

## **EXPERIMENT - 1**

**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.

### **INTRODUCTION TO COMPUTER HARDWARE**

**Computer hardware is a physical device of computers that we can see and touch. For e.g. Monitor, Central Processing Unit, Mouse, Joystick, etc. Using these devices, we can control computer operations like input and output.**

These hardware components are further divided into the following categories, which are:

- Input Devices
- Output Devices
- Storage Devices
- Internal Components

#### **• Input Devices**

Input devices are those devices with the help of which the user interacts with the computer. Or, In other words, with the help of input devices, the user enters the data or information into the computer. This information or data is accepted by the input devices and converted into a computer-acceptable format, which is further sent to the computer system for processing. some input devices:

Keyboard: It is the most common and main input device for computers. The data is inputted by typing on the keyboard. It consists of 104 keys in total. It contains numeric keys, alphabet keys, and different function keys as well. Earlier, it was connected to the computer via cable, now as technology has advanced, you can connect a keyboard using Bluetooth.

Mouse: A mouse is a kind of pointing device which is rolled over to control the cursor on the screen and it has functional keys like left, middle, and right buttons. Using these functional keys, on by the click of which an object

is selected or to open a file by just a click of a mouse. It also consists of a sensor inside which notifies its speed to the computer and according to which the cursor is moved on the screen.

Scanner: As the name suggests, it scans images, documents, etc., and converts them into digital form and that can be further edited and used. It works just like a Xerox machine.



- Output Devices

These are the devices that are used to display the output of any task given to the computer in human-readable form.

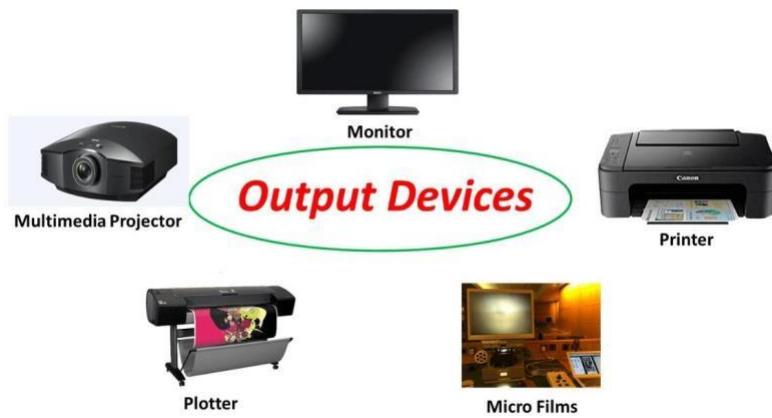
some output devices:

Monitor: The monitor is the main output device. It is also called VDU(visual display unit) and it looks like a TV screen. The Monitor displays the information from the computer. It is used to display text, video, images, etc.

Printer: A printer is an output device that transfers data from the computer in a printed format by using text or images on paper. There are both colored and black & white printers. Further, there are also different types of printers, like Laser Printer, Dot-matrix printers, and Inkjet printers.

Plotter: It is similar to a printer but potters are large in size. A plotter is used to generate large drawings, architectural blueprints, etc. on paper and these are high-quality images and drawings and large in size.

Speakers: It is a very common output device and it gives sound as an output. Speaker is generally used to play music or anything having sound.



- Storage Devices

There are some devices that are used for storage purposes and are known as secondary storage devices. Some of them are :

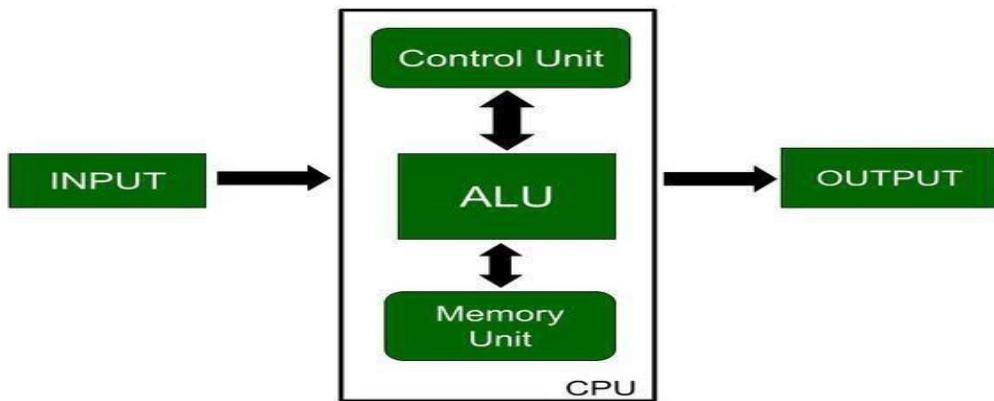
1. **CD (Compact disc):** A CD is circular in shape and made up of thin platted glass and plastic polycarbonate material. It has a storage capacity of 600 MB to 700 MB of data. It has a standard size of 12 cm with a hole in the center of about 1.5 cm and 1.2 mm in thickness
2. **DVD (Digital Video/Versatile Disc):** A DVD is the same as a CD but with some more features. A DVD comes in single and dual-layer formats. It has much greater storage capacity in comparison to CD. The storage capacity of a DVD with one-sided single layer is – 4.7 GB, one-sided double layer – 8.5 GB, double-sided single layer – 9.4 GB, and double-sided double layer – 17 GB

3. **Hard Disk:** An hard disk is a non-volatile storage device that uses its read/write heads to store digital data on a magnetic surface of a rigid plate. It is generally 3.5 inches in size for desktops and 2.5 inches in size for laptops



- **Internal Components 1. CPU (Central Processing Unit)**

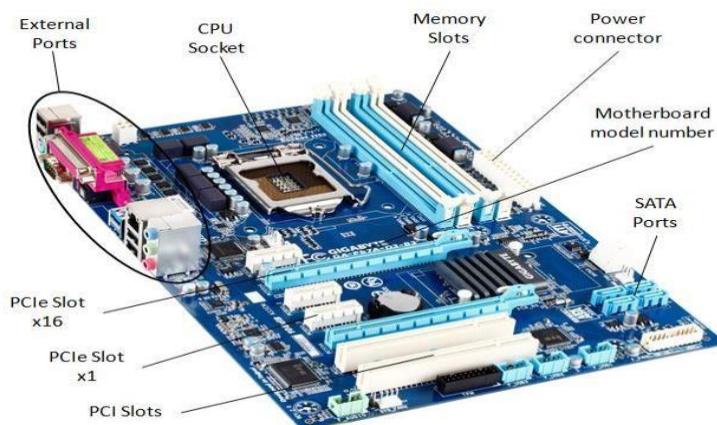
The CPU is also known as the heart of the computer. It consists of three units, generally known as the control unit, Arithmetic Logical Unit (ALU), and the memory unit. Below is the block diagram of the CPU is given:



As shown in the diagram input is given to the CPU through input devices. This input goes to memory and the control unit gets instructions from memory. The control unit now decides what to do with the input or instructions and transfers it to ALU. Now, ALU performs various operations like addition, subtraction, multiplication, division, logical operations, etc. After that, the final result gets stored in memory and finally passed to output devices to give the output. So, this is how the CPU works.

## 2. Motherboard

It is the main circuit board inside a computer and it contains most of the electronic components together. All the components of the computer are directly or indirectly connected to the motherboard. It includes RAM slots, controllers, system chipsets, etc.



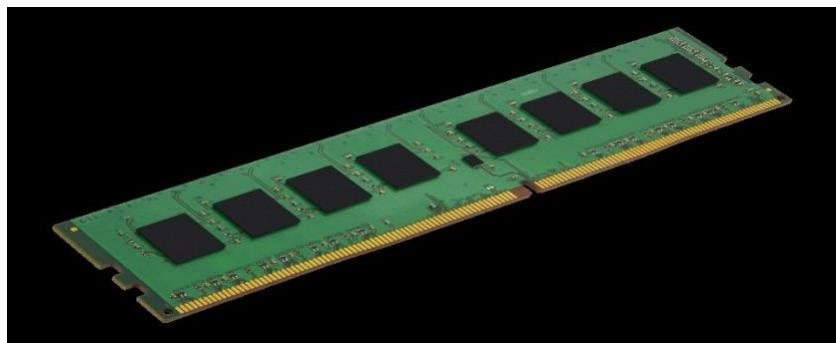
### **3. RAM (Random Access Memory)**

It is also known as temporary or volatile memory. It holds the program and data, which are currently in process or processing. All the data is erased as soon as the computer is turned off or in case of a power failure. Data stored in this memory can be changed. There are two types of RAM:-

**SRAM (Static RAM):** SRAM basically consists of a flip-flop using a transistor or Mosfet (MOS). It is fast and has less access time. In this refreshing circuits are not required. But it is costly and requires more space. For e.g. cache memory.



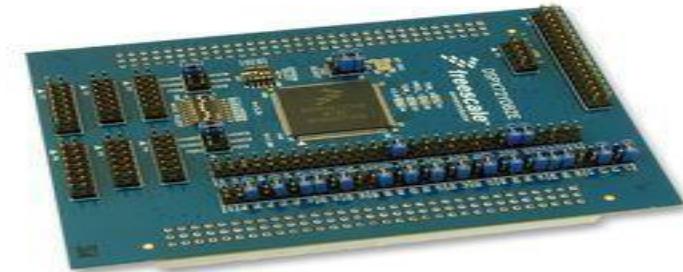
**DRAM (Dynamic RAM):** DRAM consists of capacitors and the data is stored in the form of capacitors. Capacitors charge when data is 1 and don't charge if data is 0. It requires refreshing circuits, as leakage of current in the capacitor can occur, so they need to be refreshed to the data. It is slower and has a higher access time. It is cheaper in comparison with SRAM. For e.g. Main memory.



### **4. Daughter cards**

Daughter cards, also known as expansion cards or daughterboards, are additional circuit Boards that can be inserted into slots on a main circuit board, such as a motherboard or a baseboard. They are

commonly used to add extra functionality or features to a system, such as audio, video, networking, or additional ports. These cards typically connect to the main board via connectors or slots, allowing for easy expansion or customization of a system's capabilities.



## 5. Bus Slots

Bus slots, in the context of computer hardware, are physical or logical connectors on a motherboard where expansion cards can be inserted. These slots allow for the connection of various peripheral devices to the computer's motherboard, expanding its capabilities. Common types of bus slots include Peripheral Component Interconnect (PCI), PCI Express (PCIe), Accelerated Graphics Port (AGP), and Industry Standard Architecture (ISA) slots. Each type of slot has specific characteristics and is designed to accommodate different types of expansion cards, such as graphics cards, sound cards, network adapters, and storage controllers.

Below is a listing of expansion slots commonly found in a computer and the devices associated with those slots

**PCI (Peripheral Component Interconnect):** A standard expansion slot for connecting various hardware devices like sound cards, network cards, and storage controllers to the motherboard.

**PCIe (Peripheral Component Interconnect Express):** A high-speed expansion slot that replaced PCI. It offers faster data transfer rates and is commonly used for graphics cards, SSDs, and other high-performance peripherals.

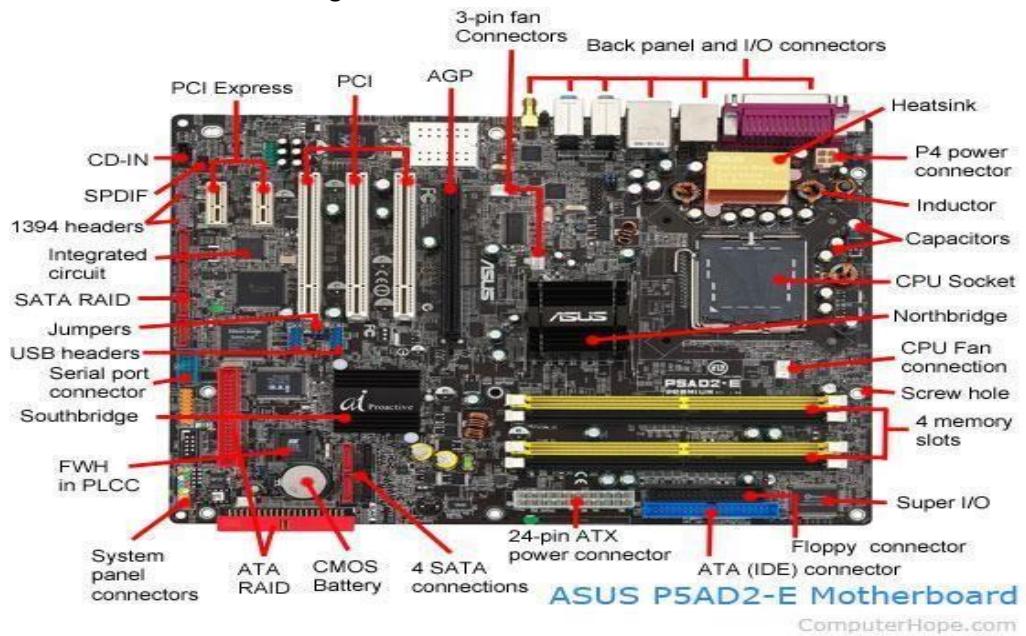
**AGP (Accelerated Graphics Port):** An older expansion slot primarily used for connecting graphics cards to the motherboard. It has been largely replaced by PCIe.

**ISA (Industry Standard Architecture):** A legacy expansion slot used in older computers for connecting peripherals like sound cards and network cards. It's largely obsolete now.

**VESA Local Bus (VLB):** Another legacy expansion slot primarily used for graphics cards in early 486 and Pentium computers. It's obsolete.

**AMR (Audio/Modem Riser):** An expansion slot used for integrating audio and modem functions into motherboards. It's less common now.

**CNR (Communications and Networking Riser):** Similar to AMR, CNR was used for integrating communication and networking functions into motherboards. It's less common now.



## 6.SMPS :

SMPS stands for Switched-Mode Power Supply. It is an electronic power supply that uses a switching regulator to convert electrical power efficiently. It is also known as Switching Mode Power Supply. It is power supply unit (PSU) generally used in computers to convert the voltage into the computer acceptable range.

This device has the power handling electronic components that converts electrical power efficiently. Switched Mode Power Supply uses a great power conversion technique to reduce overall power loss.



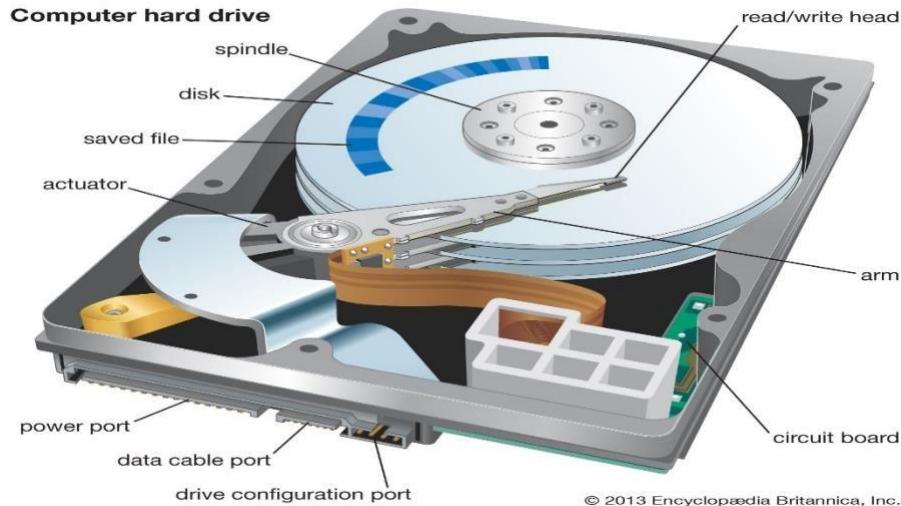
## 7.internal Storage Devices :

Internal storage devices in a computer refer to the components used to store data and programs permanently within the system. These devices include hard disk drives (HDDs), solid-state drives (SSDs), and in some cases, newer technologies like NVMe drives. They differ in terms of speed, capacity, and cost, offering various options for users based on their needs and preferences.

### HDD (HARD DISK DRIVE):

A computer hard disk drive (HDD) is a non-volatile data storage device. Non-volatile refers to storage devices that maintain stored data when turned off. All computers need a storage device, and HDDs are just one example of a type of storage device.

HDDs are usually installed inside desktop computers, mobile devices, consumer electronics and enterprise storage arrays in data centers. They can store operating systems, software programs and other files using magnetic disks.



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### **SSD(SOLID STATE DRIVE) :**

SSDs store data permanently inside an integrated circuit, typically using flash memory. The flash memory inside an SSD means data is written, transferred, and erased electronically and silently — SSDs don't have the moving parts found inside mechanical hard-disk drives (HDDs). Without moving parts, SSDs are fast and quiet, but they have a high price tag compared to HDDs.



### **8. Interfacing Ports :**

Interfacing ports in a computer are physical connectors on the motherboard or external devices that allow communication between the computer and external peripherals. These ports facilitate the transfer of data, power, and signals between the computer and various devices.

# Ports



Some common computer interfacing ports:

1. **USB (Universal Serial Bus) port:** A standard interface used for connecting peripherals like keyboards, mice, printers, and external storage devices to a computer.
2. **HDMI (High Definition Multimedia Interface) port:** A digital interface used for transmitting high-definition audio and video signals between devices like computers, TVs, and monitors.
3. **Ethernet port:** A networking port used for connecting a computer to a local area network (LAN) or the internet using an Ethernet cable.

4. Audio jack: A port used for connecting audio devices such as headphones, speakers, or microphones to a computer for audio input or output.
5. DisplayPort: A digital display interface used for connecting a computer to a monitor, providing high-quality video and audio transmission.
6. Thunderbolt port: A high-speed interface used for connecting peripherals like external storage devices, monitors, and docking stations to a computer, supporting data transfer, video output, and power delivery.
7. Serial port: An older type of port used for serial communication between a computer and peripherals, often used for connecting legacy devices like serial printers or barcode scanners.

## **DESKTOP:**

The desktop is a basic element of a personal computer that represents different types of objects, including project folders, reference sources, drawing tools, documents, writing tools, phone books, telephones. It is the primary user interface of a computer that might be found on top of a physical desk. The desktop display is that the default display and displayed once the startup process is complete at the time of booting the system. The icons of files and folders that you store to the desktop are displayed on the desktop, as well as the desktop wallpaper. In Windows operating system, it includes a taskbar located at the base of the display screen. In Mac OS X, at the top of the screen, it contains the Dock at the bottom and a menu bar. Both Windows and Macintosh computers have a desktop, but it will be visible if the display screen is not filling up by the application or file and folder icons.



## **SERVER OPERATING SYSTEM**

It is an operating system designed for usage on servers. It is utilized to give services To a large number of clients. It is a very advanced operating system that can serve Several clients simultaneously. It is a more advanced operating system with features And capabilities needed in a client-server architecture or comparable enterprise Computing environment.

**DATA SERVER:** A data server is a software program/platform used to provide Database services like storing, processing and securing data.

