

AIM:

To identify the major components of a computer system such as motherboard, ram modules, daughter cards, SMPS, bus loads, internal storage devices and interfacing ports. Specification of desktop and server class computers. Installation of common operating system for desktop and server use.

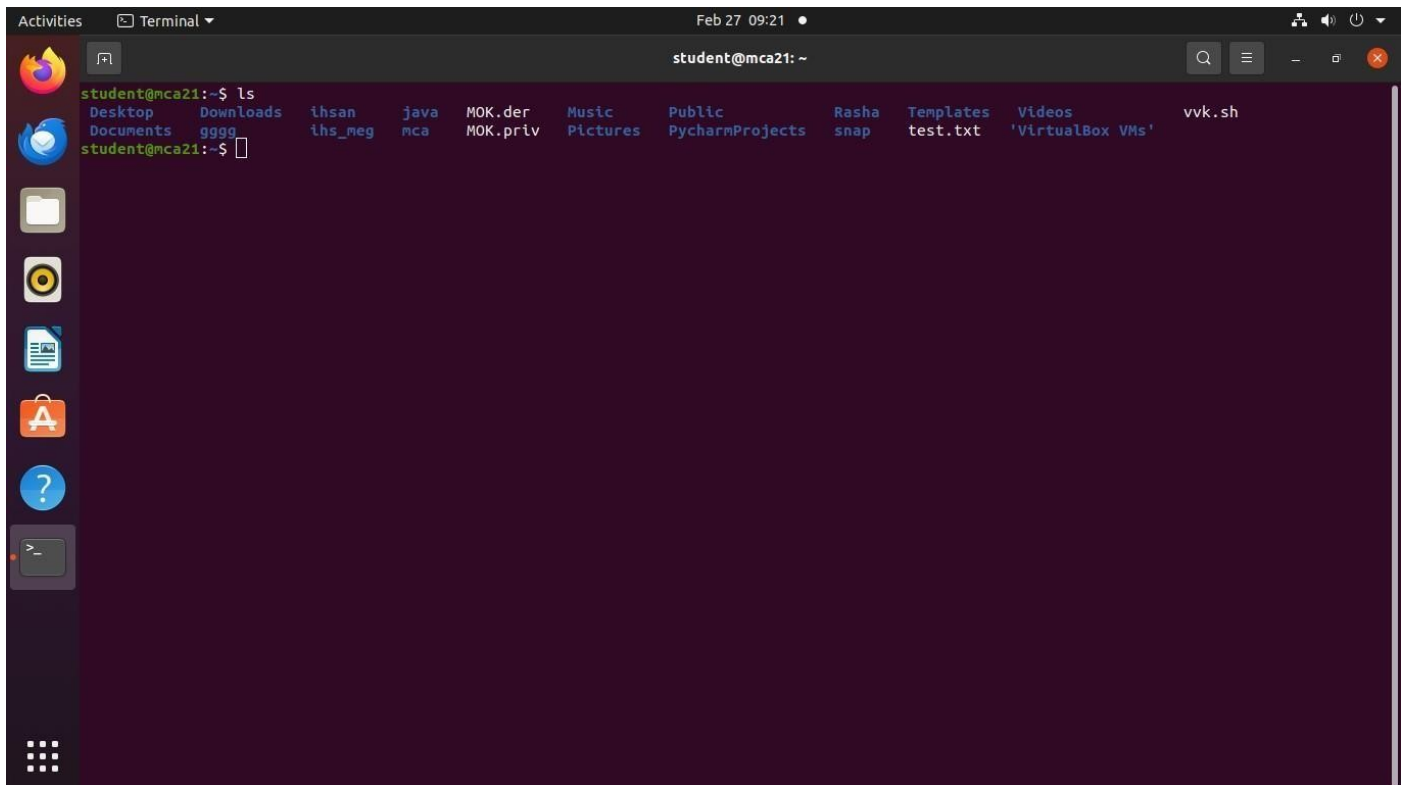
1. man
2. ls, echo, read
3. more, less, cat
4. cd, mkdir, pwd, find
5. mv, cp, rm ,tar
6. wc, cut, paste
7. head, tail, grep, expr
8. chmod, chown
9. Redirections & Piping
10. useradd, usermod, userdel, passwd
11. df,top, ps
- 12 ssh, scp, ssh-keygen, ssh-copy-id

BASIC LINUX COMMANDS

ls: List the directory (folder) system.

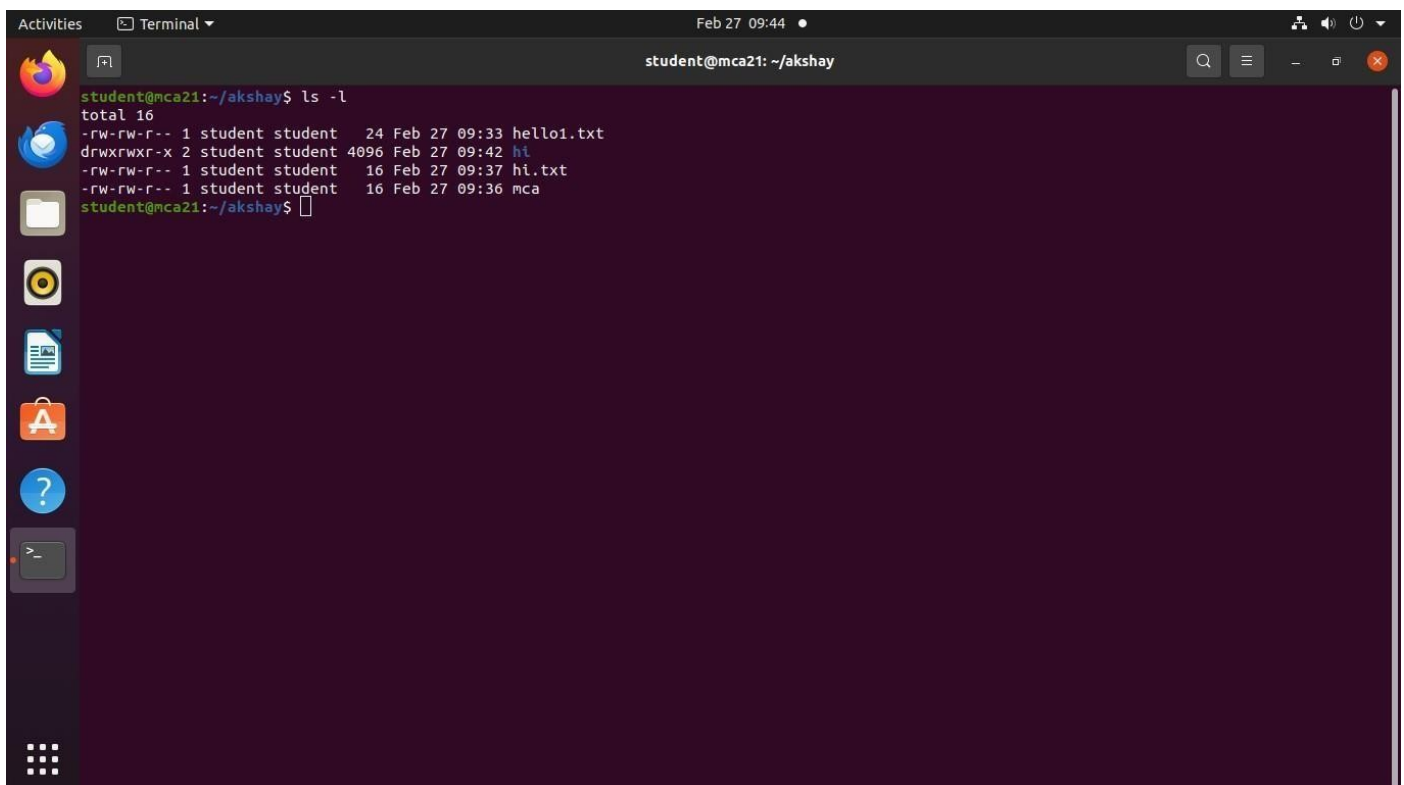
ls -a: Will show the hidden file.

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



A terminal window titled "Terminal" with the user "student@mca21: ~". The command "ls" has been executed, displaying a list of files and directories in the home directory. The output is as follows:

```
student@mca21:~$ ls
Desktop    Downloads  ihsan      java        MOK.der    Music       Public     Rasha       Templates  Videos     vvk.sh
Documents  gggg      ihs_neg    mca         MOK.priv   Pictures    PycharmProjects  snap      test.txt   'VirtualBox VMs'
```



A terminal window titled "Terminal" with the user "student@mca21: ~/akshay". The command "ls -l" has been executed, displaying a detailed list of files and directories in the directory ~/akshay. The output is as follows:

```
student@mca21:~/akshay$ ls -l
total 16
-rw-rw-r-- 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 hi
-rw-rw-r-- 1 student student 16 Feb 27 09:37 hi.txt
-rw-rw-r-- 1 student student 16 Feb 27 09:36 mca
```

man:

Show the manual for a given command.Eg:

man ls

```
ssslit@JavaTpoint: ~
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 -cftuv 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
Manual page ls(1) line 1 (press h for help or q to quit)
```

echo :

It is built in linux feature that print out arguments as the standard output.

```
Activities Terminal Feb 27 09:43
student@mca21: ~/akshay
student@mca21:~/akshay$ echo hello
hello
student@mca21:~/akshay$
```

Read :

It is used to read the contents of a line into a variable.

```
cev@cev-H81M-S:~/Documents$ echo hello,John
hello,John
cev@cev-H81M-S:~/Documents$ read
my name is John
cev@cev-H81M-S:~/Documents$ echo $REPLY
my name is John
cev@cev-H81M-S:~/Documents$ █
```

More:

It is used to view the text files in the command prompt, displaying onscreen at a time in case the file is large.

