# EXPERIMENT 2

***AIM:***

Study of a terminal based text editor such as Vim or Emacs. (By the end of the course, students are expected to acquire following skills in using the editor: cursor operations, manipulate text, search for patterns, global search and replace)

Basic Linux commands, familiarity with following commands/operations expected

1 man

2 ls, echo, read

3 more, less, cat

4 cd, mkdir, pwd, find

5 mv, cp, rm, tar

6 wc, cut, paste

7 head, tail, grep, expr

8 chmod, chown

9 Redirections & Piping

10 useradd,

usermod, userdel, passwd11

df,top, ps

12 ssh, scp, ssh-keygen, ssh-copy-id

## Text Editor

Text editors are software programs used for creating and editing plain text files. They're essential tools for programmers, writers, and anyone who works with text-based documents.

Unix text editors are:

- VIM

- EMACS

- NANO

- PICO

# VIM

Vim is an acronym for Vi IMproved. It is a free and open-source cross-platform text editor. Itwas first released by Bram Moolenaar in 1991 for UNIX variants.

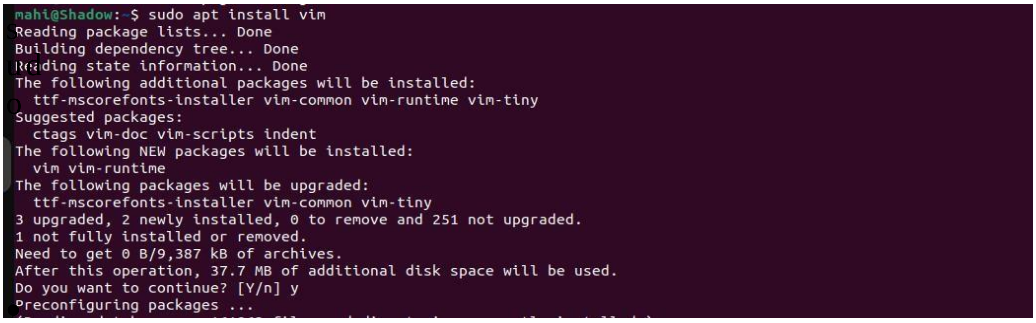
Vim is based on the original Vi editor, which was created by Bill Joy in 1976.

## Vim Modes:

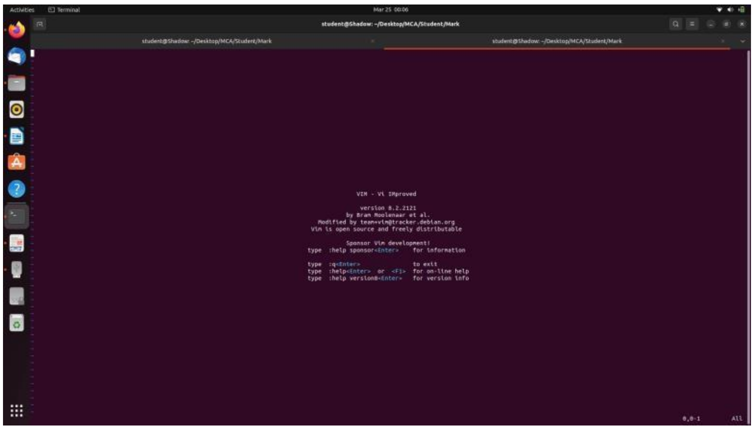
There are 4 most important modes in Vim:

- o Command Mode
- o Command-Line Mode
- o Insert Mode
- o Visual Mode

## Vim Installation:



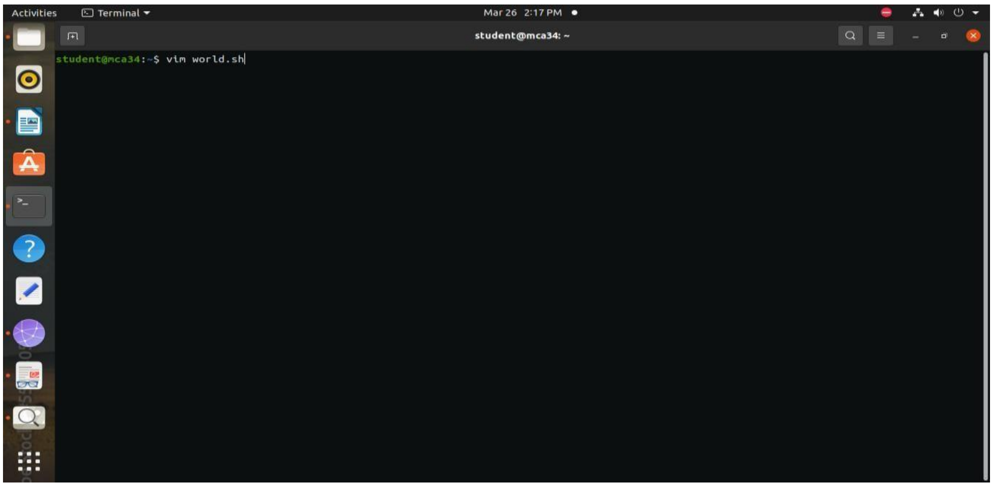
```
mahi@Shadow:~$ sudo apt install vim
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ttf-mscorefonts-installer vim-common vim-runtime vim-tiny
Suggested packages:
  ctags vim-doc vim-scripts indent
The following NEW packages will be installed:
  vim vim-runtime
The following packages will be upgraded:
  ttf-mscorefonts-installer vim-common vim-tiny
3 upgraded, 2 newly installed, 0 to remove and 251 not upgraded.
1 not fully installed or removed.
Need to get 0 B/9,387 kB of archives.
After this operation, 37.7 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Preconfiguring packages ...
```



Activities
Terminal
Mar 25 06:06
student@Shadow: ~/Desktop/MCA/Student/Mark
student@Shadow: ~/Desktop/MCA/Student/Mark
student@Shadow: ~/Desktop/MCA/Student/Mark
0,0-1
All

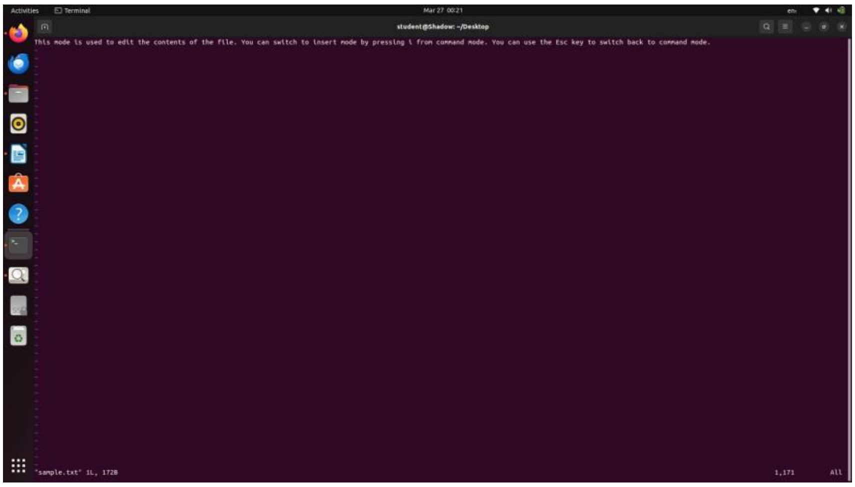
```
                 VIM - Vi IMproved

                 version 8.2.2121
             by Bram Moolenaar et al.
    Modified by team+vim@tracker.debian.org
  Vim is open source and freely distributable

             Sponsor Vim development!
type  :help sponsor<Enter>    for information

type  :q<Enter>               to exit
type  :help<Enter>  or  <F1>  for on-line help
type  :help version8<Enter>   for version info
```

To invoke the vim editor, execute the vim command with the file name:



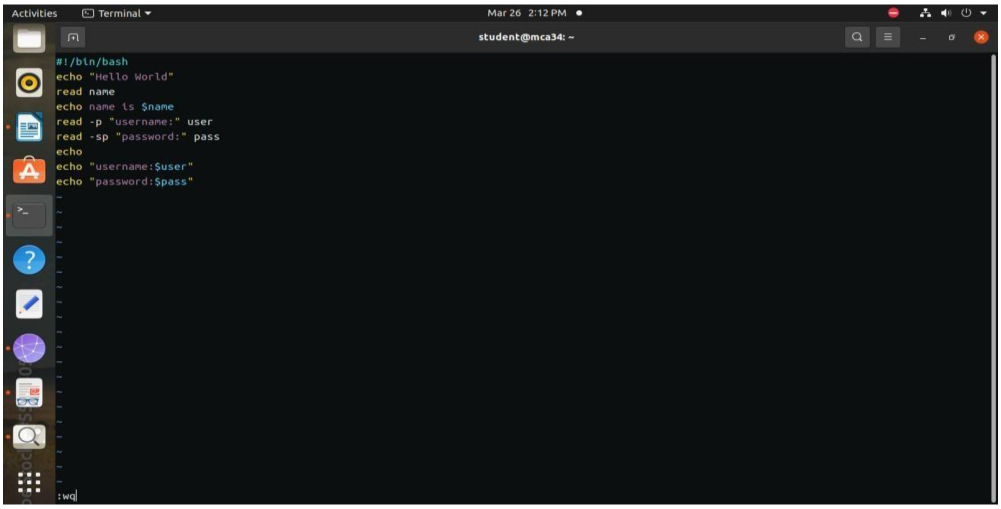
```
student@mca34:~$ vim world.sh
```

- **Command Mode:** This is the default mode (also called Normal mode) in Vim. Whenever Vim starts, you'll be in this mode. You can switch to any mode from this mode.