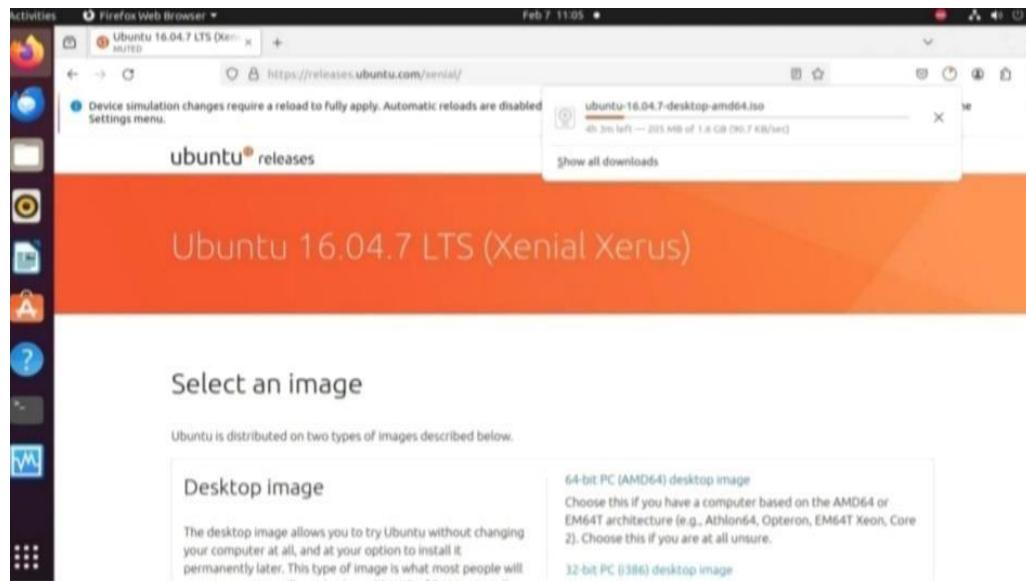
**They are mainly three types:**

- **File Server:** A file server is a computer responsible for the storage and Management of data files so that other computers on the same network can Access the files. It enables users to share information over a network without Having to physically transfer files.
- **Mail Server:** A mail server is a central computer that stores electronic mails for Clients over the network. It is much like the post office that obtains emails sent To the users and stores them until it is not requested by the user. It uses Standard email protocols, like simple mail transfer protocol ( SMTP) to send and Receive an email.
- **Web Server:** A web server offers web pages or other contents to the web Browser by loading the information from a disc and transfer files by using a Network to the user's web browser. It's used by a computer or a collection of Computers to provide content to several users over the internet. This exchange Was done with the help of HTTP communicating between the browser and Server.

## INSTALLING UBUNTU ON VIRTUAL BOX

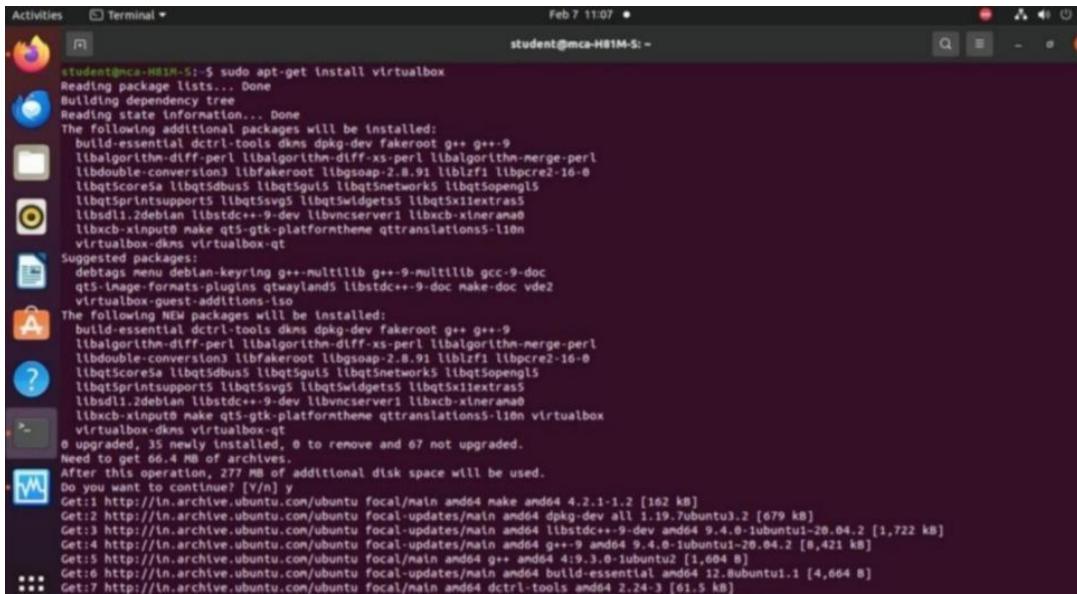
Virtual box by Oracle is a powerful virtualization software that allows users to run Multiple operating system on one physical computer. VirtualBox is an open-source Software for virtualizing the x86 computing architecture. It acts as a hypervisor creating A VM (Virtual machine) where the user can run another OS (operating system).The system where the VirtualBox runs is called the “host” OS. The operating system Running in the VM is called the “guest” OS. VirtualBox supports windows, Linux and Mac OS as it’s host OS

Before we begin with installation process, we need to download ISO for Ubuntu



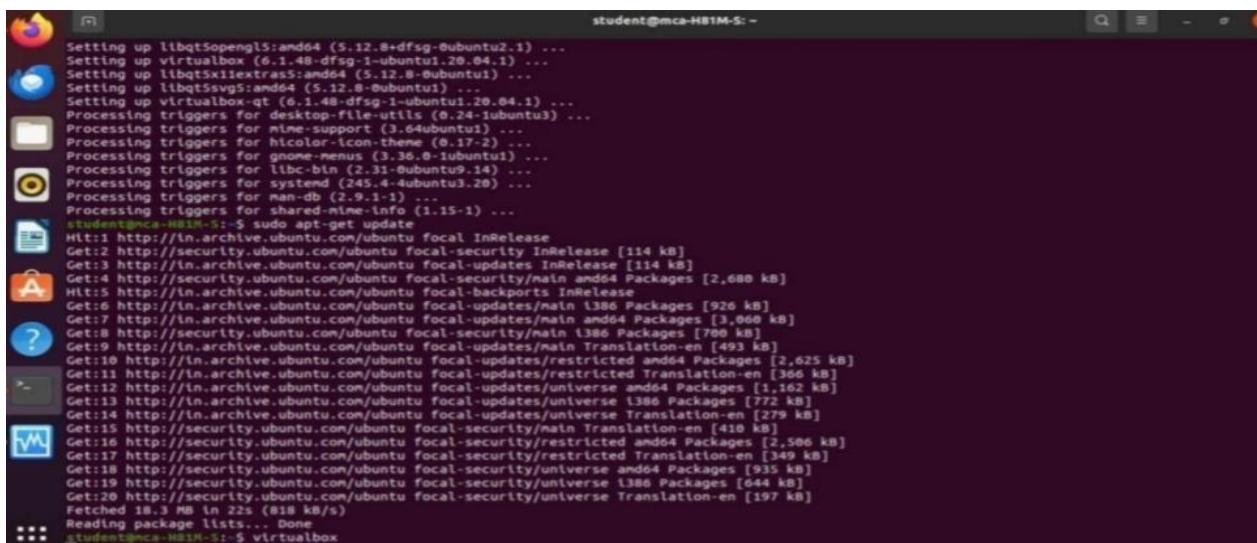
## VIRTUAL BOX INSTALLATION :

Sudo apt -get install virtualbox



```
student@mca-H81M-S:~$ sudo apt-get install virtualbox
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  build-essential dkms dpkg-dev fakeroot g++ g++-9
  libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl
  libdouble-conversion3 libfakeroot libgsoap-2.8.9i liblzf1 libpcre2-16-0
  libqt5core5a libqt5dbus libqt5gui5 libqt5networks libqt5opengl5
  libqt5printsupport5 libqt5svg5 libqt5widgets5 libqt5x11extras5
  libsd1.2debian libstdc++-9-dev libvncserver1 libxcb-xinerama0
  libxcb-xinput0 make qt5-gtk-platformtheme qttranslations5-l10n
  virtualbox-dkms virtualbox-guest
Suggested packages:
  debtags menu debian-keyring g++-multilib gcc-9-doc
  qt5-image-formats-plugins qtwayland libstdc++-9-doc make-doc vde2
  virtualbox-guest-additions-isos
The following NEW packages will be installed:
  build-essential dkms dpkg-dev fakeroot g++ g++-9
  libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl
  libdouble-conversion3 libfakeroot libgsoap-2.8.9i liblzf1 libpcre2-16-0
  libqt5core5a libqt5dbus libqt5gui5 libqt5networks libqt5opengl5
  libqt5printsupport5 libqt5svg5 libqt5widgets5 libqt5x11extras5
  libsd1.2debian libstdc++-9-dev libvncserver1 libxcb-xinerama0
  libxcb-xinput0 make qt5-gtk-platformtheme qttranslations5-l10n virtualbox
virtualbox-dkms virtualbox-guest
0 upgraded, 35 newly installed, 0 to remove and 67 not upgraded.
Need to get 66.4 MB of archives.
After this operation, 277 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 make amd64 4.2.1-1.2 [162 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 dpkg-dev all 1.19.7ubuntu3.2 [679 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 libstdc++-9-dev amd64 9.4.0-1ubuntu1-20.04.2 [1,722 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 g++-9 amd64 9.4.0-1ubuntu1-20.04.2 [8,421 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal/main amd64 g++ amd64 9.3.0-1ubuntu2 [1,084 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 build-essential amd64 12.8ubuntu1.1 [4,664 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal/main amd64 dctrl-tools amd64 2.2.4-3 [61.5 kB]
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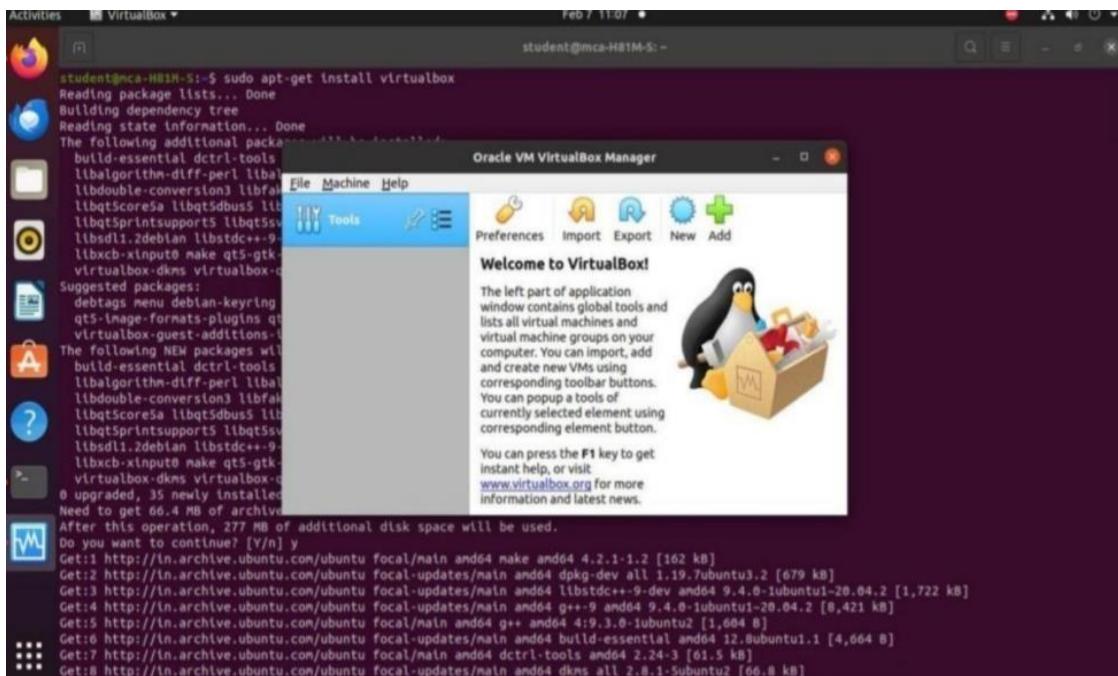
Sudo apt -get update

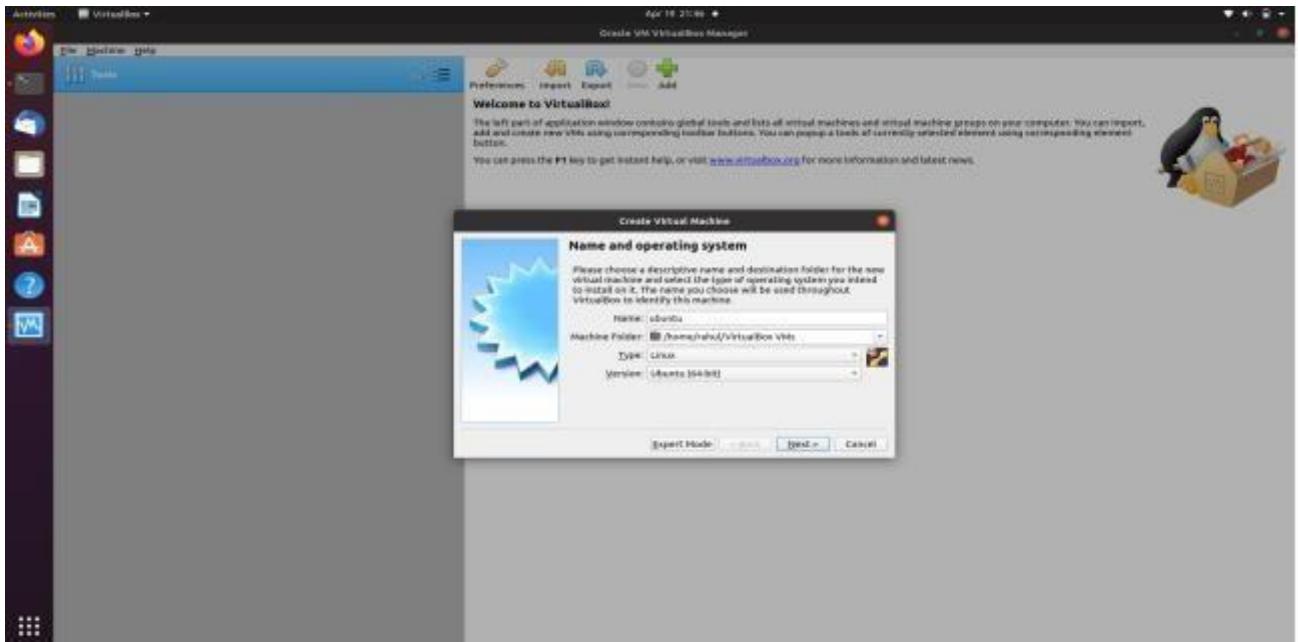