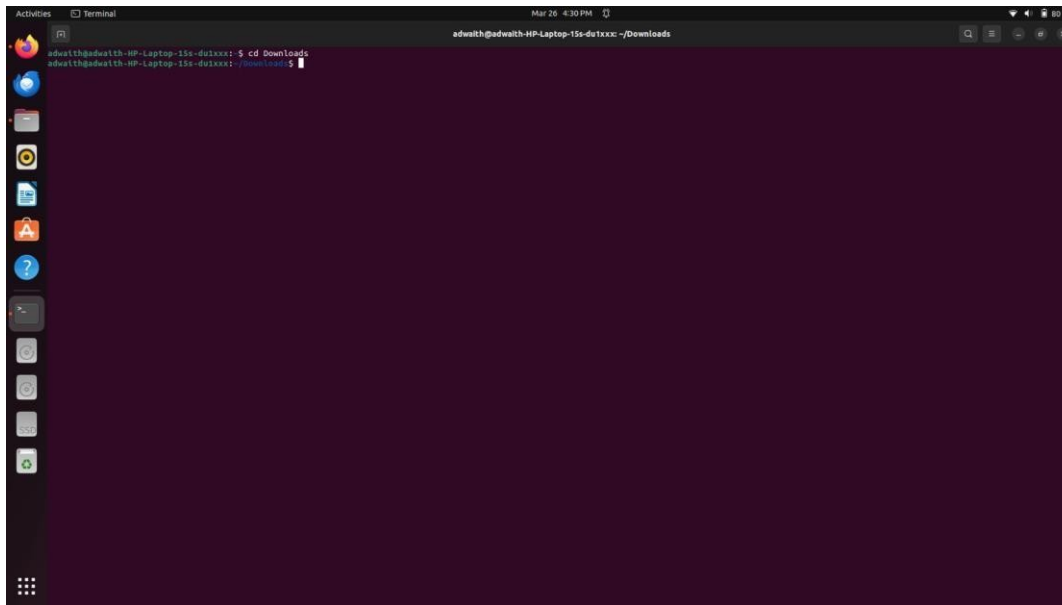
```
student@mca21:~/Desktop$ more nsd.txt
hdhsjkhbc
dcfd
vfvfb
fvdfb
dvfdbfdb
bfgfbngfnhbnm
h
fbgfbgnbg
gnhg
n
h
nhgnhgnhnmndgfhbfbgf
fbgbg
gbgfdngfngnhnmhj
gfdgfffffffffffffffff
fdggfgkfovklf
dcdcdvdokd
deedhfugduhjd
dcjkdhnvckkkkkkkkkkf
fdfdhhhhhhhhj
vckjnnnnnnnnn
safdhksjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
dhvvvvvvvvvvvvvvvvvvv
dssssssjcnedd
cccccccccccccccccccx
```

Less :

Less command is a linux utility that can be used to read the contents of a textfile one page(one screen) at a time.

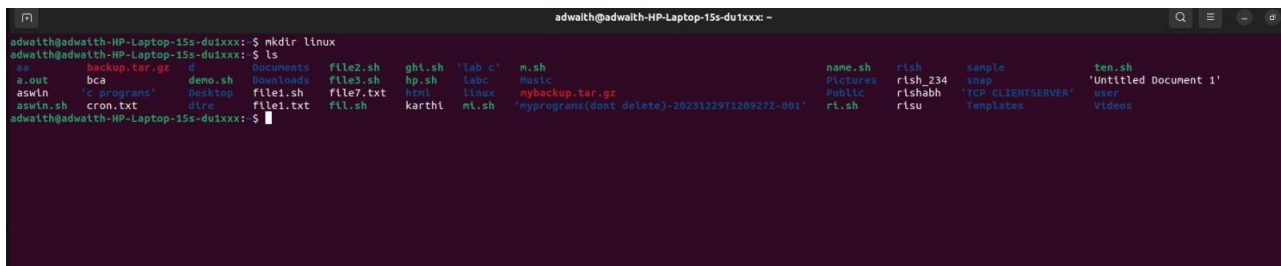
cd :

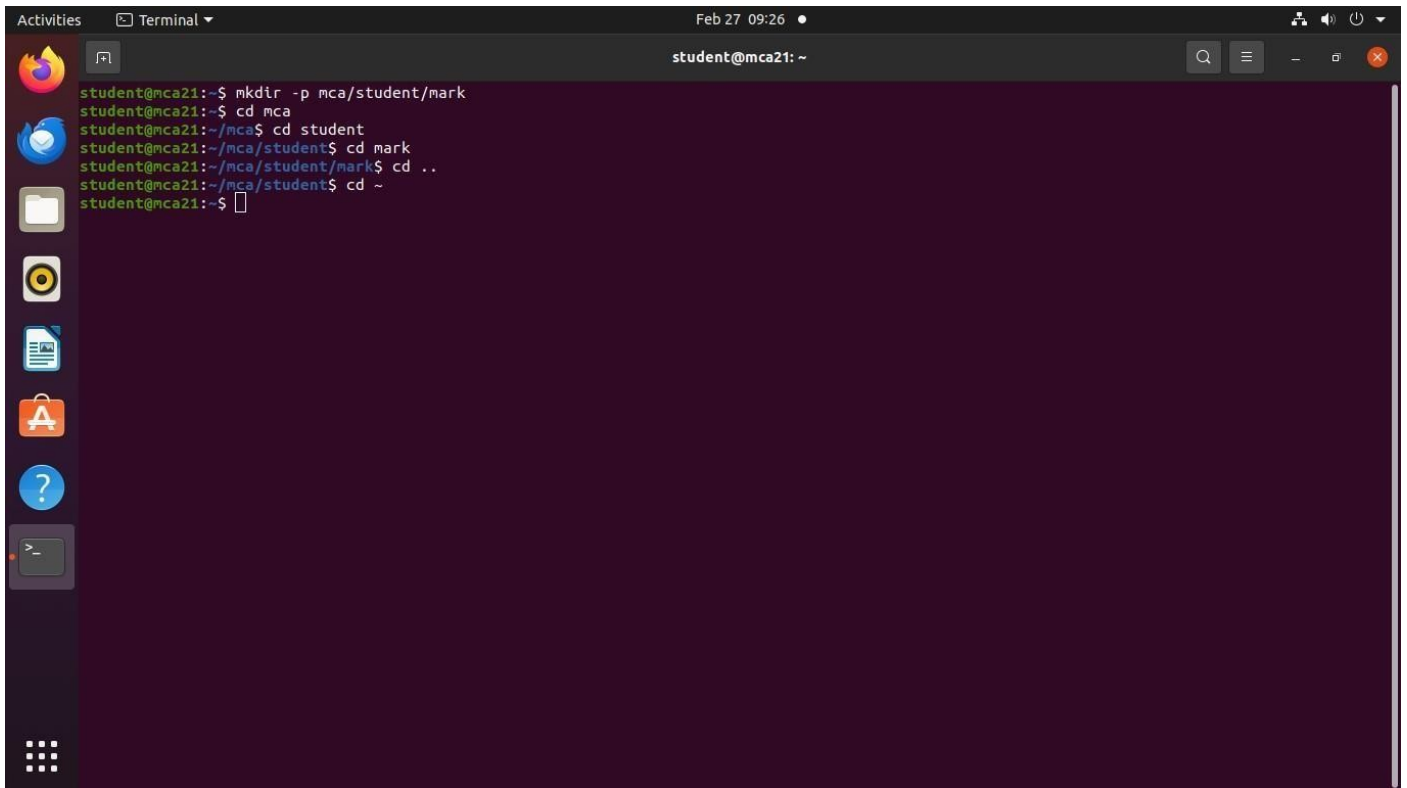
It is used to navigate through the linux files and directories.



mkdir :

Create a new directory (folder).