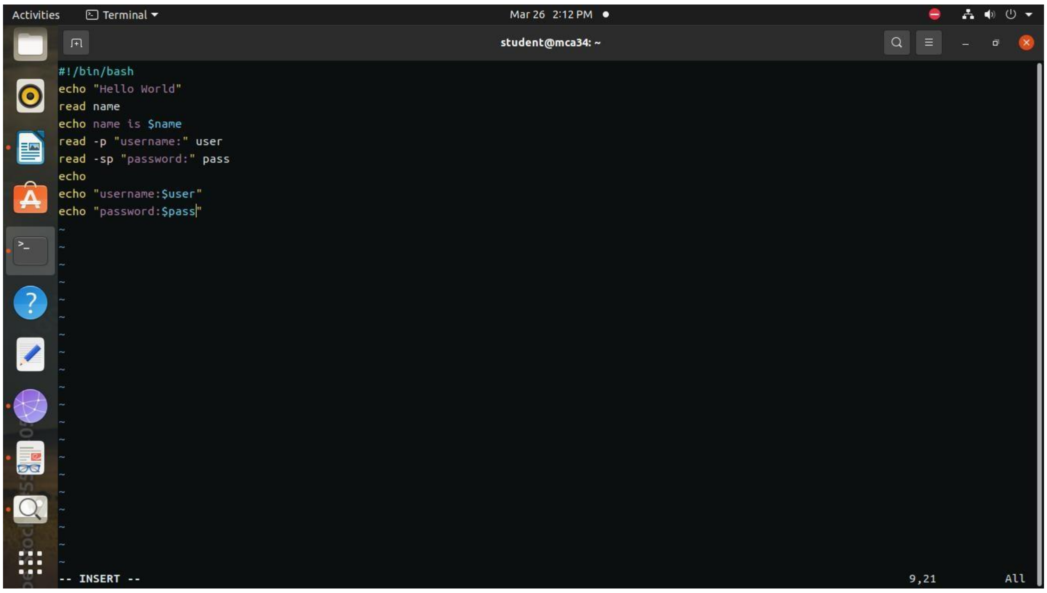
```
This mode is used to edit the contents of the file. You can switch to insert mode by pressing i from command mode. You can use the Esc key to switch back to command mode.
"sample.txt" 1L, 172B                                                    1,171         All
```

- **Command-Line Mode:** You can use this mode to play around with some commands.But the commands in this mode are prefixed with a colon (:). You can switch to this mode by pressing : (colon) in command mode.



```
#!/bin/bash
echo "Hello World"
read name
echo name is $name
read -p "username:" user
read -sp "password:" pass
echo
echo "username:$user"
echo "password:$pass"
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
:wq
```

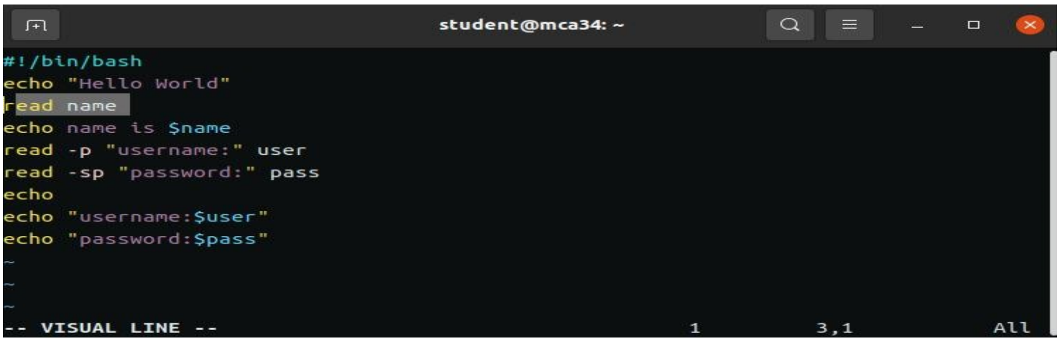
- **Insert Mode:** This mode is used to edit the contents of the file. You can switch to insert mode by pressing i from command mode. You can use the Esc key to switch back to command mode.



```
#!/bin/bash
echo "Hello World"
read name
echo name is $name
read -p "username:" user
read -sp "password:" pass
echo
echo "username:$user"
echo "password:$pass"
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
-- INSERT --                                                    9,21          All
```

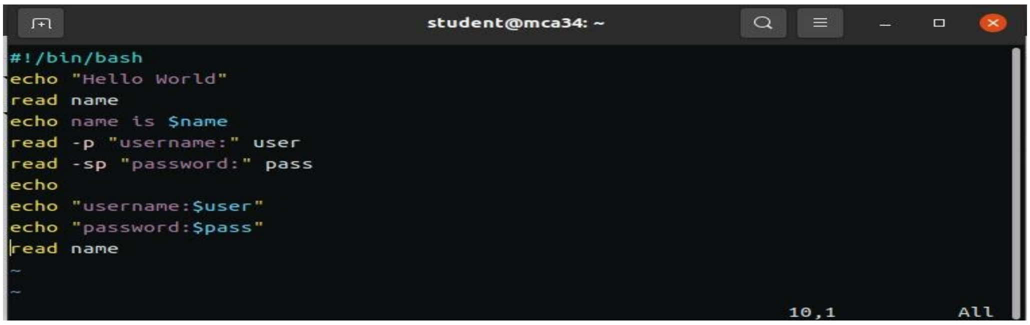
- **Visual Mode:** You use this mode to visually select some text and run commands over that section of code. You can switch to this mode by pressing v from the command mode.

To copy the line (yy) -



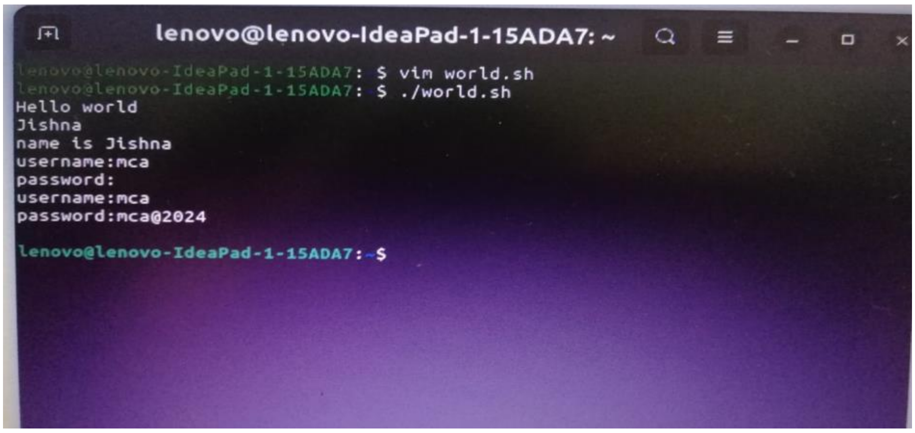
```
#!/bin/bash
echo "Hello World"
read name
echo name is $name
read -p "username:" user
read -sp "password:" pass
echo
echo "username:$user"
echo "password:$pass"
~
~
~
-- VISUAL LINE --                                  1         3,1          All
```

To paste(p) –



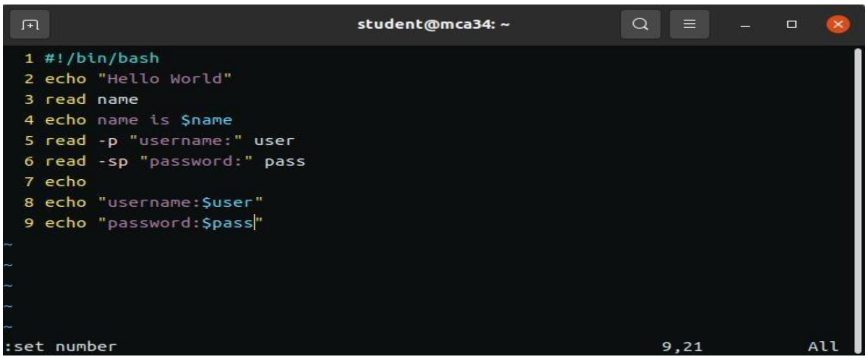
```
#!/bin/bash
echo "Hello World"
read name
echo name is $name
read -p "username:" user
read -sp "password:" pass
echo
echo "username:$user"
echo "password:$pass"
read name
~
~
                                                      10,1          All
```

**Output**



```
lenovo@lenovo-IdeaPad-1-15ADA7: $ vim world.sh
lenovo@lenovo-IdeaPad-1-15ADA7: $ ./world.sh
Hello world
Jishna
name is Jishna
username:mca
password:
username:mca
password:mca@2024

lenovo@lenovo-IdeaPad-1-15ADA7:~$
```

To set number :



```
  1 #!/bin/bash
  2 echo "Hello World"
  3 read name
  4 echo name is $name
  5 read -p "username:" user
  6 read -sp "password:" pass
  7 echo
  8 echo "username:$user"
  9 echo "password:$pass"
~
~
~
~
~
:set number                                          9,21         All
```

# Basic Linux Commands

whoami : Display the user.

□ pwd : Present working directory

□ mkdir : Create a new directory (folder).