```
student@mca-H81M-S:~$ sudo apt-get update
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Hit:4 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2,688 kB]
Hit:5 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [700 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [926 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [3,060 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [700 kB]
Get:9 http://in.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [493 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [2,625 kB]
Get:11 http://in.archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [366 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1,162 kB]
Get:13 http://in.archive.ubuntu.com/ubuntu focal-updates/universe i386 Packages [772 kB]
Get:14 http://in.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [279 kB]
Get:15 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [410 kB]
Get:16 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [2,566 kB]
Get:17 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [349 kB]
Get:18 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [935 kB]
Get:19 http://security.ubuntu.com/ubuntu focal-security/universe i386 Packages [644 kB]
Get:20 http://security.ubuntu.com/ubuntu focal-security/universe Translation-en [197 kB]
Fetched 18.3 MB in 22s (818 kB/s)
Reading package lists... Done
student@mca-H81M-S:~$ virtualbox
```

Create virtual machine by just clicking on this new Click -> new

We can install Ubuntu so type Ubuntu and choose the type.





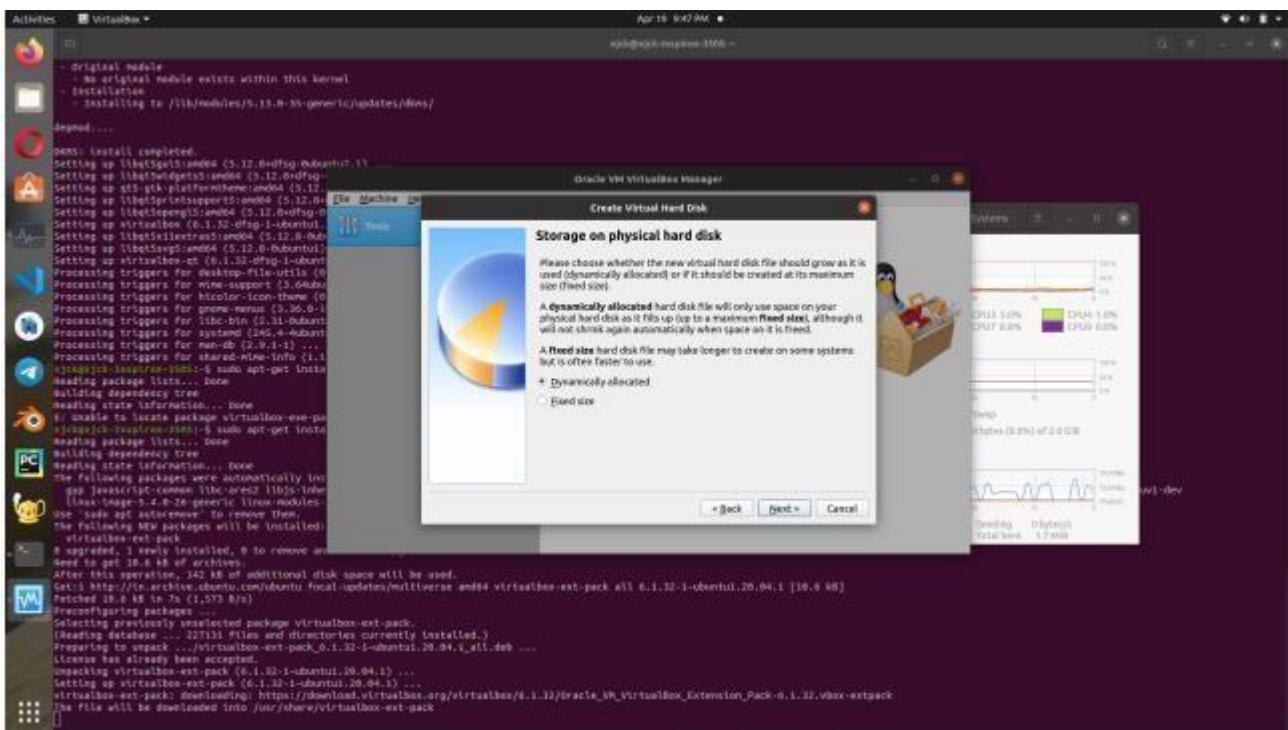
Click Next



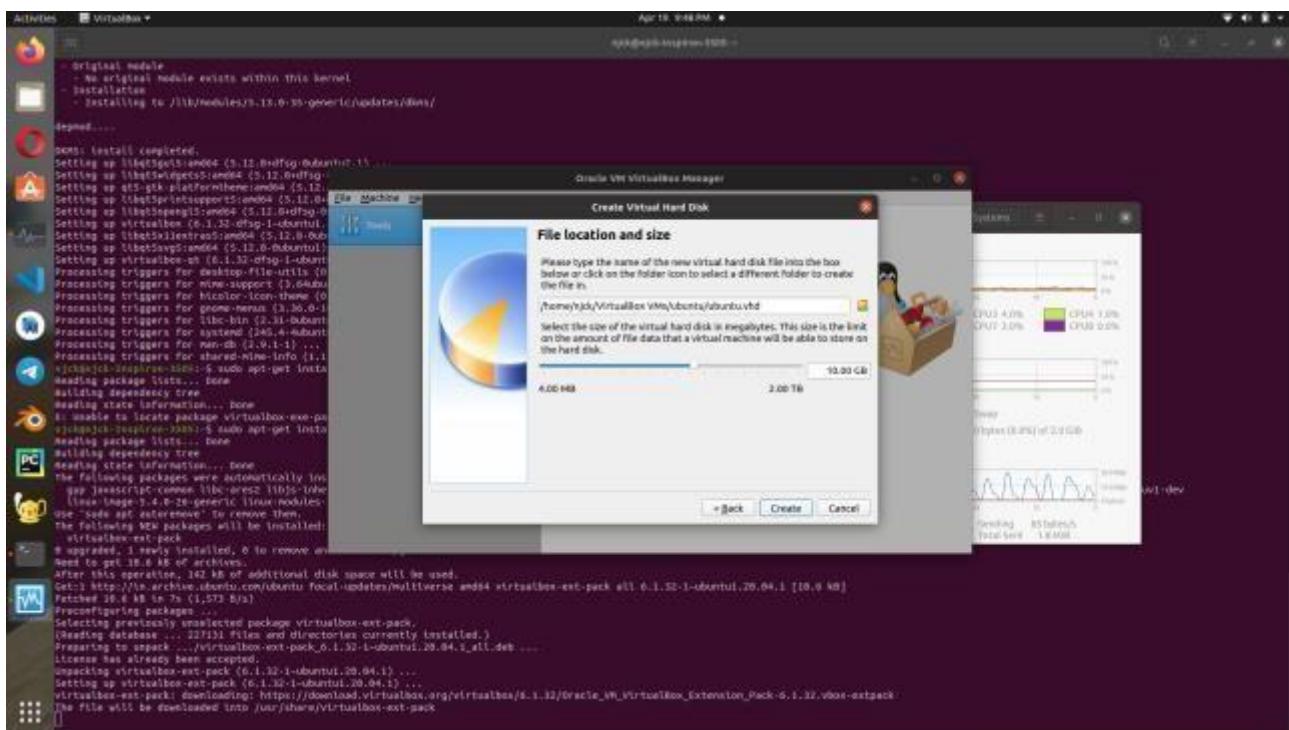
Click next



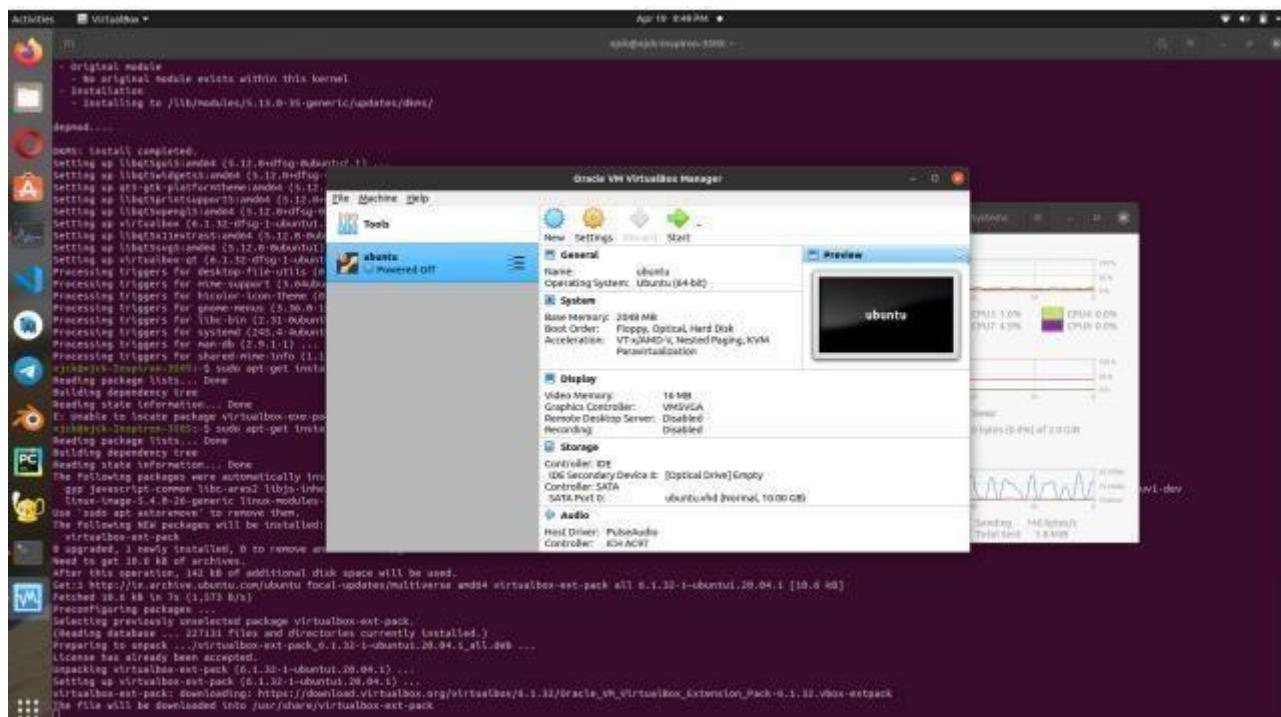
Select the Virtual hard disk  
Click-> Next

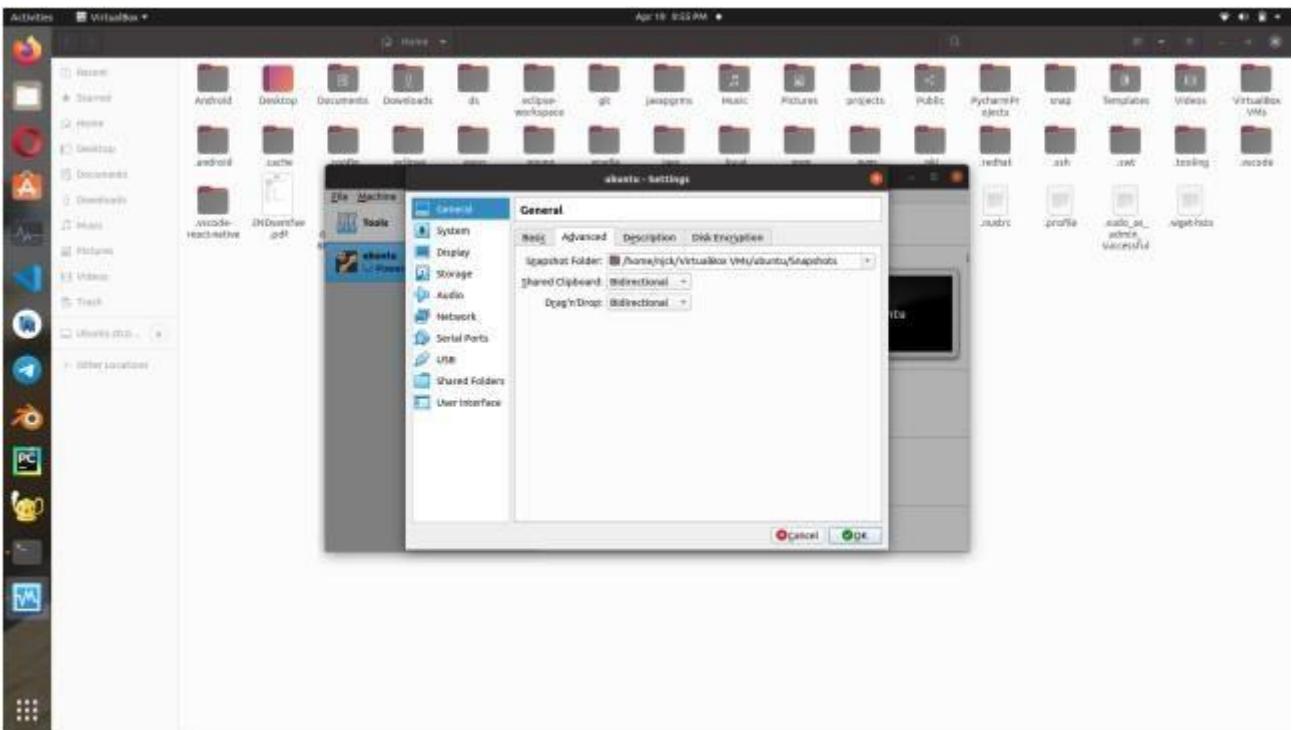


Select Dynamically allocated memory.  
Click->Next



Select size of the virtualbox  
Click->create

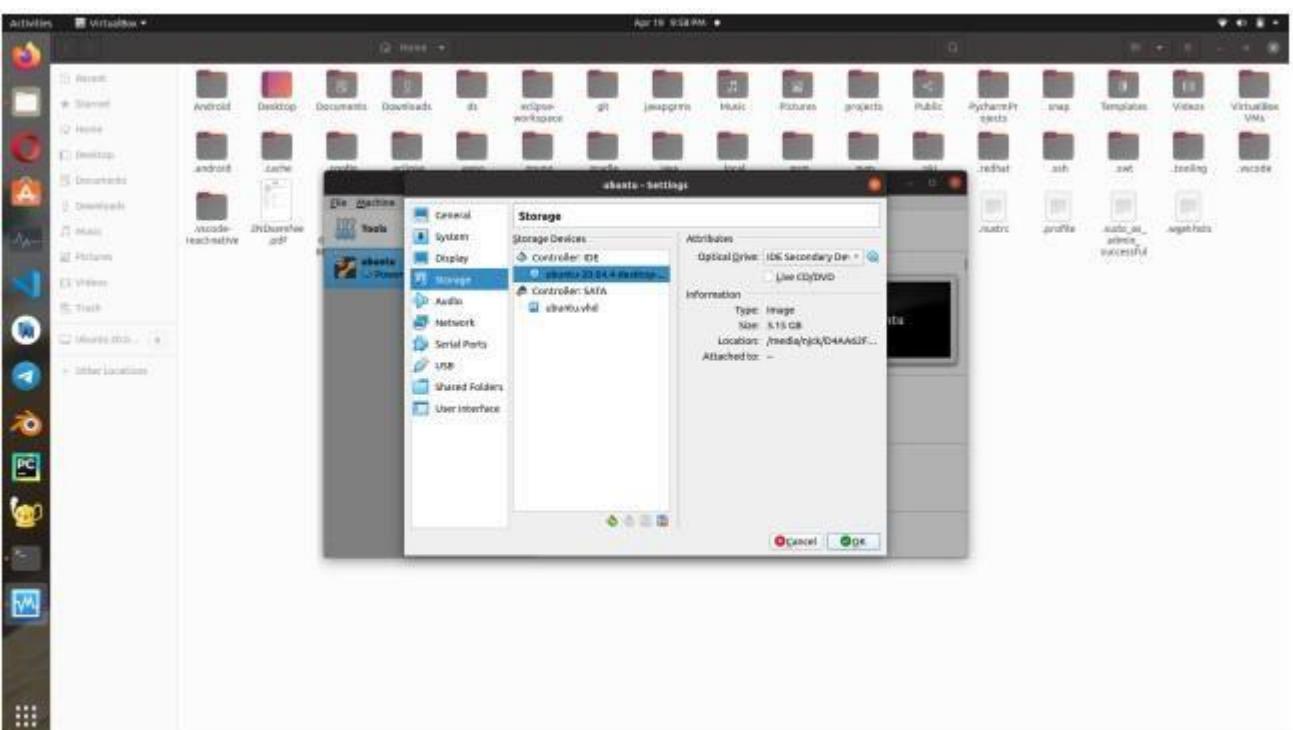




Settings -> General-> Advanced

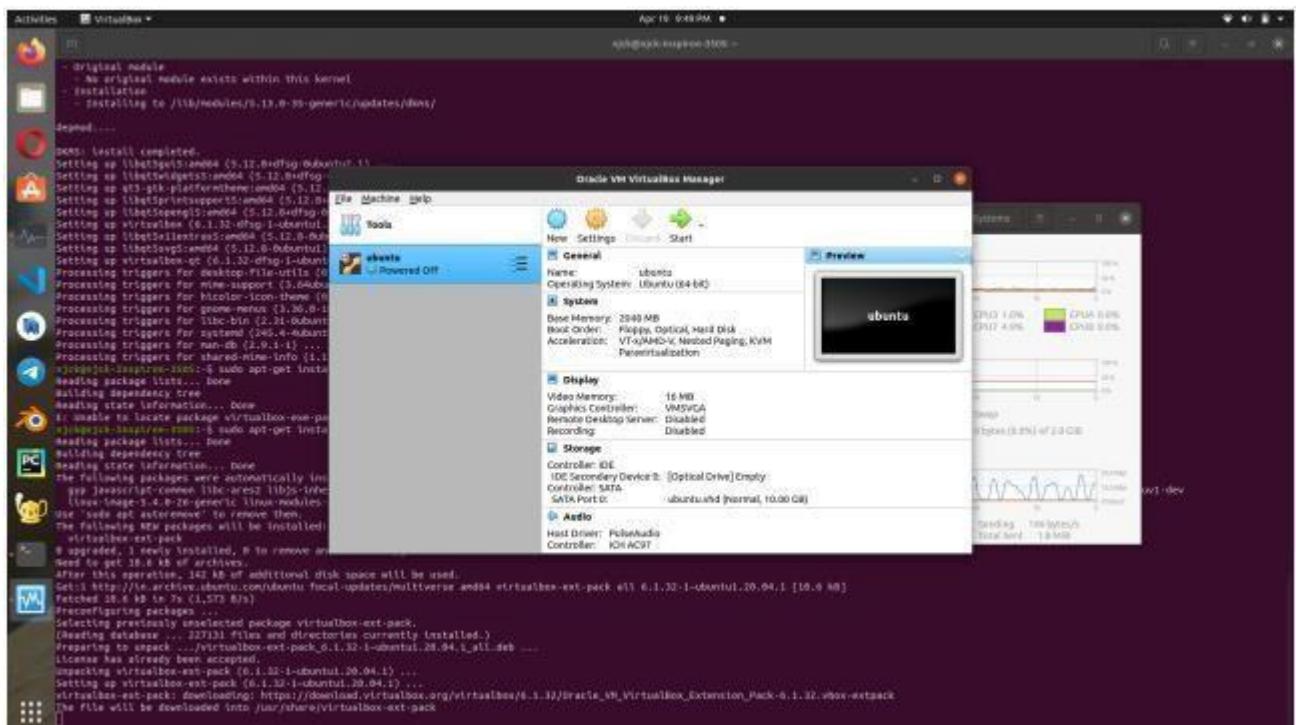
Set Shared clipboard and Drag 'n' Drop as Bidirectional. Click -> ok

