

AIM:

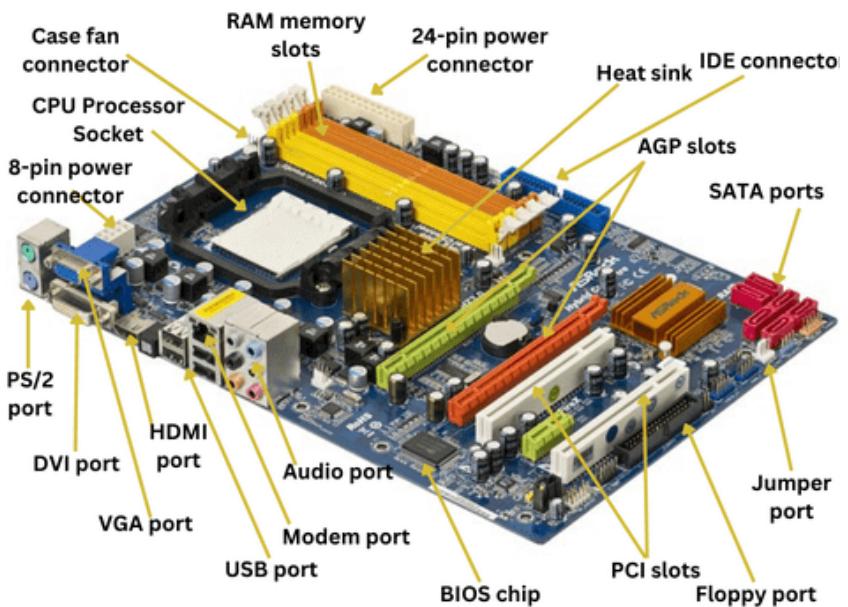
To identify the major components of a computer system such as motherboard, ram modules, daughter cards, SMPS, bus loads, internal storage devices and interfacing ports. Specification of desktop and server class computers. Installation of common operating system for desktop and server use.

COMPUTER HARDWARE

Computer hardware refers to the physical components that make up a computer system. These components work together to enable a computer to perform various tasks and functions. Key components include the central processing unit (CPU), which acts as the brain of the system, executing instructions and managing data. Memory, in the form of Random Access Memory (RAM), provides the volatile workspace for the CPU to swiftly access and process data actively in use. Storage devices, such as hard disk drives (HDD) or solid-state drives (SSD), store data persistently, and the motherboard serves as the main circuit board connecting and facilitating communication between various hardware elements, including the CPU, memory, and peripherals. Input devices, like keyboards and mice, allow user interaction, while output devices, such as monitors and printers, present information in a human-readable format. The power supply unit (PSU) converts electrical power to sustain the computer's operation, ensuring components receive the necessary energy to function.

MOTHERBOARD

A motherboard, also known as a mainboard or system board, is the primary circuit board in a computer that connects and facilitates communication between various hardware components. It serves as a central hub for the essential components of a computer system to work together. The motherboard provides the physical and electrical connections for the central processing unit (CPU), memory (RAM), storage devices, graphics cards, and other peripherals.



GRAPHICS PROCESSING UNIT (GPU)

A GPU, or Graphics Processing Unit, is a specialized electronic circuit designed to accelerate the processing of images and videos. Unlike the central processing unit (CPU), which is a general-purpose processor responsible for overall system tasks, a GPU is specifically designed to handle parallel computations needed for rendering graphics and visual effects. The primary function of a GPU is to render images and graphics, which is crucial for video games, graphic design, video editing, and other visually intensive applications.



COMPLEMENTARY METAL-OXIDE-SEMICONDUCTOR (CMOS) BATTERY

The CMOS battery is a small, coin-shaped battery located on the computer's motherboard. It provides power to the complementary metal-oxide-semiconductor (CMOS) memory, a special type of volatile memory that stores system configuration

settings such as date and time. The CMOS battery ensures that these settings are retained even when the computer is powered off. If the CMOS battery fails, the computer may lose its date and time settings, and the system may not operate properly.



HDMI (HIGH-DEFINITION MULTIMEDIA INTERFACE)

HDMI stands for High-Definition Multimedia Interface. It is a widely used interface for transmitting audio and video signals between devices, such as computers, gaming consoles, Blu-ray players, TVs, monitors, and audio-video receivers. HDMI is known for delivering high-quality digital audio and video in a single cable, simplifying connectivity and providing a superior multimedia experience.



SMPS SWITCHED-MODE POWER SUPPLY

SMPS is an electronic power supply system that makes use of a switching regulator to transfer electrical power effectively. It is a PSU (POWER SUPPLY UNIT) and is usually used in computers to change the voltage to the appropriate range for the computer.



