhi1.txt,nidhi2.txt,nidhi3.txt  nidhi.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

20. rm :- remove files

The rm command is used to remove a file.

Syntax :-

rm <file name>

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
nidhi1.txt  nidhi1.txt,nidhi2.txt,nidhi3.txt  nidhi4.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ rm nidhi4.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
nidhi1.txt  nidhi1.txt,nidhi2.txt,nidhi3.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

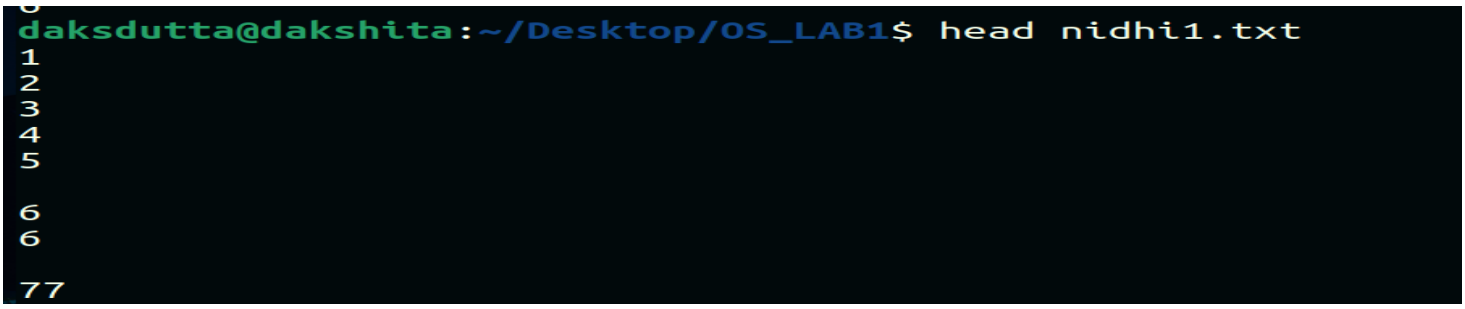
21. head :- show first few lines of a file(s)

The head command is used to display the content of a file. It displays the first 10 lines of a file.

Syntax :-

head <file name>

Description :-



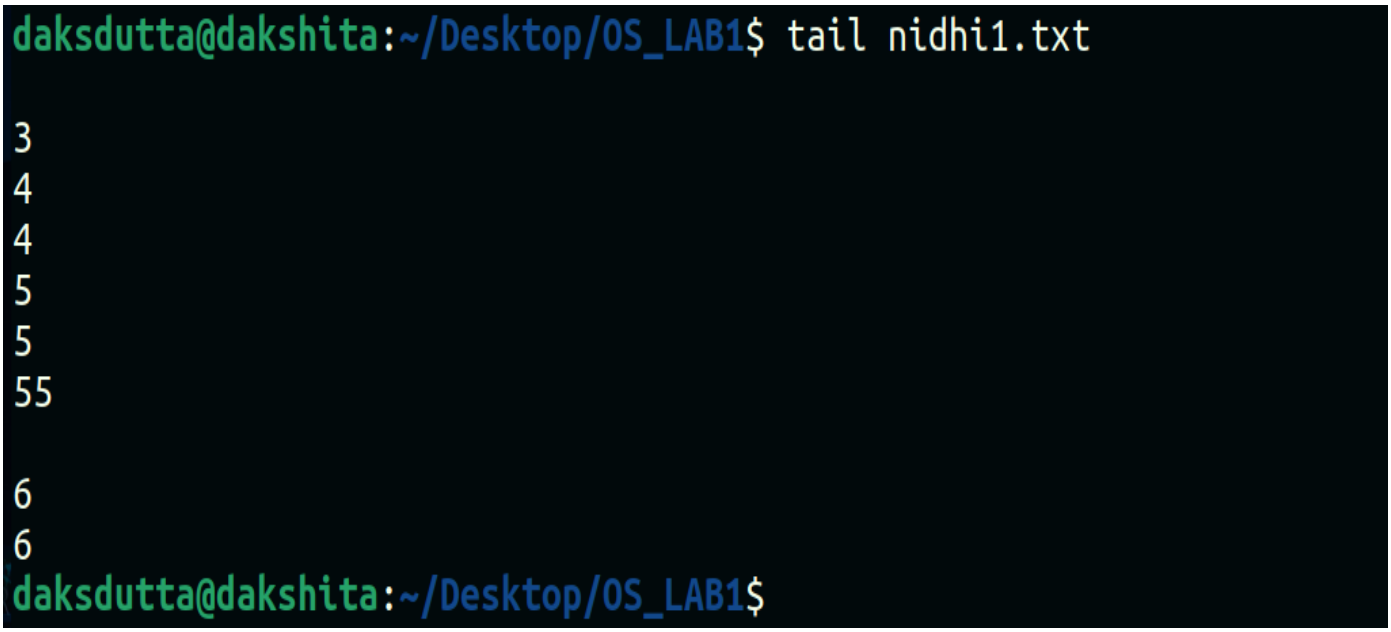
22. tail :- show last few lines of a file; or reverse line order

The tail command is similar to the head command. The difference between both commands is that it displays the last ten lines of the file content. It is useful for reading the error message.

Syntax :-

tail <file name>

Description :-



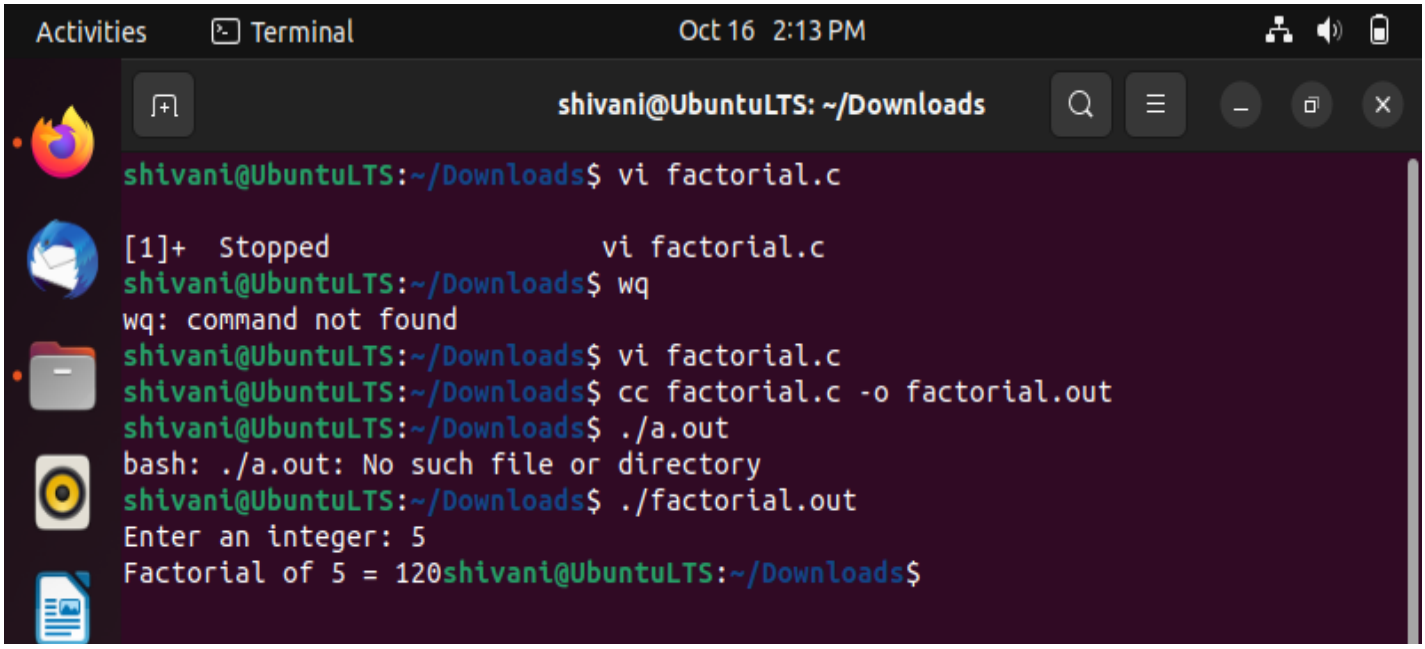
23. vi :- full-featured screen editor for modifying text files

The default editor that comes with the UNIX operating system is called vi (visual editor). Using vi editor, we can edit an existing file or create a new file from scratch. we can also use this editor to just read a text file.

Syntax :-

vi filename

Description :-



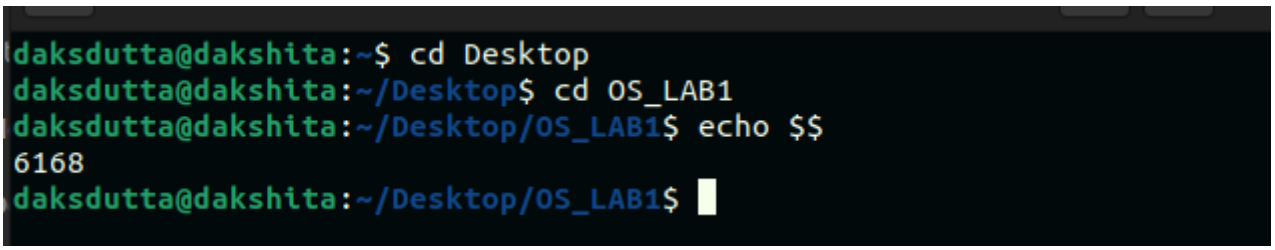
24. echo $$:- process id of current shell

It is shows the process id of the current shell. The $$ variable holds the process ID of the script in which it appears.

Syntax :-

echo $$

Description :-



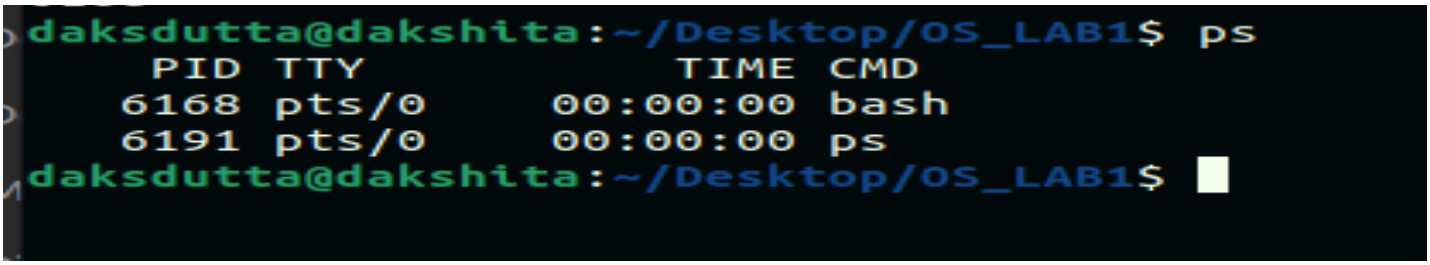
25. ps :- process status

Linux provides us a utility called **ps** for viewing information related with the processes on a system which stands as abbreviation for **"Process Status".** ps command is used to list the currently running processes and their PIDs along with some other information depends on different options.

Syntax :-

ps [options]

Description :-



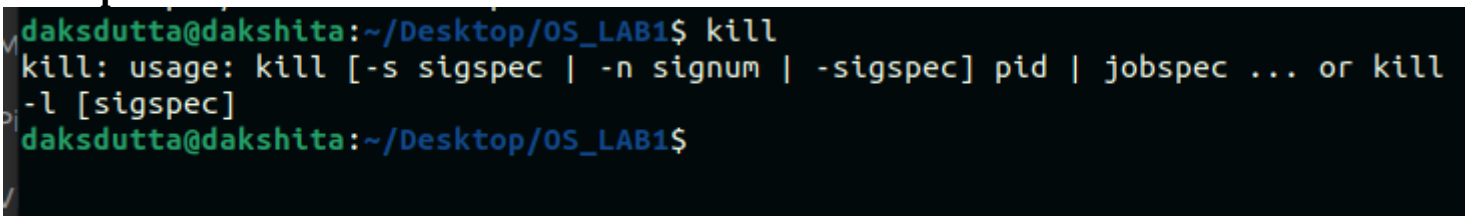
26. Kill :- kill background job or previous process…

kill command in Linux (located in /bin/kill), is a built-in command which is used to terminate processes manually. kill command sends a signal to a process which terminates the process. If the user doesn't specify any signal which is to be sent along with kill command then default TERM signal is sent that terminates the process.

Syntax :-

$kill

Description :-



27. touch Command

The touch command is used to create empty files. We can create multiple empty files by executing it once.

Syntax:

1. touch <file name>
2. touch <file1> <file2> ....