Download Ubuntu from <https://ubuntu.com/download/desktop/> this site.

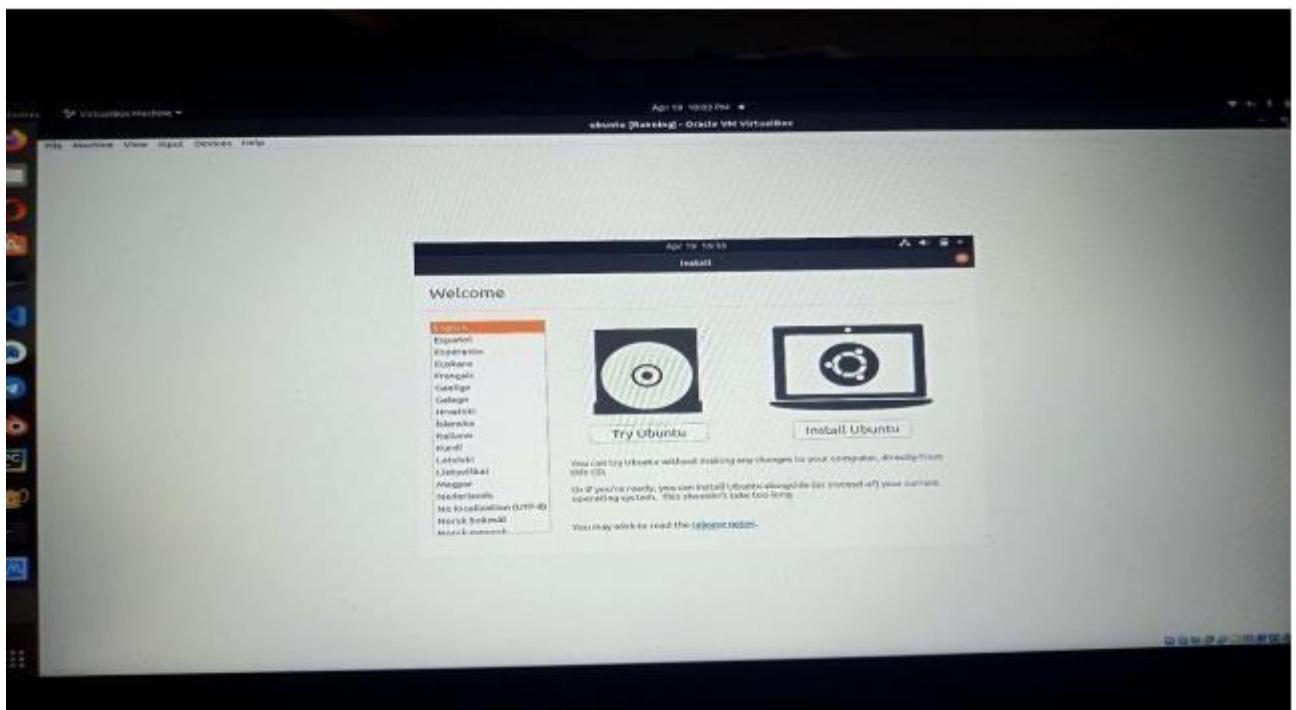


Settings->Storage->Attributes->optical Drive select downloaded ubuntu iso file.

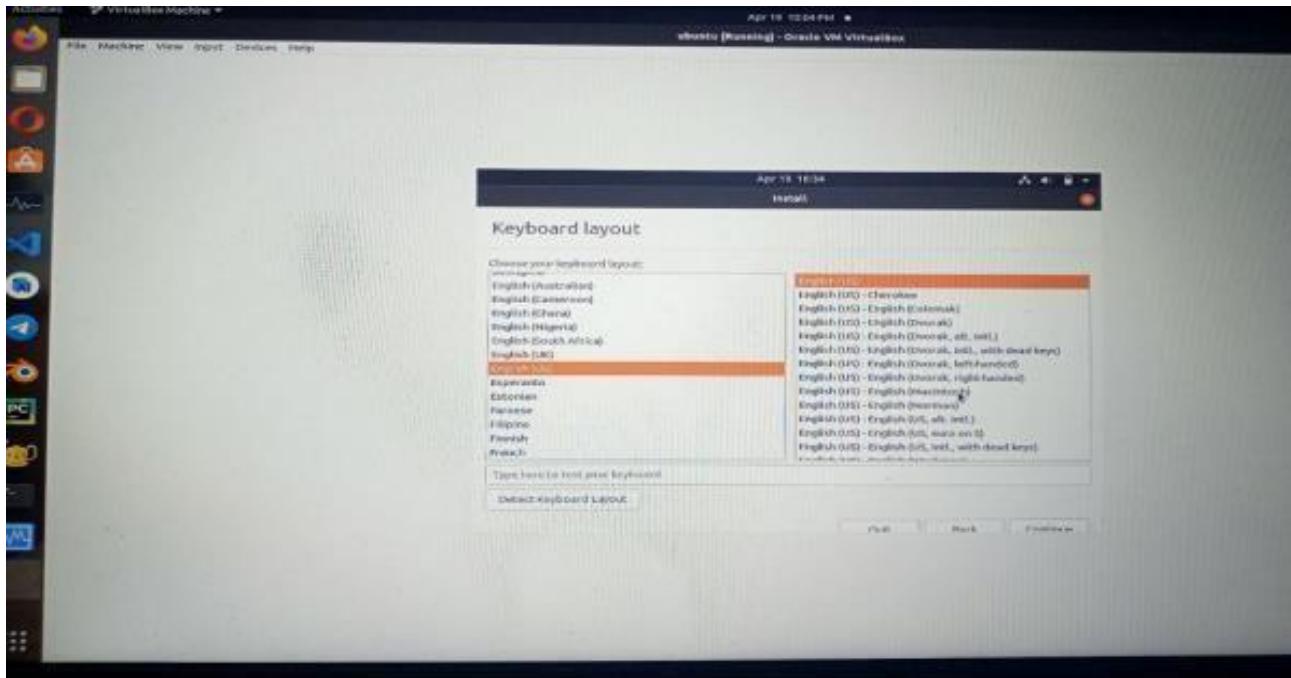
Click -> ok



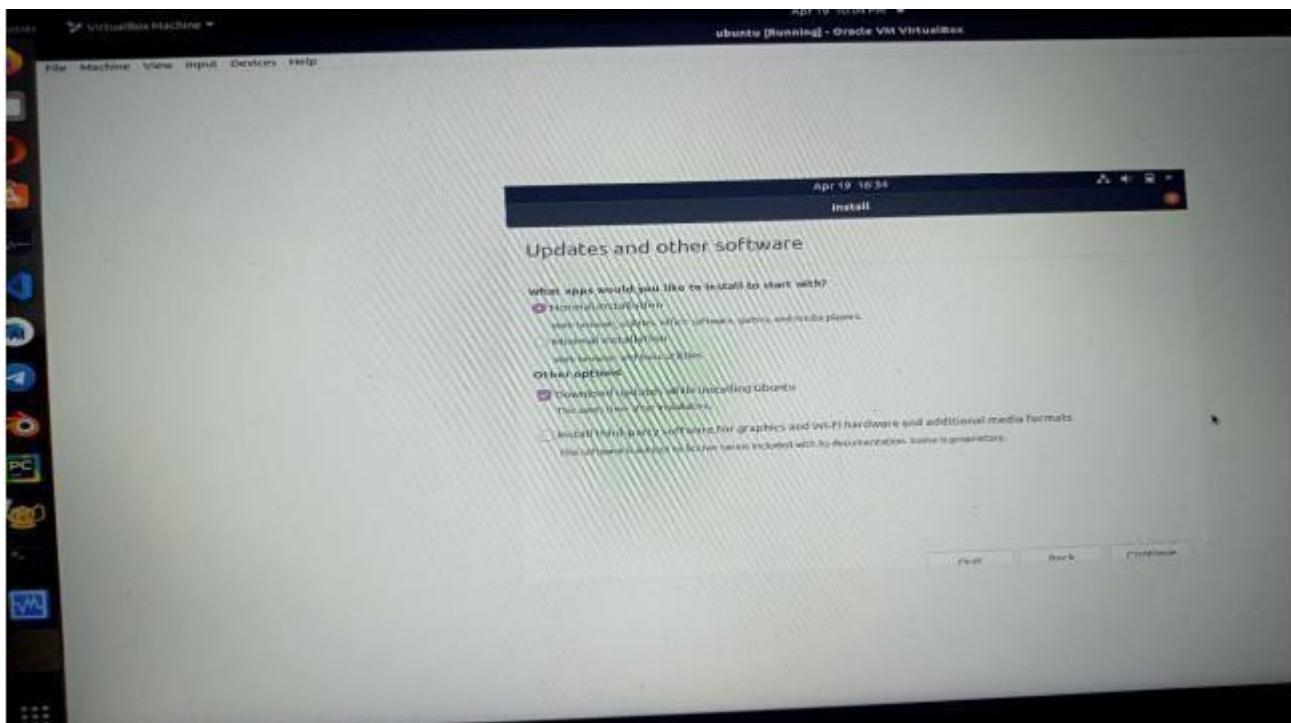
Click-> Start



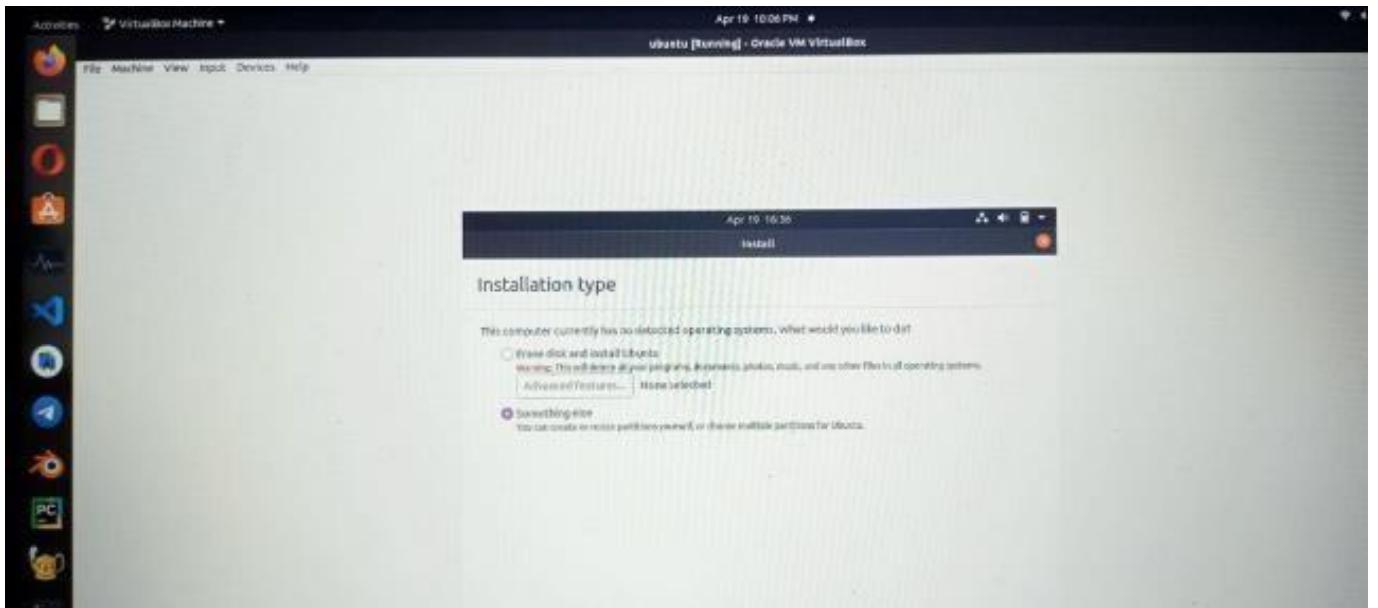
Click Install Ubuntu



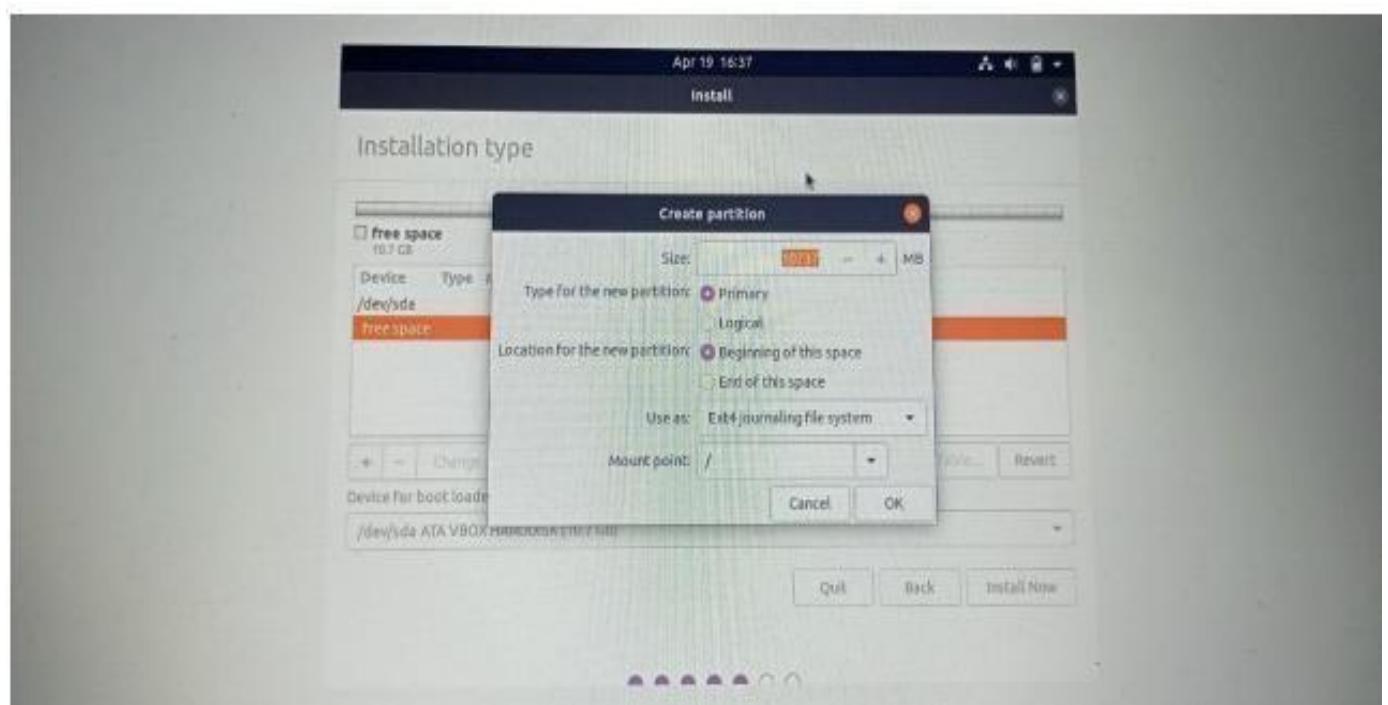
Click -> Continue



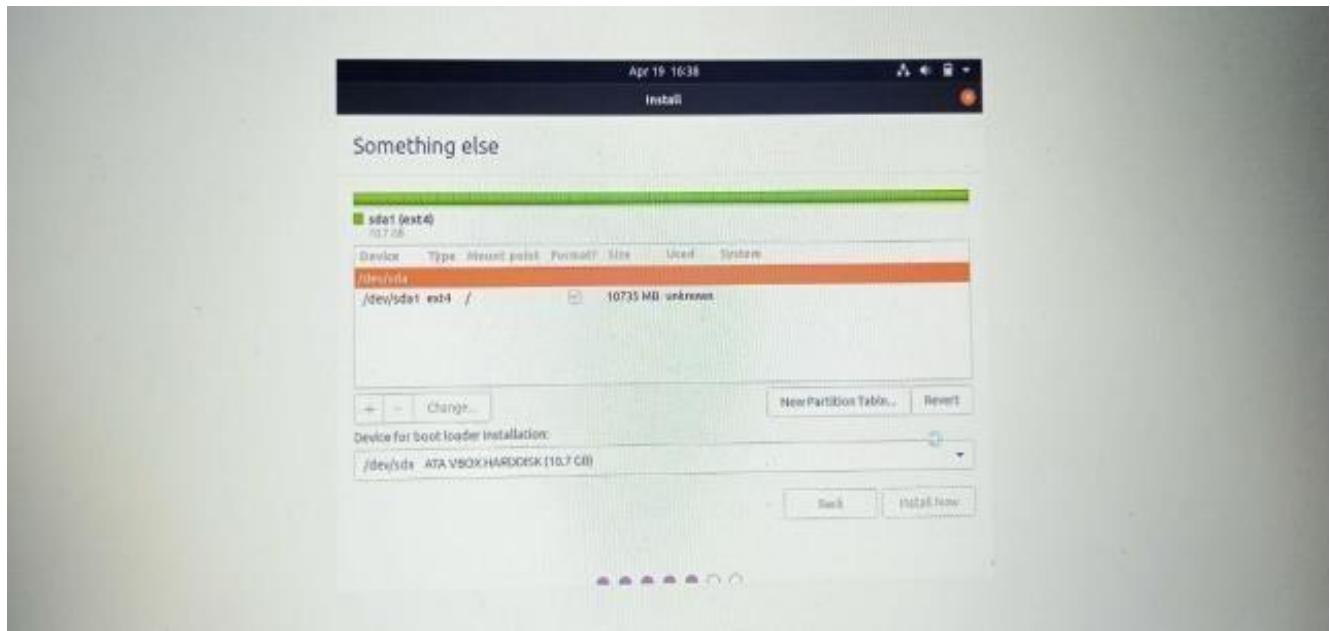
Select Normal installation and Download updates while installing ubuntu. Click->continue



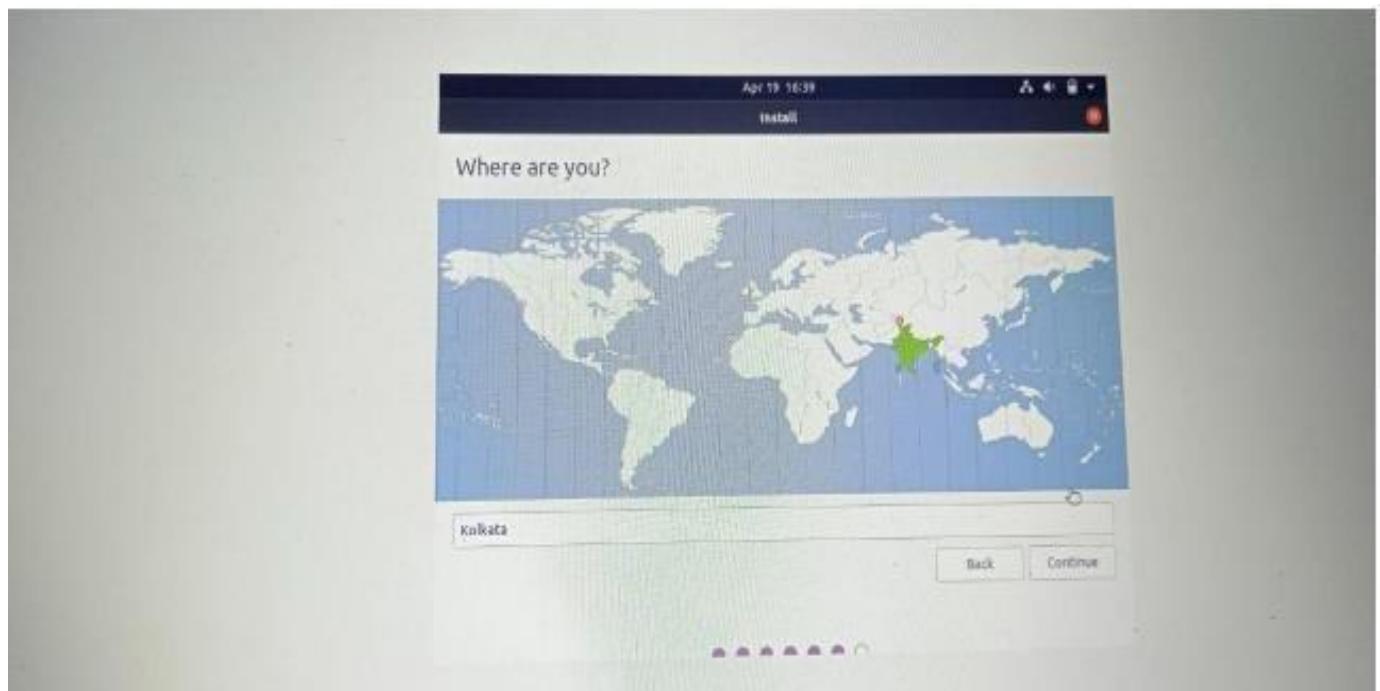
Select installation type something else.  
Click->continue



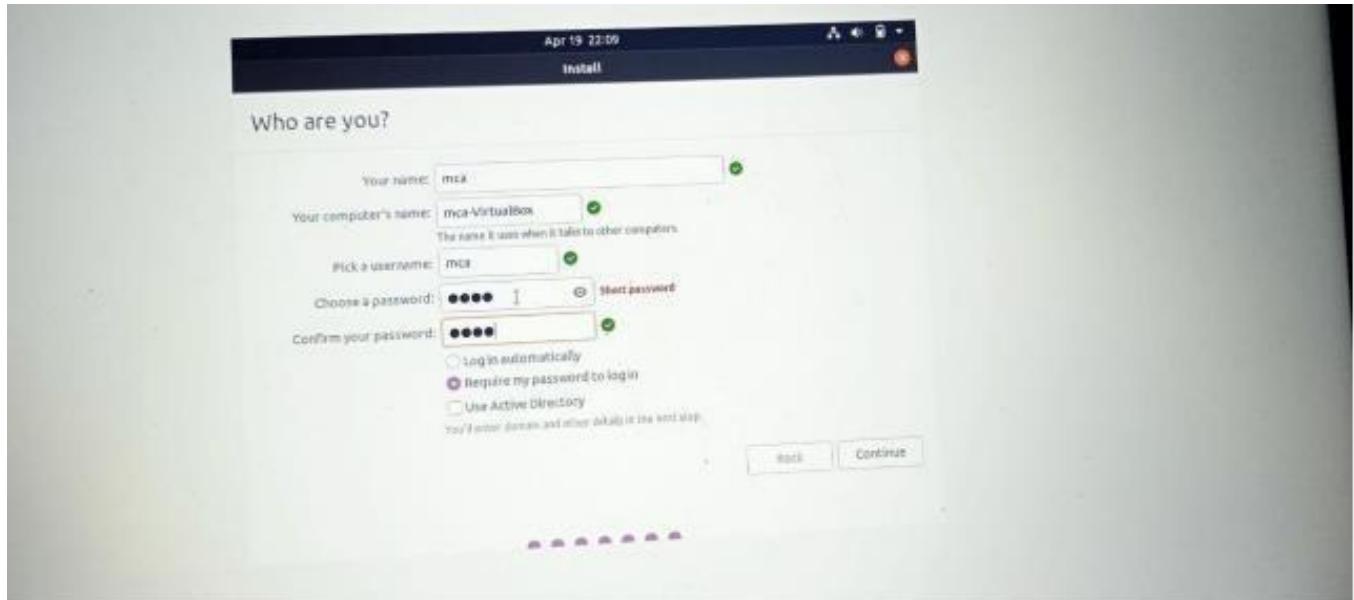
Select disk then create partition and set mount point as '/' click -> ok



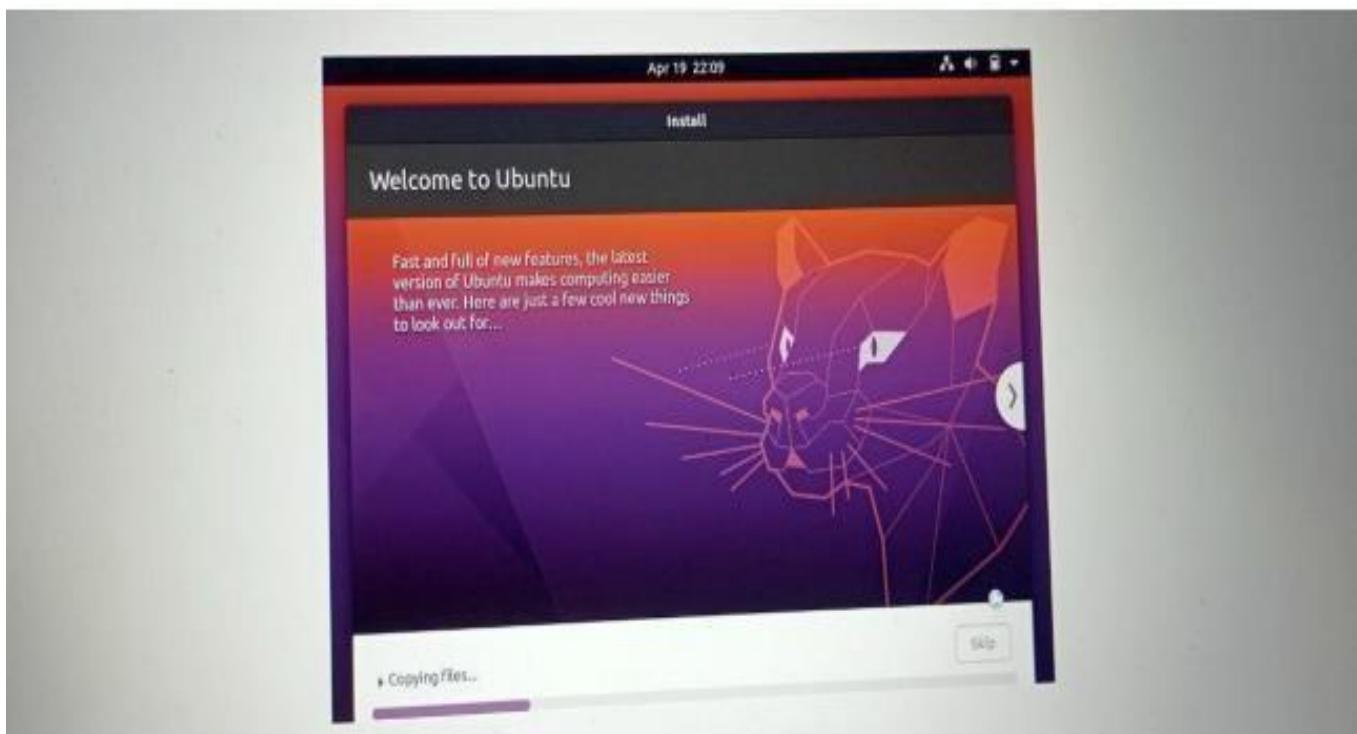
click -> install now

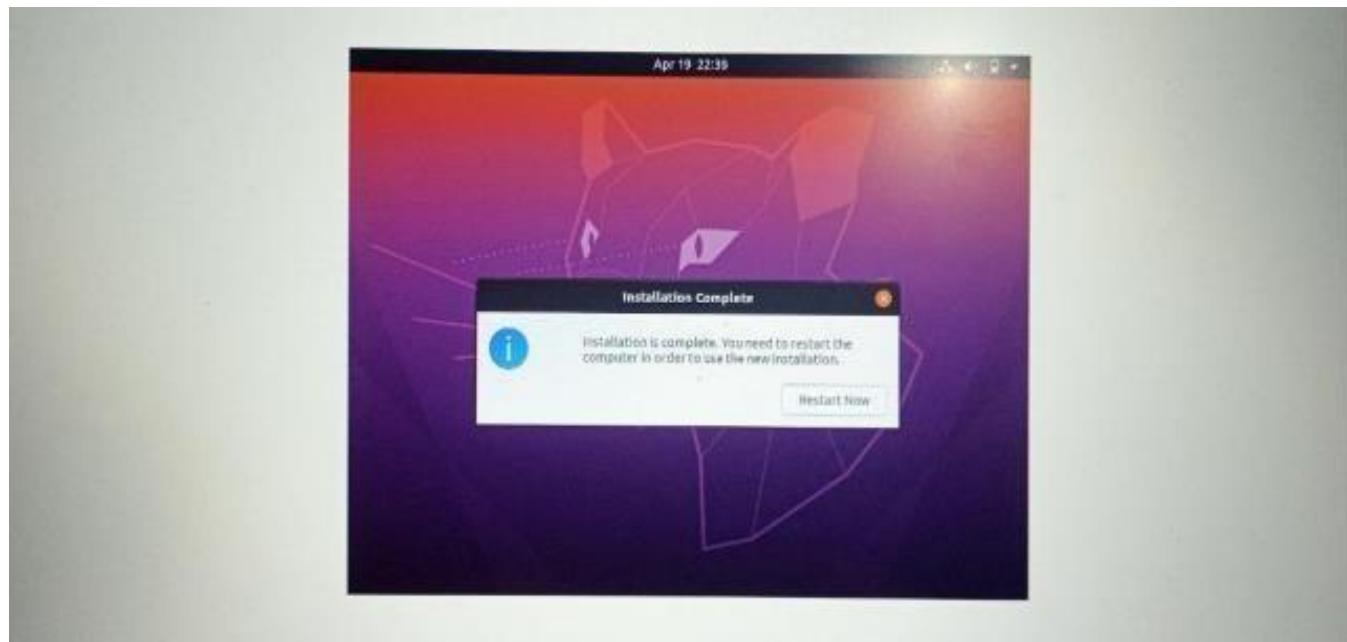


click -> continue



Set Your name and Password  
click -> continue





Click -> Restart Now



## **EXPERIMENT 2**

**Aim:** Study of a terminal based text editor such as Vim or 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, 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 -al:** Will list the file and directory with detailed information like the permission size,owner...etc.

A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for Dash, Home, Applications, Documents, and Help. The main area shows a terminal window titled "Terminal" with the command "ls" run in the home directory (~). The output lists various directories and files including Desktop, Downloads, ihsan, java, MOK.der, Music, Public, Pictures, PycharmProjects, Rasha, Templates, Videos, snap, test.txt, 'VirtualBox VMs', and vvk.sh.

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

A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for Dash, Home, Applications, Documents, and Help. The main area shows a terminal window titled "Terminal" with the command "ls -l" run in the directory ~/akshay. The output shows a total of 16 files and directories, including hello1.txt, hi.txt, and mca.