RAM MODULES

In computing, a memory module or RAM (random access memory) stick is a printed circuit board on which memory integrated circuit are mounted. Memory modules permit easy installation and replacement in electronic systems, especially computers such as personal computers, word stations, and servers. RAM modules refer to the physical hardware components that contain the RAM chips.



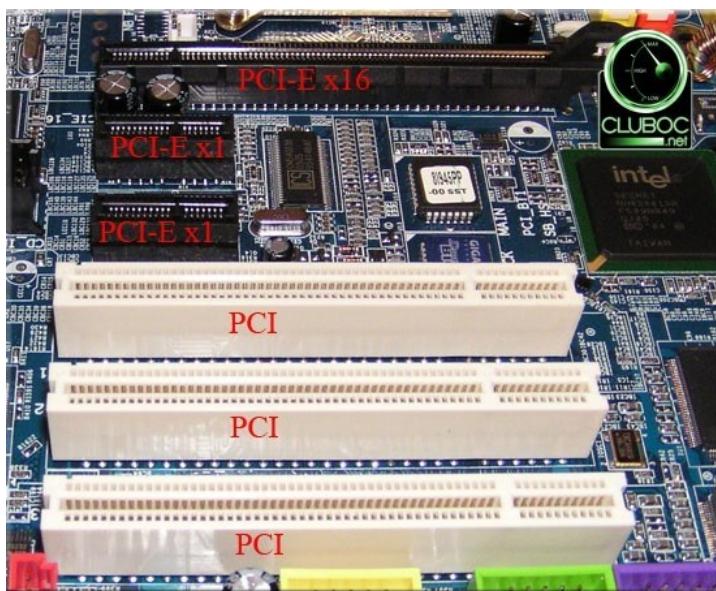
DAUGHTER CARDS

A daughterboard (or daughter board, daughter card, or daughtercard) is a circuit board that plugs into and extends the circuitry of another circuit board. The other circuit board maybe the computer's main board (its motherboard) or it may be another board or card that is already in the computer, often a sound card. The term is commonly used by manufacturers of wavetable daughterboards that attach to existing sound cards.



BUS SLOT

Alternatively known as a bus slot or expansion port, an expansion slot is a connection or port inside a computer on the motherboard or riser card. It provides an installation point for a hardware expansion card to be connected. For example, if you wanted to install a new video card in the computer, you'd purchase a video expansion card and install that card into the compatible expansion slot.



STORAGE DEVICES

Storage devices are hardware components or devices that store, retain, and retrieve digital data. They come in various types and serve different purposes, ranging from providing long-term storage for large amounts of data to offering fast, temporary storage for active processes.

1) HDD (HARD DISK DRIVE) - is an electro mechanical storage device, which is an abbreviation of hard disk drive. It uses magnetic storage for storing and retrieving the digital data. It is a non-volatile storage device. Hard disk is installed internally in our computer systems, which is connected directly to the disk controllers of the motherboard. HDD means data is retained when our computer system is shutdown.



2) SSD (SOLID STATE DRIVE) - SSD is non-volatile storage device, it stores the data on flash memory chips and maintains the data in a permanent state, even when the power is off. As compared to electromechanical drives, SSDs have lower latency and access quickly. These storage devices store the data in the semiconductor cells.



Following are several types of SSDs:

SATA SSD: SATA is the acronym for 'serial advanced

M.2 SATA SSD: Its newer, and its format is lighter and smaller than the SATA SSD.

mSATA SSD: Its mini version of SATA. It has a smaller form factor mainly used in ultra-compact computers, laptops, mobile devices with an mSATA slot, in which the installation of an extended size SATA SSD is impossible.

INPUT DEVICES/UNITS

Input devices or units are hardware components that allow users to interact with a computer or other electronic devices by providing data or commands. These devices convert physical actions or signals into digital information that can be processed by the computer.

1) KEYBOARD: The keyboard is one of the primary input devices, which helps in entering data and commands in a computer. A normal keyboard usually has a variety of keys, such as alphabetic character keys, function keys, number keys, arrow keys, and control keys. The keyboard can be connected to a computer using USB or BLUETOOTH.



2) MOUSE: Mouse is the most common and very popular pointing device that helps interact with a computer through a process called 'point and click'. This is mainly used to move a cursor on the computer's screen and click on the corresponding object using buttons (usually left, right, and middle key roller buttons).



3) SCANNER: Scanner is an input device, which works more like a photocopy machine. It is used when some information is available on paper and it is to be transferred to the hard disk of the computer for further manipulation.