Description :-

```
daksdutta@dakshita:~/Desktop$ cd OS_LAB1
daksdutta@dakshita:~/Desktop/OS_LAB1$ touch nidhi.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ touch nidhi.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ cat nidhi1.txt
cat: nidhi1.txt: No such file or directory
daksdutta@dakshita:~/Desktop/OS_LAB1$ touch nidhi1.txt,nidhi2.txt,nidhi3.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
nidhi1.txt,nidhi2.txt,nidhi3.txt  nidhi.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

Unix commands

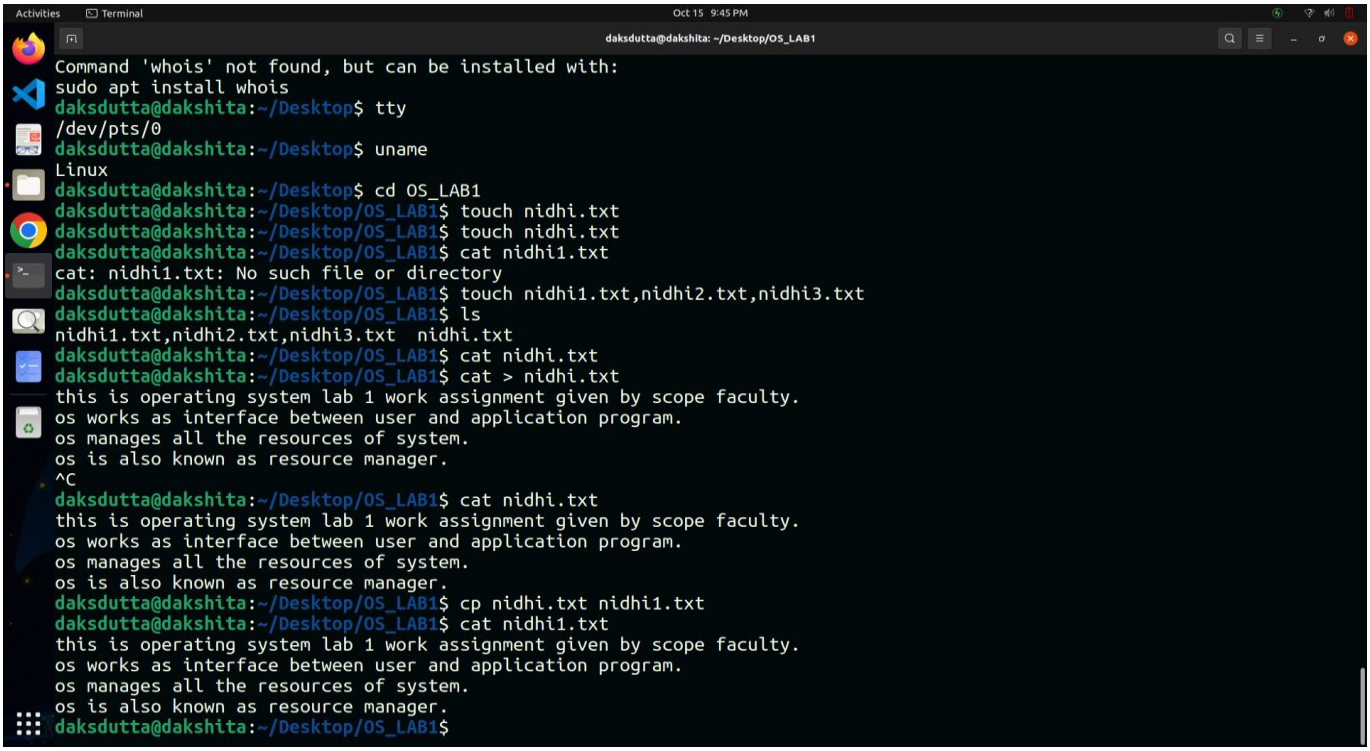
1. cat - display or concatenate files

cat takes a copy of a file and sends it to the standard output (i.e. to be displayed on your terminal, unless redirected elsewhere), so it is generally used either to read files, or to string together copies of several files, writing the output to a new file.

Syntax:-

cat ex
cat ex1 ex2 > newex

Description :-



2. cd - change directory

cd is used to change from one directory to another.

Syntax :-

cd dir1

changes directory so that dir1 is your new current directory. dir1 may be either the full pathname of the directory, or its pathname relative to the current directory.

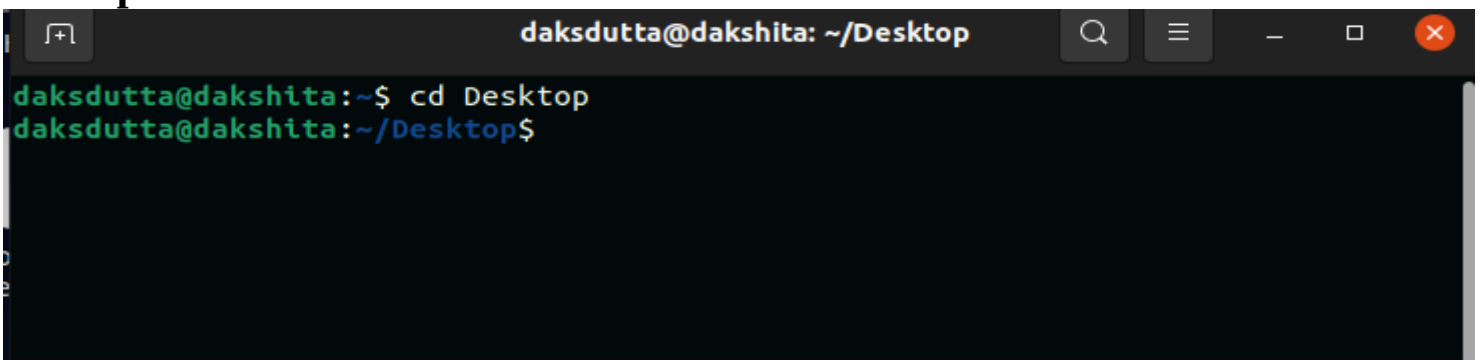
cd

changes directory to your home directory.

cd ..

moves to the parent directory of your current directory.

Description :-



3. chmod - change the permissions on a file or directory

chmod alters the permissions on files and directories using either symbolic or octal numeric codes. The symbolic codes are given here:-

u user + to add a permission **r** read

g group - to remove a permission **w** write

o other = to assign a permission explicitly **x** execute (for files),access (for directories)

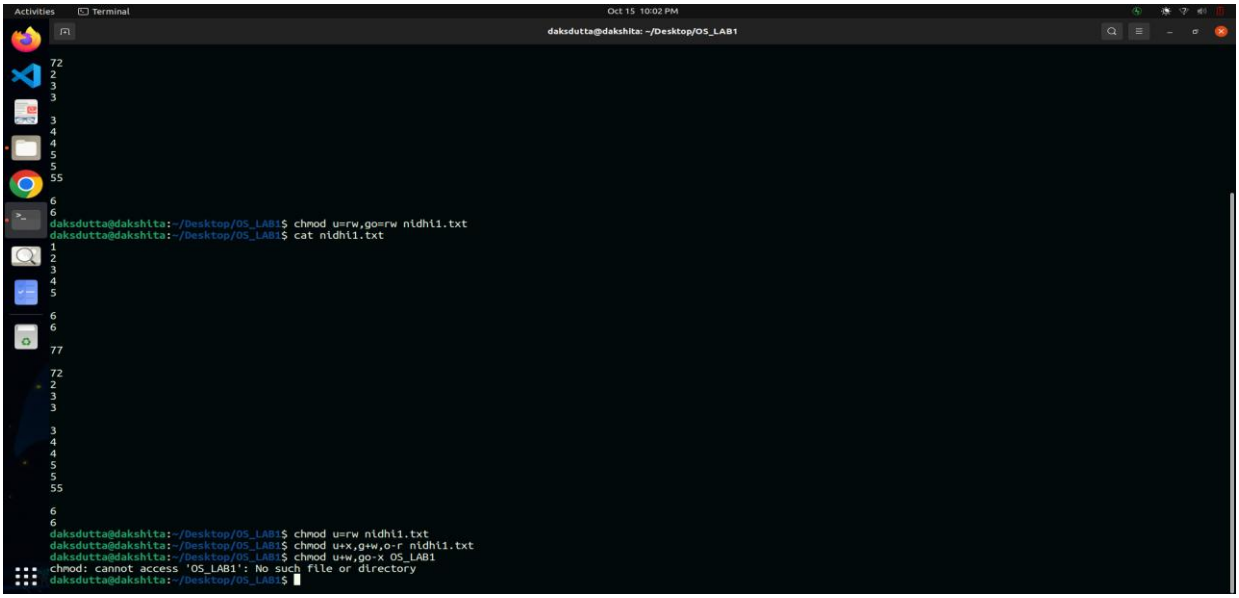
Syntax :-

chmod u=rw file1

chmod u+x,g+w,o-r file1

chmod u+w,go-x dir1

Description :-



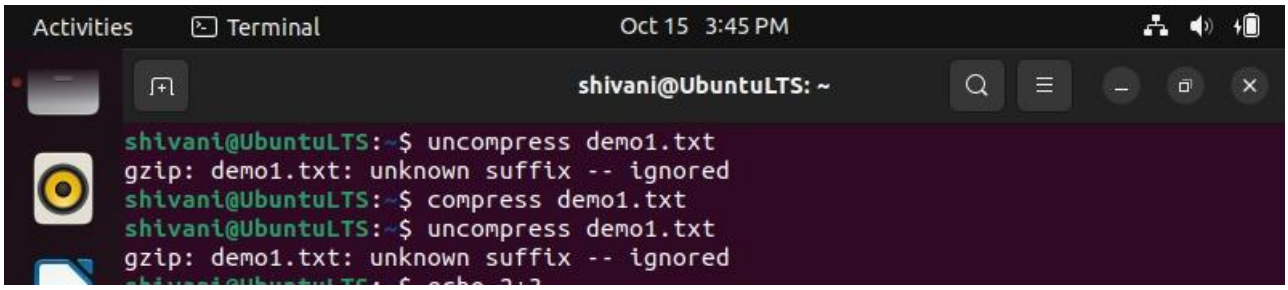
4. compress - compress a file

compress reduces the size of named files, replacing them with files of the same name extended by **.Z** .The amount of space saved by compression varies. If no saving of space would occur, then the file will not be altered.

Syntax :-

compress file1
compress -v file2

Description :-



5. cp - copy a file

The command **cp** is used to make copies of files and directories.

Syntax :-

cp file1 file2
cp file3 file4 dir1
cp -r dir2 dir3

Description :-

```
os is also known as resource manager.
^C
daksdutta@dakshita:~/Desktop/OS_LAB1$ cat nidhi.txt
this is operating system lab 1 work assignment given by scope faculty.
os works as interface between user and application program.
os manages all the resources of system.
os is also known as resource manager.
daksdutta@dakshita:~/Desktop/OS_LAB1$ cp nidhi.txt nidhi1.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ cat nidhi1.txt
this is operating system lab 1 work assignment given by scope faculty.
os works as interface between user and application program.
os manages all the resources of system.
os is also known as resource manager.
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

6. date - display the current date and time

date returns information on the current date and time in the format shown below:-
Tue Mar 25 15:21:16 GMT 1997
It is possible to alter the format of the output from date. For example, using the command line
date 'The date is d/m/y, and the time is H:M:S.'
at exactly 3.10pm on 14th December 1997, would produce the output

The date is 14/12/97, and the time is 15:10:00.

Syntax :-

Date

Description :-

```
daksdutta@dakshita:~/Desktop$ date
Saturday 15 October 2022 09:34:51 PM IST
daksdutta@dakshita:~/Desktop$
```

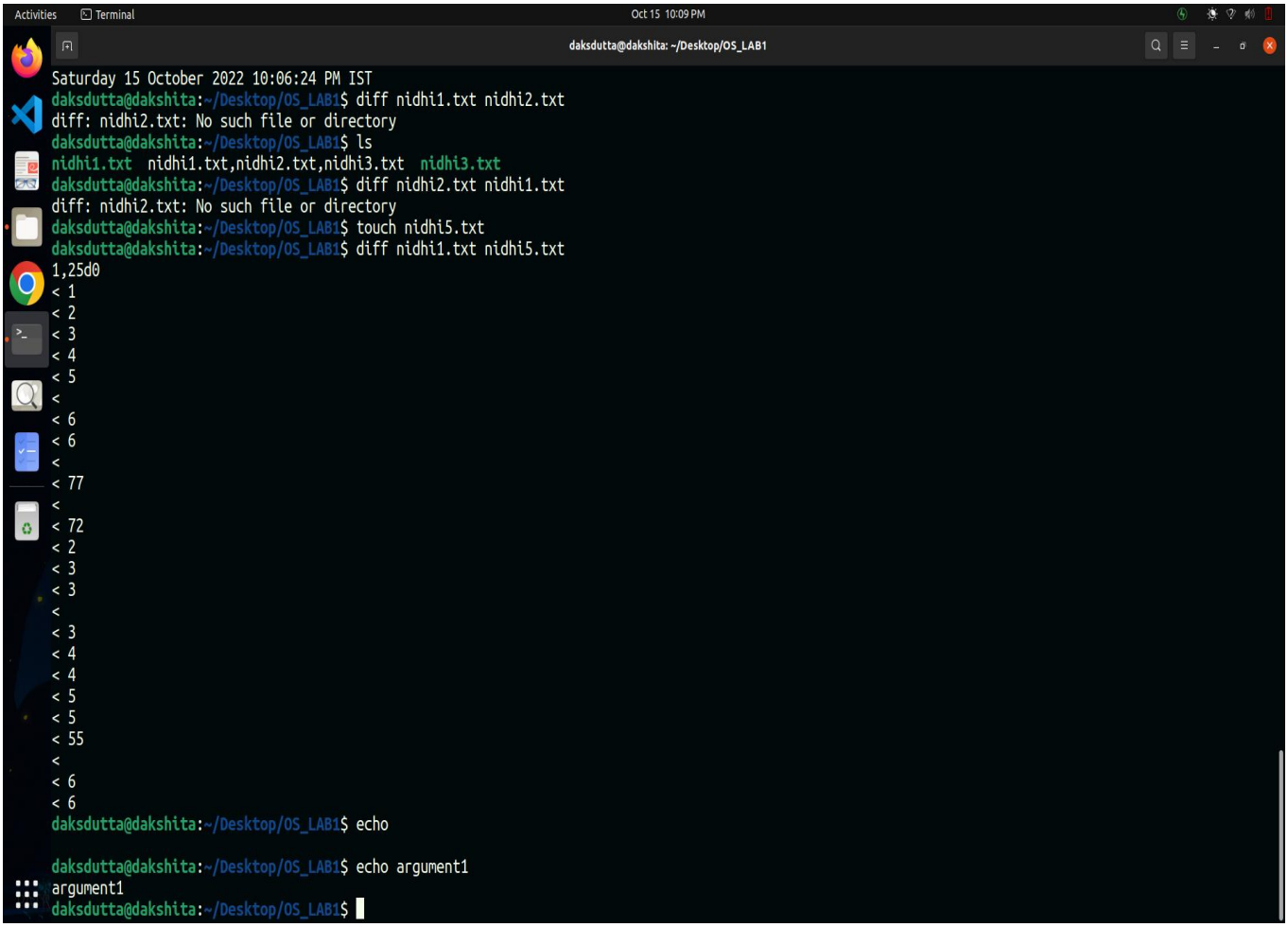
7. diff - display differences between text files

diff file1 file2 reports line-by-line differences between the text files file1 and file2. The default output will contain lines such as **n1 a n2,n3** and **n4,n5 c n6,n7** , (where n1 a n2,n3 means that file2 has the extra lines n2 to n3 following the line that has the number n1 in file1, and **n4,n5 c n6,n7** means that lines n4 to n5 in **file1** differ from lines n6 to n7 in file2). After each such line, **diff** prints the relevant lines from the text files, with < in front of each line from file1 and > in front of each line from file2.

Syntax :-

diff file1 file2

Description :-



8. echo - echo arguments to the standard output

echo echoes given arguments to the standard output, and is generally used in shell programs.

Syntax :-

echo argument1

writes argument1 to the standard output.

Description :-

9. file - determine the type of a file

file tests named files to determine the categories their contents belong to.