```
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$
```

## man:

Show the manual for a given command.

Eg: man ls

```
sssit@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 -cftuvSUX nor --sort is specified.

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

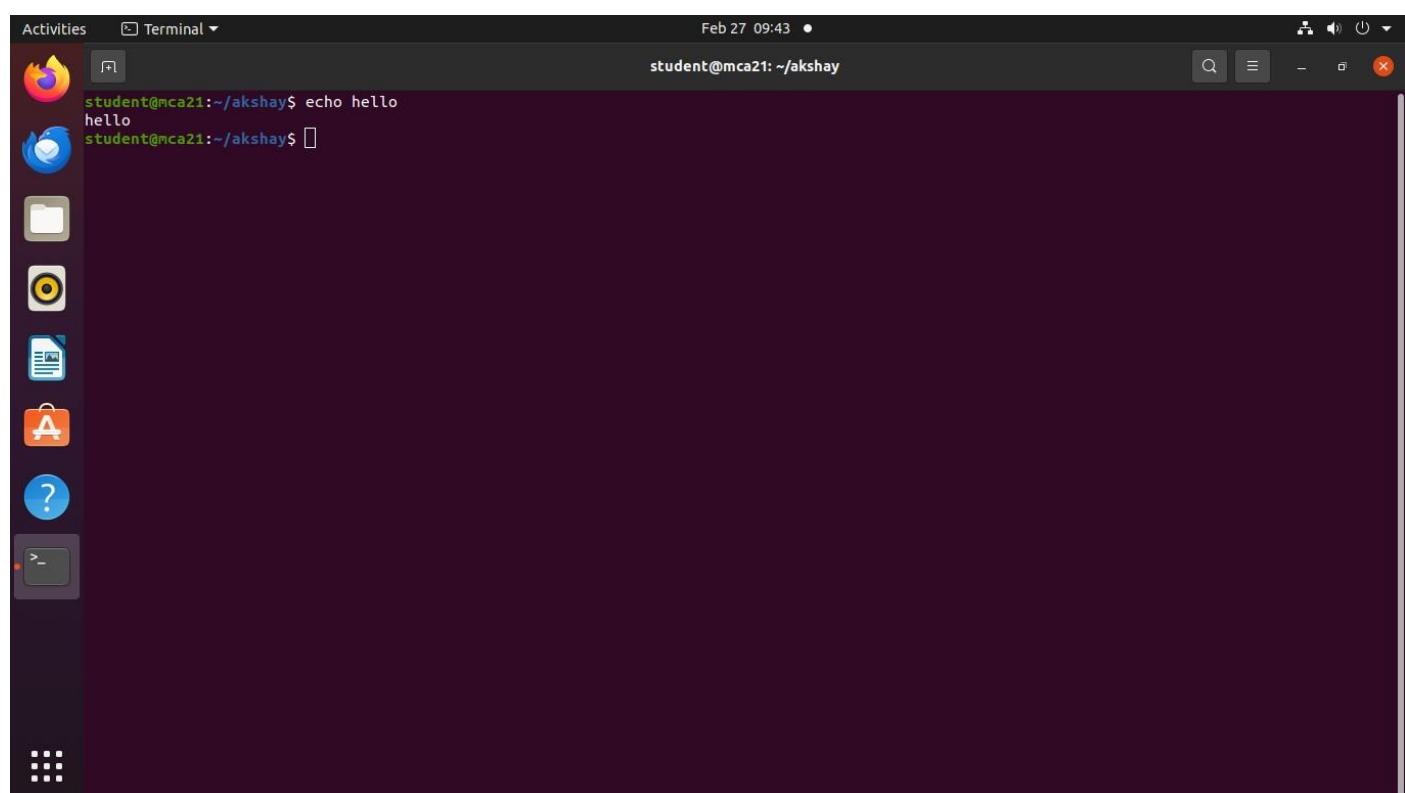
-a, --all
      do not ignore entries starting with .

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

--author
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.

A screenshot of an Ubuntu desktop environment. On the left, there's a vertical dock with icons for Dash, Home, File Explorer, Terminal, Dash Home, Help, and a terminal window icon. The main area shows a terminal window titled "Terminal". The terminal window has a dark background and displays the following text:

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

The terminal window title bar also shows the user "student@mca21" and the path "~/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 one screen 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
nhgnhgnhnmmmmmmmmmmndgfhbfgbgf
fbgbg
gbgfdbngfngnhnmhj
gfdgfffffffffffff
fdggfgkfovklf
dcdcvdokd
deedhfugduhjd
dcjkdhnvckkkkkkkkkf
fdfdhhhhhhhjh
vckjnnnnnnnnn
safdhksjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
dhvvvvvvvvvvvvvvvvvvcv
dsssssssjcncdd
ccccccccccccccccccx
```

## Less :

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

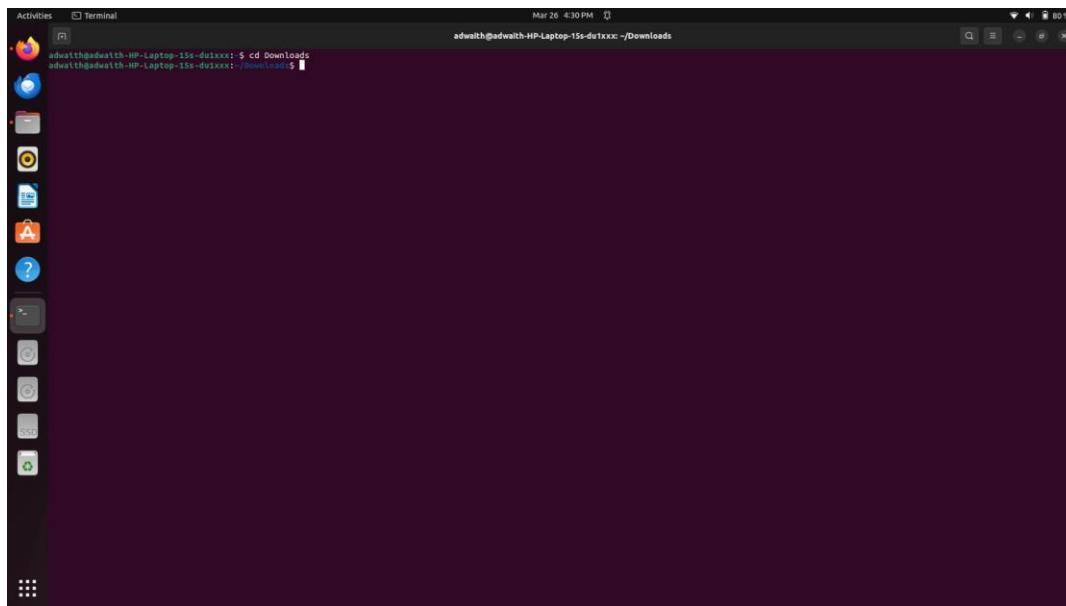
```
mca@mca-HE1M-S: ~
  a dash, precede the filelist with "--".
  .
  -t [tag] The file to edit is read from stdin. Commands are read from stderr, which should be a tty.
  .
  -q [errorfile]
    Start in quickFix mode. The file [errorfile] is read and the first error is displayed. If [errorfile] is omitted, the
    filename is obtained from the 'errorfile' option (defaults to "Artecc.Err" for the Amiga, "errors.err" on other sys-
    tems). Further errors can be jumped to with the ':cm' command. See ":help quickfix".
  .
  VIM behaves differently, depending on the name of the command (the executable may still be the same file).
  vim      The "normal" way, everything is default.
  ex      Start in Ex mode. Go to Normal mode with the ':vi' command. Can also be done with the '-e' argument.
  view     Start in read-only mode. You will be protected from writing the files. Can also be done with the '-R' argument.
  gvim gview   The GUI version. Starts a new window. Can also be done with the "-g" argument.
  evim evview  The GUI version in easy mode. Starts a new window. Can also be done with the "-y" argument.
  rvim rview rgvim rgview
    Like the above, but with restrictions. It will not be possible to start shell commands, or suspend VIM. Can also be done
    with the "-Z" argument.
  .
  OPTIONS
  The options may be given in any order, before or after filenames. Options without an argument can be combined after a single dash.
  +[num]   For the first file the cursor will be positioned on line "num". If "num" is missing, the cursor will be positioned on
          the last line.
  +/[pat]  For the first file the cursor will be positioned in the line with the first occurrence of [pat]. See ":help search-pat-
          tern" for the available search patterns.
  +(command)
  Manual page vim(1) line 41 (press h for help or q to quit)
```

**Cat :**

It is used to list the contents of a file on the standard output.

## **cd :**

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



A screenshot of a Linux desktop environment. On the left is a vertical dock with icons for various applications like a web browser, file manager, and terminal. In the center is a terminal window titled 'Terminal' with the command 'cd Downloads' entered and executed. The terminal shows the current directory as '/Downloads'. The desktop background is dark purple.

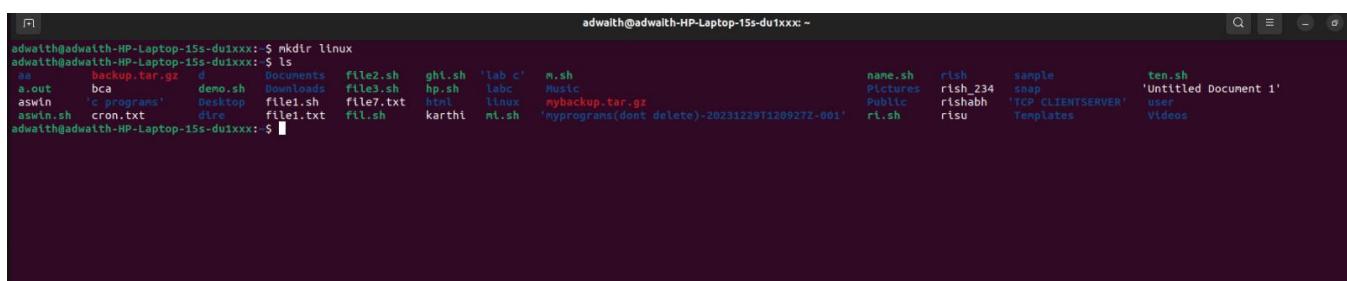
```
adwaith@adwaith-HP-Laptop-15s-duxxx: ~
```

```
adwaith@adwaith-HP-Laptop-15s-duxxx: $ cd Downloads
```

```
adwaith@adwaith-HP-Laptop-15s-duxxx: ~/Downloads$
```

## **mkdir :**

Create a new directory (folder).



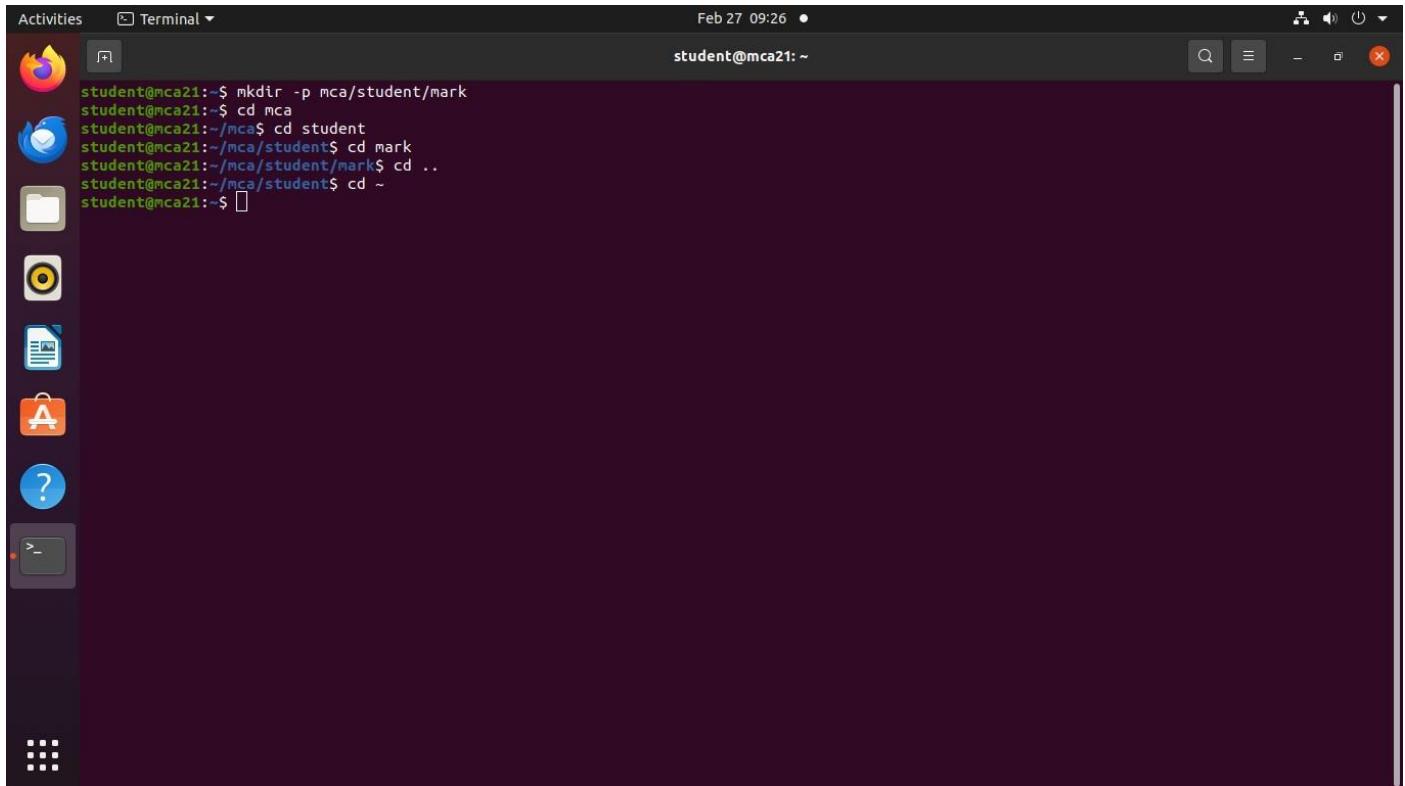
A screenshot of a Linux desktop environment. A terminal window is open with the command 'mkdir linux' entered and executed. The terminal shows the current directory as '~'. The desktop background is dark purple.