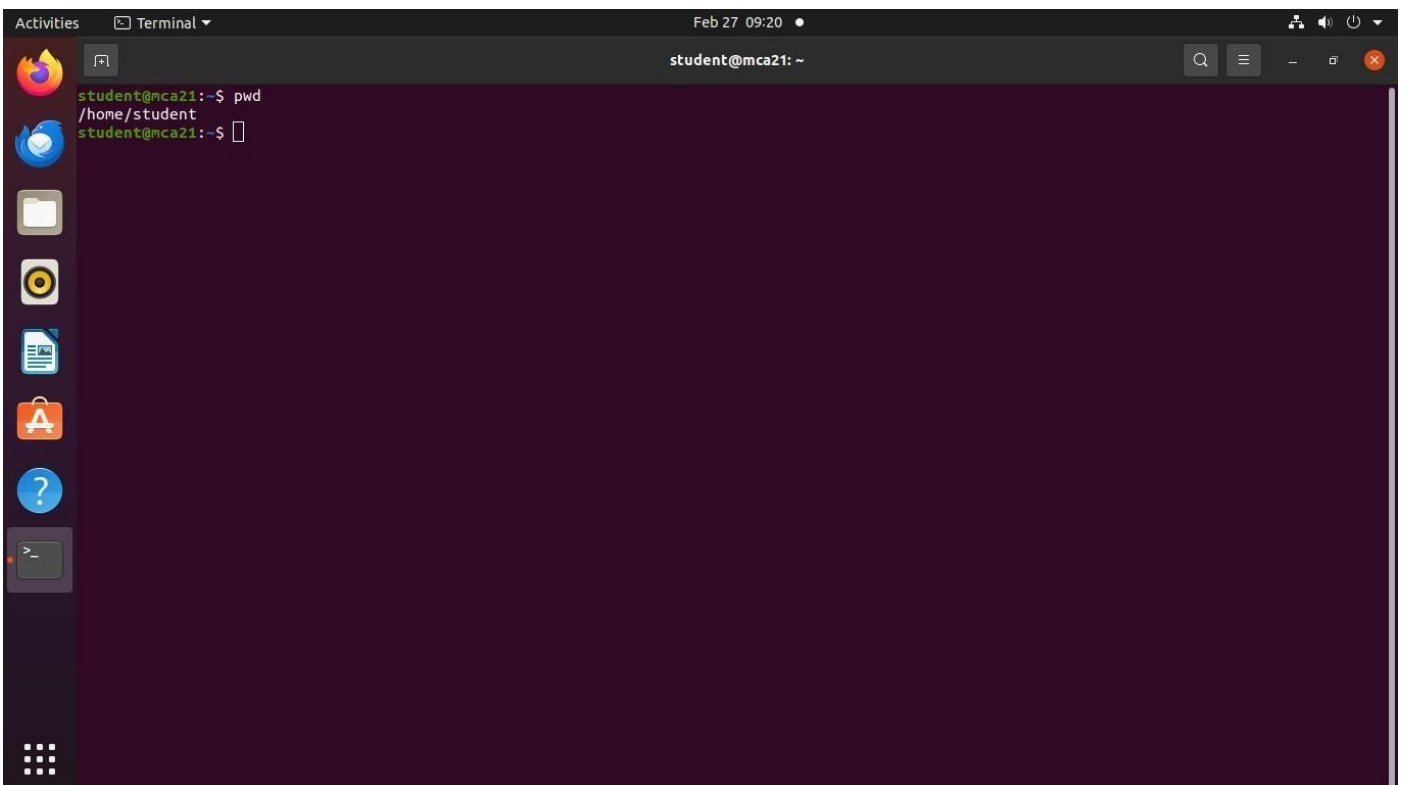


A terminal window titled 'Terminal' with a dark purple background. The window shows a series of commands being executed in a shell. The user is 'student' on host 'mca21'. The commands are: 'mkdir -p mca/student/mark', 'cd mca', 'cd student', 'cd mark', 'cd ..', and 'cd ~'. The prompt changes accordingly from '~' to '/mca' to '/mca/student' to '/mca/student/mark' and back to '~'.

```
student@mca21:~$ mkdir -p mca/student/mark
student@mca21:~$ cd mca
student@mca21:~/mca$ cd student
student@mca21:~/mca/student$ cd mark
student@mca21:~/mca/student/mark$ cd ..
student@mca21:~/mca/student$ cd ~
student@mca21:~$
```

pwd :

It print the current working directory path,starting from the root(/).

A terminal window titled 'Terminal' with a dark purple background. The user 'student' on host 'mca21' has entered the 'pwd' command. The output is '/home/student'.

```
student@mca21:~$ pwd
/home/student
student@mca21:~$
```

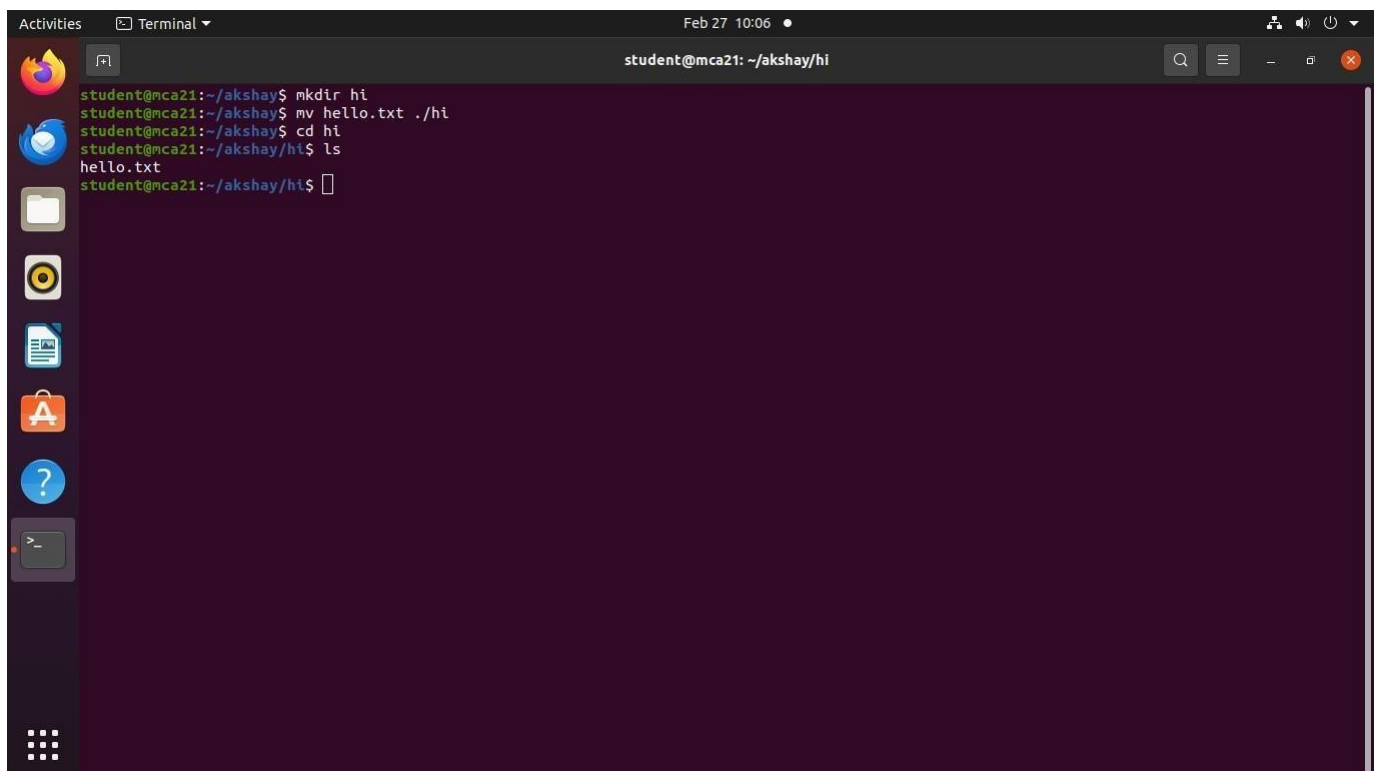
find :

It is used to search and locate the list of files and directories based on conditions you specify for files that match the arguments.

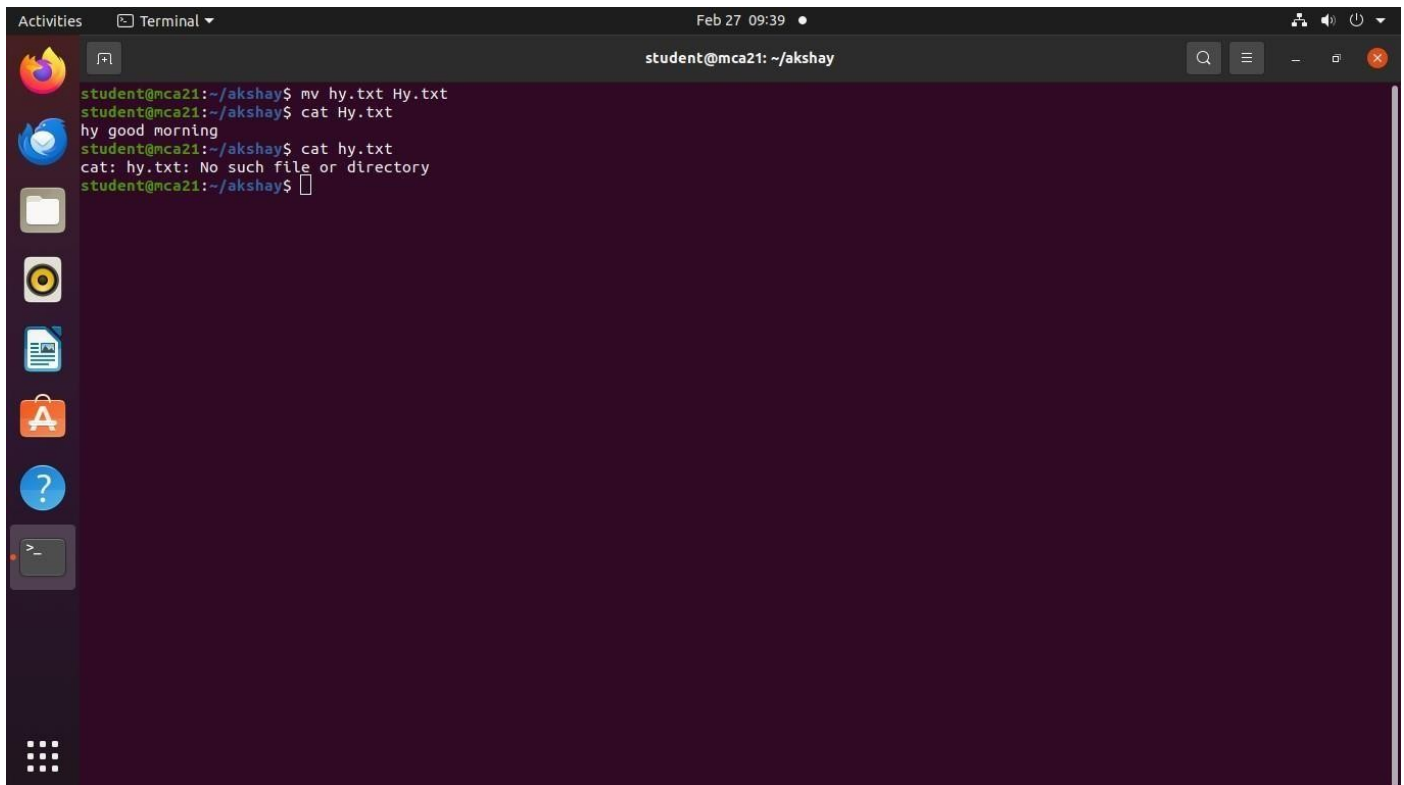
```
mca@mca-H81M-S:~$ find . -name text.txt;
./text.txt
./.local/share/Trash/files/text.txt
mca@mca-H81M-S:~$
```

mv :

It is used to move one or more files or directories from one place to another in a file system like unix.