Syntax :-

file file1

Description :-

10. find - find files of a specified name or type

find searches for files in a named directory and all its subdirectories.

find . -name '*.f' **-print**

searches the current directory and all its subdirectories for files ending in .f, and writes their names to the standard output. In some versions of Unix the names of the files will only be written out if the **-print** option is used.

Syntax :-

find /local **-name** core **-user** user1 **-print**

Description :-

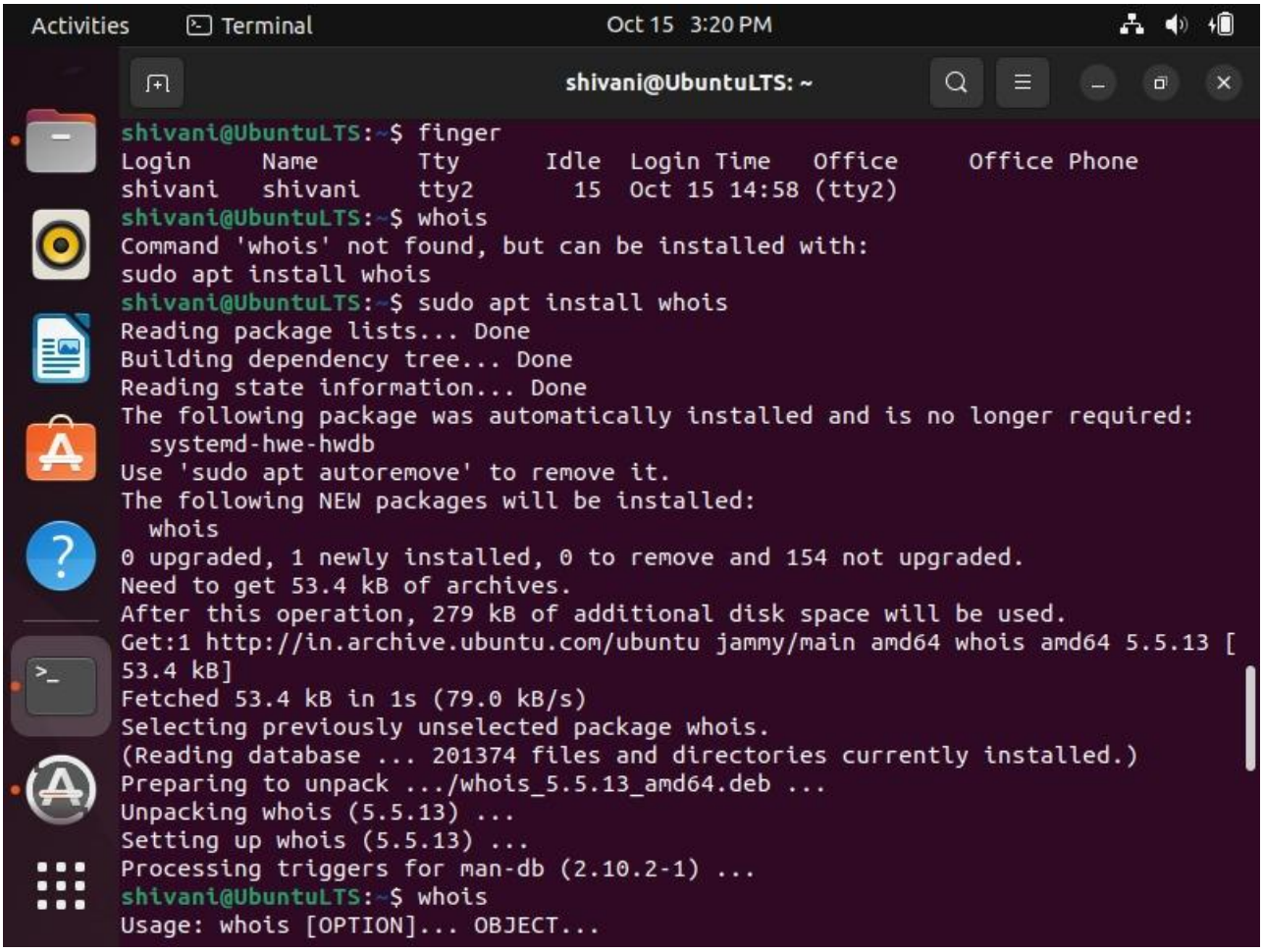
11. finger - display information about a user

finger can be used to obtain information on users on your own and other machines. **Finger** on its own will give information on all users currently logged onto your machine: their user names, real names, the terminal they are using and its idle time, the time they logged on, and the name of the machine from which they logged on.

Syntax :-

finger

Description :-



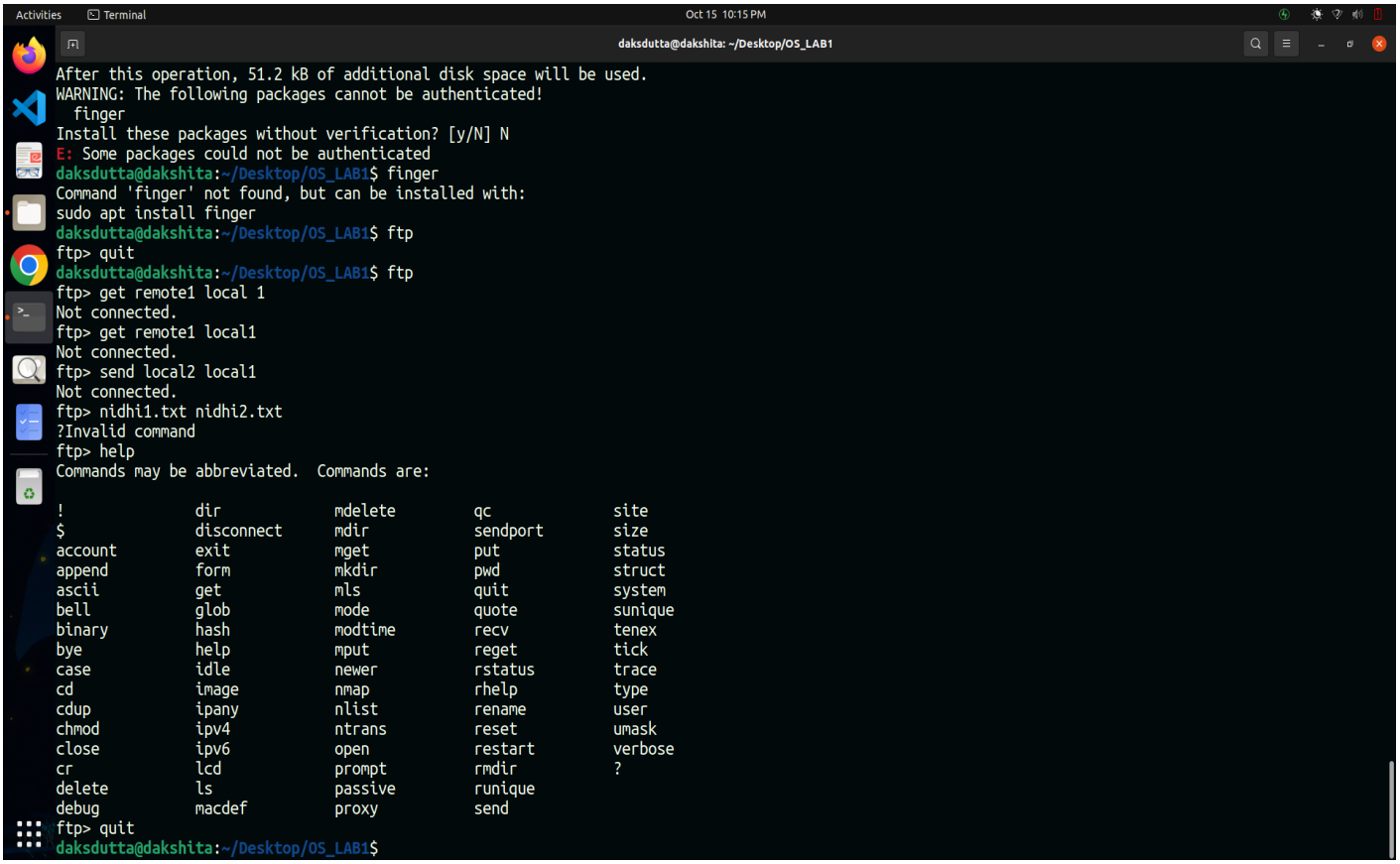
12. ftp - file transfer program

ftp is an interactive file transfer program. While logged on to one machine (described as the local machine), **ftp** is used to logon to another machine (described as the remote machine) that files are to be transferred to or from. As well as file transfers, it allows the inspection of directory contents on the remote machine. There are numerous options and commands associated with **ftp**, and **man** ftp will give details of those.

Syntax :-

ftp

Description :-



13. grep - searches files for a specified string or expression

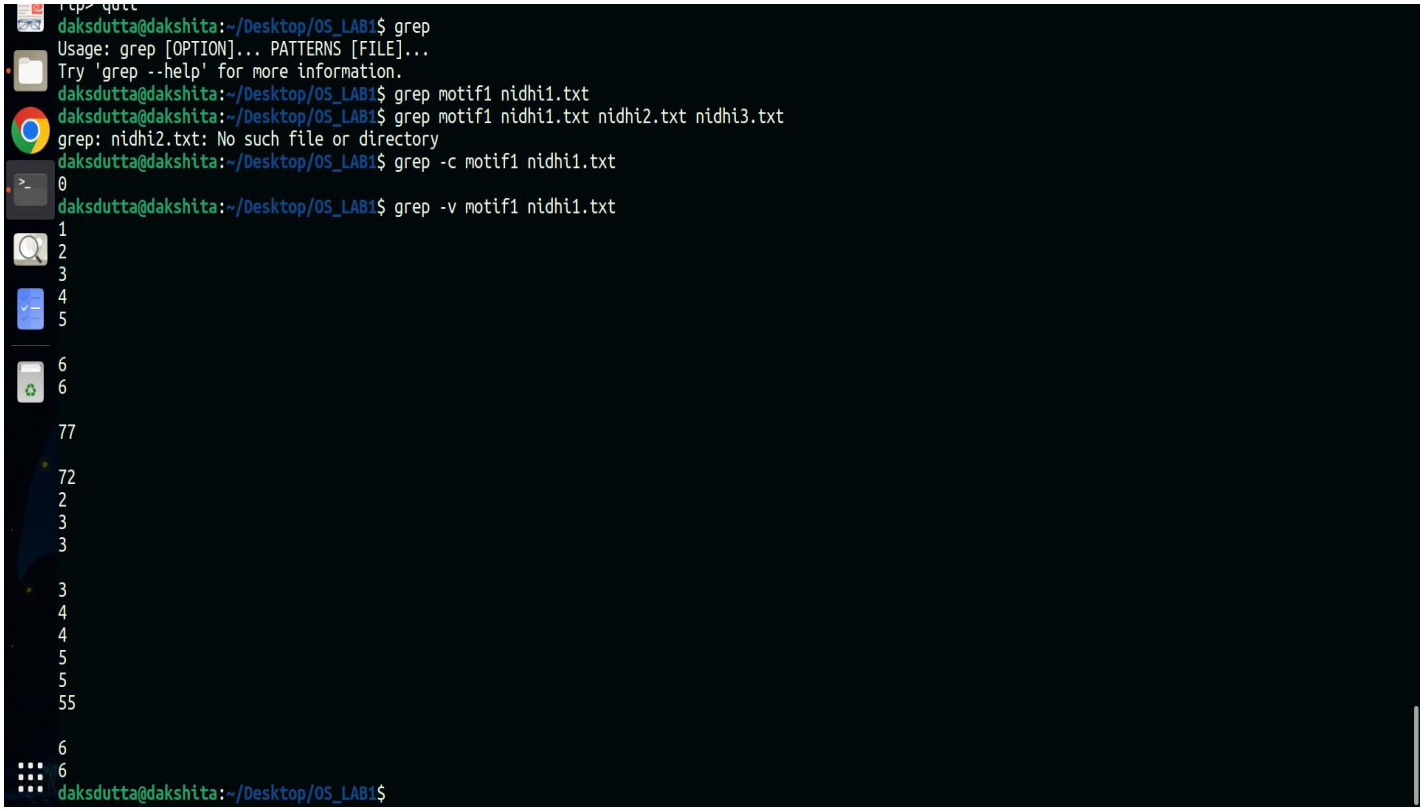
grep searches for lines containing a specified pattern and, by default, writes them to the standard output.

Syntax :-

grep motif1 file1
grep motif1 file1 file2 ... filen
grep -c motif1 file1

grep -v motif1 file1

Description :-



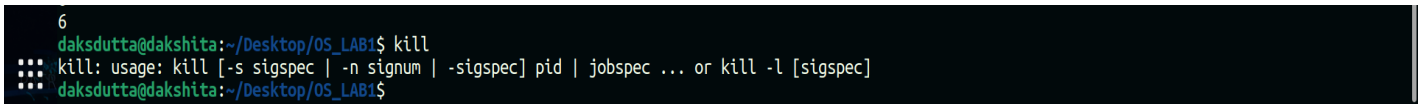
14. kill - kill a process

To kill a process using **kill** requires the process id (PID). This can be found by using **ps**. Suppose the PID is 3429, then **kill** 3429 should kill the process.

Syntax :-

kill

Description :-



15. lpr - print out a file

lpr is used to send the contents of a file to a printer. If the printer is a laserwriter, and the file contains PostScript, then the PostScript will be interpreted and the results of that printed out.

Syntax :-

lpr -Pprinter1 file1
lpq -Pprinter1

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ lpr -Pprinter1 nidhi1.txt
lpr: Error - The printer or class does not exist.
daksdutta@dakshita:~/Desktop/OS_LAB1$ lpq -Pprinter1
lpq: Unknown destination "printer1".
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

16. ls - list names of files in a directory

ls lists the contents of a directory, and can be used to obtain information on the files and directories within it.