```
adwaith@adwaith-HP-Laptop-15s-duxxx: ~
```

```
adwaith@adwaith-HP-Laptop-15s-duxxx: $ mkdir linux
```

```
adwaith@adwaith-HP-Laptop-15s-duxxx: $ ls
```

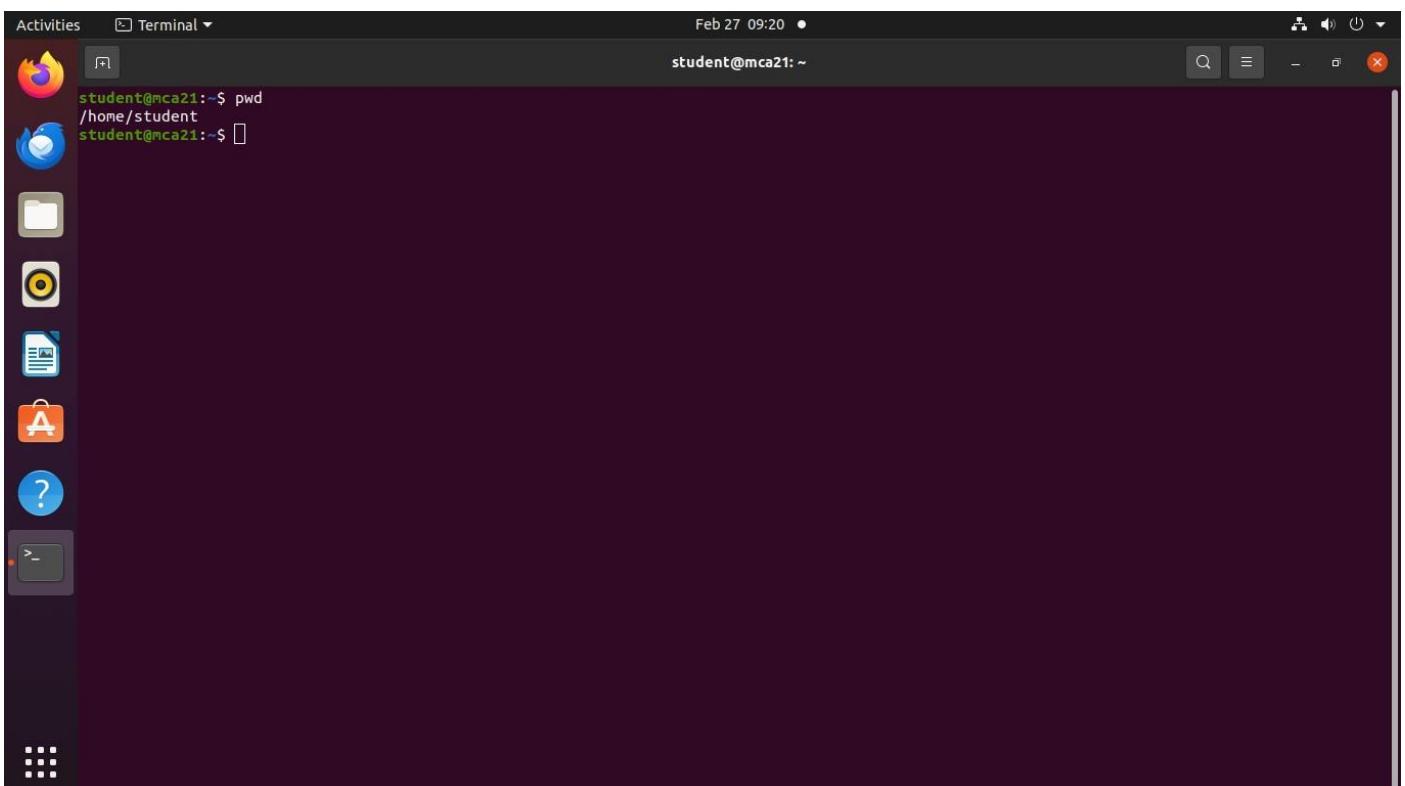
```
.   backup.tar.gz  Documents  file2.sh  ghi.sh  'lab c'  m.sh  name.sh  rish  sample  ten.sh
..  bca  deno.sh  Downloads  file3.sh  hp.sh  labc  Music  Pictures  rish.234  snap  'Untitled Document 1'
aswin  'programs'  Desktop  file1.sh  file7.txt  html  linux  mybackup.tar.gz  Public  rishabh  'TCP CLIENTSERVER'
aswin.sh  cron.txt  dire  file1.txt  fil.sh  karthi  ml.sh  'myprograms(dont delete)-20231229T120927Z-001'  ri.sh  risu  Templates  user
adwaith@adwaith-HP-Laptop-15s-duxxx: $
```

A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for the Dash, Home, Applications, and Help. The main area shows a terminal window titled "Terminal". The terminal window has a dark purple background and displays the following command-line session:

```
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 screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for the Dash, Home, Applications, and Help. The main area shows a terminal window titled "Terminal". The terminal window has a dark purple background and displays the following command-line session:

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

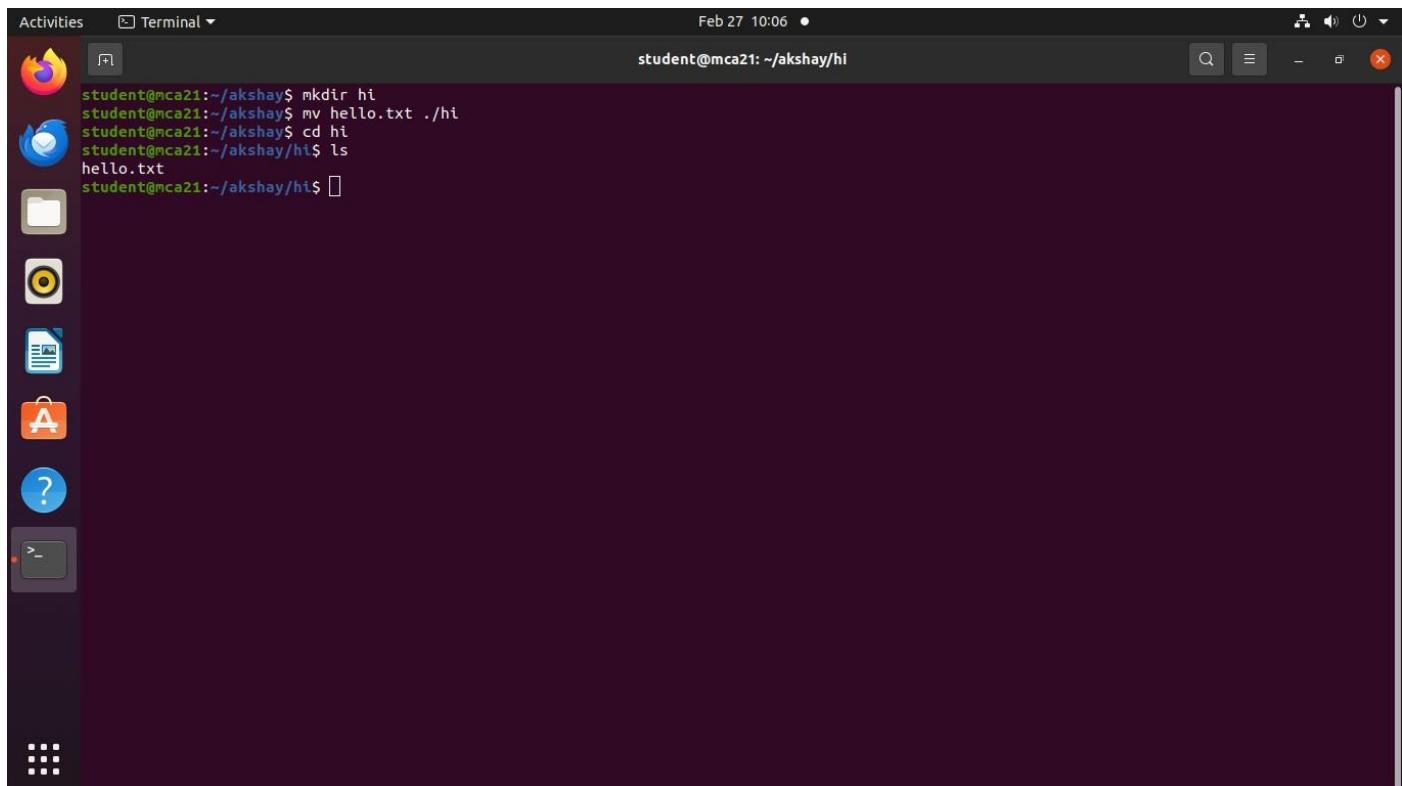
## **find :**

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-5:~$ find . -name text.txt;
./text.txt
./.local/share/Trash/files/text.txt
mca@mca-H81M-5:~$
```

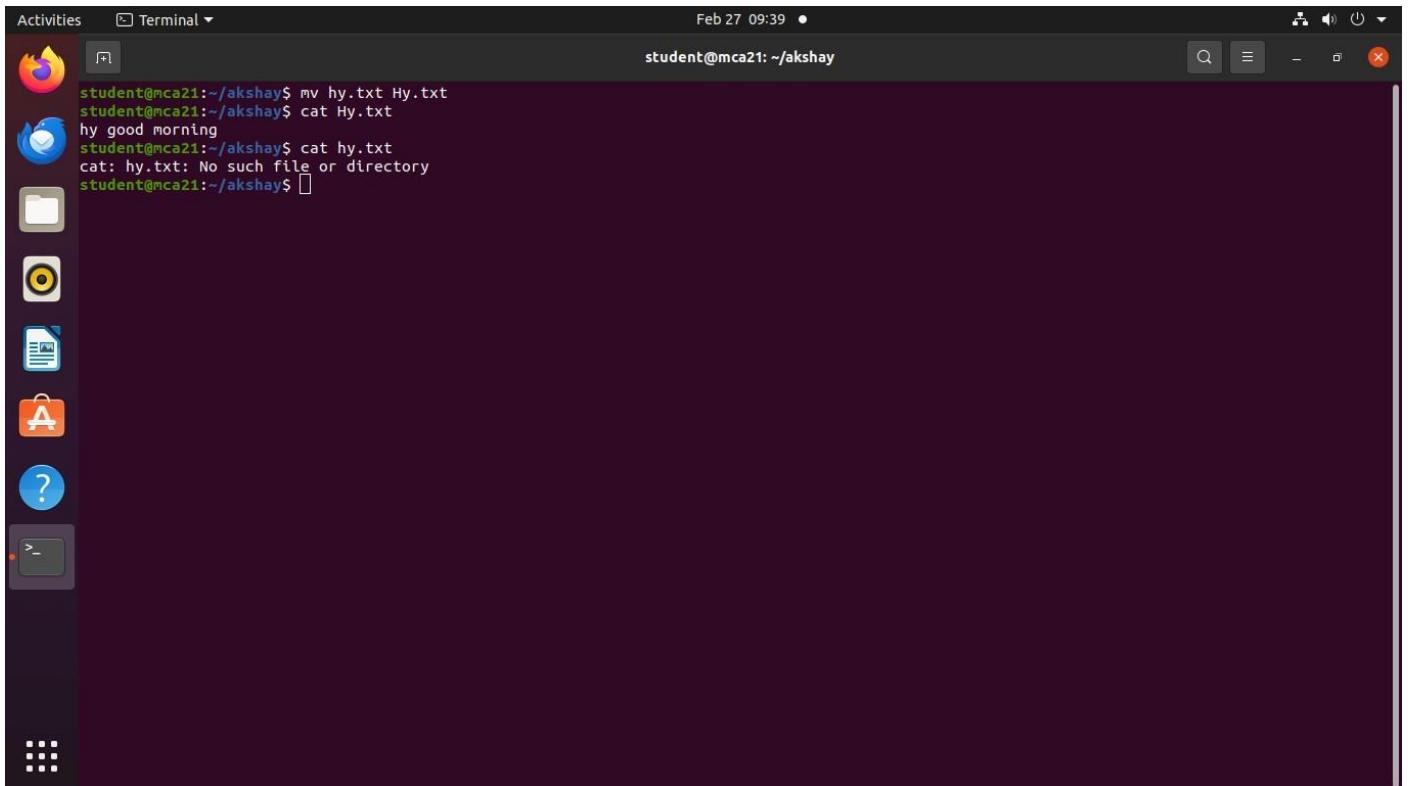
## **mv :**

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



The screenshot shows a standard Ubuntu desktop environment. On the left, there's a vertical dock with icons for Dash, Home, Applications, Files, Dash Home, Help, and a terminal icon. The main area is a terminal window titled "Terminal". The terminal shows the following command-line session:

```
Activities Terminal Feb 27 10:06 •
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$
```

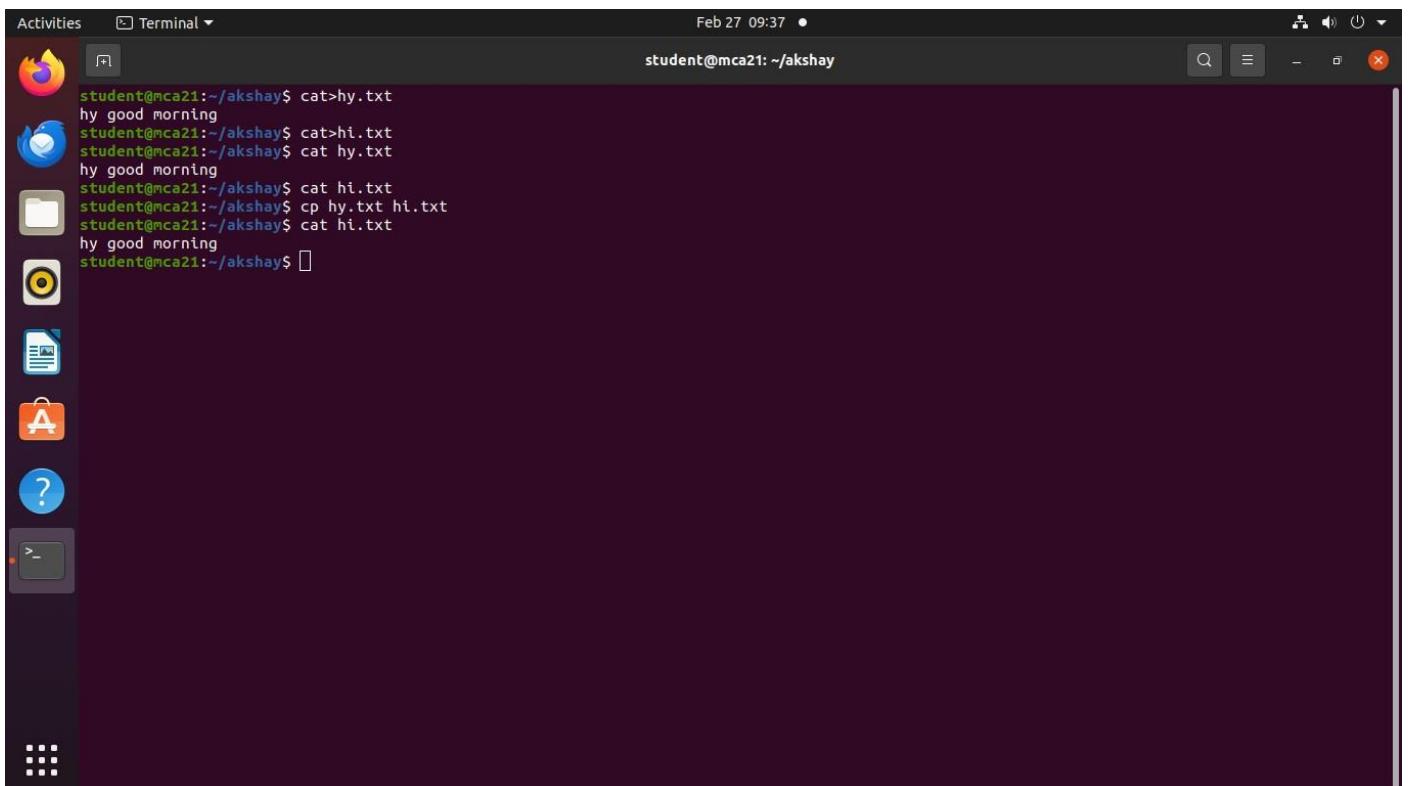


A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for Dash, Home, Applications, Documents, and Help. The main area shows a terminal window titled "Terminal" with the command-line interface. The terminal window has a dark background and white text. It displays the following session:

```
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.