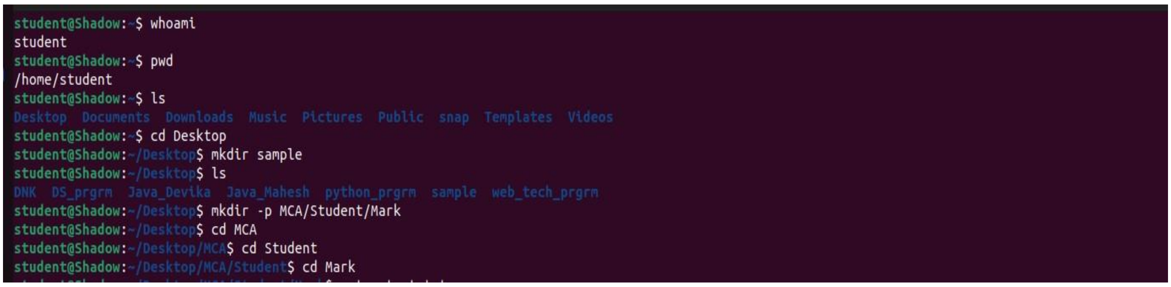
□ cd : It is used to navigate through the linux files and directories.

□ ls : List the directory(folder)

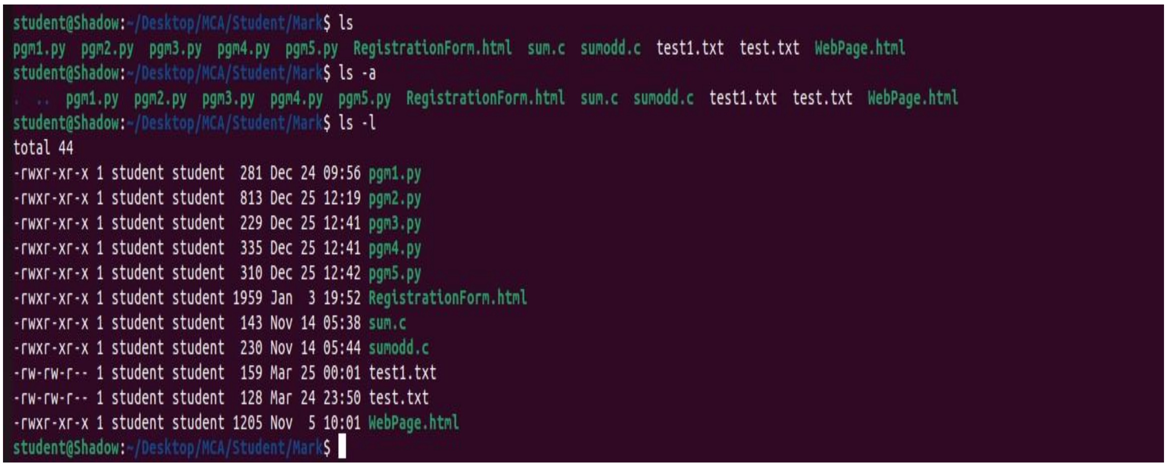
system.ls -a: Will show the

hidden file.

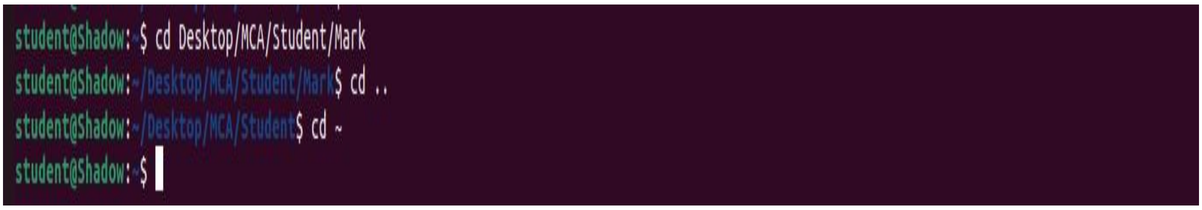
ls -l: Will list the file and directory with detailed information like the permission size,owner…etc.



```
student@Shadow:~$ whoami
student
student@Shadow:~$ pwd
/home/student
student@Shadow:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
student@Shadow:~$ cd Desktop
student@Shadow:~/Desktop$ mkdir sample
student@Shadow:~/Desktop$ ls
DNK  DS_prgrm  Java_Devika  Java_Mahesh  python_prgrm  sample  web_tech_prgrm
student@Shadow:~/Desktop$ mkdir -p MCA/Student/Mark
student@Shadow:~/Desktop$ cd MCA
student@Shadow:~/Desktop/MCA$ cd Student
student@Shadow:~/Desktop/MCA/Student$ cd Mark
```



```
student@Shadow:~/Desktop/MCA/Student/Mark$ ls
pgm1.py  pgm2.py  pgm3.py  pgm4.py  pgm5.py  RegistrationForm.html  sum.c  sumodd.c  test1.txt  test.txt  WebPage.html
student@Shadow:~/Desktop/MCA/Student/Mark$ ls -a
.  ..  pgm1.py  pgm2.py  pgm3.py  pgm4.py  pgm5.py  RegistrationForm.html  sum.c  sumodd.c  test1.txt  test.txt  WebPage.html
student@Shadow:~/Desktop/MCA/Student/Mark$ ls -l
total 44
-rwxr-xr-x 1 student student  281 Dec 24 09:56 pgm1.py
-rwxr-xr-x 1 student student  813 Dec 25 12:19 pgm2.py
-rwxr-xr-x 1 student student  229 Dec 25 12:41 pgm3.py
-rwxr-xr-x 1 student student  335 Dec 25 12:41 pgm4.py
-rwxr-xr-x 1 student student  310 Dec 25 12:42 pgm5.py
-rwxr-xr-x 1 student student 1959 Jan  3 19:52 RegistrationForm.html
-rwxr-xr-x 1 student student  143 Nov 14 05:38 sum.c
-rwxr-xr-x 1 student student  230 Nov 14 05:44 sumodd.c
-rw-rw-r-- 1 student student  159 Mar 25 00:01 test1.txt
-rw-rw-r-- 1 student student  128 Mar 24 23:50 test.txt
-rwxr-xr-x 1 student student 1205 Nov  5 10:01 WebPage.html
student@Shadow:~/Desktop/MCA/Student/Mark$
```



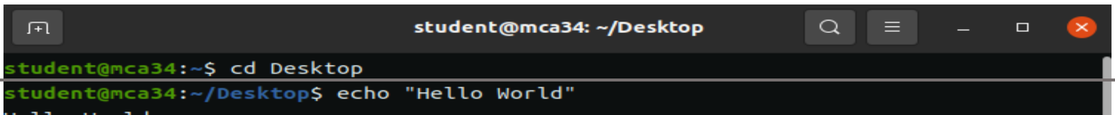
```
student@Shadow:~$ cd Desktop/MCA/Student/Mark
student@Shadow:~/Desktop/MCA/Student/Mark$ cd ..
student@Shadow:~/Desktop/MCA/Student$ cd ~
student@Shadow:~$
```

□

□

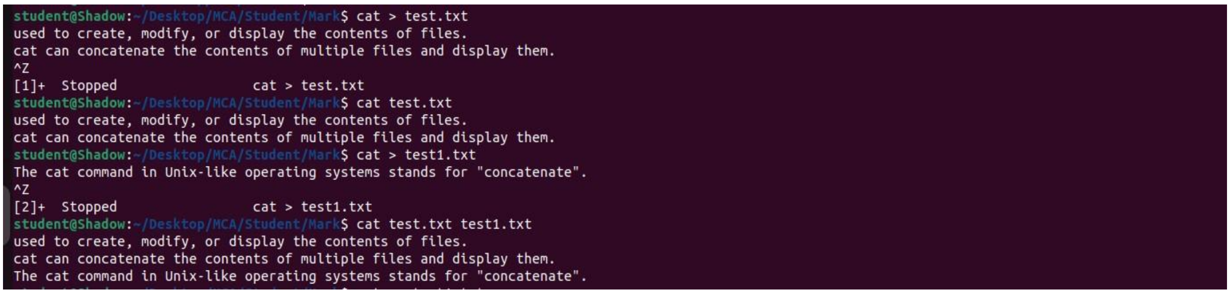
echo: echo "Hello, World!" - Prints "Hello, World!" to the command line.

□

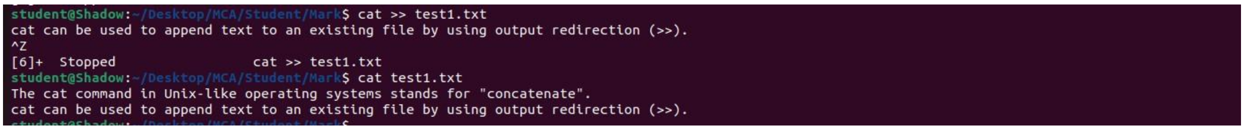


```
student@mca34:~$ cd Desktop
student@mca34:~/Desktop$ echo "Hello World"
```

- read: Reads a line from standard input into the variable.
- more: Displays text files one page at a time, waiting for user input to continue to the next page.
- less: Similar to more, but with additional features such as backward scrolling and searching within the displayed text.
- cat : The cat command in Unix-like operating systems stands for "concatenate".cat can concatenate the contents of multiple files and display them. Its also used to create, modify, or display the contents of files.