Syntax :-

ls dir1
ls -a dir1
ls -l file1
ls -l dir1
ls -ld dir1

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
nidhi1.txt  nidhi1.txt,nidhi2.txt,nidhi3.txt  nidhi3.txt  nidhi5.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

17. man - display an on-line manual page

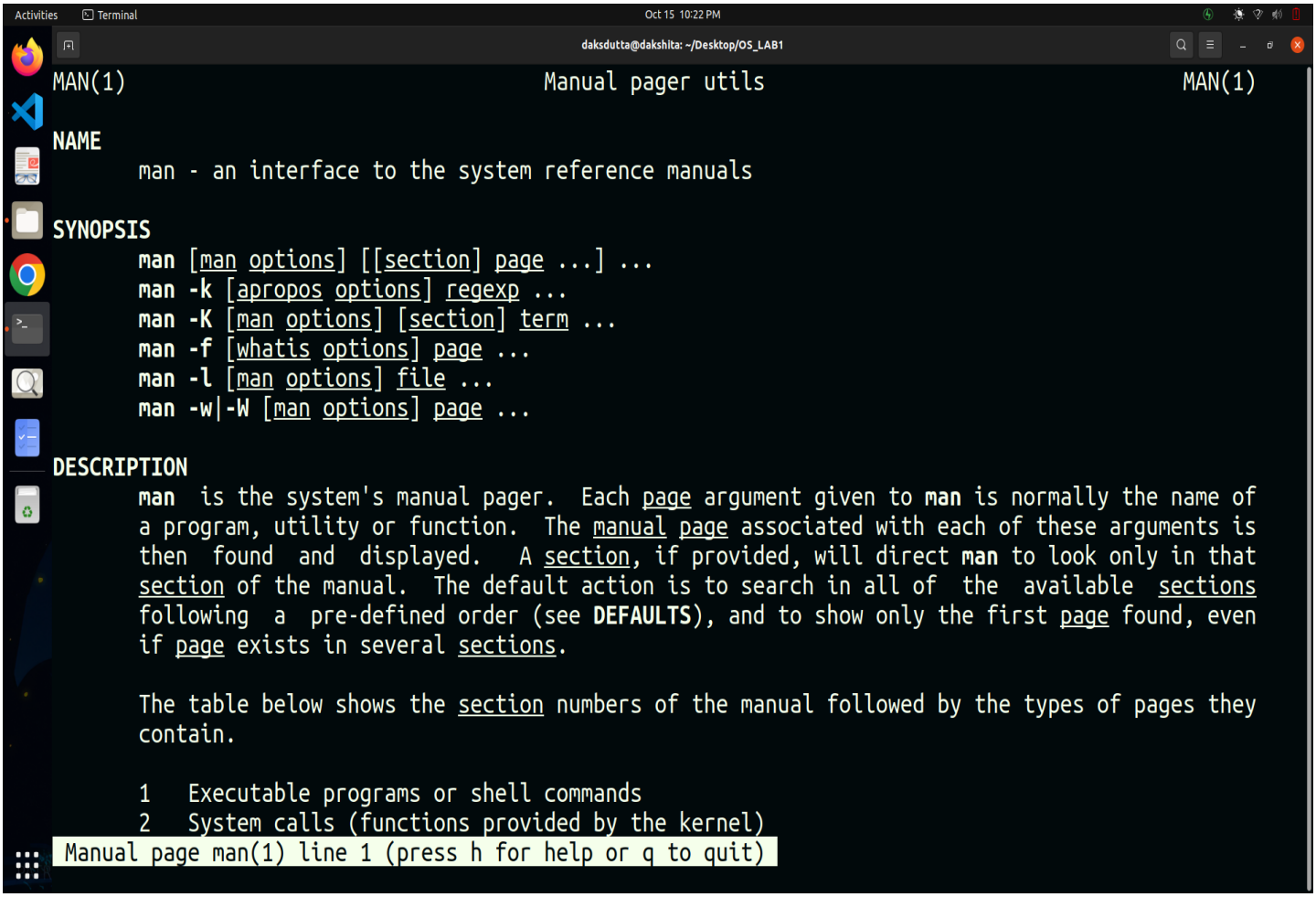
man displays on-line reference manual pages.

Syntax :-

man command1
man -k keyword
man -Mpath command1

Description :-

```
nidhi1.txt  nidhi1.txt,nidhi2.txt,nidhi3.txt  nidhi3.txt  nidhi5.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ man
What manual page do you want?
For example, try 'man man'.
daksdutta@dakshita:~/Desktop/OS_LAB1$ man man
```



18. mkdir - make a directory

mkdir is used to create new directories. In order to do this you must have write permission in the parent directory of the new directory.

Syntax :-

mkdir newdir
mkdir -p
mkdir -p dir1/dir2/newdir

Description :-

```
daksdutta@dakshita:~$ cd Desktop
daksdutta@dakshita:~/Desktop$ mkdir OS_LAB
daksdutta@dakshita:~/Desktop$ mkdir OS_LAB1
daksdutta@dakshita:~/Desktop$ mkdir OS_LAB2
daksdutta@dakshita:~/Desktop$ ls
nidhi  OS_LAB  OS_LAB1  OS_LAB2  xampp-control-panel.desktop
daksdutta@dakshita:~/Desktop$
```

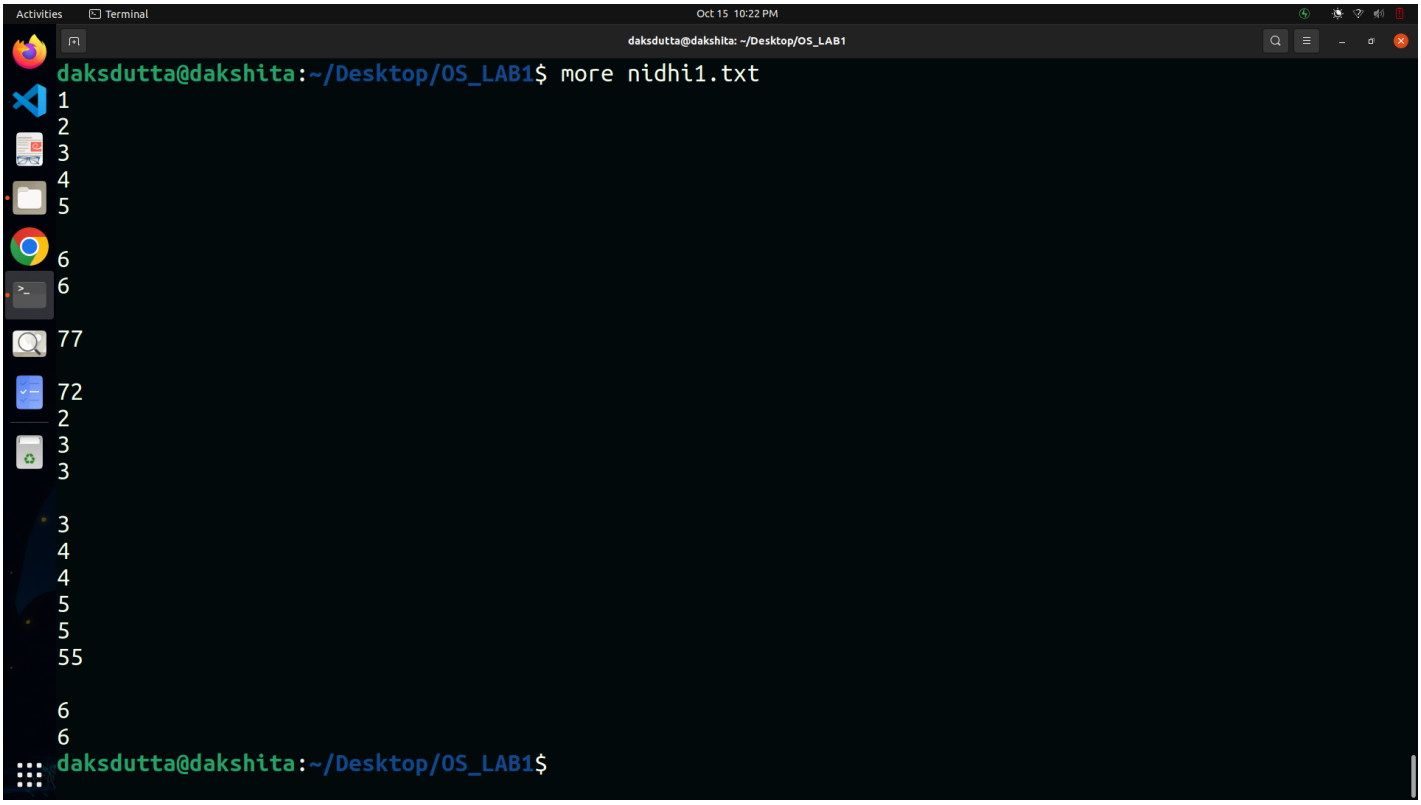
19. more - scan through a text file page by page

more displays the contents of a file on a terminal one screenful at a time.

Syntax :-

more file1
more -n file1

Description :-



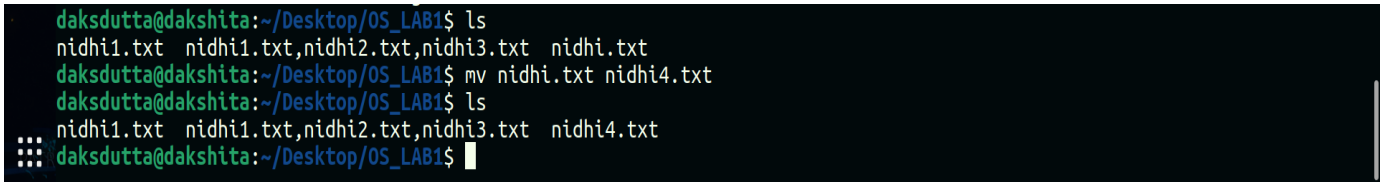
20. mv - move or rename files or directories

mv is used to change the name of files or directories, or to move them into other directories. **mv** cannot move directories from one file-system to another, so, if it is necessary to do that, use **cp** instead.

Syntax :-

mv file1 file2
mv dir1 dir2
mv file1 file2 dir3

Description :-



21. nice - change the priority at which a job is being run

nice causes a command to be run at a lower than usual priority. **nice** can be particularly useful when running a long program that could cause annoyance if it slowed down the execution of other users' commands. An example of the use of **nice** is

Syntax :-

nice compress file1

Description :-

22. passwd - change your password

Use **passwd** when you wish to change your password. You will be prompted once for your current password, and twice for your new password. Neither password will be displayed on the screen.

Syntax :-

passwd

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ passwd
Changing password for daksdutta.
Current password:
New password:
Retype new password:
passwd: password updated successfully
daksdutta@dakshita:~/Desktop/OS_LAB1$ passwd
Changing password for daksdutta.
Current password:
New password:
Retype new password:
passwd: password updated successfully
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

23. ps - list processes

ps displays information on processes currently running on your machine. This information includes the process id, the controlling terminal (if there is one), the cpu time used so far, and the name of the command being run.

Syntax :-

ps
ps -a

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ ps
    PID TTY          TIME CMD
   6233 pts/0    00:00:00 bash
   7210 pts/0    00:00:00 ps
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

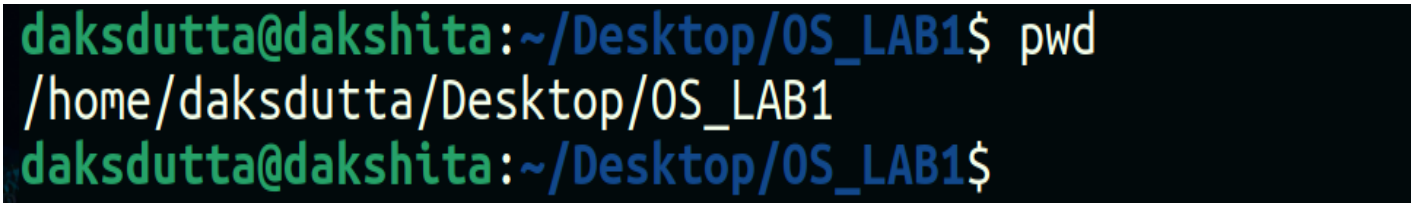
24. pwd - display the name of your current directory

The command **pwd** gives the full pathname of your current directory.

Syntax :-

pwd

Description :-



25. quota - disk quota and usage

quota gives information on a user's disk space quota and usage.

Syntax :-

quota

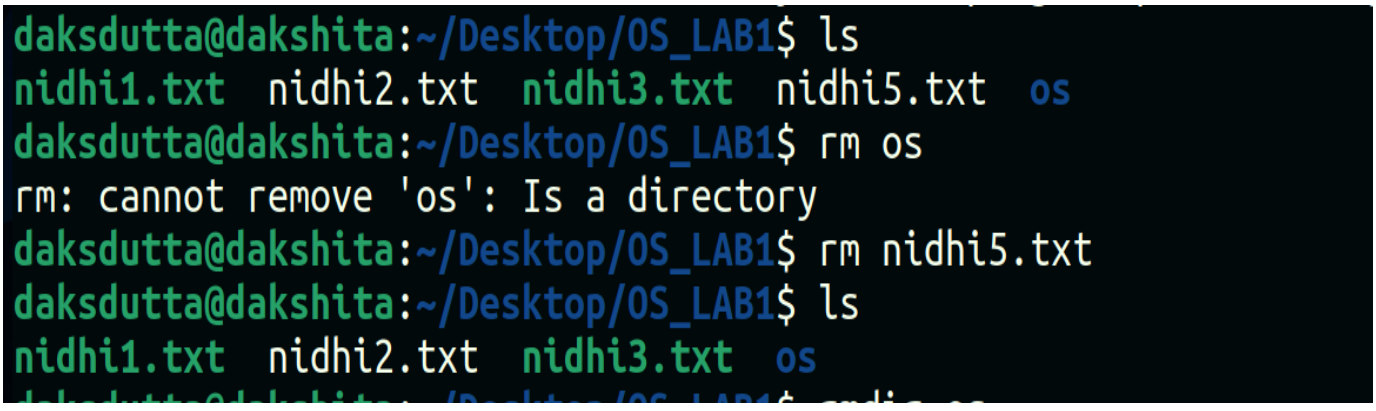
26. rm - remove files or directories

rm is used to remove files. In order to remove a file you must have write permission in its directory, but it is not necessary to have read or write permission on the file itself.

Syntax :-

rm file1
rm -i file1
rm -r dir1

Description :-



27. rmdir - remove a directory

rmdir removes named empty directories. If you need to delete a non-empty directory **rm -r** can be used instead.

Syntax :-

rmdir exdir

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
nidhi1.txt  nidhi2.txt  nidhi3.txt  os
daksdutta@dakshita:~/Desktop/OS_LAB1$ rmdir os
daksdutta@dakshita:~/Desktop/OS_LAB1$ ls
nidhi1.txt  nidhi2.txt  nidhi3.txt
```

28. sort - sort and collate lines

The command **sort** sorts and collates lines in files, sending the results to the standard output. If no file names are given, **sort** acts on the standard input. By default, **sort** sorts lines using a character bycharacter comparison, working from left to right, and using the order of the ASCII character set.

Syntax :-

sort -d
sort -r
sort -n

Description :-

```
daksdutta@dakshita:~/Desktop/OS_LAB1$ sort
-d
^C
daksdutta@dakshita:~/Desktop/OS_LAB1$ sort -d
1
2
3^C
daksdutta@dakshita:~/Desktop/OS_LAB1$ sort -n
hjkll
^C
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

29. talk - talk to another user

talk copies lines from your terminal to another user's terminal.