4) BARCODE SCANNER: A barcode scanner is an input device that captures and translates barcode information into digital data that a computer or other electronic system can process. Barcode scanners are widely used in various industries for tasks such as inventory management, point-of-sale transactions, and tracking items through supply chains.



PROCESSING UNIT

The part of a computer that performs logical and arithmetical operation on the data as specified in the instructions.

1) CPU (CENTRAL PROCESSING UNIT): A central processing unit is also called a processor, central processor, or microprocessor. The CPU, or Central Processing Unit, is a critical component of a computer system. It serves as the brain of the computer, executing instructions and performing calculations necessary for the operation of software and the overall functioning of the system.



2) RAM (RANDOM ACCESS MEMORY): Is a hardware device generally located on the motherboard of a computer or the CPU. RAM is a type of computer memory that is used to store data that is actively being used or processed by a computer. It is a volatile memory, meaning that it loses its content when the power is turned off. RAM is a crucial component for the smooth functioning of a computer, as it allows the system to quickly access and retrieve data that is in active use by the CPU.



OUTPUT DEVICES/UNITS

Output devices or units in computing are hardware components that present information from a computer to the user or to other systems. These devices convert electronic information into human-readable or machine-readable forms.

1) MONITOR: A monitor is a piece of computer hardware that accepts data from a computer and displays it on the system screen through the computer's video card. Monitors have the ability to display information at much higher resolution.

Additionally, these are much like televisions and also known as video screen, display, video display terminal, or video display unit.



2) SPEAKERS: The most common output devices, speakers accept sound data from a computer and play the sounds for users to hear.



3) PROJECTOR: Projector is an output device that accepts data from a computer and projects that data or information as a picture onto a wall or screen or any large surface.



4) PLOTTERS: Specialized output devices used for printing large-scale engineering drawings, maps, or designs with high precision.



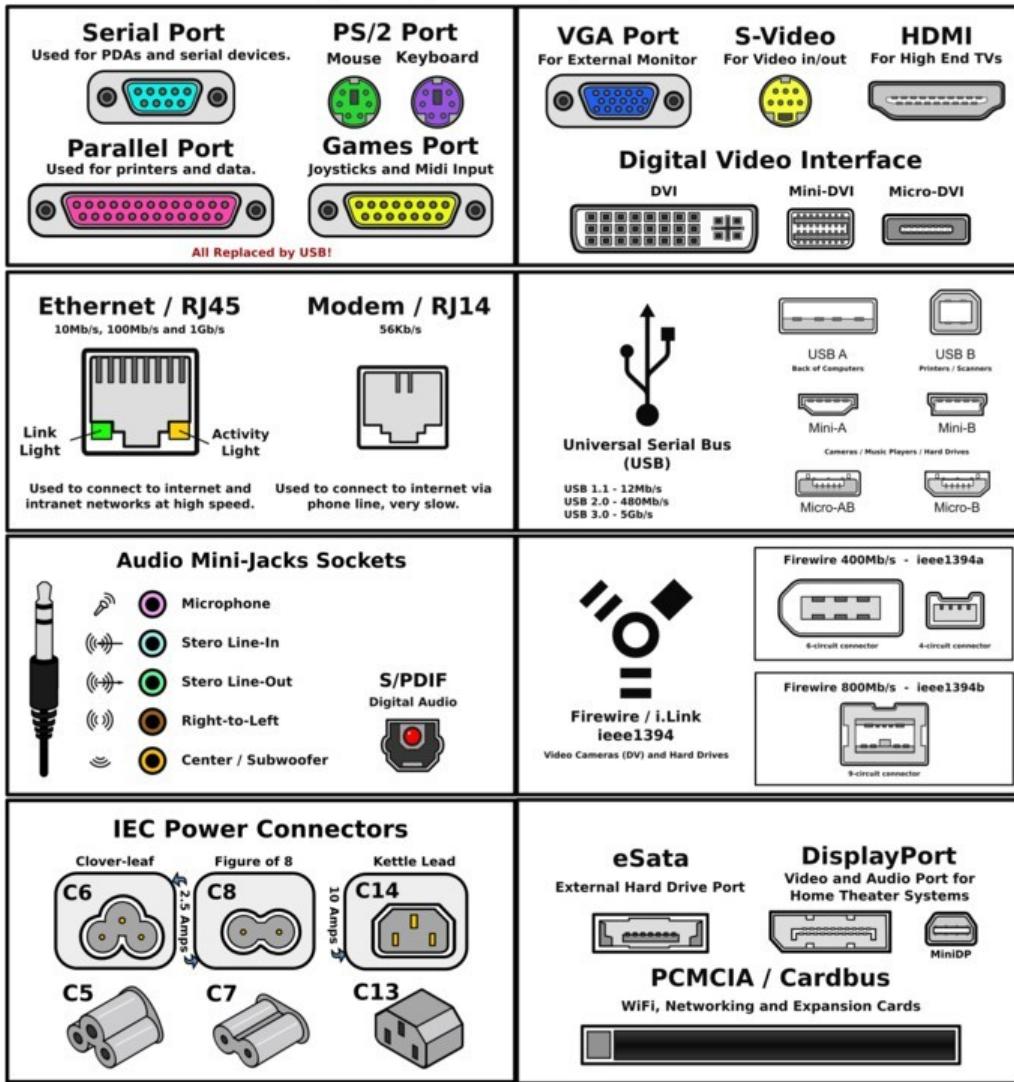
5) PRINTER: Produces hard copies of digital documents or images on paper. Types of printers include inkjet, laser, dot matrix, and 3D printers.