A terminal window titled 'Terminal' with a dark background and light green text. The window shows a series of commands and their outputs. The user 'student' is at machine 'mca21' in the directory '~/akshay/hi'. The commands executed are: 'mkdir hi', 'mv hello.txt ./hi', 'cd hi', and 'ls'. The output of 'ls' is 'hello.txt'. The terminal window has a standard Ubuntu-style top bar with the date 'Feb 27 10:06' and system icons on the right. On the left, there is a vertical dock with icons for Firefox, Telegram, Files, GNOME Software, LibreOffice, and the Dash icon at the bottom.

```
student@mca21:~/akshay$ mkdir hi
student@mca21:~/akshay$ mv hello.txt ./hi
student@mca21:~/akshay$ cd hi
student@mca21:~/akshay/hi$ ls
hello.txt
student@mca21:~/akshay/hi$
```

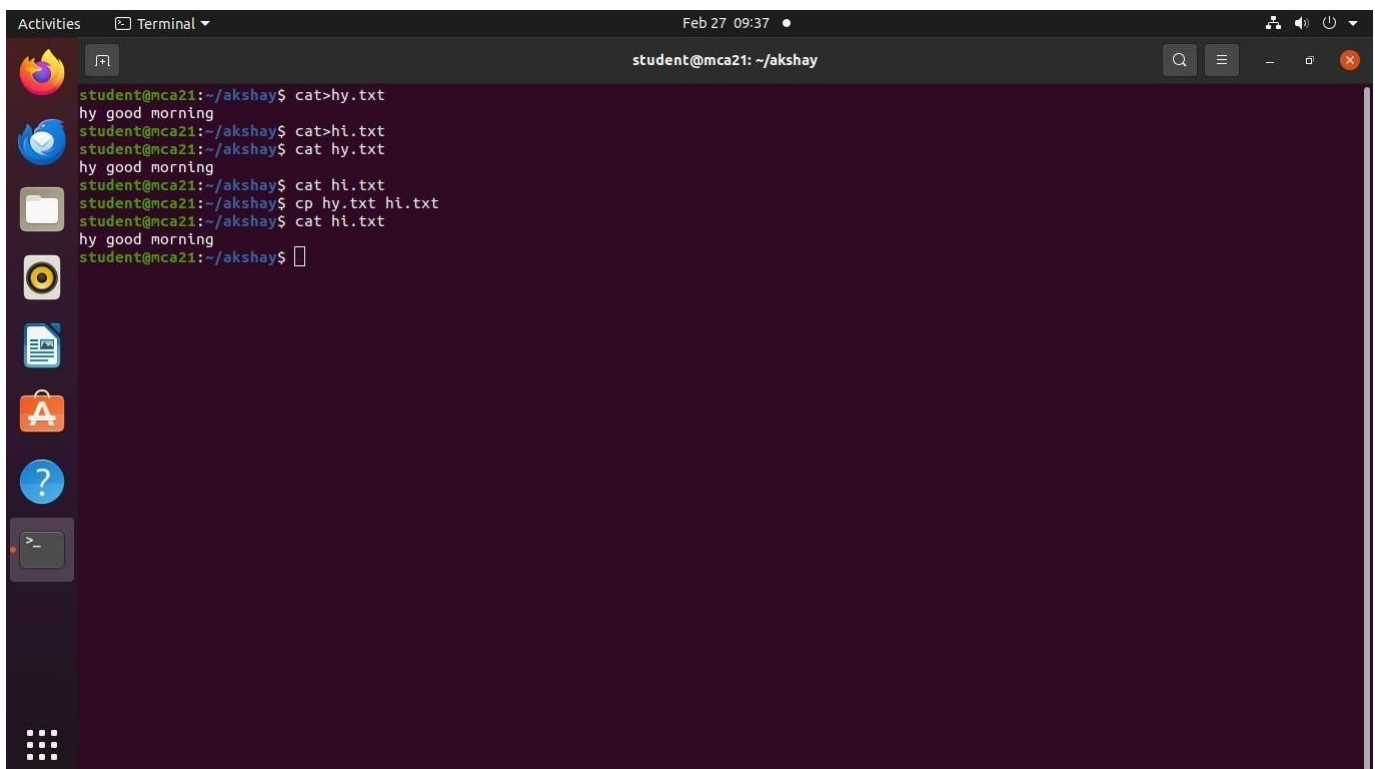



A terminal window titled 'student@mca21: ~/akshay' showing the following commands and output:

```
student@mca21:~/akshay$ mv hy.txt Hy.txt
student@mca21:~/akshay$ cat Hy.txt
hy good morning
student@mca21:~/akshay$ cat hy.txt
cat: hy.txt: No such file or directory
student@mca21:~/akshay$
```

cp :

This command used to copy files or group of files or directory.

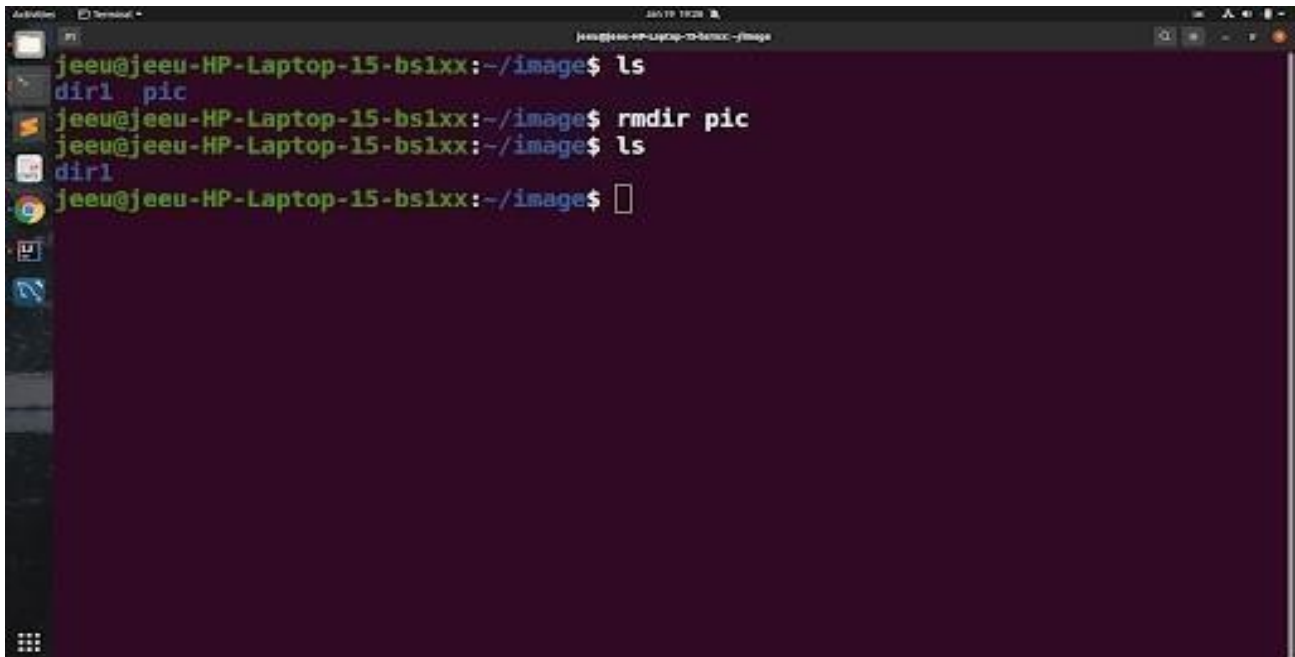


A terminal window titled 'student@mca21: ~/akshay' showing the following commands and output:

```
student@mca21:~/akshay$ cat>hy.txt
hy good morning
student@mca21:~/akshay$ cat>hi.txt
student@mca21:~/akshay$ cat hy.txt
hy good morning
student@mca21:~/akshay$ cat hi.txt
student@mca21:~/akshay$ cp hy.txt hi.txt
student@mca21:~/akshay$ cat hi.txt
hy good morning
student@mca21:~/akshay$
```

rm :

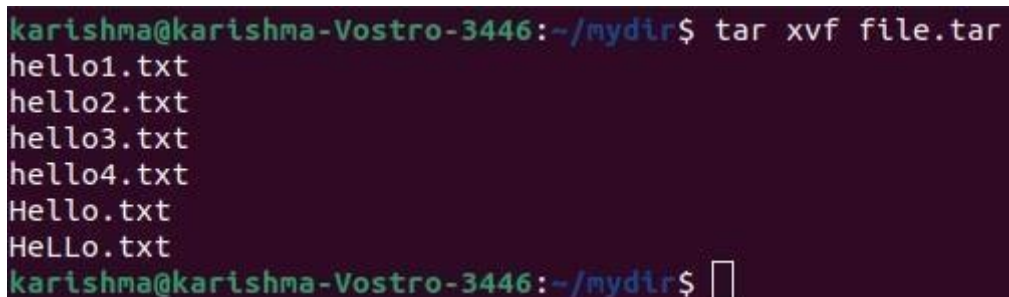
It is used to remove objects such as files, directories, symbolic, links and soon from the file system.