Syntax :-

talk user1
talk user1@sole
talk user2@carp

30. wc - display a count of lines, words and characters

wc counts the number of lines, words, and characters in files. If no filename is given, **wc** will count the standard input instead.

Syntax :-

wc file1

Description :-

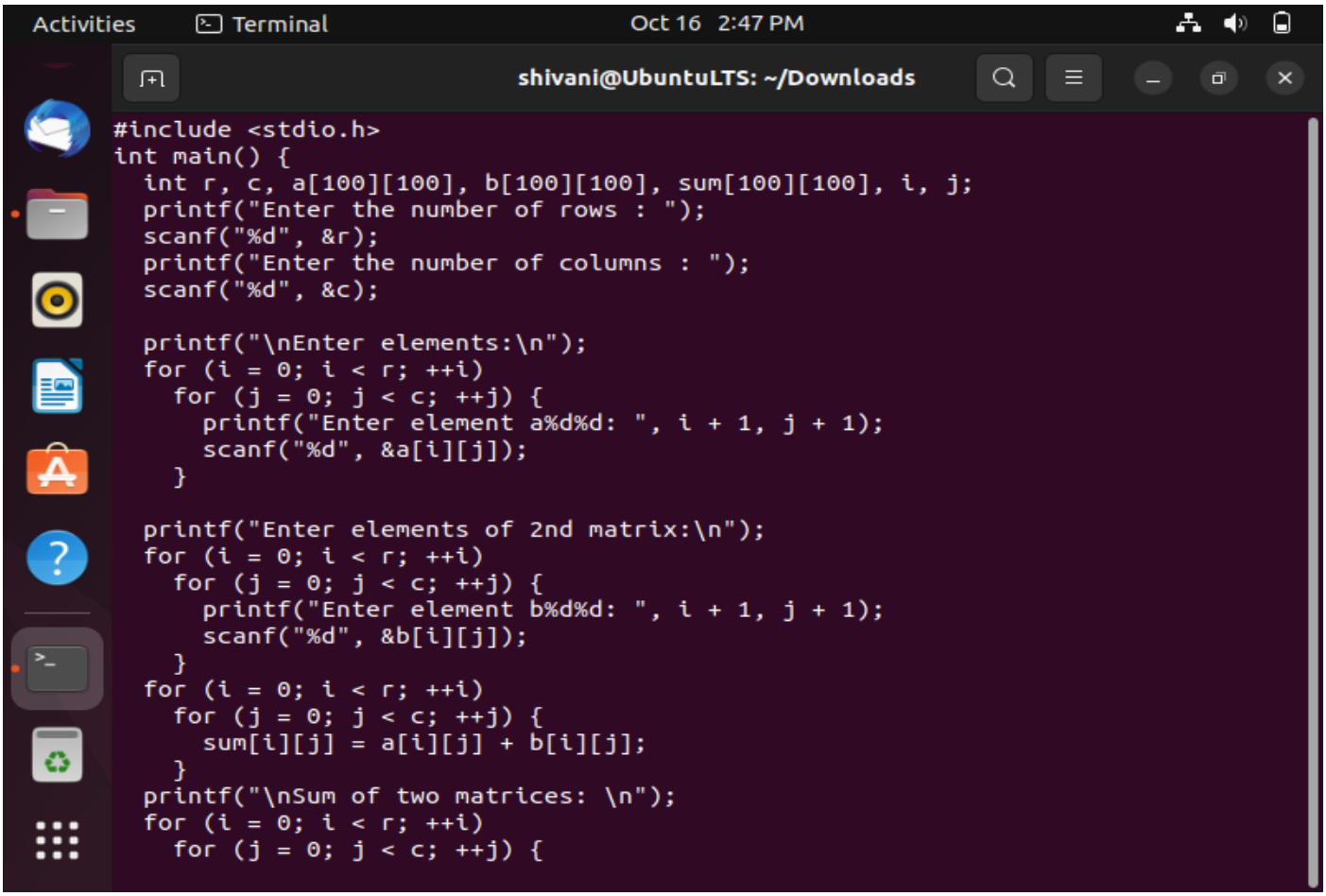
```
daksdutta@dakshita:~/Desktop/OS_LAB1$ wc nidhi1.txt
25 20 48 nidhi1.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ wc nidhi2.txt
0 0 0 nidhi2.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ wc nidhi3.txt
25 20 48 nidhi3.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ wc nidhi4.txt
wc: nidhi4.txt: No such file or directory
daksdutta@dakshita:~/Desktop/OS_LAB1$ wc -l nidhi1.txt
25 nidhi1.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ wc -w nidhi1.txt
20 nidhi1.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$ wc -c nidhi1.txt
48 nidhi1.txt
daksdutta@dakshita:~/Desktop/OS_LAB1$
```

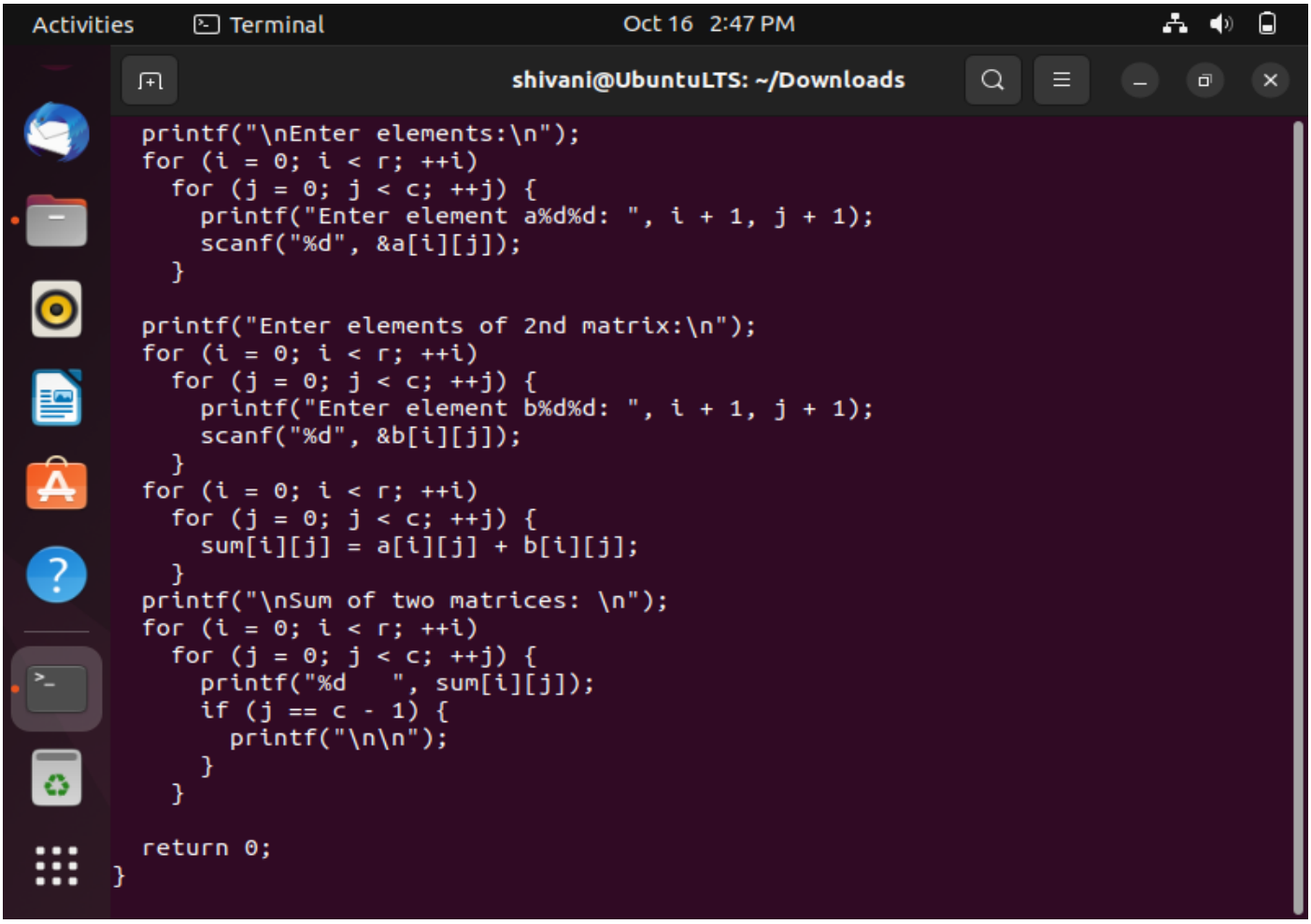
LAB – 2

29-09-2022

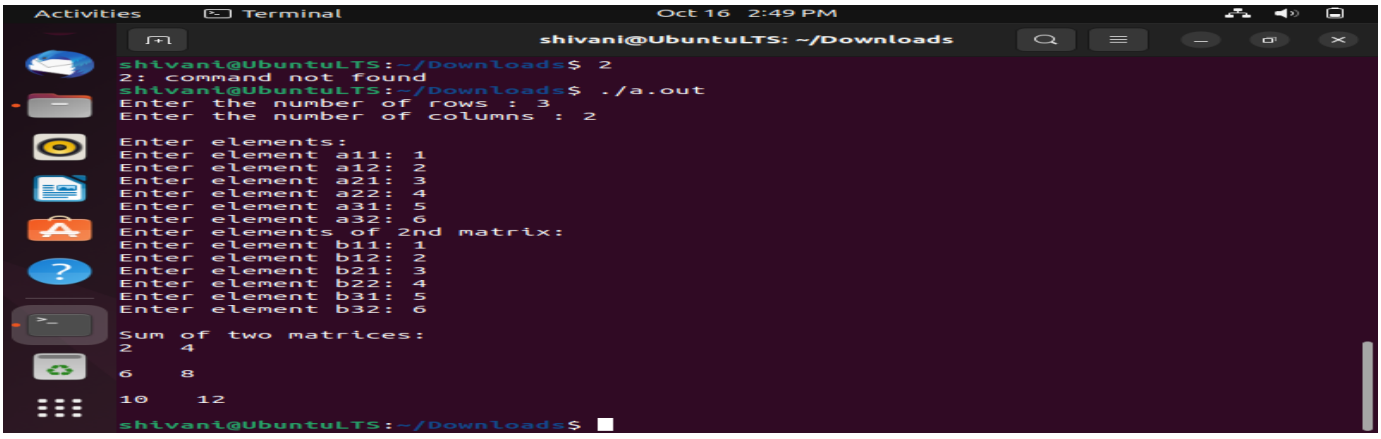
Writing 5 c program in LINUX using vi editor.

1. write a c program for addition of two matrices.

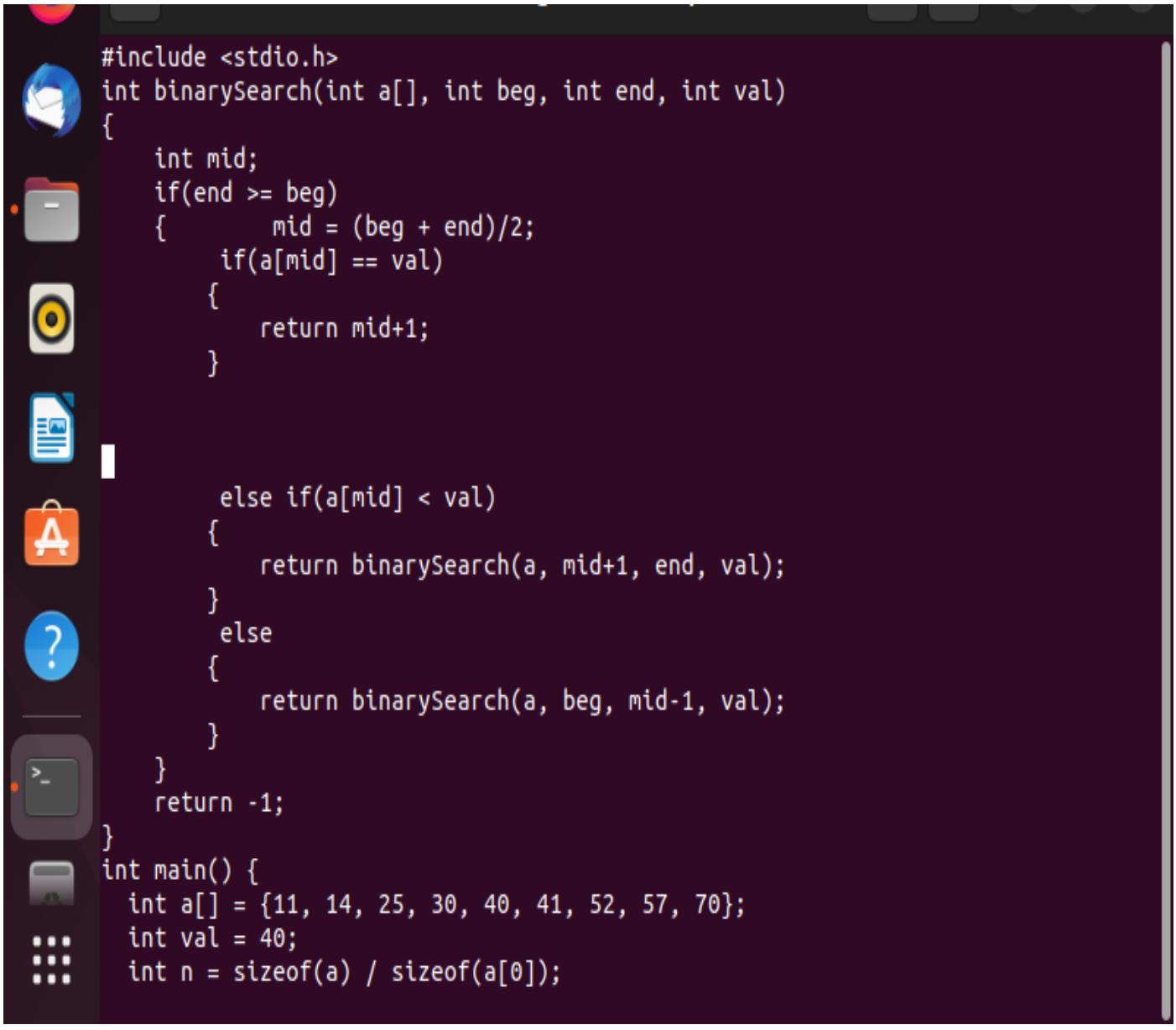



Activities
Terminal
Oct 16 2:47 PM
shivani@UbuntuLTS: ~/Downloads
printf("\nEnter elements:\n");
for (i = 0; i < r; ++i)
for (j = 0; j < c; ++j) {
printf("Enter element a%d%d: ", i + 1, j + 1);
scanf("%d", &a[i][j]);
}
printf("Enter elements of 2nd matrix:\n");
for (i = 0; i < r; ++i)
for (j = 0; j < c; ++j) {
printf("Enter element b%d%d: ", i + 1, j + 1);
scanf("%d", &b[i][j]);
}
for (i = 0; i < r; ++i)
for (j = 0; j < c; ++j) {
sum[i][j] = a[i][j] + b[i][j];
}
printf("\nSum of two matrices: \n");
for (i = 0; i < r; ++i)
for (j = 0; j < c; ++j) {
printf("%d ", sum[i][j]);
if (j == c - 1) {
printf("\n\n");
}
}
return 0;
}