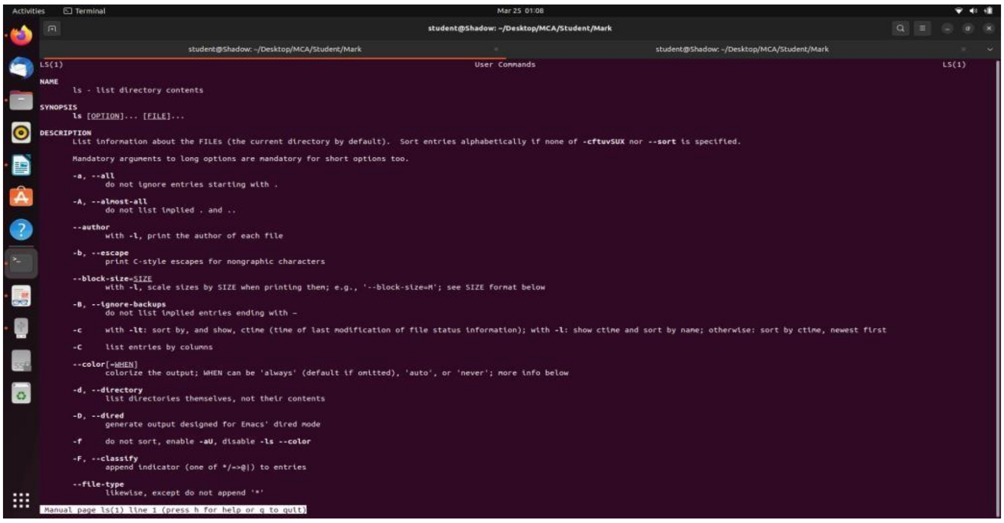
```
student@Shadow:~/Desktop/MCA/Student/Mark$ cat > test.txt
used to create, modify, or display the contents of files.
cat can concatenate the contents of multiple files and display them.
^Z
[1]+  Stopped                 cat > test.txt
student@Shadow:~/Desktop/MCA/Student/Mark$ cat test.txt
used to create, modify, or display the contents of files.
cat can concatenate the contents of multiple files and display them.
student@Shadow:~/Desktop/MCA/Student/Mark$ cat > test1.txt
The cat command in Unix-like operating systems stands for "concatenate".
^Z
[2]+  Stopped                 cat > test1.txt
student@Shadow:~/Desktop/MCA/Student/Mark$ cat test.txt test1.txt
used to create, modify, or display the contents of files.
cat can concatenate the contents of multiple files and display them.
The cat command in Unix-like operating systems stands for "concatenate".
```



```
student@Shadow:~/Desktop/MCA/Student/Mark$ cat >> test1.txt
cat can be used to append text to an existing file by using output redirection (>>).
^Z
[6]+  Stopped                 cat >> test1.txt
student@Shadow:~/Desktop/MCA/Student/Mark$ cat test1.txt
The cat command in Unix-like operating systems stands for "concatenate".
cat can be used to append text to an existing file by using output redirection (>>).
```

- man : Used to display the manual pages for other commands.

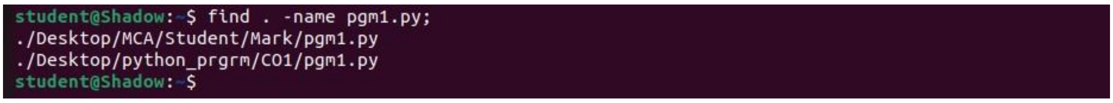
  Eg;  man ls



Activities
Terminal
Mar 25 01:08
student@Shadow: ~/Desktop/MCA/Student/Mark
student@Shadow: ~/Desktop/MCA/Student/Mark
student@Shadow: ~/Desktop/MCA/Student/Mark

```
LS(1)                                User Commands                                LS(1)

NAME
       ls - list directory contents

SYNOPSIS
       ls [OPTION]... [FILE]...

DESCRIPTION
       List information about the FILEs (the current directory by default).  Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

       Mandatory arguments to long options are mandatory for short options too.

       -a, --all
              do not ignore entries starting with .

       -A, --almost-all
              do not list implied . and ..

       --author
              with -l, print the author of each file

       -b, --escape
              print C-style escapes for nongraphic characters

       --block-size=SIZE
              with -l, scale sizes by SIZE when printing them; e.g., '--block-size=M'; see SIZE format below

       -B, --ignore-backups
              do not list implied entries ending with ~

       -c     with -lt: sort by, and show, ctime (time of last modification of file status information); with -l: show ctime and sort by name; otherwise: sort by ctime, newest first

       -C     list entries by columns

       --color[=WHEN]
              colorize the output; WHEN can be 'always' (default if omitted), 'auto', or 'never'; more info below

       -d, --directory
              list directories themselves, not their contents

       -D, --dired
              generate output designed for Emacs' dired mode

       -f     do not sort, enable -aU, disable -ls --color

       -F, --classify
              append indicator (one of */=>@|) to entries

       --file-type
              likewise, except do not append '*'
 Manual page ls(1) line 1 (press h for help or q to quit)
```

- find : Searches for files and directories in a directory hierarchy.



```
student@Shadow:~$ find . -name pgm1.py;
./Desktop/MCA/Student/Mark/pgm1.py
./Desktop/python_prgrm/CO1/pgm1.py
student@Shadow:~$
```

□

□ mv: Moves a file or directory from one location to another.

For example, mv file1.txt /path/to/new/location/ moves file1.txt to /path/to/new/location/.

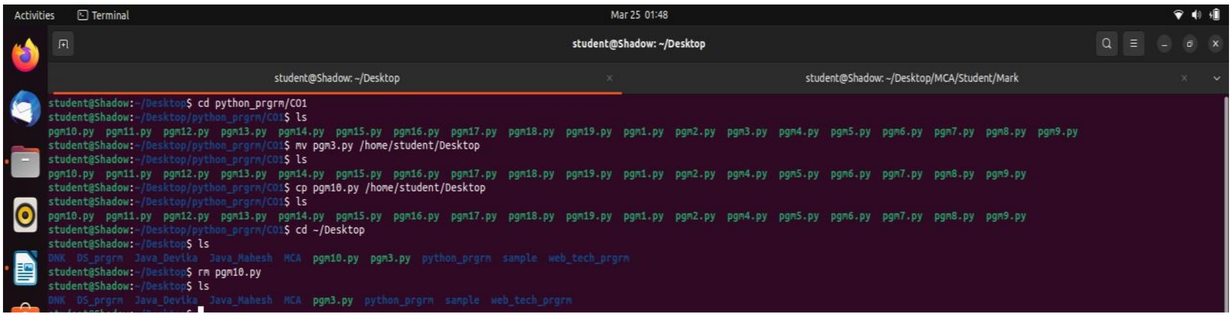
□ cp: Copies a file or directory from one location to another.

For example, cp file1.txt file2.txt copies file1.txt to file2.txt.

□ rm: Deletes (removes) a file or directory.

For example, rm file.txt deletes file.txt.

□ tar: Creates an archive of files and directories.


Activities
Terminal
Mar 25 01:48
student@Shadow: ~/Desktop
student@Shadow: ~/Desktop
student@Shadow: ~/Desktop/MCA/Student/Mark

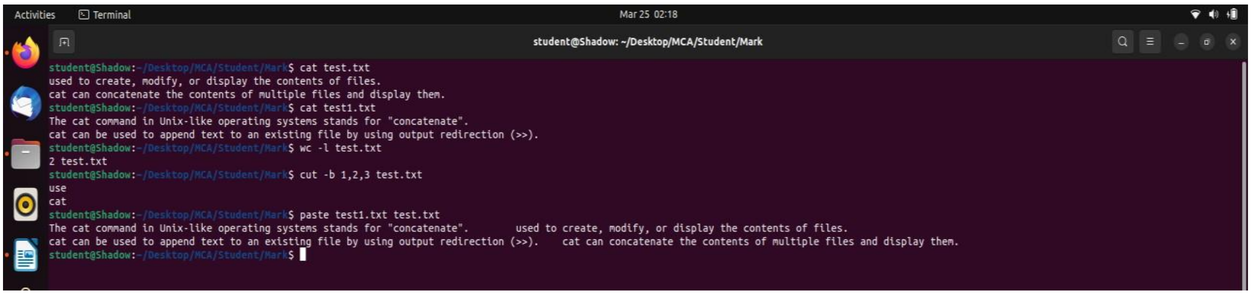
```
student@Shadow:~/Desktop$ cd python_prgrm/CO1
student@Shadow:~/Desktop/python_prgrm/CO1$ ls
pgm10.py  pgm11.py  pgm12.py  pgm13.py  pgm14.py  pgm15.py  pgm16.py  pgm17.py  pgm18.py  pgm19.py  pgm1.py  pgm2.py  pgm3.py  pgm4.py  pgm5.py  pgm6.py  pgm7.py  pgm8.py  pgm9.py
student@Shadow:~/Desktop/python_prgrm/CO1$ mv pgm3.py /home/student/Desktop
student@Shadow:~/Desktop/python_prgrm/CO1$ ls
pgm10.py  pgm11.py  pgm12.py  pgm13.py  pgm14.py  pgm15.py  pgm16.py  pgm17.py  pgm18.py  pgm19.py  pgm1.py  pgm2.py  pgm4.py  pgm5.py  pgm6.py  pgm7.py  pgm8.py  pgm9.py
student@Shadow:~/Desktop/python_prgrm/CO1$ cp pgm10.py /home/student/Desktop
student@Shadow:~/Desktop/python_prgrm/CO1$ ls
pgm10.py  pgm11.py  pgm12.py  pgm13.py  pgm14.py  pgm15.py  pgm16.py  pgm17.py  pgm18.py  pgm19.py  pgm1.py  pgm2.py  pgm4.py  pgm5.py  pgm6.py  pgm7.py  pgm8.py  pgm9.py
student@Shadow:~/Desktop/python_prgrm/CO1$ cd ~/Desktop
student@Shadow:~/Desktop$ ls
DNK  DS_prgrm  Java_Devika  Java_Mahesh  MCA  pgm10.py  pgm3.py  python_prgrm  sample  web_tech_prgrm
student@Shadow:~/Desktop$ rm pgm10.py
student@Shadow:~/Desktop$ ls
DNK  DS_prgrm  Java_Devika  Java_Mahesh  MCA  pgm3.py  python_prgrm  sample  web_tech_prgrm
```

□

□ wc: wc -l file.txt - Counts the number of lines in file.txt.