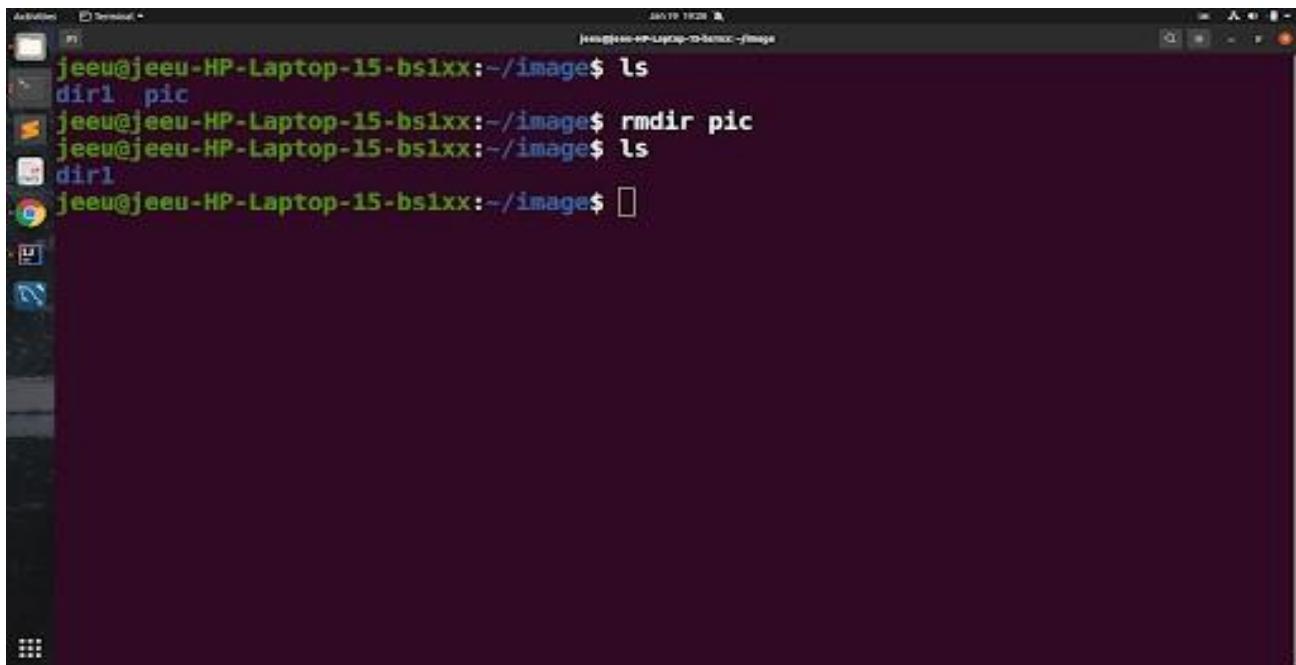


A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for Dash, Home, Applications, Documents, and Help. The main area shows a terminal window titled "Terminal" with the command-line interface. The terminal window has a dark background and white text. It displays the following session:

```
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 so on from the file system.



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

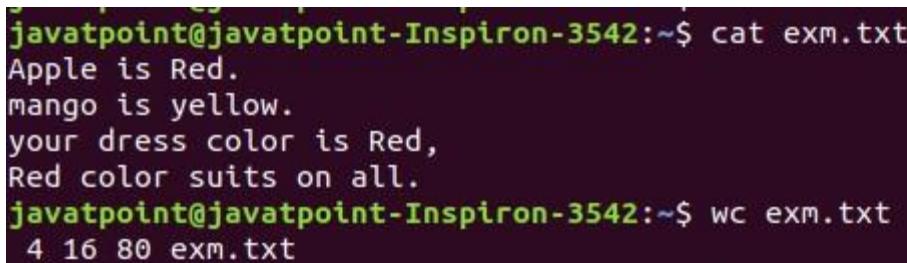
## **tar :**

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



```
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.



```
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
dr
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 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
vfvfb
```

### tail :

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

```
student@mca21:~/Desktop$ tail nsd.txt
dccdvdokd
deedhfugduhjd
dcjkdhnvckkkkkkkkkkf
fdfdhhhhhhhj
vckjnnnnnnnnn
safdhksjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
dhvvvvvvvvvvvvvvvvvvvvvcv
dsssssssjcncdd
ccccccccccccccccccccx
```

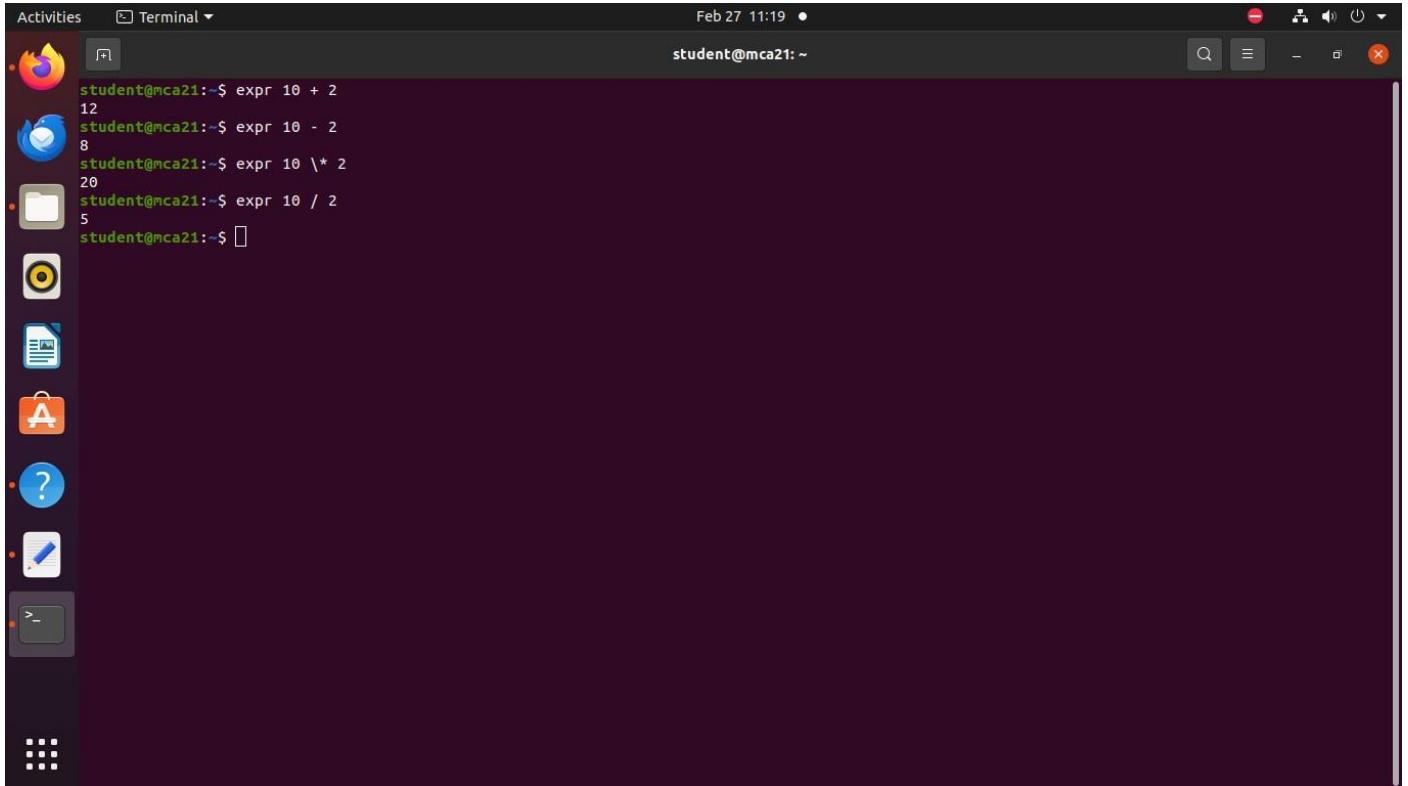
### grep :

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 :**

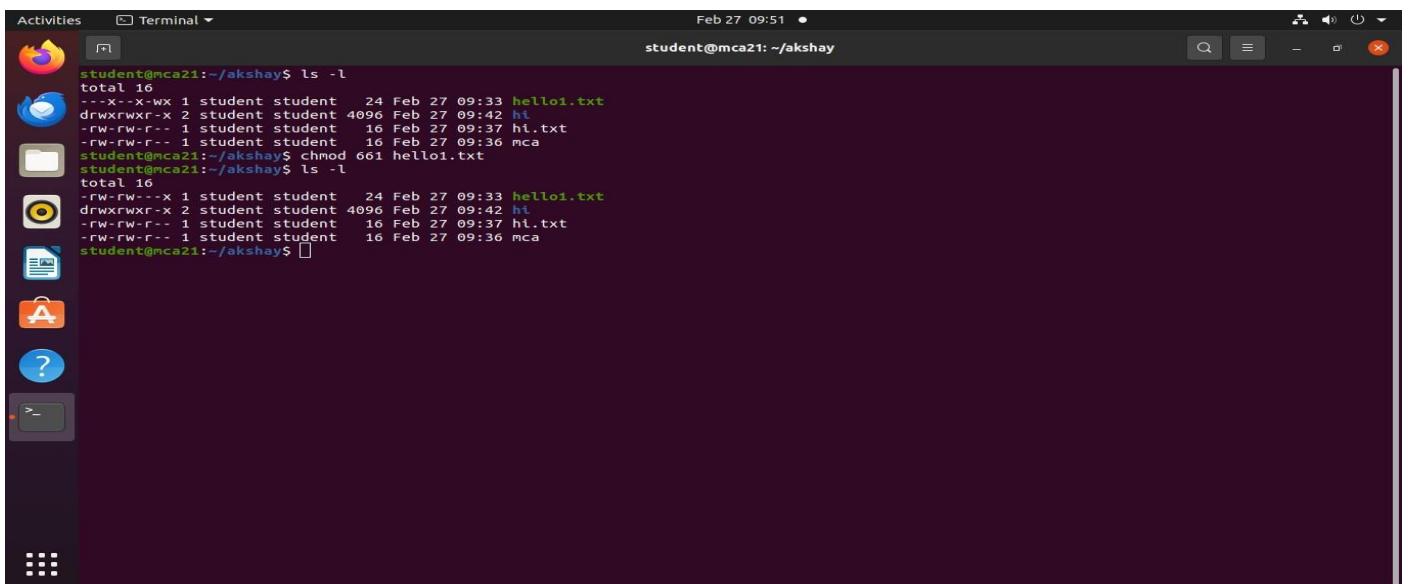
It was used to evaluate a given expression and display its corresponding output.

A screenshot of an Ubuntu desktop environment. On the left is a dock with icons for Dash, Home, Activities, Dash search, and several application icons. The main area shows a terminal window titled 'Terminal' with the command 'student@mca21:~\$ expr 10 + 2' followed by the output '12'. Below it, 'student@mca21:~\$ expr 10 - 2' outputs '8', 'student@mca21:~\$ expr 10 \\* 2' outputs '20', and 'student@mca21:~\$ expr 10 / 2' outputs '5'. The terminal window has a dark background and white text.

```
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 screenshot of an Ubuntu desktop environment. On the left is a dock with icons for Dash, Home, Activities, Dash search, and several application icons. The main area shows a terminal window titled 'Terminal' with the command 'student@mca21:~/akshay\$ ls -l' followed by a list of files: 'total 16', 'hello1.txt', 'hi', 'hi.txt', and 'mca'. Below it, 'student@mca21:~/akshay\$ chmod 661 hello1.txt' changes the permissions. Finally, 'student@mca21:~/akshay\$ ls -l' is run again to show the updated permissions. The terminal window has a dark background and white text.

```
student@mca21:~/akshay$ ls -l
total 16
-rwxr--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 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=rx 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 act as input to the another command, and this command output may act as input to the next command.

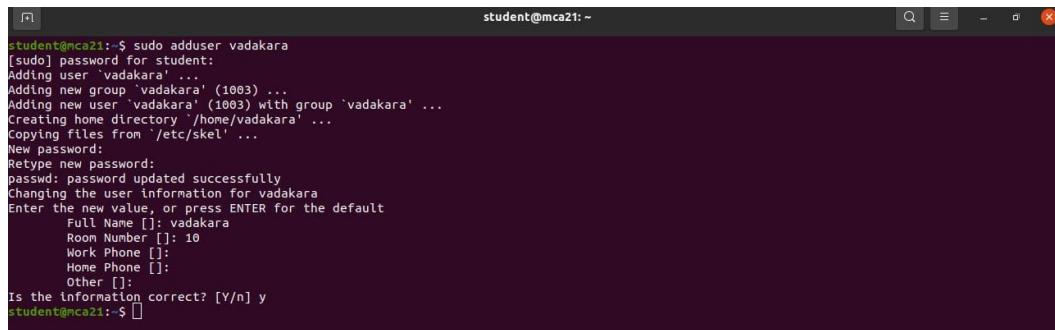
Redirection in linux command refers to the ability of the linux operating system that allows us to change the standard input and standard output when executing a command on the terminal.

```
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
-rw xr-xr-x 1 mca mca 8980 Nov 16 13:29 examples.desktop
-rw xrwxr-x 1 mca mca 6 May 7 14:42 file1.txt
-rw xrwxr-x 1 mca mca 0 May 7 14:24 file.txt
-rw xrwxr-x 1 mca mca 779 May 7 14:49 linux.txt
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Music
-rw xrwxr-x 1 mca mca 0 May 7 14:21 new1.txt
-rw xrwxr-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
-rw xrwxr-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
-rw xr-xr-x 1 mca mca 8980 Nov 16 13:29 examples.desktop
-rw xrwxr-x 1 mca mca 6 May 7 14:42 file1.txt
-rw xrwxr-x 1 mca mca 0 May 7 14:24 file.txt
-rw xrwxr-x 1 mca mca 779 May 7 14:49 linux.txt
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Music
-rw xrwxr-x 1 mca mca 0 May 7 14:21 new1.txt
-rw xrwxr-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
-rw xrwxr-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.



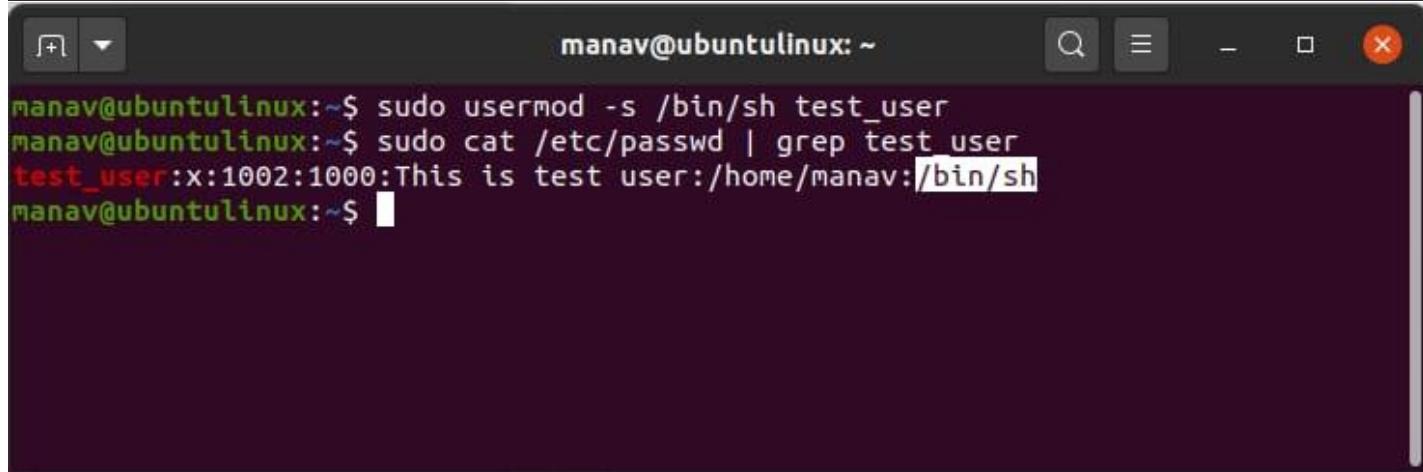
```
student@mca21:~$ sudo adduser vadakara
[sudo] password for student:
Adding user `vadakara' ...
Adding new group `vadakara' (1003) ...
Adding new user `vadakara' (1003) with group `vadakara' ...
Creating home directory `/home/vadakara' ...
Copying files from `/etc/skel' ...
New password:
Retype new 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:~$ 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:~$ 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:~$ 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:~$ sudo usermod -L test_user
manav@ubuntulinux:~$ sudo usermod -U test_user
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:~$ 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:~$ 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 cev
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: 10:29:03 up 25 min, 1 user, load average: 0.81, 0.52, 0.41
Tasks: 267 total, 2 running, 265 sleeping, 0 stopped, 0 zombie, 0 d st
CPU(s): 4.8 us, 4.8 sy, 0.0 ni, 89.3 id, 1.2 wa, 0.0 hi, 0.0 sl, 0.0 st
Mem: 7611.5 total, 3424.7 free, 1662.7 used, 2584.0 buff/cache
Swap: 8091.0 total, 8091.0 free, 0.0 used, 5193.0 avail Mem

 PID USER      PR  NI  VIRT  RES  SHR S %CPU %MEM COMMAND
15183 adwath  20   0 559100 56044 43936 R  45.5  0.7 0:00.66 gnome-terminal-
1595 adwath  20   0 5635104 268780 120860 S 27.3  3.4 1:27.77 gnome-shell
2426 adwath  20   0 11.6g 376600 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 160880 11352 8024 S  0.0  0.1 0:03.78 systemd
  2 root    20   0      0  0    0  0.0  0.0 0:00.00 kthreadd
  3 root    0 -20   0      0  0.1  0.0  0.0 0:00.00 rCU_gp
  4 root    0 -20   0      0  0.1  0.0  0.0 0:00.00 rCU_par_gp
  5 root    0 -20   0      0  0.1  0.0  0.0 0:00.00 slub_flushwq
  6 root    0 -20   0      0  0.1  0.0  0.0 0:00.00 netns
  8 root    0 -20   0      0  0.1  0.0  0.0 0:00.00 kworker/0:0H-events_highpri
10 root    0 -20   0      0  0.1  0.0  0.0 0:00.00 MM_percpu_wq
11 root    20   0      0  0.1  0.0  0.0 0:00.00 rCU_tasks_kthread
12 root    20   0      0  0.1  0.0  0.0 0:00.00 rCU_tasks_rude_kthread
13 root    20   0      0  0.1  0.0  0.0 0:00.00 rCU_tasks_trace_kthread
14 root    20   0      0  0.5  0.0  0.0 0:00.07 ksoftirqd/0
15 root    20   0      0  0.1  0.0  0.0 0:01.17 rCU_prempt
16 root    rt   0      0  0.5  0.0  0.0 0:00.01 migration/0
17 root    -51   0      0  0.5  0.0  0.0 0:00.00 idle_inject/0
19 root    20   0      0  0.5  0.0  0.0 0:00.00 cpuhp/0
20 root    20   0      0  0.5  0.0  0.0 0:00.00 cpuhp/1
21 root    -51   0      0  0.5  0.0  0.0 0:00.00 idle_inject/1
22 root    rt   0      0  0.5  0.0  0.0 0:00.00 migration/1
23 root    20   0      0  0.5  0.0  0.0 0:00.06 ksoftirqd/1

```

## 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:~$ 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 (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
```

```

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