Output :-


Activities
Terminal
Oct 16 2:49 PM
shivani@UbuntuLTS: ~/Downloads
shivani@UbuntuLTS:~/Downloads$ 2
2: command not found
shivani@UbuntuLTS:~/Downloads$ ./a.out
Enter the number of rows : 3
Enter the number of columns : 2
Enter elements:
Enter element a11: 1
Enter element a12: 2
Enter element a21: 3
Enter element a22: 4
Enter element a31: 5
Enter element a32: 6
Enter elements of 2nd matrix:
Enter element b11: 1
Enter element b12: 2
Enter element b21: 3
Enter element b22: 4
Enter element b31: 5
Enter element b32: 6
Sum of two matrices:
2 4
6 8
10 12
shivani@UbuntuLTS:~/Downloads$

2. write a program to implement binary search using c language.



```c
#include <stdio.h>
int binarySearch(int a[], int beg, int end, int val)
{
    int mid;
    if(end >= beg)
    {        mid = (beg + end)/2;
         if(a[mid] == val)
        {
            return mid+1;
        }


         else if(a[mid] < val)
        {
            return binarySearch(a, mid+1, end, val);
        }
         else
        {
            return binarySearch(a, beg, mid-1, val);
        }
    }
    return -1;
}
int main() {
  int a[] = {11, 14, 25, 30, 40, 41, 52, 57, 70};
  int val = 40;
  int n = sizeof(a) / sizeof(a[0]);
```

```
    {         mid = (beg + end)/2;
         if(a[mid] == val)
        {
            return mid+1;
        }
         else if(a[mid] < val
        {
            return binarySearch(a, mid+1, end, val);
        }
         else
        {
            return binarySearch(a, beg, mid-1, val);
        }
    }
    return -1;
}
int main() {
  int a[] = {11, 14, 25, 30, 40, 41, 52, 57, 70};
  int val = 40;
  int n = sizeof(a) / sizeof(a[0]);
  int res = binarySearch(a, 0, n-1, val);
  printf("\nElement to be searched is - %d", val);
  if (res == -1)
  printf("\nElement is not present in the array");
  else
  printf("\nElement is present at %d position of array", res);
  return 0;
}
:wq
```

Outout:-

```
shivani@UbuntuLTS:~/Downloads$ vi binary.c
shivani@UbuntuLTS:~/Downloads$ ./a.out

Element to be searched is - 40
Element is present at 5 position of arrayshivani@UbuntuLTS:~/Downloads$ vi binar
cc binary.c
binary.c: In function ‘binarySearch’:
binary.c:11:30: error: expected ‘)’ before ‘{’ token
   11 |           else if(a[mid] < val
      |                   ~          ^
      |                              )
   12 |         {
      |         ~
binary.c:19:5: error: expected expression before ‘}’ token
   19 |     }
      |     ^
shivani@UbuntuLTS:~/Downloads$ vi binary.c
shivani@UbuntuLTS:~/Downloads$ cc binary.c
shivani@UbuntuLTS:~/Downloads$ ./a.out

Element to be searched is - 40
Element is present at 5 position of arrayshivani@UbuntuLTS:~/Downloads$
```

3. write a program to find factorial of number.

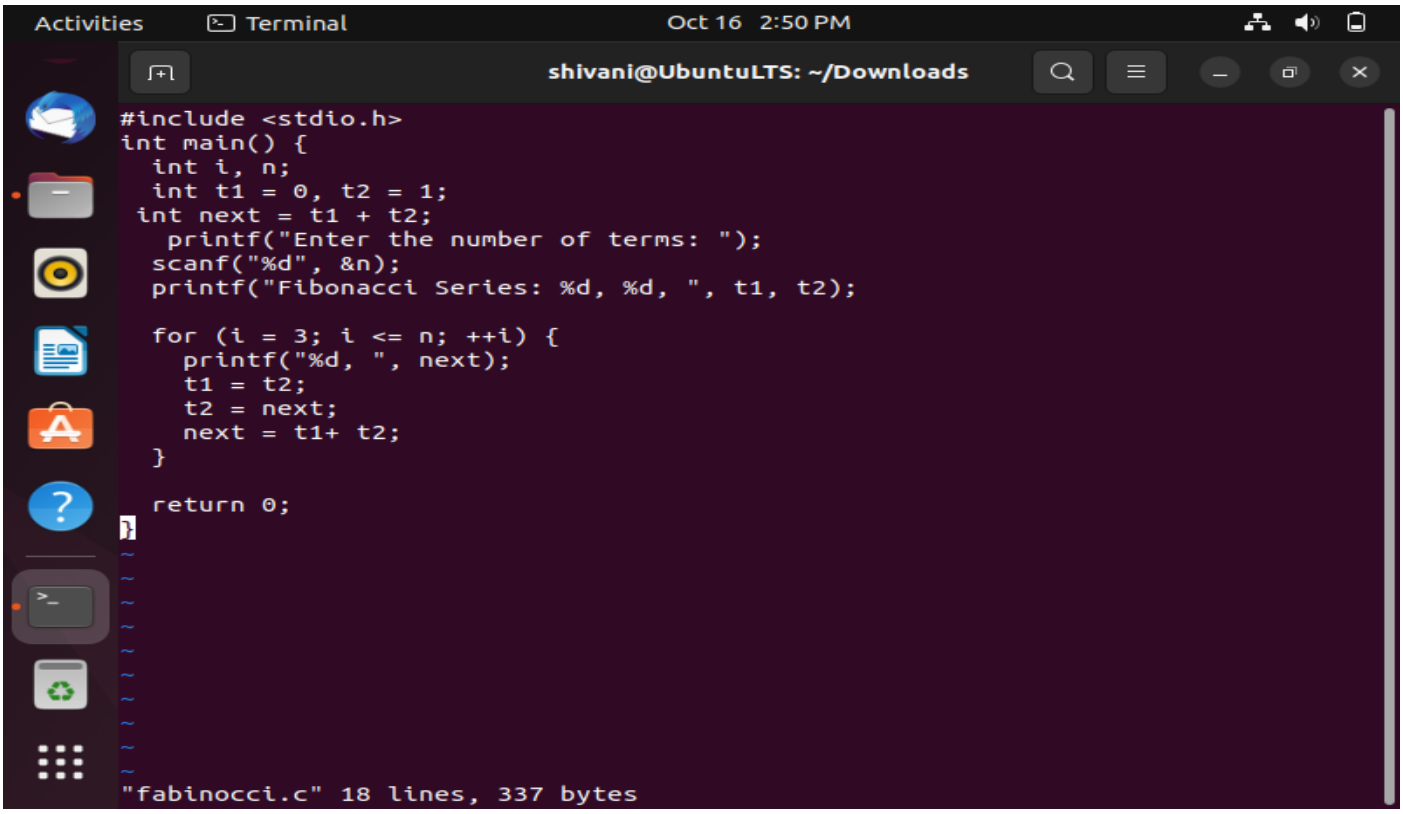
```
#include <stdio.h>^M
int main() {^M
    int n, i;^M
    unsigned long long fact = 1;^M
    printf("Enter an integer: ");^M
    scanf("%d", &n);^M
 if (n < 0)^M
        printf("Factorial of a negative number doesn't exist.");^M
    else {^M
        for (i = 1; i <= n; ++i) {^M
            fact *= i;^M
        }^M
        printf("Factorial of %d = %llu", n, fact);^M
    }^M
^M
    return 0;^M
}^M
~
~
```

Output :-

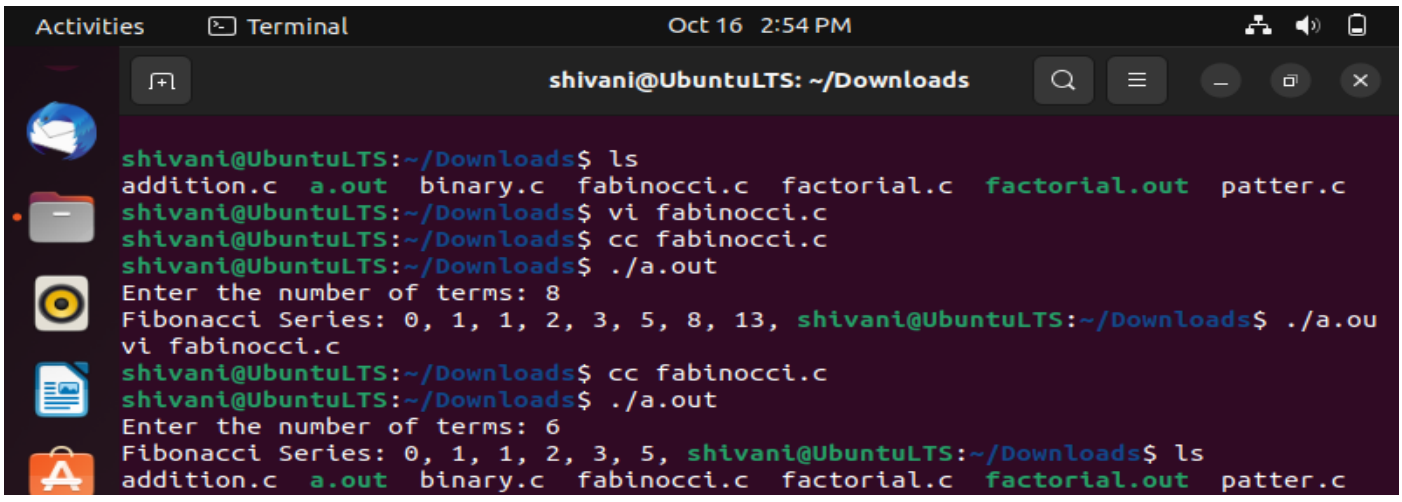
```
Activities  Terminal  Oct 16 2:13 PM
shivani@UbuntuLTS: ~/Downloads
shivani@UbuntuLTS:~/Downloads$ vi factorial.c

[1]+  Stopped                 vi factorial.c
shivani@UbuntuLTS:~/Downloads$ wq
wq: command not found
shivani@UbuntuLTS:~/Downloads$ vi factorial.c
shivani@UbuntuLTS:~/Downloads$ cc factorial.c -o factorial.out
shivani@UbuntuLTS:~/Downloads$ ./a.out
bash: ./a.out: No such file or directory
shivani@UbuntuLTS:~/Downloads$ ./factorial.out
Enter an integer: 5
Factorial of 5 = 120shivani@UbuntuLTS:~/Downloads$
```

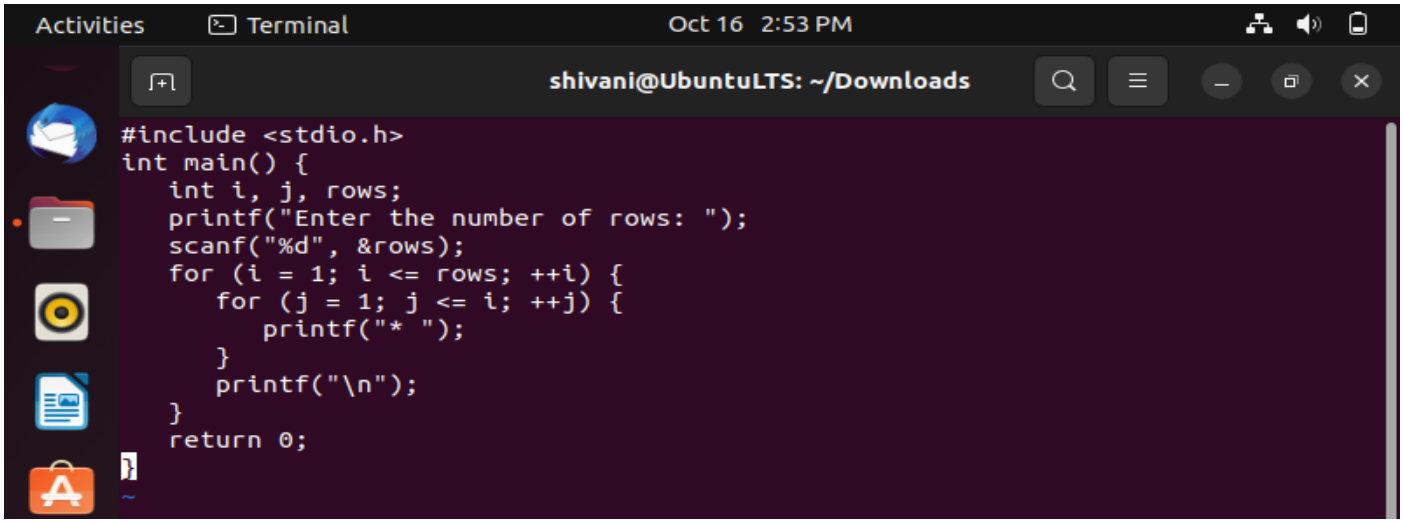
4. write a program to print Fibonacci series in c language.