□ cut: Extracts specific fields from lines in a file based on a delimiter.

□ paste: Merges lines from multiple files.



```
student@Shadow:~/Desktop/MCA/Student/Mark$ cat test.txt
used to create, modify, or display the contents of files.
cat can concatenate the contents of multiple files and display them.
student@Shadow:~/Desktop/MCA/Student/Mark$ cat test1.txt
The cat command in Unix-like operating systems stands for "concatenate".
cat can be used to append text to an existing file by using output redirection (>>).
student@Shadow:~/Desktop/MCA/Student/Mark$ wc -l test.txt
2 test.txt
student@Shadow:~/Desktop/MCA/Student/Mark$ cut -b 1,2,3 test.txt
use
cat
student@Shadow:~/Desktop/MCA/Student/Mark$ paste test1.txt test.txt
The cat command in Unix-like operating systems stands for "concatenate".        used to create, modify, or display the contents of files.
cat can be used to append text to an existing file by using output redirection (>>).    cat can concatenate the contents of multiple files and display them.
student@Shadow:~/Desktop/MCA/Student/Mark$ 
```

□ head: head -n 5 file.txt - Displays the first 5 lines of file.txt.

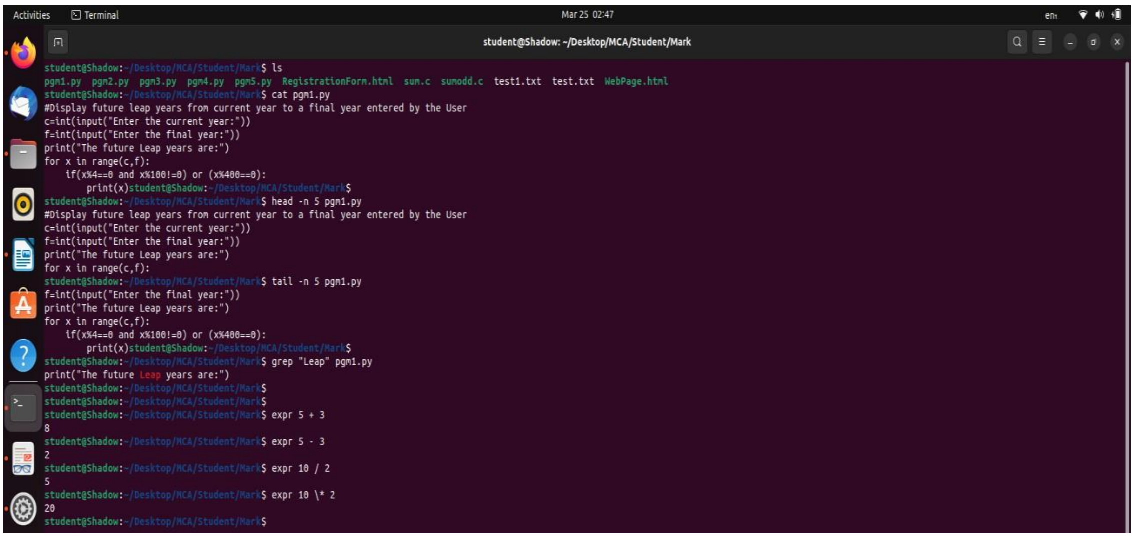
□ tail: tail -n 5 file.txt - Displays the last 5 lines of file.txt.

□ grep: Grep command is used to search through all the text in a given file.

Eg: grep "pattern" file.txt - Searches for lines containing "pattern" in file.txt.

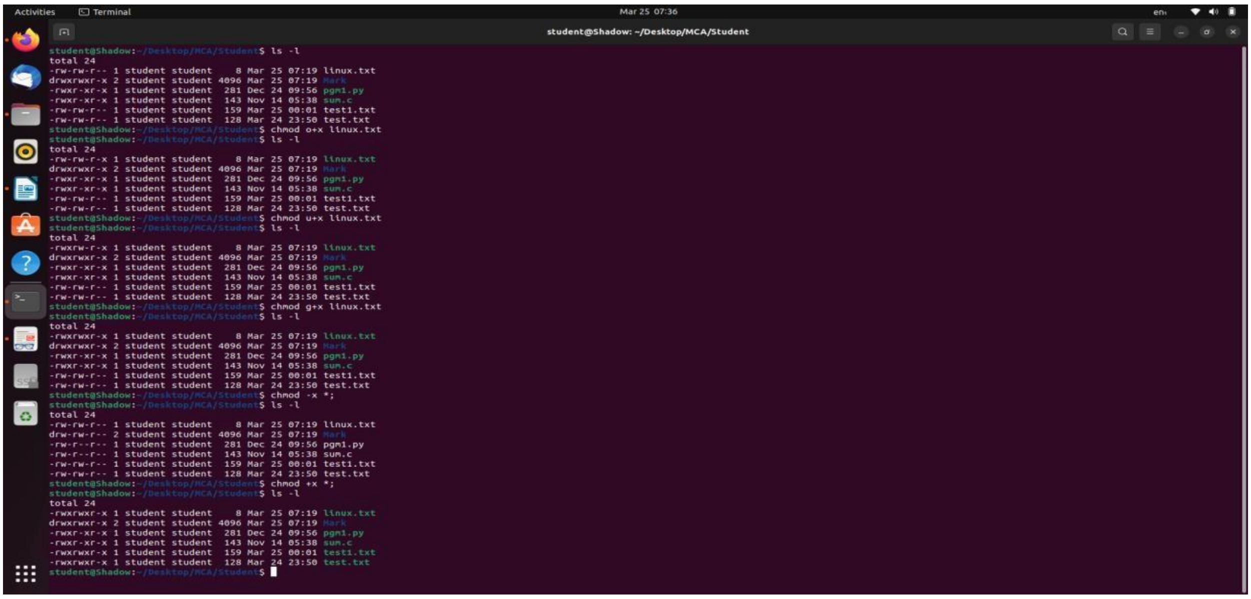
□ expr: It was used to evaluate a given expression and display its corresponding output.

Eg: expr 5 + 3 - Evaluates the expression 5 + 3



```
student@Shadow:~/Desktop/MCA/Student/Mark$ ls
pgm1.py  pgm2.py  pgm3.py  pgm4.py  pgm5.py  RegistrationForm.html  sum.c  sumodd.c  test1.txt  test.txt  WebPage.html
student@Shadow:~/Desktop/MCA/Student/Mark$ cat pgm1.py
#Display future leap years from current year to a final year entered by the User
c=int(input("Enter the current year:"))
f=int(input("Enter the final year:"))
print("The future Leap years are:")
for x in range(c,f):
    if(x%4==0 and x%100!=0) or (x%400==0):
        print(x)student@Shadow:~/Desktop/MCA/Student/Mark$
student@Shadow:~/Desktop/MCA/Student/Mark$ head -n 5 pgm1.py
#Display future leap years from current year to a final year entered by the User
c=int(input("Enter the current year:"))
f=int(input("Enter the final year:"))
print("The future Leap years are:")
for x in range(c,f):
student@Shadow:~/Desktop/MCA/Student/Mark$ tail -n 5 pgm1.py
f=int(input("Enter the final year:"))
print("The future Leap years are:")
for x in range(c,f):
    if(x%4==0 and x%100!=0) or (x%400==0):
        print(x)student@Shadow:~/Desktop/MCA/Student/Mark$
student@Shadow:~/Desktop/MCA/Student/Mark$ grep "Leap" pgm1.py
print("The future Leap years are:")
student@Shadow:~/Desktop/MCA/Student/Mark$
student@Shadow:~/Desktop/MCA/Student/Mark$
student@Shadow:~/Desktop/MCA/Student/Mark$ expr 5 + 3
8
student@Shadow:~/Desktop/MCA/Student/Mark$ expr 5 - 3
2
student@Shadow:~/Desktop/MCA/Student/Mark$ expr 10 / 2
5
student@Shadow:~/Desktop/MCA/Student/Mark$ expr 10 \* 2
20
student@Shadow:~/Desktop/MCA/Student/Mark$
```