A terminal window on a Linux system. The user is in the directory ~/image. They run 'ls' and see 'dir1' and 'pic'. Then they run 'rmdir pic'. They run 'ls' again and see only 'dir1'.

```
jeeu@jeeu-HP-Laptop-15-bs1xx:~/image$ ls
dir1  pic
jeeu@jeeu-HP-Laptop-15-bs1xx:~/image$ rmdir pic
jeeu@jeeu-HP-Laptop-15-bs1xx:~/image$ ls
dir1
jeeu@jeeu-HP-Laptop-15-bs1xx:~/image$
```

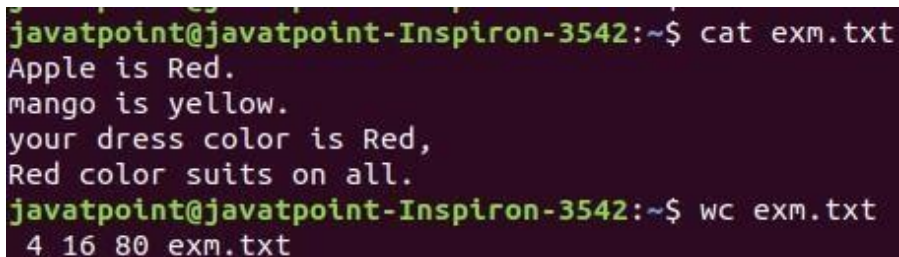
tar :

It is used for saving several files into an archive file.

A terminal window showing the extraction of a tar archive. The user runs 'tar xvf file.tar' and lists the contents of the archive.

```
karishma@karishma-Vostro-3446:~/mydir$ tar xvf file.tar
hello1.txt
hello2.txt
hello3.txt
hello4.txt
Hello.txt
HeLLo.txt
karishma@karishma-Vostro-3446:~/mydir$
```

wc : word count. It is mainly used for counting purpose.

A terminal window showing the word count of a file. The user first displays the contents of 'exm.txt' with 'cat', then runs 'wc exm.txt' to get the word count.

```
javatpoint@javatpoint-Inspiron-3542:~$ cat exm.txt
Apple is Red.
mango is yellow.
your dress color is Red,
Red color suits on all.
javatpoint@javatpoint-Inspiron-3542:~$ wc exm.txt
 4 16 80 exm.txt
```

cut :

It is used for cutting out the sections from each line of files and writing the result to standard output.

```
mca@mca-VirtualBox:~$ cut -b 1,2 linux.txt
to
dr
dr
dr
-r
-r
-r
-r
dr
-r
-r
dr
dr
dr
dr
-r
mca@mca-VirtualBox:~$
```

paste :

It is used to join horizontally by outputting lines consisting of lines from each file specified, separated by tab as delimiter, to standard output.

```
mca@mca-VirtualBox:~$ paste linux.txt file1.txt
hello world    happy
mca@mca-VirtualBox:~$ paste file1.txt linux.txt
happy  hello world
mca@mca-VirtualBox:~$
```

head :

It is present in all major linux distributions which are used to print out data from the start of a file.

```
student@mca21:~/Desktop$ head nsd.txt
hdhsjkhbc
dcfd
vfvfb
fvdfb
dvfdbfdb
bfgfbngfnhbnm
h
fbgfbgnbg
gnhg
n
```

```
student@mca21:~/Desktop$ head -n 3 nsd.txt
hdhsjkhbc
dcfd
vfxfb
```

tail :

The basic functionality of linux tail commands is to output the end of a file.

```
student@mca21:~/Desktop$ tail nsd.txt
dcdcdvdokd
deedhfugduhdj
dcjdkdhvckkkkkkkkkkkkf
fdfdhhhhhhhhhj
vckjnnoooooooooo
safdhksjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
dhvvvvvvvvvvvvvvvvvvvvvcv
dsssssssjcncdd
cccccccccccccccccccx
```

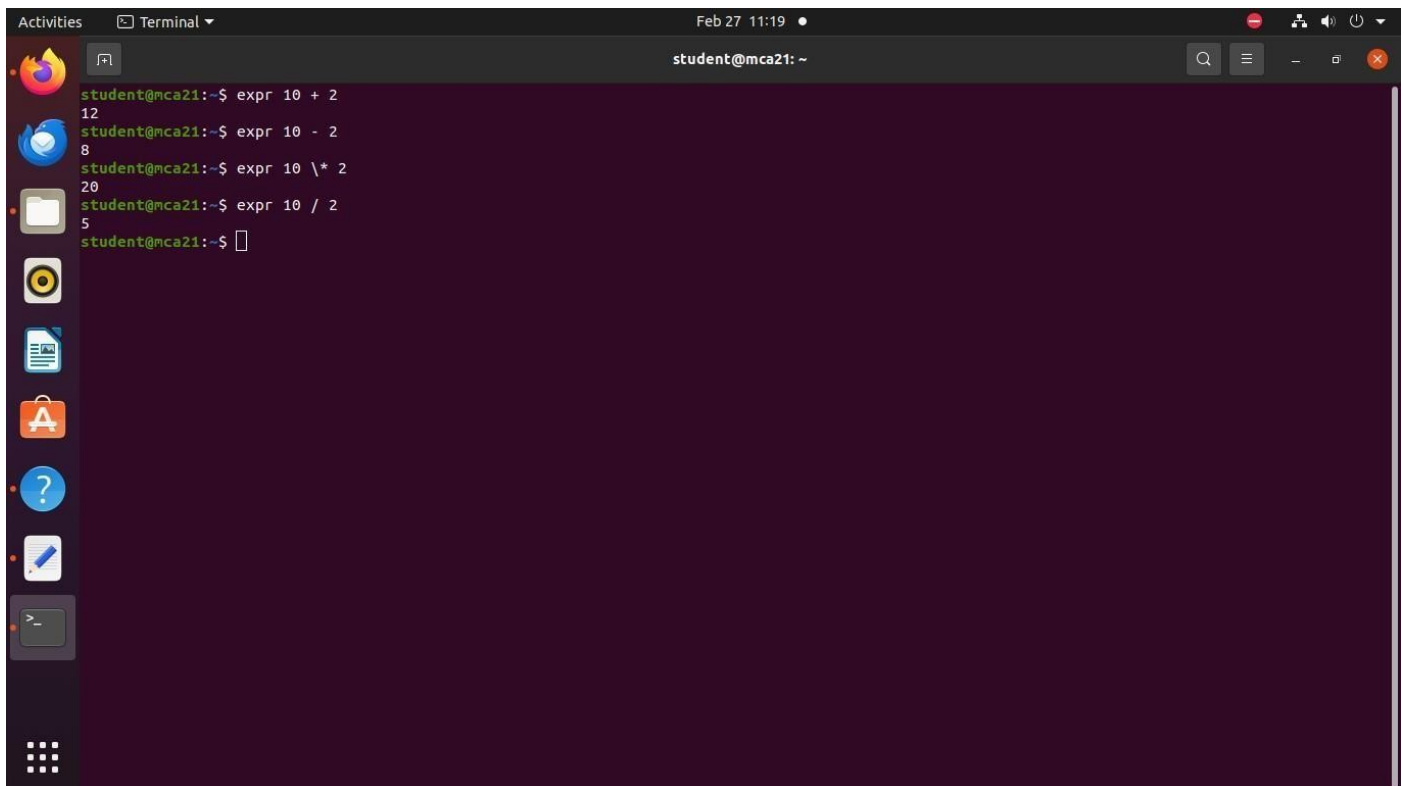
grep :

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

```
sssit@JavaTpoint: ~  
sssit@JavaTpoint:~$ cat marks.txt  
Priya-66  
Suman-91  
Abhi-78  
Soumya-72  
Ankit-95  
Gaurav-90  
Sumit-98  
sssit@JavaTpoint:~$ cat marks.txt | grep 9  
Suman-91  
Ankit-95  
Gaurav-90  
Sumit-98  
sssit@JavaTpoint:~$
```

expr :

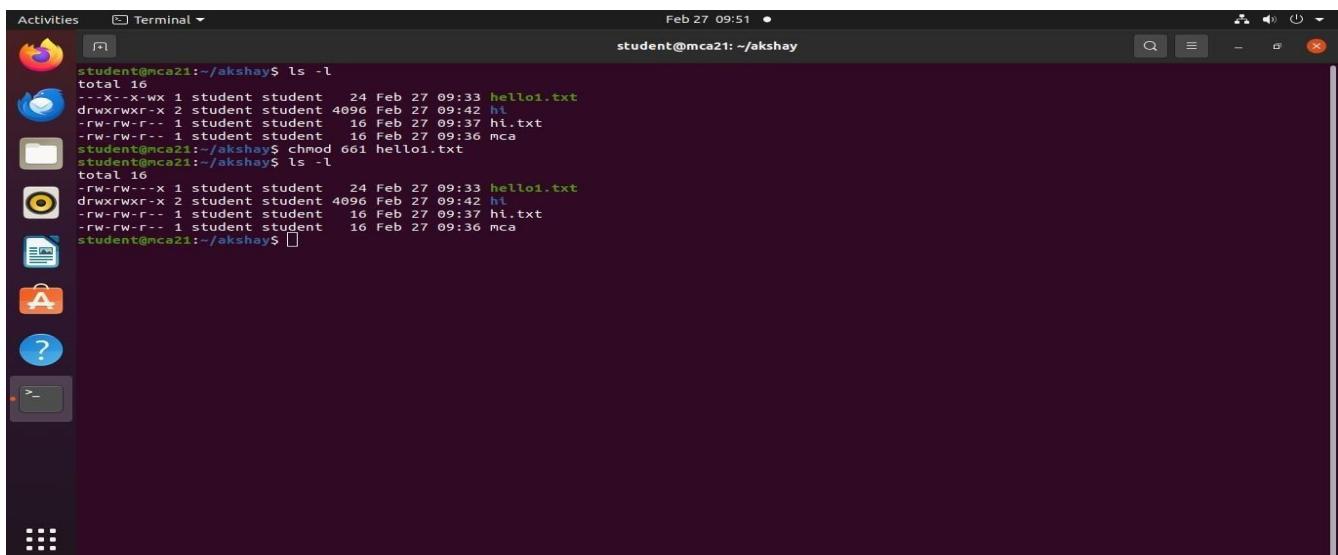
It was used to evaluate a given expression and display its corresponding output.