```

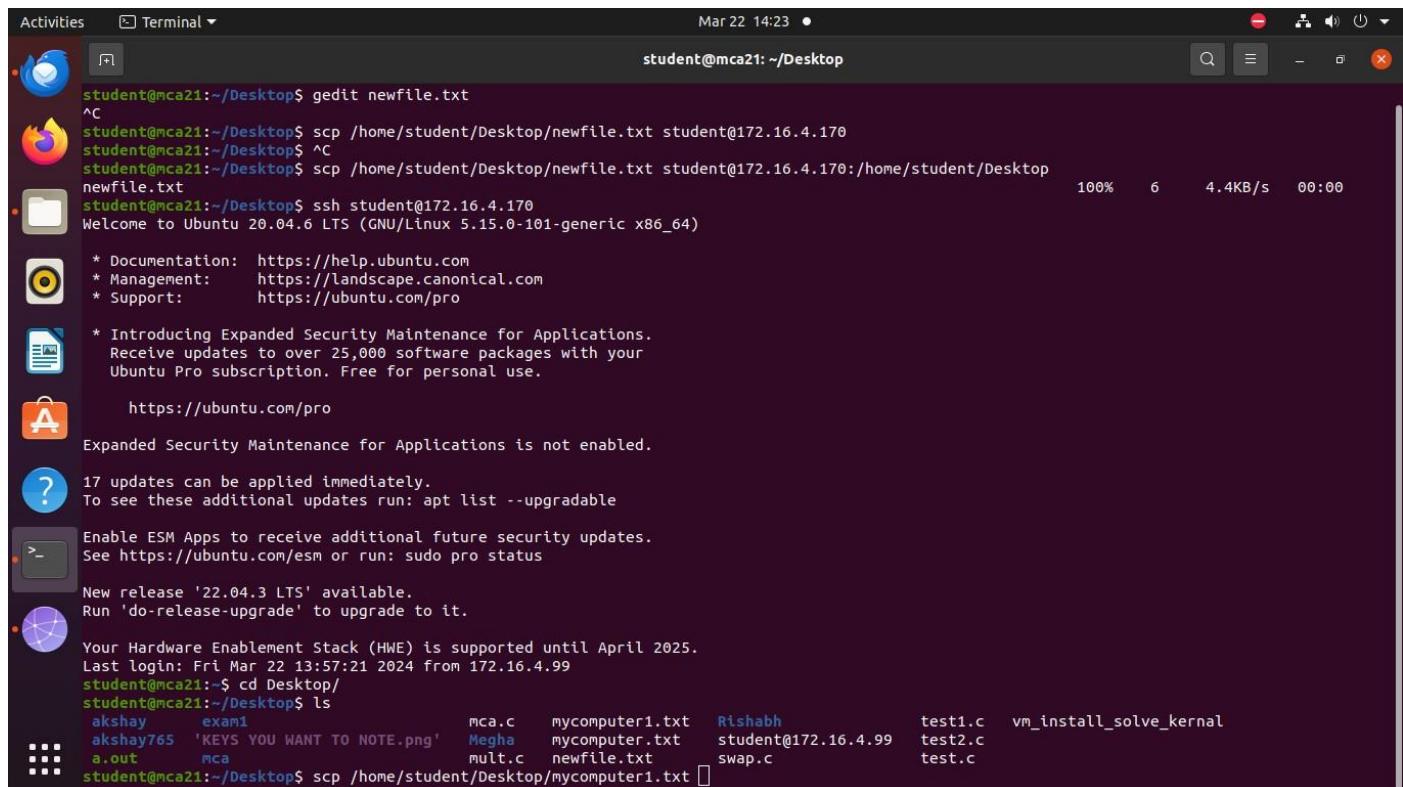
## scp :

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

\$ "scp 2<sup>nd</sup> system file path 1<sup>st</sup> system user@1<sup>st</sup> system IP:2<sup>nd</sup> system path"

To logout the connection using:

\$ "logout/cntrl+D"



```

Activities Terminal Mar 22 14:23 •
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.

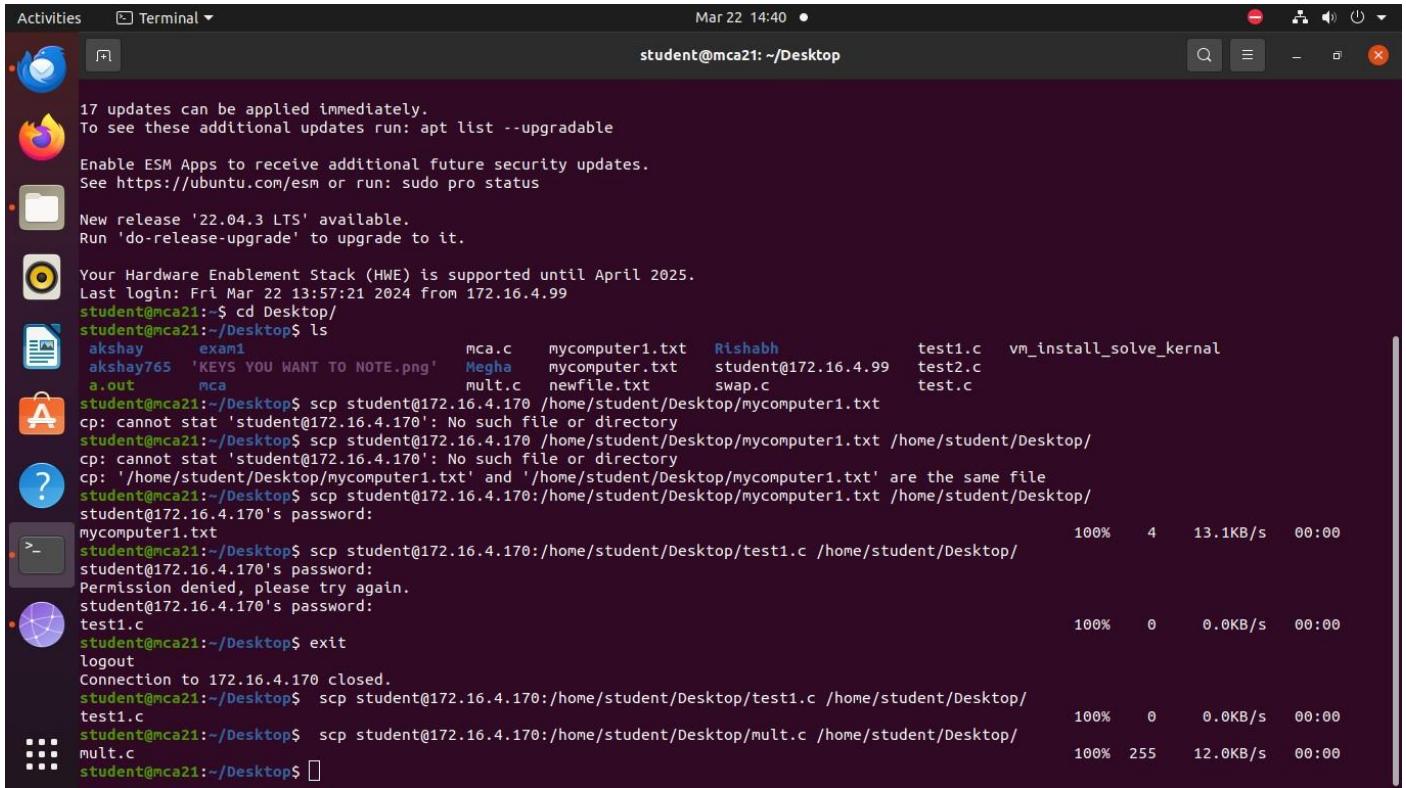
17 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

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      exam1          mca.c      mycomputer1.txt  Rishabh      test.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 /home/student/Desktop/mycomputer1.txt []

```



Activities Terminal Mar 22 14:40 student@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 upload the “ssh” user key.

## TEXT EDITOR

Text editors can be used for **editing text files, writing codes, updating user instruction 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 the best 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.

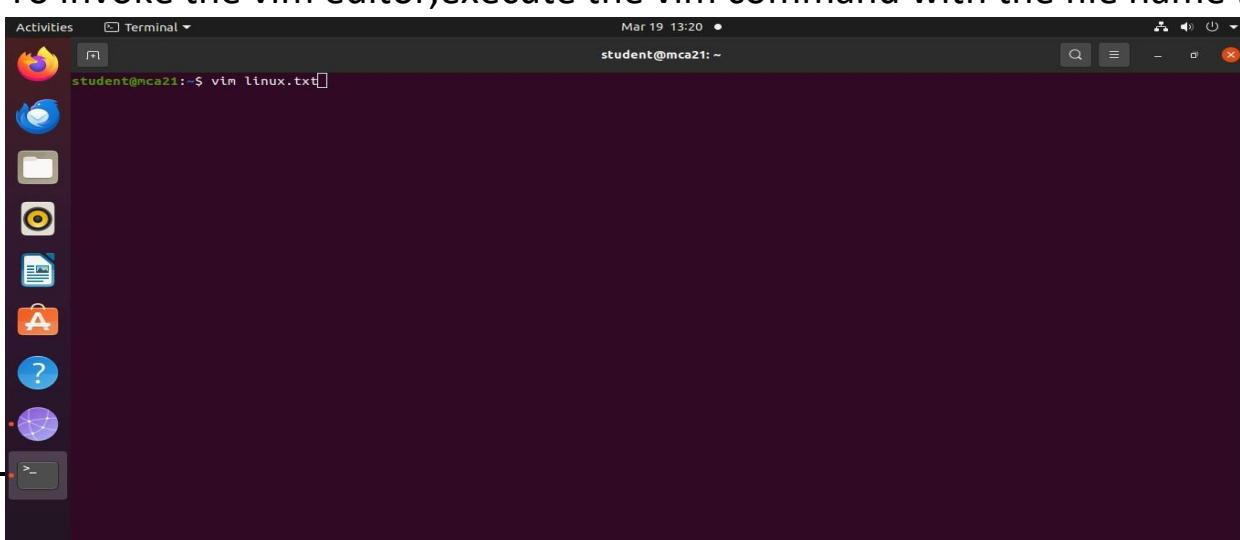
Vi editor has some special features such as Vi modes and syntax highlighting that makes it powerful than other text editors. Generally, it has two modes:

**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.

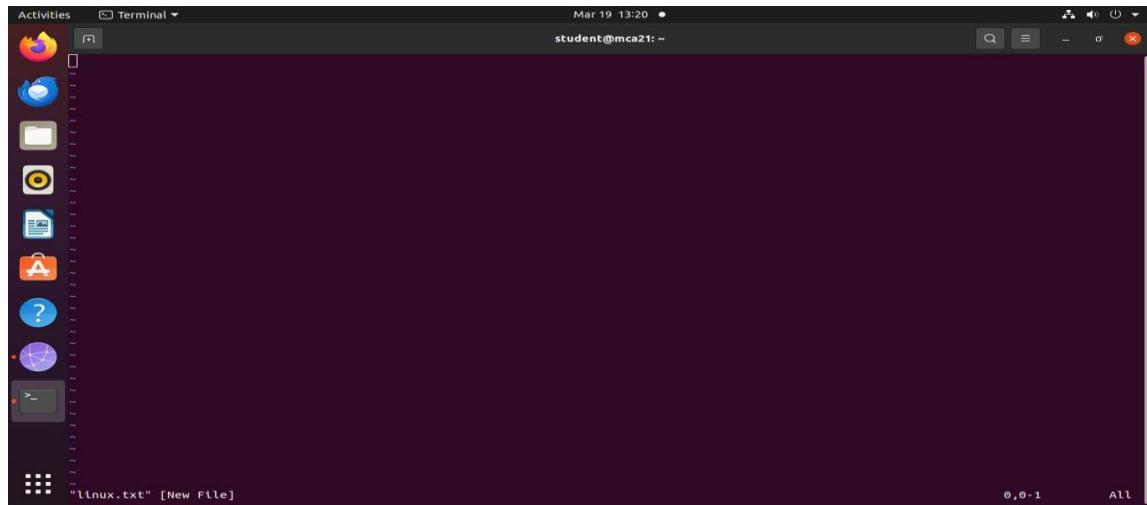
### **Insert Mode :**

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.

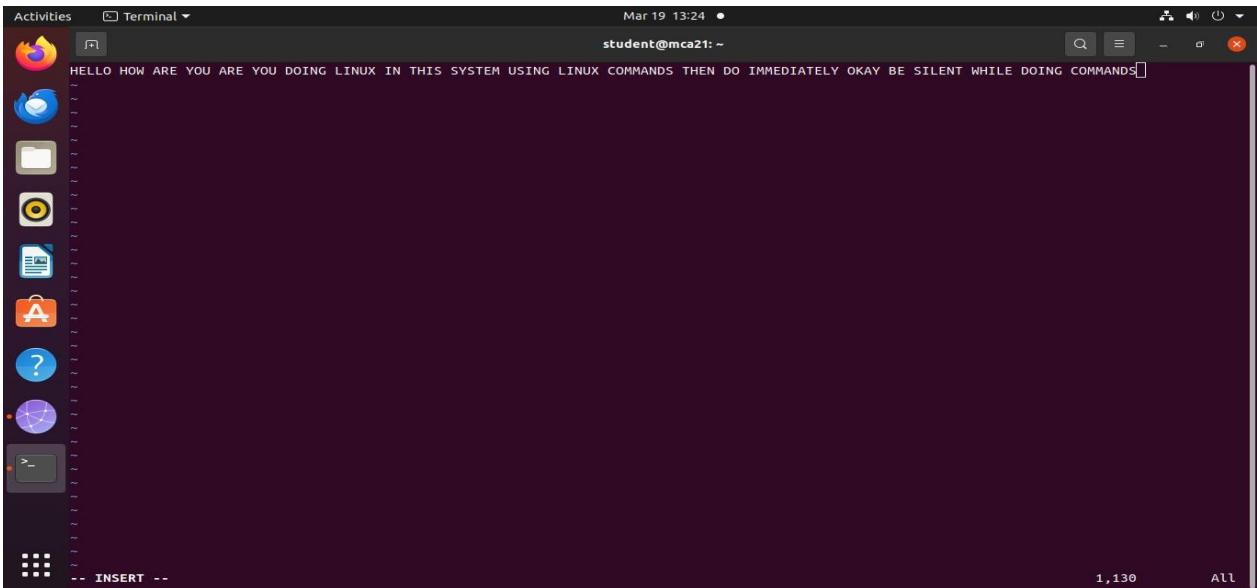
To invoke the vim editor, execute the vim command with the file name :



The file linux.txt is opened.



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



A screenshot of a Linux desktop environment showing a terminal window. The terminal window title is "Terminal". The status bar at the top shows the date and time as "Mar 19 13:24" and the user as "student@mca21:~". The main area of the terminal contains the following text:

```
HELLO HOW ARE YOU ARE DOING LINUX IN THIS SYSTEM USING LINUX COMMANDS THEN DO IMMEDIATELY OKAY BE SILENT WHILE DOING COMMANDS
```

The bottom right corner of the terminal window displays "1,130" and "All". On the left side of the desktop, there is a vertical dock with various icons, including a browser, file manager, terminal, and system settings.

**ESCAPE : wq [ Save and Exit ]**

**To quit without saving press ESC :q**

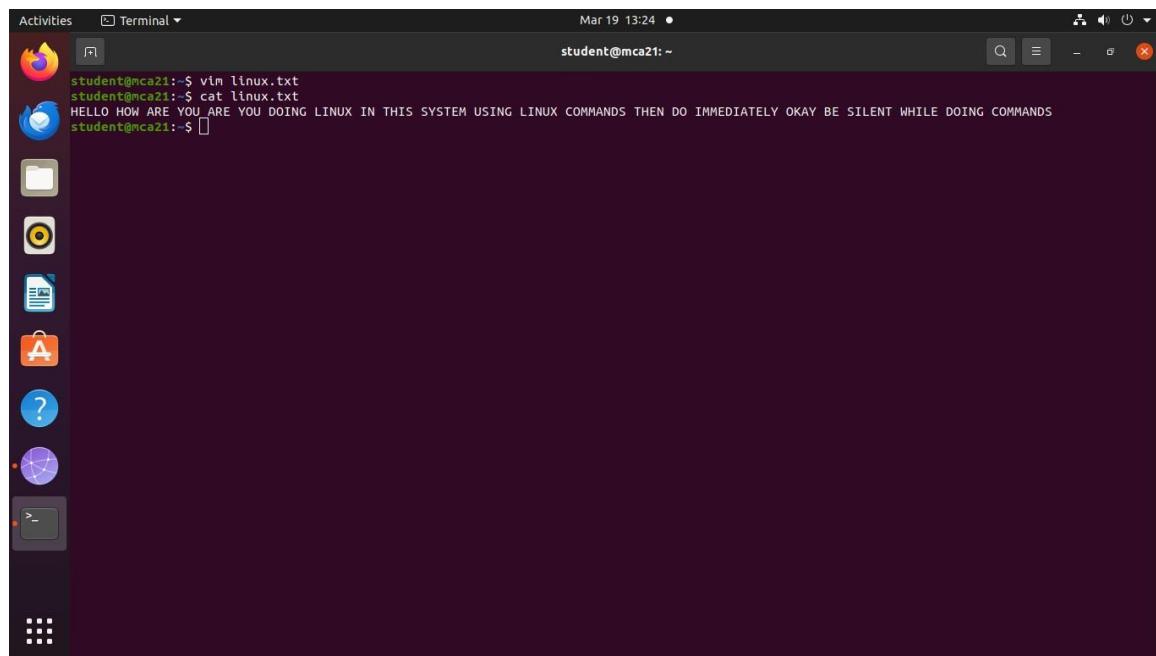


A screenshot of a Linux desktop environment showing a terminal window. The terminal window title is "Terminal". The status bar at the top shows the date and time as "Mar 19 13:24" and the user as "student@mca21:~". The main area of the terminal contains the following text:

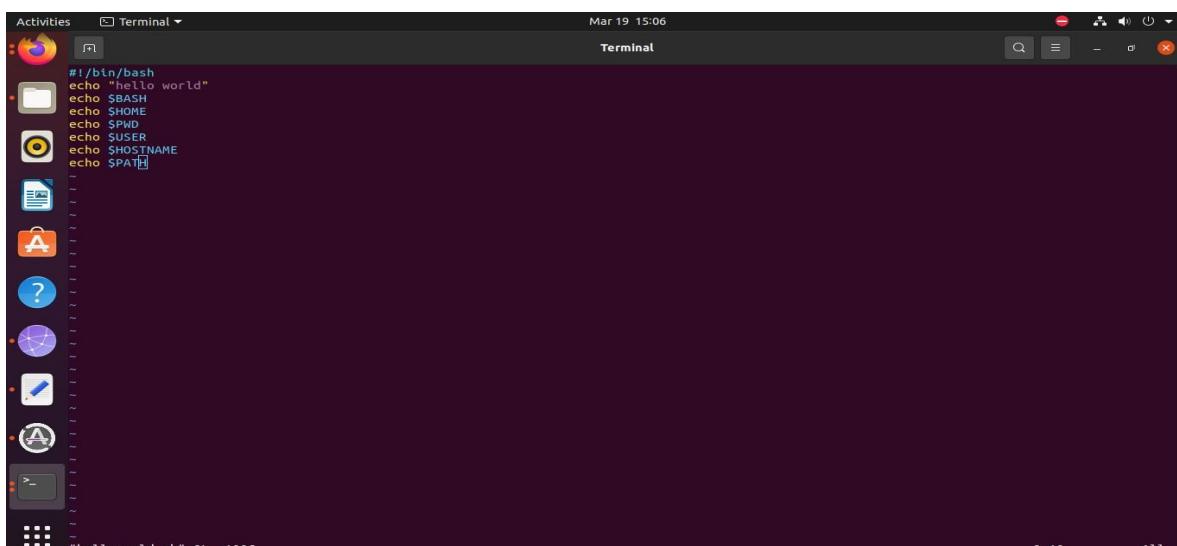
```
HELLO HOW ARE YOU ARE DOING LINUX IN THIS SYSTEM USING LINUX COMMANDS THEN DO IMMEDIATELY OKAY BE SILENT WHILE DOING COMMANDS
```

The bottom right corner of the terminal window displays "1,130" and "All". On the left side of the desktop, there is a vertical dock with various icons, including a browser, file manager, terminal, and system settings. In the status bar, the command ":wq" is visible, indicating the user has entered a command to save and exit the file.

## 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:~$
```



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

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:~$
```



```
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:~$
```