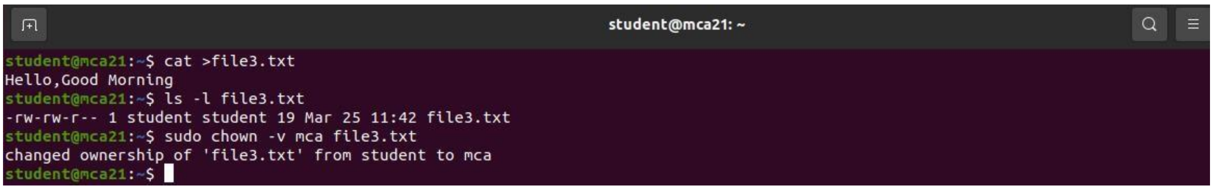
- □
- □
- □ chmod: It is used to change the access permissions of files and directories.



```
student@Shadow:~/Desktop/MCA/Student$ ls -l
total 24
-rw-rw-r-- 1 student student    8 Mar 25 07:19 linux.txt
drwxrwxr-x 2 student student 4096 Mar 25 07:19 Mark
-rwxr-xr-x 1 student student  281 Dec 24 09:56 pgm1.py
-rwxr-xr-x 1 student student  143 Nov 14 05:38 sum.c
-rw-rw-r-- 1 student student  159 Mar 25 00:01 test1.txt
-rw-rw-r-- 1 student student  128 Mar 24 23:50 test.txt
student@Shadow:~/Desktop/MCA/Student$ chmod o+x linux.txt
student@Shadow:~/Desktop/MCA/Student$ ls -l
total 24
-rw-rw-r-x 1 student student    8 Mar 25 07:19 linux.txt
drwxrwxr-x 2 student student 4096 Mar 25 07:19 Mark
-rwxr-xr-x 1 student student  281 Dec 24 09:56 pgm1.py
-rwxr-xr-x 1 student student  143 Nov 14 05:38 sum.c
-rw-rw-r-- 1 student student  159 Mar 25 00:01 test1.txt
-rw-rw-r-- 1 student student  128 Mar 24 23:50 test.txt
student@Shadow:~/Desktop/MCA/Student$ chmod u+x linux.txt
student@Shadow:~/Desktop/MCA/Student$ ls -l
total 24
-rwxrw-r-x 1 student student    8 Mar 25 07:19 linux.txt
drwxrwxr-x 2 student student 4096 Mar 25 07:19 Mark
-rwxr-xr-x 1 student student  281 Dec 24 09:56 pgm1.py
-rwxr-xr-x 1 student student  143 Nov 14 05:38 sum.c
-rw-rw-r-- 1 student student  159 Mar 25 00:01 test1.txt
-rw-rw-r-- 1 student student  128 Mar 24 23:50 test.txt
student@Shadow:~/Desktop/MCA/Student$ chmod g+x linux.txt
student@Shadow:~/Desktop/MCA/Student$ ls -l
total 24
-rwxrwxr-x 1 student student    8 Mar 25 07:19 linux.txt
drwxrwxr-x 2 student student 4096 Mar 25 07:19 Mark
-rwxr-xr-x 1 student student  281 Dec 24 09:56 pgm1.py
-rwxr-xr-x 1 student student  143 Nov 14 05:38 sum.c
-rw-rw-r-- 1 student student  159 Mar 25 00:01 test1.txt
-rw-rw-r-- 1 student student  128 Mar 24 23:50 test.txt
student@Shadow:~/Desktop/MCA/Student$ chmod -x *;
student@Shadow:~/Desktop/MCA/Student$ ls -l
total 24
-rw-rw-r-- 1 student student    8 Mar 25 07:19 linux.txt
drw-rw-r-- 2 student student 4096 Mar 25 07:19 Mark
-rw-r--r-- 1 student student  281 Dec 24 09:56 pgm1.py
-rw-r--r-- 1 student student  143 Nov 14 05:38 sum.c
-rw-rw-r-- 1 student student  159 Mar 25 00:01 test1.txt
-rw-rw-r-- 1 student student  128 Mar 24 23:50 test.txt
student@Shadow:~/Desktop/MCA/Student$ chmod +x *;
student@Shadow:~/Desktop/MCA/Student$ ls -l
total 24
-rwxrwxr-x 1 student student    8 Mar 25 07:19 linux.txt
drwxrwxr-x 2 student student 4096 Mar 25 07:19 Mark
-rwxr-xr-x 1 student student  281 Dec 24 09:56 pgm1.py
-rwxr-xr-x 1 student student  143 Nov 14 05:38 sum.c
-rwxrwxr-x 1 student student  159 Mar 25 00:01 test1.txt
-rwxrwxr-x 1 student student  128 Mar 24 23:50 test.txt
student@Shadow:~/Desktop/MCA/Student$ 
```

chown: It is used to change the files ownership, directory,orsymbolic link

for a user or group.

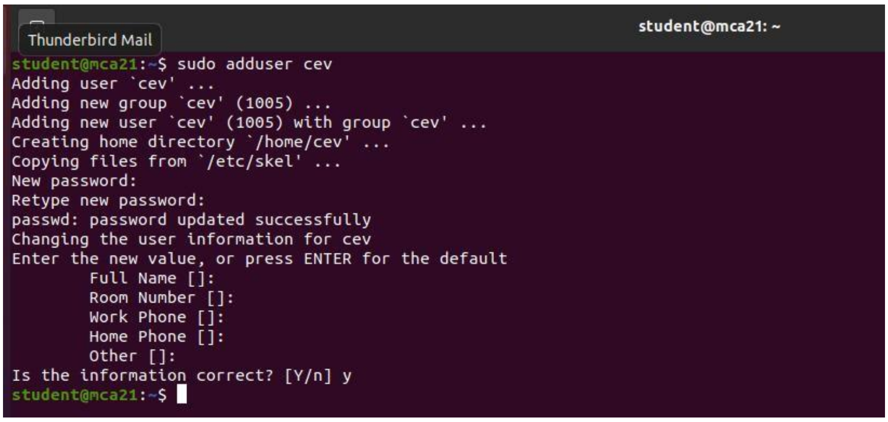


```
student@mca21:~$ cat >file3.txt
Hello,Good Morning
student@mca21:~$ ls -l file3.txt
-rw-rw-r-- 1 student student 19 Mar 25 11:42 file3.txt
student@mca21:~$ sudo chown -v mca file3.txt
changed ownership of 'file3.txt' from student to mca
student@mca21:~$ 
```

redirection and piping: Pipe is used to combine two or more commends and inthis the output of one comma nd and act as input to the another command, and this command output may cut as input to the next command. Redirection in linux command refers to the ability of the linux operating system that allowsas to change the standard input and standard output when executing a command on the terminal.

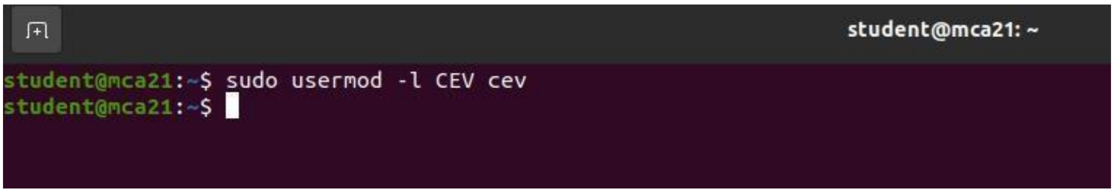
□

useradd: It is used to for adding /creating user accounts in linux and other unix-like operating systems.



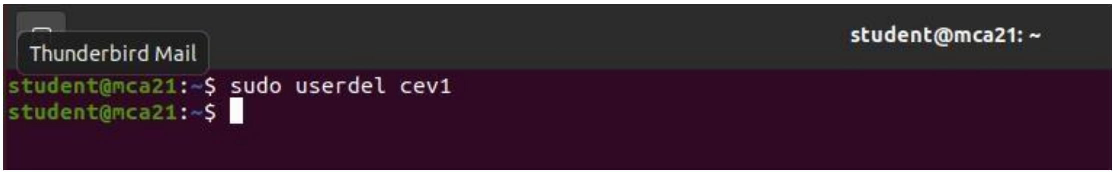
```
student@mca21:~$ sudo adduser cev
Adding user `cev' ...
Adding new group `cev' (1005) ...
Adding new user `cev' (1005) with group `cev' ...
Creating home directory `/home/cev' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for cev
Enter the new value, or press ENTER for the default
        Full Name []:
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] y
student@mca21:~$
```

- □ usermod:It is used tomodify existing user account details, such as username,password,home directory location,default shell,and more.

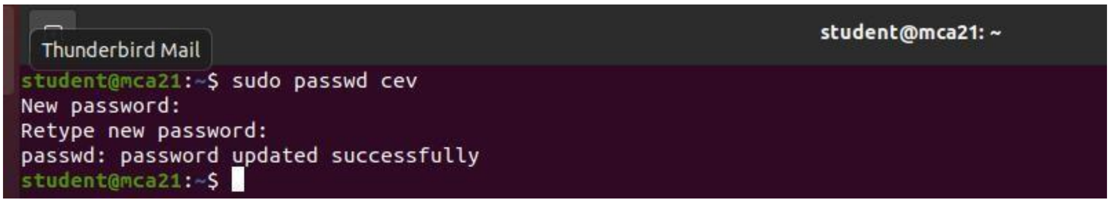


```
student@mca21:~$ sudo usermod -l CEV cev
student@mca21:~$
```

- □ userdel: It is used to delete a user account and related files.



```
student@mca21:~$ sudo userdel cev1
student@mca21:~$
```



```
student@mca21:~$ sudo passwd cev
New password:
Retype new password:
passwd: password updated successfully
student@mca21:~$
```

- ssh : It instructs the system to establish an encrypted secure connection with the host machine.