A terminal window titled 'student@mca21: ~' showing the use of the 'expr' command for arithmetic operations. The terminal has a dark purple background and a light-colored text. The left sidebar shows various application icons. The terminal output is as follows:

```
student@mca21:~$ expr 10 + 2
12
student@mca21:~$ expr 10 - 2
8
student@mca21:~$ expr 10 \* 2
20
student@mca21:~$ expr 10 / 2
5
student@mca21:~$
```

chmod :

It is used to change the access permissions of files and directories.

A terminal window titled 'student@mca21: ~/akshay' showing the use of the 'chmod' command to change file permissions. The terminal has a dark purple background and a light-colored text. The left sidebar shows various application icons. The terminal output is as follows:

```
student@mca21:~/akshay$ ls -l
total 16
-rwx--x-wx 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 hi
-rw-rw-r-- 1 student student 16 Feb 27 09:37 hi.txt
-rw-rw-r-- 1 student student 16 Feb 27 09:36 mca
student@mca21:~/akshay$ chmod 661 hello1.txt
student@mca21:~/akshay$ ls -l
total 16
-rw-rw--x 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 hi
-rw-rw-r-- 1 student student 16 Feb 27 09:37 hi.txt
-rw-rw-r-- 1 student student 16 Feb 27 09:36 mca
student@mca21:~/akshay$
```

```
Activities Terminal Feb 27 09:48 student@mca21: ~/akshay
student@mca21:~/akshay$ ls -l
total 16
-rwxrw-r-x 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 hi
-rw-rw-r-- 1 student student 16 Feb 27 09:37 hi.txt
-rw-rw-r-- 1 student student 16 Feb 27 09:36 mca
student@mca21:~/akshay$ chmod u-x hello1.txt
student@mca21:~/akshay$ ls -l
total 16
-rw-rw-r-x 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 hi
-rw-rw-r-- 1 student student 16 Feb 27 09:37 hi.txt
-rw-rw-r-- 1 student student 16 Feb 27 09:36 mca
student@mca21:~/akshay$ chmod o-x hello1.txt
student@mca21:~/akshay$ ls -l
total 16
-rw-rw-r-- 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 hi
-rw-rw-r-- 1 student student 16 Feb 27 09:37 hi.txt
-rw-rw-r-- 1 student student 16 Feb 27 09:36 mca
student@mca21:~/akshay$
```

```
Activities Terminal Feb 27 09:50 student@mca21: ~/akshay
student@mca21:~/akshay$ ls -l
total 16
-rw-rw-r-- 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 hi
-rw-rw-r-- 1 student student 16 Feb 27 09:37 hi.txt
-rw-rw-r-- 1 student student 16 Feb 27 09:36 mca
student@mca21:~/akshay$ chmod u=x,g=x,o=wx hello1.txt
student@mca21:~/akshay$ ls -l
total 16
---x--x-wx 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 hi
-rw-rw-r-- 1 student student 16 Feb 27 09:37 hi.txt
-rw-rw-r-- 1 student student 16 Feb 27 09:36 mca
student@mca21:~/akshay$
```


chown :

It is used to change the files ownership, directory, or symbolic link for a user or group.

Redirections & Piping :

Pipe is used to combine two or more commands and in this the output of one command 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 allows as to change the standard input and standard output when executing a command on the terminal.

```
mca@mca-VirtualBox:~$ ls -l | more;
total 56
drwxr-xr-x 3 mca mca 4096 Mar 14 15:21 Desktop
drwxr-xr-x 2 mca mca 4096 Mar 14 15:22 Documents
drwxr-xr-x 2 mca mca 4096 Mar 17 18:45 Downloads
-rwxr-xr-x 1 mca mca 8980 Nov 16 13:29 examples.desktop
-rwxrwxr-x 1 mca mca 6 May 7 14:42 file1.txt
-rwxrwxr-x 1 mca mca 0 May 7 14:24 file.txt
-rwxrwxr-x 1 mca mca 779 May 7 14:49 linux.txt
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Music
-rwxrwxr-x 1 mca mca 0 May 7 14:21 new1.txt
-rwxrwxr-x 1 mca mca 0 May 7 14:21 new.txt
drwxr-xr-x 2 mca mca 4096 Mar 10 12:04 Pictures
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Public
drwxr-xr-x 2 mca mca 4096 Mar 10 12:05 Templates
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Videos
drwxrwxr-x 2 mca mca 4096 Mar 14 15:26 vismaya
-rwxrwxr-x 1 mca mca 0 May 7 14:25 vis.txt
mca@mca-VirtualBox:~$ cat linux.txt | head -2 | tail -3;
total 52
drwxr-xr-x 3 mca mca 4096 Mar 14 15:21 Desktop
mca@mca-VirtualBox:~$
```

```
mca@mca-VirtualBox:~$ ls -l > linux.txt
mca@mca-VirtualBox:~$ cat linux.txt
total 52
drwxr-xr-x 3 mca mca 4096 Mar 14 15:21 Desktop
drwxr-xr-x 2 mca mca 4096 Mar 14 15:22 Documents
drwxr-xr-x 2 mca mca 4096 Mar 17 18:45 Downloads
-rwxr-xr-x 1 mca mca 8980 Nov 16 13:29 examples.desktop
-rwxrwxr-x 1 mca mca 6 May 7 14:42 file1.txt
-rwxrwxr-x 1 mca mca 0 May 7 14:24 file.txt
-rwxrwxr-x 1 mca mca 0 May 7 14:49 linux.txt
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Music
-rwxrwxr-x 1 mca mca 0 May 7 14:21 new1.txt
-rwxrwxr-x 1 mca mca 0 May 7 14:21 new.txt
drwxr-xr-x 2 mca mca 4096 Mar 10 12:04 Pictures
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Public
drwxr-xr-x 2 mca mca 4096 Mar 10 12:05 Templates
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Videos
drwxrwxr-x 2 mca mca 4096 Mar 14 15:26 vismaya
-rwxrwxr-x 1 mca mca 0 May 7 14:25 vis.txt
mca@mca-VirtualBox:~$
```

Useradd :

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



```
student@mca21: ~  
student@mca21:~$ sudo adduser vadakara  
[sudo] password for student:  
Adding user `vadakara' ...  
Adding new group `vadakara' (1003) ...  
Adding new user `vadakara' (1003) with group `vadakara' ...  
Creating home directory `/home/vadakara' ...  
Copying files from `/etc/skel' ...  
New password:  
Retype new password:  
passwd: password updated successfully  
Changing the user information for vadakara  
Enter the new value, or press ENTER for the default  
  Full Name []: vadakara  
    Room Number []: 10  
    Work Phone []:  
    Home Phone []:  
    Other []:  
Is the information correct? [Y/n] y  
student@mca21:~$
```

Usermod :

It is used to modify existing user account details ,such as username,password, home directory location, default shell,and more.


```
manav@ubuntulinux: ~  
manav@ubuntulinux:~$ sudo usermod -u 1234 test_user  
manav@ubuntulinux:~$ id test_user  
uid=1234(test_user) gid=1000(manav) groups=1000(manav)  
manav@ubuntulinux:~$
```

```
manav@ubuntulinux: ~  
manav@ubuntulinux:~$ sudo usermod -s /bin/sh test_user  
manav@ubuntulinux:~$ sudo cat /etc/passwd | grep test user  
test_user:x:1002:1000:This is test user:/home/manav:/bin/sh  
manav@ubuntulinux:~$
```

```
manav@ubuntulinux: ~  
manav@ubuntulinux:~$ sudo usermod -p test_password test_user  
manav@ubuntulinux:~$ sudo cat /etc/shadow | grep test_user  
test_user:test_password:18402:0:99999:7::18411:  
manav@ubuntulinux:~$
```

```
manav@ubuntulinux: ~  
manav@ubuntulinux:~$ sudo usermod -L test_user  
manav@ubuntulinux:~$ sudo usermod -U test_user  
manav@ubuntulinux:~$
```

```
manav@ubuntulinux: ~  
manav@ubuntulinux:~$ sudo usermod -l test_account test_user  
manav@ubuntulinux:~$ id test_account  
uid=1002(test_account) gid=1000(manav) groups=1000(manav)  
manav@ubuntulinux:~$ id test_user  
id: 'test_user': no such user  
manav@ubuntulinux:~$
```

```
manav@ubuntulinux: ~  
manav@ubuntulinux:~$ sudo usermod -g manav test_user  
manav@ubuntulinux:~$ id test_user  
uid=1002(test_user) gid=1000(manav) groups=1000(manav)  
manav@ubuntulinux:~$
```

```
manav@ubuntulinux: ~  
manav@ubuntulinux:~$ sudo usermod -e 2020-05-29 test_user  
manav@ubuntulinux:~$ sudo chage -l test_user  
Last password change           : May 20, 2020  
Password expires               : never  
Password inactive              : never  
Account expires                : May 29, 2020  
Minimum number of days between password change : 0  
Maximum number of days between password change : 99999  
Number of days of warning before password expires : 7  
manav@ubuntulinux:~$  
  
manav@ubuntulinux:~$ sudo usermod -d /home/manav test_user  
manav@ubuntulinux:~$ sudo cat /etc/passwd | grep test_user  
test_user:x:1002:1002:This is test user:/home/manav:/bin/bash  
manav@ubuntulinux:~$
```

Userdel :

It is used to delete a user account and related files.