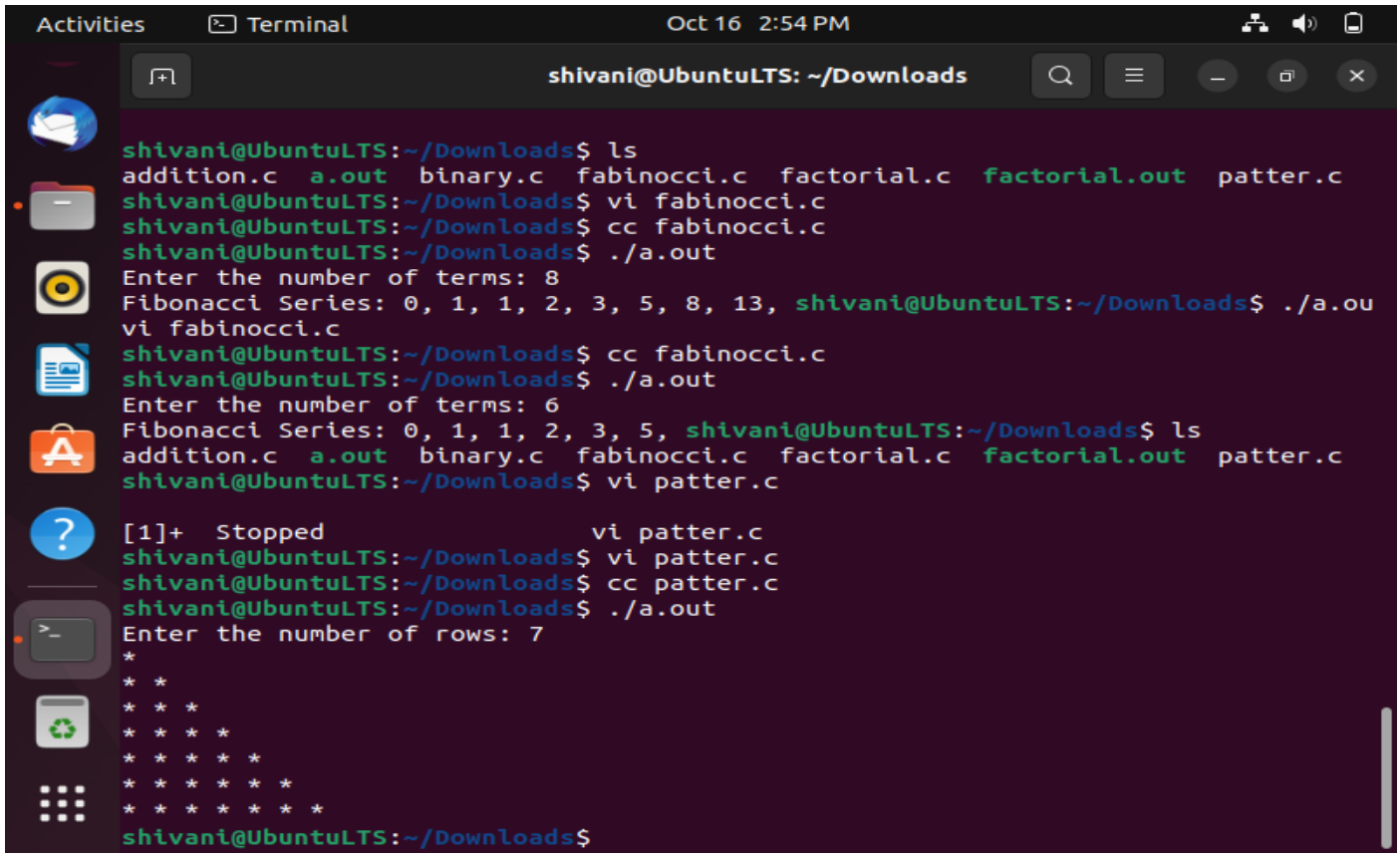
Output :-



5. write a program to print a specific pattern in c language.



Output : -



LAB 3:-

06/10/2022

Create child, Orphan and Zombie processes using suitable system calls such as fork(), exec(), wait(), kill(), sleep() and exit() system calls.

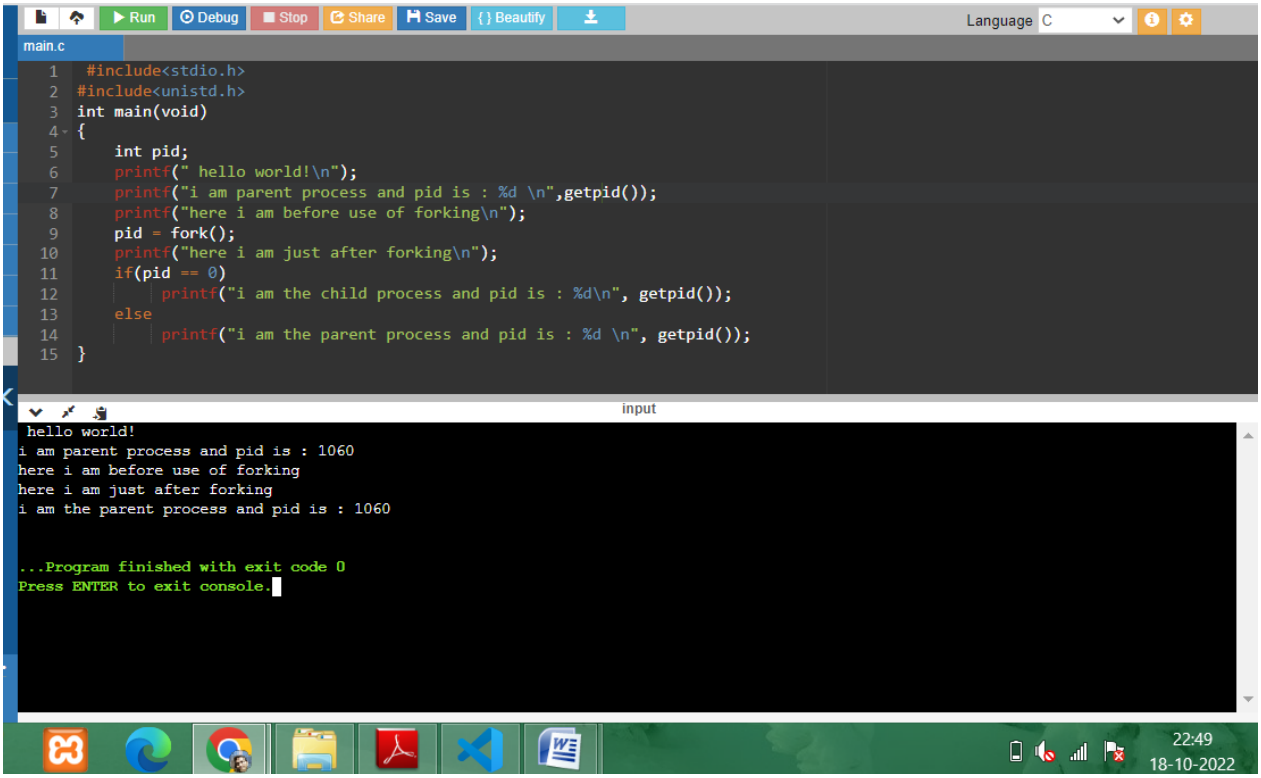
Child Process:-

Fork system call is used for creating a new process, which is called **child process**, which runs concurrently with the process that makes the fork() call (parent process). After a new child process is created, both processes will execute the next instruction following the fork() system call. A child process uses the same pc(program counter), same CPU registers, same open files which use in the parent process.

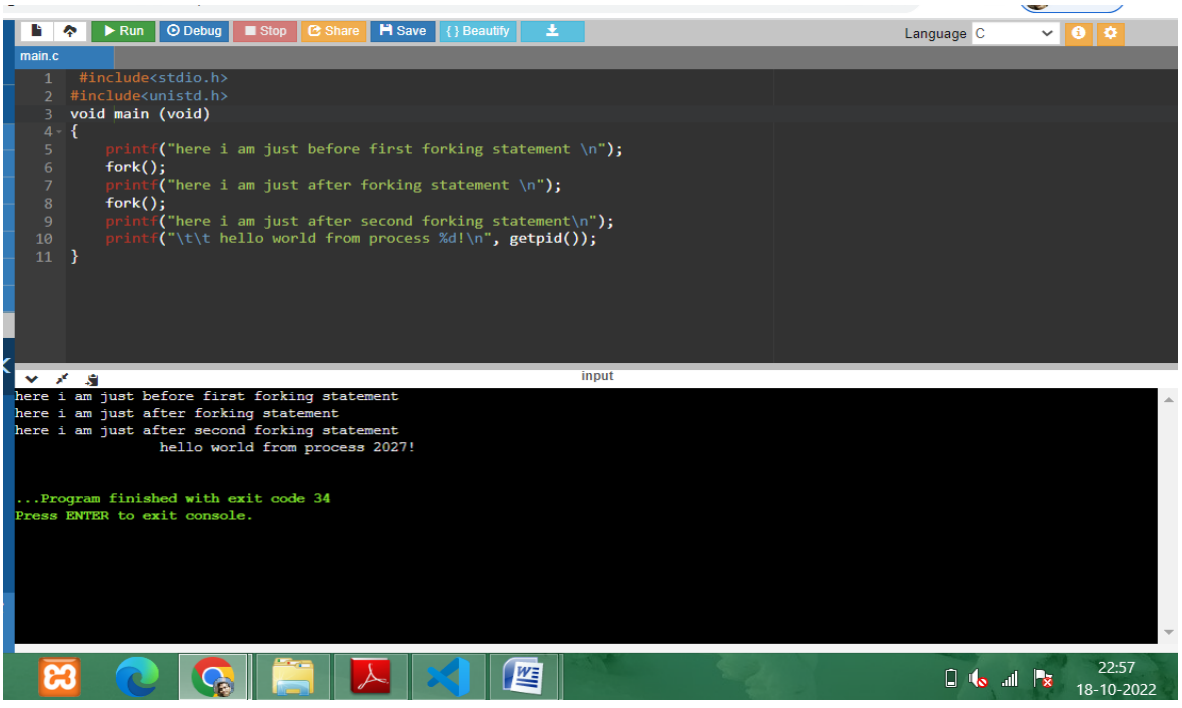
It takes no parameters and returns an integer value. Below are different values returned by fork().**Negative Value**: creation of a child process was unsuccessful. **Zero**: Returned to the newly created child process. **Positive value**: Returned to parent or caller. The value contains process ID of newly created child process.

LAB 4.1

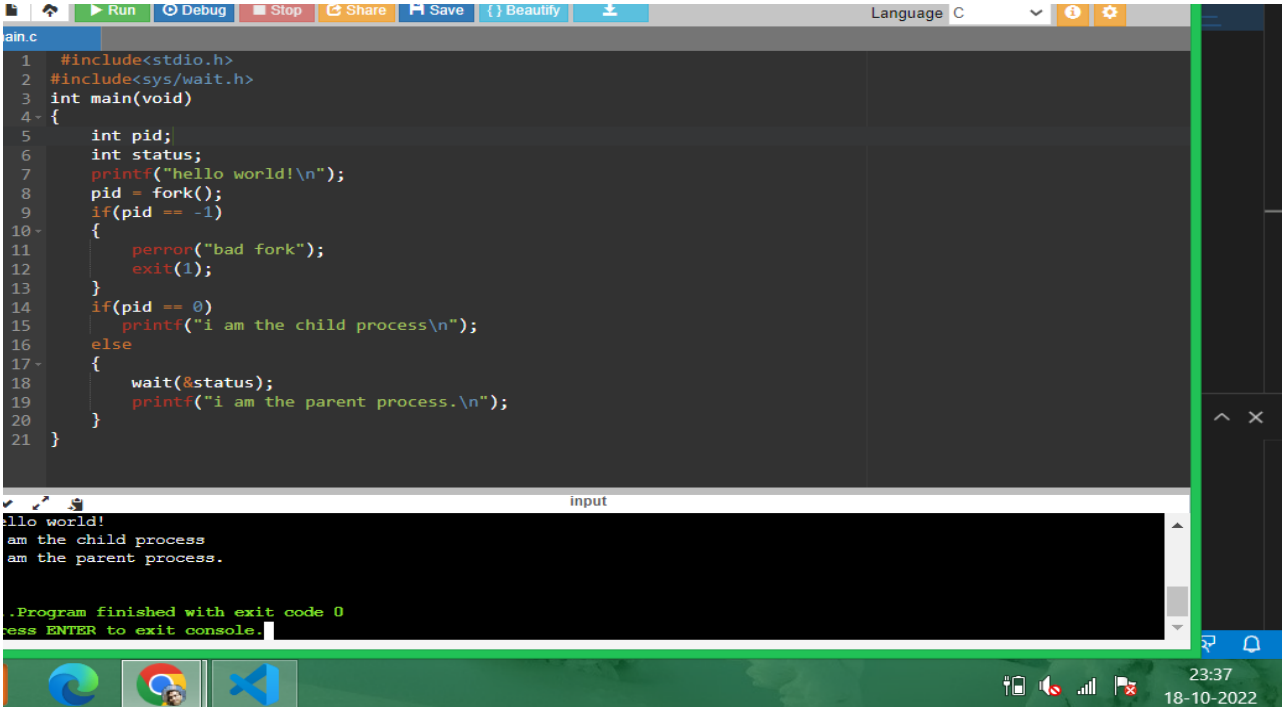
LAB 4.2


Run
Debug
Stop
Share
Save
{ } Beautify
Language C
main.c
#include<stdio.h>
#include<unistd.h>
int main(void)
{
int pid;
printf(" hello world!\n");
printf("i am parent process and pid is : %d \n",getpid());
printf("here i am before use of forking\n");
pid = fork();
printf("here i am just after forking\n");
if(pid == 0)
printf("i am the child process and pid is : %d\n", getpid());
else
printf("i am the parent process and pid is : %d \n", getpid());
}
input
hello world!
i am parent process and pid is : 1060
here i am before use of forking
here i am just after forking
i am the parent process and pid is : 1060
...Program finished with exit code 0
Press ENTER to exit console.
22:49
18-10-2022