  To check the system containing ssh using the command;

  $ “ssh”

  The installation command on ssh is:

  $ “sudo apt-get install open ssh-server”

  To check the system IP address using the command:

  $ “ifconfig”

  Ping command using to check working:

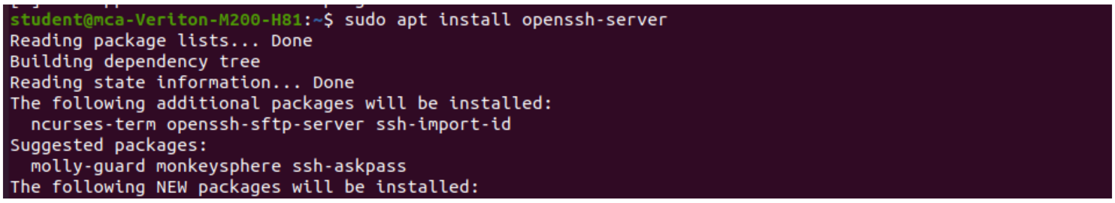
  $ “ping second system IP”

  To login second system using the given command:

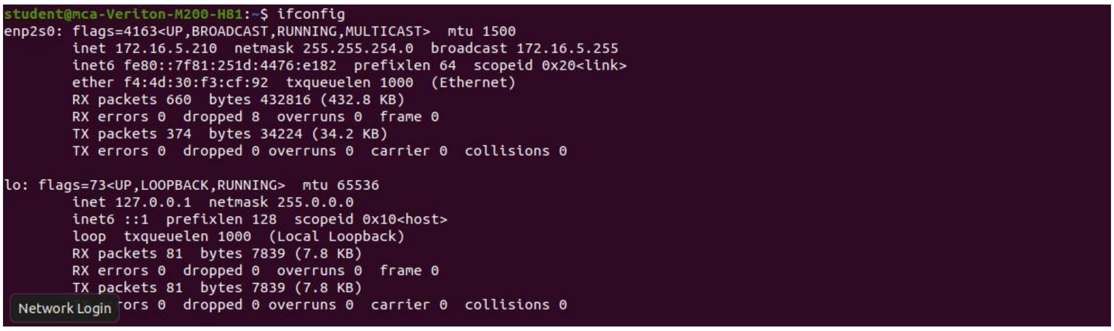
  $ “ssh second system user@second system IP

  $ “cd Desktop”

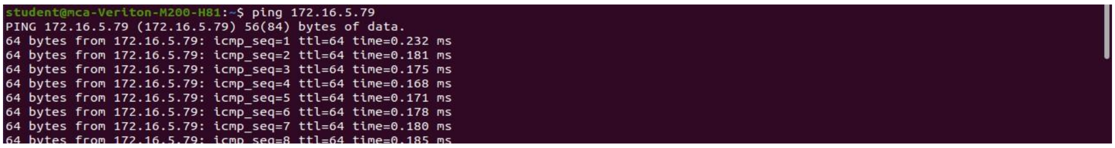
  $ “ls”



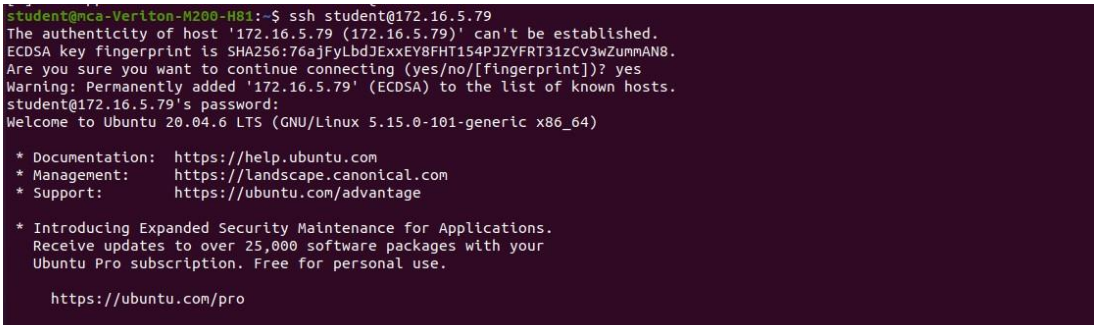
```
student@mca-Veriton-M200-H81:~$ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ncurses-term openssh-sftp-server ssh-import-id
Suggested packages:
  molly-guard monkeysphere ssh-askpass
The following NEW packages will be installed:
```



```
student@mca-Veriton-M200-H81:~$ ifconfig
enp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.16.5.210  netmask 255.255.254.0  broadcast 172.16.5.255
        inet6 fe80::7f81:251d:4476:e182  prefixlen 64  scopeid 0x20<link>
        ether f4:4d:30:f3:cf:92  txqueuelen 1000  (Ethernet)
        RX packets 660  bytes 432816 (432.8 KB)
        RX errors 0  dropped 8  overruns 0  frame 0
        TX packets 374  bytes 34224 (34.2 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 81  bytes 7839 (7.8 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 81  bytes 7839 (7.8 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```



```
student@mca-Veriton-M200-H81:~$ ping 172.16.5.79
PING 172.16.5.79 (172.16.5.79) 56(84) bytes of data.
64 bytes from 172.16.5.79: icmp_seq=1 ttl=64 time=0.232 ms
64 bytes from 172.16.5.79: icmp_seq=2 ttl=64 time=0.181 ms
64 bytes from 172.16.5.79: icmp_seq=3 ttl=64 time=0.175 ms
64 bytes from 172.16.5.79: icmp_seq=4 ttl=64 time=0.168 ms
64 bytes from 172.16.5.79: icmp_seq=5 ttl=64 time=0.171 ms
64 bytes from 172.16.5.79: icmp_seq=6 ttl=64 time=0.178 ms
64 bytes from 172.16.5.79: icmp_seq=7 ttl=64 time=0.180 ms
64 bytes from 172.16.5.79: icmp_seq=8 ttl=64 time=0.185 ms
```



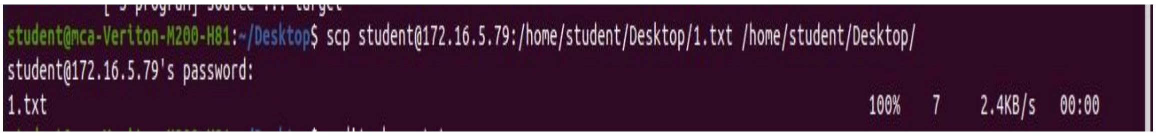
```
student@mca-Veriton-M200-H81:~$ ssh student@172.16.5.79
The authenticity of host '172.16.5.79 (172.16.5.79)' can't be established.
ECDSA key fingerprint is SHA256:76ajFyLbdJExxEY8FHT154PJZYFRT31zCv3wZummAN8.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '172.16.5.79' (ECDSA) to the list of known hosts.
student@172.16.5.79's password:
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-101-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

 * Introducing Expanded Security Maintenance for Applications.
   Receive updates to over 25,000 software packages with your
   Ubuntu Pro subscription. Free for personal use.