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

Passwd :

Passwd command used to change password for user accounts.

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

df :

It is used to display the disk space used in the file system

```
mca@mca-H81M-S:~$ df:
Filesystem      1K-blocks      Used Available Use% Mounted on
udev            914052          0    914052   0% /dev
tmpfs           187220          5940    181280   4% /run
/dev/sda2       144514712 9342692 127807976   7% /
tmpfs           936096          320    935776   1% /dev/shm
tmpfs           5120            4      5116   1% /run/lock
tmpfs           936096          0    936096   0% /sys/fs/cgroup
tmpfs           187220          64    187156   1% /run/user/1000
mca@mca-H81M-S:~$
```

top :

It shows the real-time view of running process in linux and displays and kernel managed tasks.

```
top - 18:20:03 up 25 min, 1 user, load average: 0.01, 0.02, 0.01
Tasks: 267 total, 2 running, 265 sleeping, 0 stopped, 0 zombie
Memtot: 4.8 m, 4.8 m, 0.0 m, 0.0 m, 1.2 m, 0.0 m, 0.0 st, 0.0 st
Mem Mem: 7611.9 total, 3424.7 free, 1602.7 used, 2584.0 buff/cache
Mem Swap: 8091.0 total, 8091.0 free, 0.0 used, 5193.0 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
 15183 adwath    20   0 559100 56044 43936 R 45.5   0.7   0:00.66 gnome-terminal-
 1595 adwath    20   0 563504 268700 120860 S 27.3   3.4   1:27.77 gnome-shell
 2426 adwath    20   0 11.6g 376660 191552 S  9.1   4.8   1:52.99 firefox
 15218 adwath    20   0 13360   4224   3328 R  9.1   0.1   0:00.06 top
   1 root      20   0 166880 11352  8024 S  0.0   0.1   0:03.78 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 slab_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  0.5   0.0   0:00.07 ksoftirqd/0
  15 root      20   0      0      0      0 I  0.0   0.0   0:01.17 rcu_preempt
  16 root      rt  0      0      0      0 S  0.5   0.0   0:00.01 migration/0
  17 root     -S1  0      0      0      0 S  0.5   0.0   0:00.00 idle_inject/0
  19 root      20   0      0      0      0 S  0.5   0.0   0:00.00 cpuhp/0
  20 root      20   0      0      0      0 S  0.5   0.0   0:00.00 cpuhp/1
  21 root     -S1  0      0      0      0 S  0.5   0.0   0:00.00 idle_inject/1
  22 root      rt  0      0      0      0 S  0.5   0.0   0:00.00 migration/1
  23 root      20   0      0      0      0 S  0.5   0.0   0:00.00 ksoftirqd/1
top - 18:20:06 up 25 min, 1 user, load average: 0.01, 0.02, 0.01
```

ps :

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

```
mca@mca-H81M-S:~$ ps;  
  PID TTY          TIME CMD  
  4335 pts/17    00:00:00 bash  
  4346 pts/17    00:00:00 ps  
mca@mca-H81M-S:~$
```

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"


```
Activities Terminal Mar 21 14:55
student@mca21: ~

student@mca21: ~/Desktop
student@mca21: ~

student@mca21:~$ ifconfig
eno1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.16.4.99 netmask 255.255.254.0 broadcast 172.16.5.255
    inet6 fe80::c631:a590:4429:c390 prefixlen 64 scopeid 0x20<link>
    ether e0:be:03:61:14:b9 txqueuelen 1000 (Ethernet)
    RX packets 26208 bytes 5649252 (5.6 MB)
    RX errors 0 dropped 345 overruns 0 frame 0
    TX packets 5973 bytes 845881 (845.8 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 19 memory 0x4f800000-4f820000

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 1474 bytes 159614 (159.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 1474 bytes 159614 (159.6 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

student@mca21:~$
```

```
Activities Terminal Mar 21 14:18
student@mca21: ~

student@mca21:~$ ping 172.16.4.170
PING 172.16.4.170 (172.16.4.170) 56(84) bytes of data.
64 bytes from 172.16.4.170: icmp_seq=1 ttl=64 time=1.36 ms
64 bytes from 172.16.4.170: icmp_seq=2 ttl=64 time=0.855 ms
64 bytes from 172.16.4.170: icmp_seq=3 ttl=64 time=0.864 ms
64 bytes from 172.16.4.170: icmp_seq=4 ttl=64 time=0.917 ms
64 bytes from 172.16.4.170: icmp_seq=5 ttl=64 time=0.808 ms
64 bytes from 172.16.4.170: icmp_seq=6 ttl=64 time=0.916 ms
64 bytes from 172.16.4.170: icmp_seq=7 ttl=64 time=0.651 ms
64 bytes from 172.16.4.170: icmp_seq=8 ttl=64 time=1.01 ms
64 bytes from 172.16.4.170: icmp_seq=9 ttl=64 time=0.832 ms
64 bytes from 172.16.4.170: icmp_seq=10 ttl=64 time=0.928 ms
64 bytes from 172.16.4.170: icmp_seq=11 ttl=64 time=0.570 ms
64 bytes from 172.16.4.170: icmp_seq=12 ttl=64 time=0.708 ms
64 bytes from 172.16.4.170: icmp_seq=13 ttl=64 time=0.707 ms
64 bytes from 172.16.4.170: icmp_seq=14 ttl=64 time=0.727 ms
64 bytes from 172.16.4.170: icmp_seq=15 ttl=64 time=0.677 ms
64 bytes from 172.16.4.170: icmp_seq=16 ttl=64 time=0.587 ms
64 bytes from 172.16.4.170: icmp_seq=17 ttl=64 time=0.867 ms
64 bytes from 172.16.4.170: icmp_seq=18 ttl=64 time=0.754 ms
64 bytes from 172.16.4.170: icmp_seq=19 ttl=64 time=0.917 ms
64 bytes from 172.16.4.170: icmp_seq=20 ttl=64 time=0.933 ms
64 bytes from 172.16.4.170: icmp_seq=21 ttl=64 time=0.559 ms
64 bytes from 172.16.4.170: icmp_seq=22 ttl=64 time=1.11 ms
64 bytes from 172.16.4.170: icmp_seq=23 ttl=64 time=1.09 ms
64 bytes from 172.16.4.170: icmp_seq=24 ttl=64 time=0.572 ms
64 bytes from 172.16.4.170: icmp_seq=25 ttl=64 time=0.579 ms
64 bytes from 172.16.4.170: icmp_seq=26 ttl=64 time=0.640 ms
64 bytes from 172.16.4.170: icmp_seq=27 ttl=64 time=0.638 ms
64 bytes from 172.16.4.170: icmp_seq=28 ttl=64 time=0.561 ms
64 bytes from 172.16.4.170: icmp_seq=29 ttl=64 time=0.684 ms
64 bytes from 172.16.4.170: icmp_seq=30 ttl=64 time=1.10 ms
64 bytes from 172.16.4.170: icmp_seq=31 ttl=64 time=1.01 ms
64 bytes from 172.16.4.170: icmp_seq=32 ttl=64 time=0.613 ms
64 bytes from 172.16.4.170: icmp_seq=33 ttl=64 time=0.900 ms
64 bytes from 172.16.4.170: icmp_seq=34 ttl=64 time=0.918 ms
64 bytes from 172.16.4.170: icmp_seq=35 ttl=64 time=0.904 ms
64 bytes from 172.16.4.170: icmp_seq=36 ttl=64 time=0.915 ms
64 bytes from 172.16.4.170: icmp_seq=37 ttl=64 time=0.855 ms
```

```

student@mca21:~/Desktop$ ssh student@172.16.4.170
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/pro

 * 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

Expanded Security Maintenance for Applications is not enabled.

17 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

New release '22.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Your Hardware Enablement Stack (HWE) is supported until April 2025.
Last login: Fri Mar 22 13:57:21 2024 from 172.16.4.99

```

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"

the connection using:

\$ "logout/cntrl+D"

```

Activities Terminal Mar 22 14:23 student@mca21: ~/Desktop
student@mca21:~/Desktop$ gedit newfile.txt
^C
student@mca21:~/Desktop$ scp /home/student/Desktop/newfile.txt student@172.16.4.170
student@mca21:~/Desktop$ ^C
student@mca21:~/Desktop$ scp /home/student/Desktop/newfile.txt student@172.16.4.170:/home/student/Desktop
newfile.txt 100% 6 4.4KB/s 00:00
student@mca21:~/Desktop$ ssh student@172.16.4.170
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/pro

 * 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

Expanded Security Maintenance for Applications is not enabled.

17 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

New release '22.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Your Hardware Enablement Stack (HWE) is supported until April 2025.
Last login: Fri Mar 22 13:57:21 2024 from 172.16.4.99
student@mca21:~$ cd Desktop/
student@mca21:~/Desktop$ ls
akshay      exan1      mca.c      mycomputer1.txt  Rishabh    student@172.16.4.99  test1.c    vm_install_solve_kernal
akshay765   'KEYS YOU WANT TO NOTE.png'  Megha      mycomputer.txt  student@172.16.4.99  test2.c
a.out      mca        mult.c     newfile.txt     swap.c
student@mca21:~/Desktop$ scp /home/student/Desktop/mycomputer1.txt