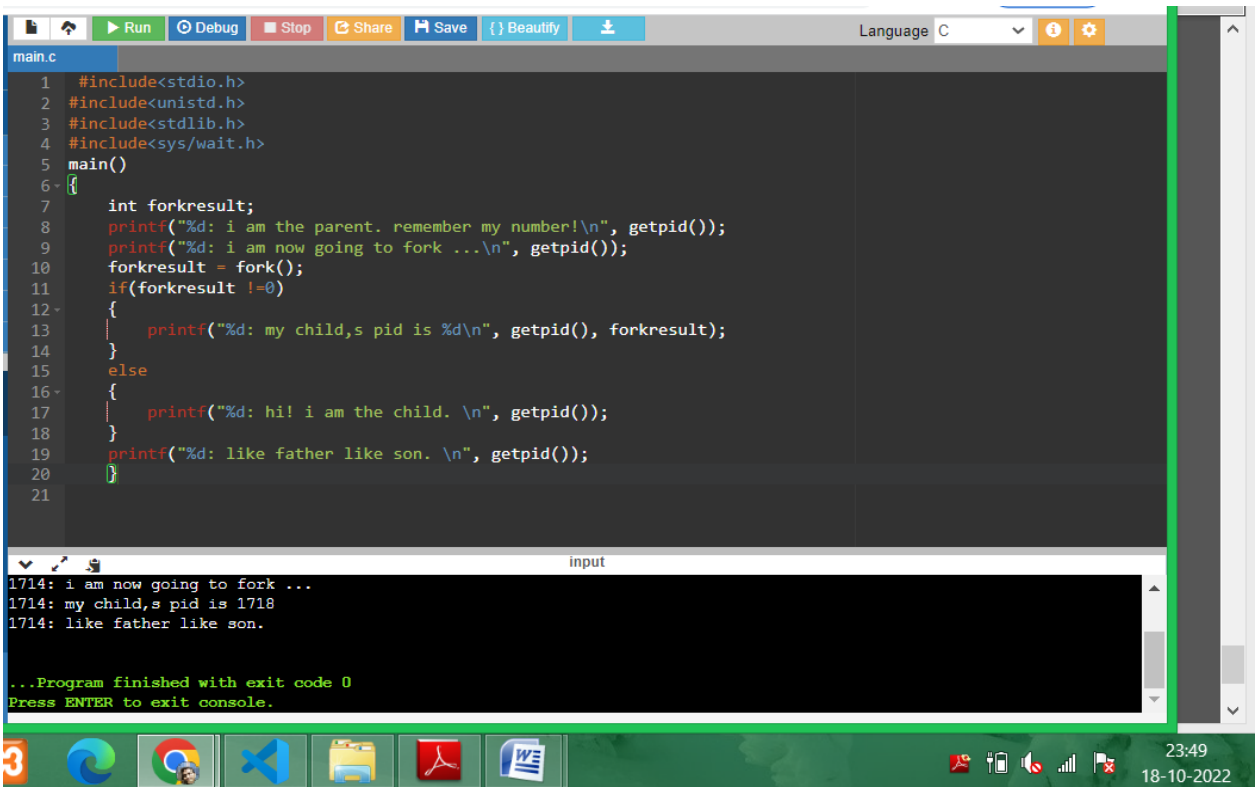
LAB 4.3


Run
Debug
Stop
Share
Save
{ } Beautify
Language C
main.c
#include<stdio.h>
#include<unistd.h>
void main (void)
{
printf("here i am just before first forking statement \n");
fork();
printf("here i am just after forking statement \n");
fork();
printf("here i am just after second forking statement\n");
printf("\t\t hello world from process %d!\n", getpid());
}
input
here i am just before first forking statement
here i am just after forking statement
here i am just after second forking statement
hello world from process 2027!
...Program finished with exit code 34
Press ENTER to exit console.
22:57
18-10-2022

Lab 4.4 : Guarantees the child processwill print its message before the parent process.



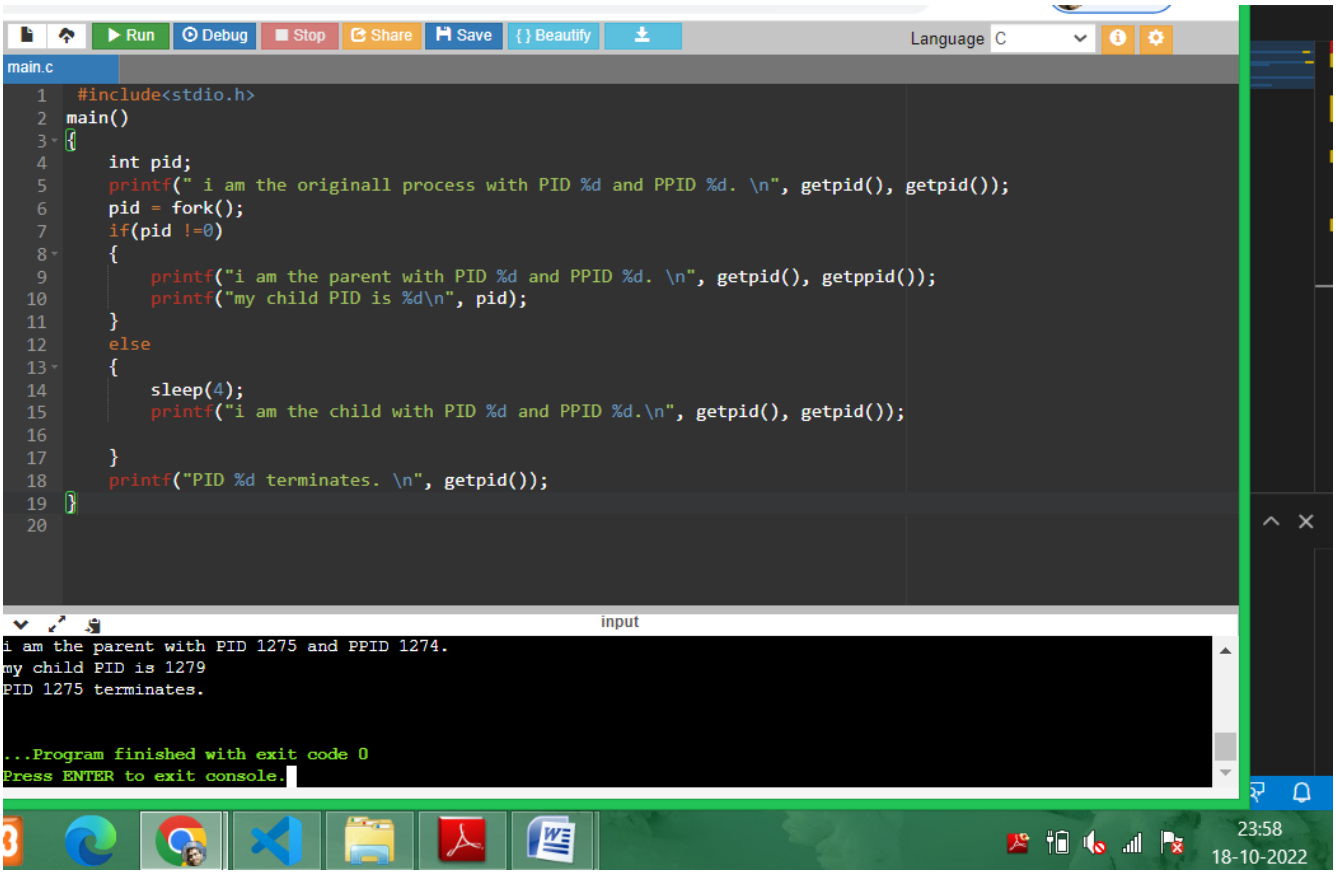
LAB 4.5

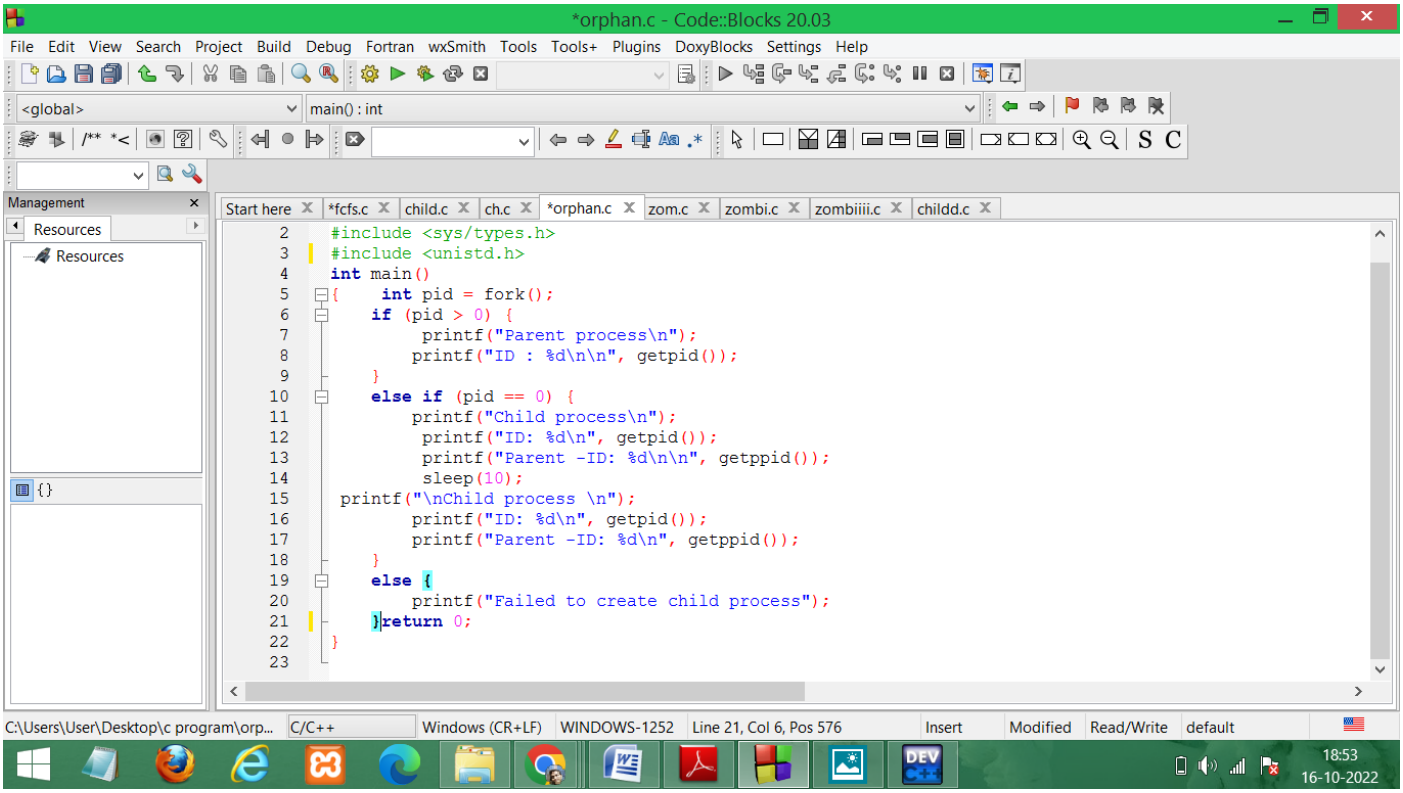


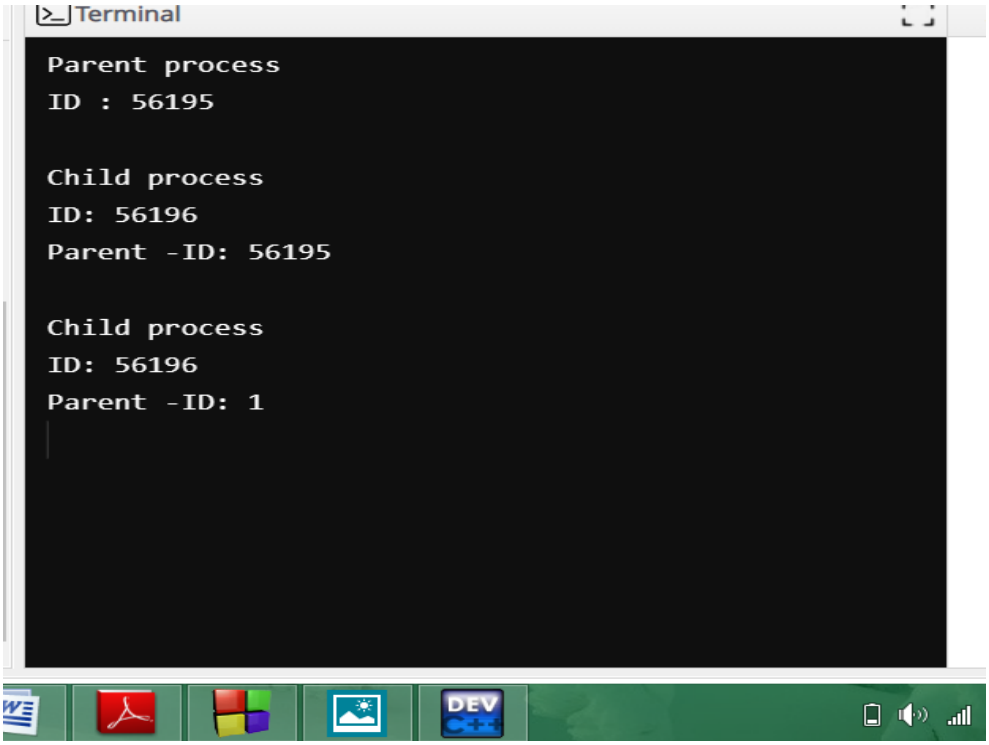
4.6 Orphan Process :

A process whose parent process no more exists i.e. either finished or terminated without waiting for its child process to terminate is called an orphan process.
In the following code, parent finishes execution and exits while the child process is still executing and is called an orphan process now.

However, the orphan process is soon adopted by init process, once its parent process dies.




*orphan.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Management
Resources
Start here
*fcfs.c
child.c
ch.c
*orphan.c
zom.c
zombi.c
zombiii.c
childd.c
#include <sys/types.h>
#include <unistd.h>
int main()
{ int pid = fork();
if (pid > 0) {
printf("Parent process\n");
printf("ID : %d\n\n", getpid());
}
else if (pid == 0) {
printf("Child process\n");
printf("ID: %d\n", getpid());
printf("Parent -ID: %d\n\n", getppid());
sleep(10);
printf("\nChild process \n");
printf("ID: %d\n", getpid());
printf("Parent -ID: %d\n", getppid());
}
else {
printf("Failed to create child process");
}return 0;
}
C:\Users\User\Desktop\c program\orp...
C/C++
Windows (CR+LF)
WINDOWS-1252
Line 21, Col 6, Pos 576
Insert
Modified
Read/Write
default
18:53
16-10-2022


Terminal
Parent process
ID : 56195
Child process
ID: 56196
Parent -ID: 56195
Child process
ID: 56196
Parent -ID: 1

4.7. Zombie process

A process which has finished the execution but still has entry in the process table to report to its parent process is known as a zombie process. A child process always first becomes a zombie before being removed from the process table. The parent process reads the exit status of the child process which reaps off the child process entry from the process table.