     https://ubuntu.com/pro
```

- scp : It is used to copy files between servers in a secure way.Command:

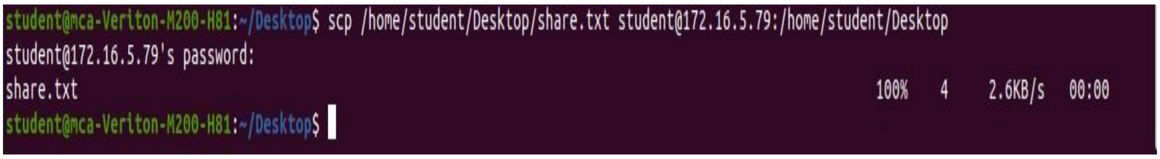
  $ ”scp 2nd system file path 1st system user@1st system IP:2nd system path”

  To logout the connection using:

  $ “logout/cntrl+D”



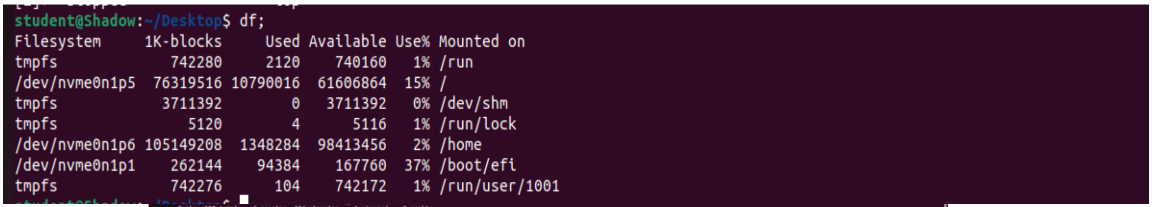
```
student@mca-Veriton-M200-H81:~/Desktop$ scp student@172.16.5.79:/home/student/Desktop/1.txt /home/student/Desktop/
student@172.16.5.79's password:
1.txt                                                          100%    7     2.4KB/s   00:00
```



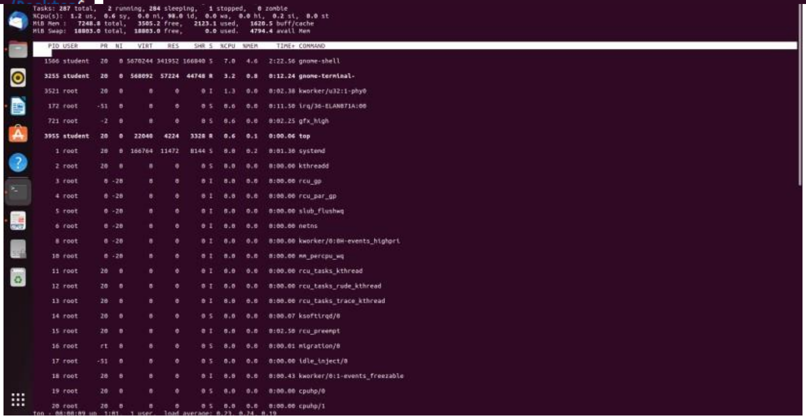
```
student@mca-Veriton-M200-H81:~/Desktop$ scp /home/student/Desktop/share.txt student@172.16.5.79:/home/student/Desktop
student@172.16.5.79's password:
share.txt                                                      100%    4     2.6KB/s   00:00
student@mca-Veriton-M200-H81:~/Desktop$
```

- ssh-keygen :It is used to generate,manage,and convert authentication keys for “ssh”.
- ssh-copy-id : It uses the “ssh” protocol to connect to the target host and upload the “ssh” user key.
- df: It is used to display the disk space used in the file system.

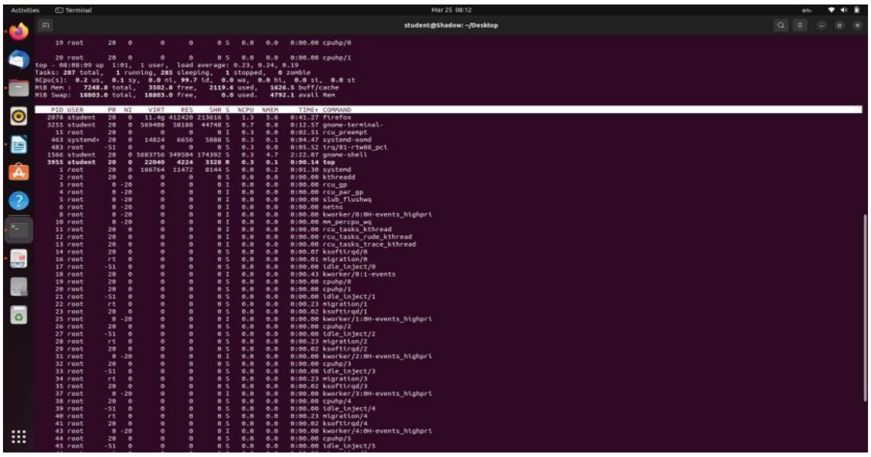
:



```
student@Shadow:~/Desktop$ df;
Filesystem     1K-blocks     Used Available Use% Mounted on
tmpfs             742280     2120    740160   1% /run
/dev/nvme0n1p5  76319516 10790016  61606864  15% /
tmpfs            3711392        0   3711392   0% /dev/shm
tmpfs               5120        4      5116   1% /run/lock
/dev/nvme0n1p6 105149208  1348284  98413456   2% /home
/dev/nvme0n1p1    262144    94384    167760  37% /boot/efi
tmpfs             742276      104    742172   1% /run/user/1001
```



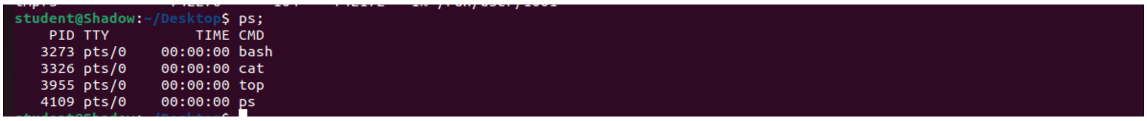
```
Tasks: 287 total,   2 running, 284 sleeping,   1 stopped,   0 zombie
%Cpu(s):  1.2 us,  0.6 sy,  0.0 ni, 98.0 id,  0.0 wa,  0.0 hi,  0.2 si,  0.0 st
MiB Mem :   7248.8 total,   3505.2 free,   2123.1 used,   1620.5 buff/cache
MiB Swap:  18803.0 total,  18803.0 free,      0.0 used.   4794.4 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   1566 student   20   0 5670244 341952 166840 S   7.0   4.6   2:22.56 gnome-shell
   3255 student   20   0  568092  57224  44748 R   3.2   0.8   0:12.24 gnome-terminal-
   3521 root      20   0       0      0      0 I   1.3   0.0   0:02.38 kworker/u32:1-phy0
    172 root     -51   0       0      0      0 S   0.6   0.0   0:11.50 irq/36-ELAN071A:00
    721 root      -2   0       0      0      0 S   0.6   0.0   0:02.25 gfx_high
   3955 student   20   0   22040   4224   3328 R   0.6   0.1   0:00.06 top
      1 root      20   0  166764  11472   8144 S   0.0   0.2   0:01.30 systemd
      2 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kthreadd
      3 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_gp
      4 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_par_gp
      5 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 slub_flushwq
      6 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 netns
      8 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/0:0H-events_highpri
     10 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 mm_percpu_wq
     11 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_kthread
     12 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_rude_kthread
     13 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_trace_kthread
     14 root      20   0       0      0      0 S   0.0   0.0   0:00.07 ksoftirqd/0
     15 root      20   0       0      0      0 I   0.0   0.0   0:02.50 rcu_preempt
     16 root      rt   0       0      0      0 S   0.0   0.0   0:00.01 migration/0
     17 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/0
     18 root      20   0       0      0      0 I   0.0   0.0   0:00.43 kworker/0:1-events_freezable
     19 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/0
     20 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/1
top - 08:08:09 up  1:01,  1 user,  load average: 0.23, 0.24, 0.19
```



```
     19 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/0

     20 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/1
top - 08:08:09 up  1:01,  1 user,  load average: 0.23, 0.24, 0.19
Tasks: 287 total,   1 running, 285 sleeping,   1 stopped,   0 zombie
%Cpu(s):  0.2 us,  0.1 sy,  0.0 ni, 99.7 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :   7248.8 total,   3502.8 free,   2119.6 used,   1626.5 buff/cache
MiB Swap:  18803.0 total,  18803.0 free,      0.0 used.   4792.1 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   2078 student   20   0   11.4g 412420 213616 S   1.3   5.6   0:41.27 firefox
   3255 student   20   0  569408  58188  44748 S   0.7   0.8   0:12.57 gnome-terminal-
     15 root      20   0       0      0      0 I   0.3   0.0   0:02.51 rcu_preempt
    463 systemd+  20   0   14824   6656   5888 S   0.3   0.1   0:04.47 systemd-oomd
    483 root     -51   0       0      0      0 S   0.3   0.0   0:05.52 irq/81-rtw88_pci
   1566 student   20   0 5683756 349504 174392 S   0.3   4.7   2:22.87 gnome-shell
   3955 student   20   0   22040   4224   3328 R   0.3   0.1   0:00.14 top
      1 root      20   0  166764  11472   8144 S   0.0   0.2   0:01.30 systemd
      2 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kthreadd
      3 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_gp
      4 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_par_gp
      5 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 slub_flushwq
      6 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 netns
      8 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/0:0H-events_highpri
     10 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 mm_percpu_wq
     11 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_kthread
     12 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_rude_kthread
     13 root      20   0       0      0      0 I   0.0   0.0   0:00.00 rcu_tasks_trace_kthread
     14 root      20   0       0      0      0 S   0.0   0.0   0:00.07 ksoftirqd/0
     16 root      rt   0       0      0      0 S   0.0   0.0   0:00.01 migration/0
     17 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/0
     18 root      20   0       0      0      0 I   0.0   0.0   0:00.43 kworker/0:1-events
     19 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/0
     20 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/1
     21 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/1
     22 root      rt   0       0      0      0 S   0.0   0.0   0:00.23 migration/1
     23 root      20   0       0      0      0 S   0.0   0.0   0:00.02 ksoftirqd/1
     25 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/1:0H-events_highpri
     26 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/2
     27 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/2
     28 root      rt   0       0      0      0 S   0.0   0.0   0:00.23 migration/2
     29 root      20   0       0      0      0 S   0.0   0.0   0:00.02 ksoftirqd/2
     31 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/2:0H-events_highpri
     32 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/3
     33 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/3
     34 root      rt   0       0      0      0 S   0.0   0.0   0:00.23 migration/3
     35 root      20   0       0      0      0 S   0.0   0.0   0:00.02 ksoftirqd/3
     37 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/3:0H-events_highpri
     38 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/4
     39 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/4
     40 root      rt   0       0      0      0 S   0.0   0.0   0:00.23 migration/4
     41 root      20   0       0      0      0 S   0.0   0.0   0:00.02 ksoftirqd/4
     43 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/4:0H-events_highpri
     44 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/5
     45 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/5
```

□

ps: It is used to list the currently running processes and their PIDs along withsome other information depends on different option.



```
student@Shadow:~/Desktop$ ps;
    PID TTY          TIME CMD
   3273 pts/0    00:00:00 bash
   3326 pts/0    00:00:00 cat
   3955 pts/0    00:00:00 top
   4109 pts/0    00:00:00 ps
```