```

```
Activities Terminal Mar 22 14:40 student@mca21: ~/Desktop

17 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

New release '22.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Your Hardware Enablement Stack (HWE) is supported until April 2025.
Last login: Fri Mar 22 13:57:21 2024 from 172.16.4.99
student@mca21:~$ cd Desktop/
student@mca21:~/Desktop$ ls
akshay exam1 mca.c mycomputer1.txt Rishabh test1.c vm_install_solve_kernal
akshay765 'KEYS YOU WANT TO NOTE.png' Megha mycomputer.txt student@172.16.4.99 test2.c
a.out mca mult.c newfile.txt swap.c test.c
student@mca21:~/Desktop$ scp student@172.16.4.170 /home/student/Desktop/mycomputer1.txt
cp: cannot stat 'student@172.16.4.170': No such file or directory
student@mca21:~/Desktop$ scp student@172.16.4.170 /home/student/Desktop/mycomputer1.txt /home/student/Desktop/
cp: cannot stat 'student@172.16.4.170': No such file or directory
cp: '/home/student/Desktop/mycomputer1.txt' and '/home/student/Desktop/mycomputer1.txt' are the same file
student@mca21:~/Desktop$ scp student@172.16.4.170:/home/student/Desktop/mycomputer1.txt /home/student/Desktop/
student@172.16.4.170's password:
mycomputer1.txt 100% 4 13.1KB/s 00:00
student@mca21:~/Desktop$ scp student@172.16.4.170:/home/student/Desktop/test1.c /home/student/Desktop/
student@172.16.4.170's password:
Permission denied, please try again.
student@172.16.4.170's password:
test1.c 100% 0 0.0KB/s 00:00
student@mca21:~/Desktop$ exit
logout
Connection to 172.16.4.170 closed.
student@mca21:~/Desktop$ scp student@172.16.4.170:/home/student/Desktop/test1.c /home/student/Desktop/
test1.c 100% 0 0.0KB/s 00:00
student@mca21:~/Desktop$ scp student@172.16.4.170:/home/student/Desktop/mult.c /home/student/Desktop/
mult.c 100% 255 12.0KB/s 00:00
student@mca21:~/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 uploadthe "ssh" user key.

TEXT EDITOR

Text editors can be used for **editing text files, writing codes, updating userinstruction files,** and more. A Linux system supports multiple text editors.

A text editor plays an important role while coding. So, it is important to select thebest text editor. A text editor should not only be simple but also functional and should be good to work with.

Unix text editors are:

- VIM
- EMACS
- NANO
- PICO

VIM

Vim editor is one of the most used and powerful command-line based editor of the Linux system. By default, it is supported by most Linux distros. It has enhanced functionalities of the old unix vi editor. It is a user-friendly editor and provides the same environment for all the Linux distros. It is also termed as **programmer's editor** because most programmers prefer Vi editor.

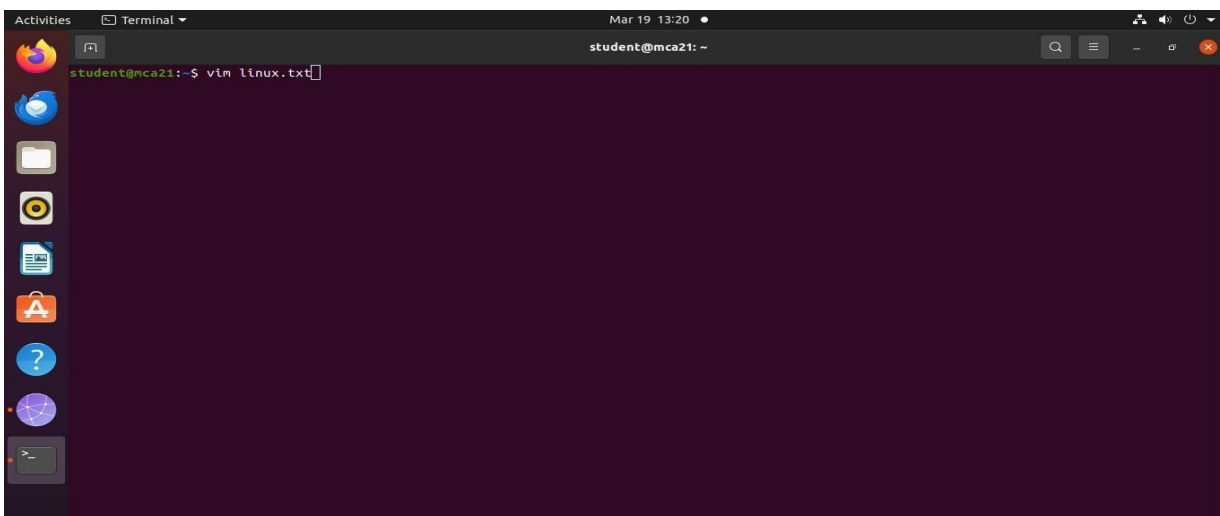
Vi editor has some special features such as Vi modes and syntax highlighting that makes it powerful than other text editors. Generally, it has two modes:

Command Mode: The command mode allows us to perform actions on files. By default, it starts in command mode. In this mode, all types of words are considered as commands. We can execute commands in this mode.

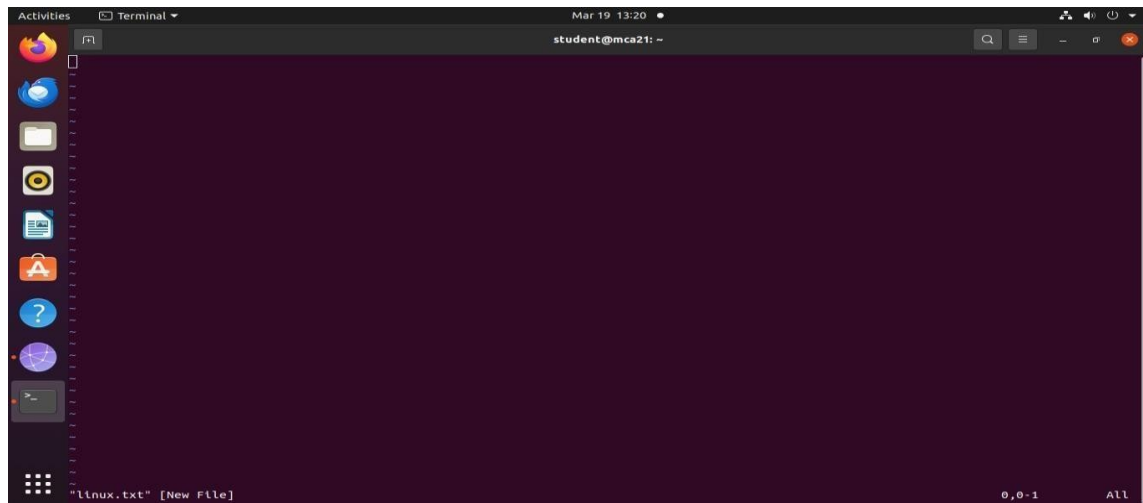
Insert Mode :

The insert mode allows to insert text on files. To switch from command mode to insert mode, press the **Esc** key to exit from active mode and **'I'** key.

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



The file linux.txt is opened.



Insert mode activated by pressing key 'I' and content is added.



ESCAPE : wq [Save and Exit]

To quit without saving press ESC :q

Activities Terminal Mar 19 15:06

```
#!/bin/bash
echo "hello world"
echo $BASH
echo $HOME
echo $PWD
echo $USER
echo $HOSTNAME
echo $PATH
```

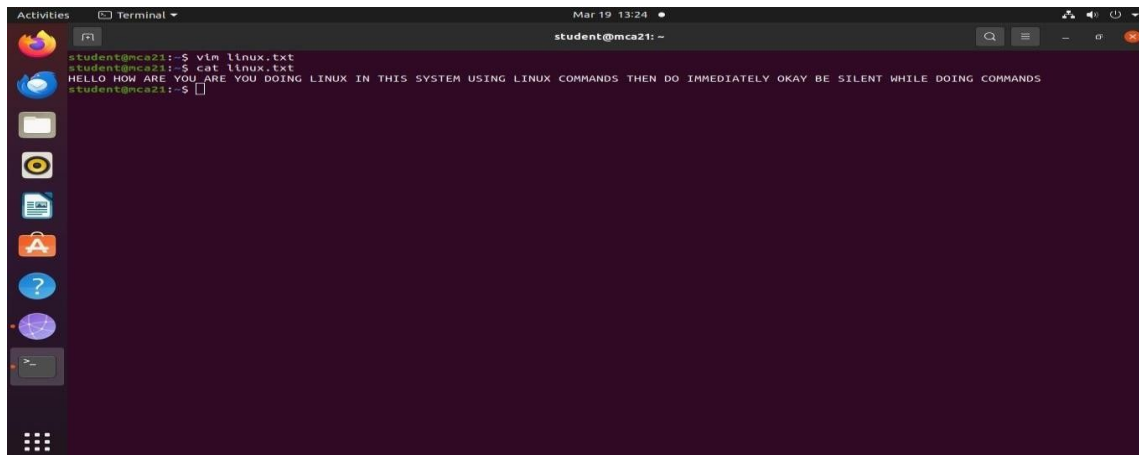
"helloworld.sh" 8L, 100C 8,10 All

Activities Terminal Mar 19 13:24

```
student@mca21: ~
HELLO HOW ARE YOU ARE YOU DOING LINUX IN THIS SYSTEM USING LINUX COMMANDS THEN DO IMMEDIATELY OKAY BE SILENT WHILE DOING COMMANDS
```

:wq

We can view the file by using cat command



```
student@mca21:~$ vim linux.txt
student@mca21:~$ cat linux.txt
HELLO HOW ARE YOU ARE YOU DOING LINUX IN THIS SYSTEM USING LINUX COMMANDS THEN DO IMMEDIATELY OKAY BE SILENT WHILE DOING COMMANDS
student@mca21:~$
```

```
student@mca21:~$ ./helloworld.sh
hello world
/bin/bash
/home/student
/home/student
student
mca21
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
student@mca21:~$
```