INTERFACING PORTS:

Interfacing ports, also known as input/output ports or simply I/O ports, are connectors on a computer or electronic device that allows communication with external peripherals or other devices. These ports facilitate the transfer of data, power, or signals between the computer and various external components.

A port is a physical docking point using which an external device can be connected to the computer. It can also be programmatic docking point through which information flows from a program to the computer or over the Internet.



- 1) **USB Ports (Universal Serial Bus):** USB ports are versatile and widely used for connecting a variety of peripherals, including keyboards, mice, printers, external hard drives, and more. Motherboards typically have multiple USB ports.
- 2) **Audio Ports:** These ports, often color-coded, include connections for headphones, microphones, and line-in/line-out audio devices. Commonly, motherboards have 3.5mm jacks for audio connections.
- 3) **Ethernet Port (RJ45):** This port enables a wired network connection, allowing the motherboard to connect to local area networks (LANs) or the internet.
- 4) **HDMI, DisplayPort, and VGA Ports:** These video output ports allow you to connect monitors or other display devices to the motherboard. The specific ports available depend on the motherboard model.

- 5) PS/2 Ports:** These are legacy ports for connecting keyboards and mice. PS/2 ports are less common on modern motherboards but may still be found on some.
- 6) PCI Express Slots:** PCIe slots are used for connecting expansion cards such as graphics cards, sound cards, network cards, and other high-performance peripherals.
- 7) SATA Ports:** Serial ATA (SATA) ports are used to connect internal storage devices, such as hard drives and SSDs, to the motherboard.
- 8) M.2 Slots:** M.2 slots support small form factor expansion cards, commonly used for connecting SSDs, Wi-Fi cards, and other high-speed components.
- 9) Thunderbolt Ports:** Some motherboards feature Thunderbolt ports, providing high-speed data transfer and display connectivity.
- 10) USB Type-C Port:** USB Type-C is a versatile and reversible connector that supports high-speed data transfer, power delivery, and display connectivity. It is becoming more common on modern motherboards.
- 11) RGB Headers:** These headers allow you to connect RGB lighting strips or fans to the motherboard, enabling control and synchronization of lighting effects.
- 12) Fan Headers:** Motherboards include headers for connecting case fans and CPU fans, allowing the motherboard to control fan speeds based on system temperature.
- 13) CMOS Battery:** Not a traditional port, but an important component for maintaining the motherboard's BIOS settings.
- 14) DVI (Digital Visual Interface):** Used for connecting computers to monitors or displays. It supports both analog and digital signals.
- 15) VGA (Video Graphics Array):** An older video port standard used to connect computers to monitors or projectors. VGA transmits analog video signals.

DESKTOP

A desktop computer is a personal computer designed for regular use at a single location on or near a desk due to its size and power requirements. The most common configuration has a case that houses the power supply, motherboard (a printed circuit board with a microprocessor as the central processing unit, memory, bus, certain peripherals and other electronic components), disk storage (usually one or more hard

disk drives, solid state drives, optical disc drives, and in early models a floppy disk drive); a keyboard and mouse for input; and a computer monitor, speakers, and, often, a printer for output. The case may be oriented horizontally or vertically and placed either underneath, beside, or on top of a desk.



INSTALL UBUNTU ON VIRTUALBOX

Oracle VM VirtualBox is free and open-source and being developed by oracle corporation. Oracle VirtualBox is a cross-platform virtualization application. It installs on your existing Intel or AMD-based computers, whether they are running Windows, Mac, Linux or Solaris operating systems. VirtualBox can create and run a "guest" operating system (virtual machine) in a window of the host operating system. The virtual machine provides a self-contained environment in which to experiment with new software without risking damaging changes to the host operating system

VirtualBox Installation:

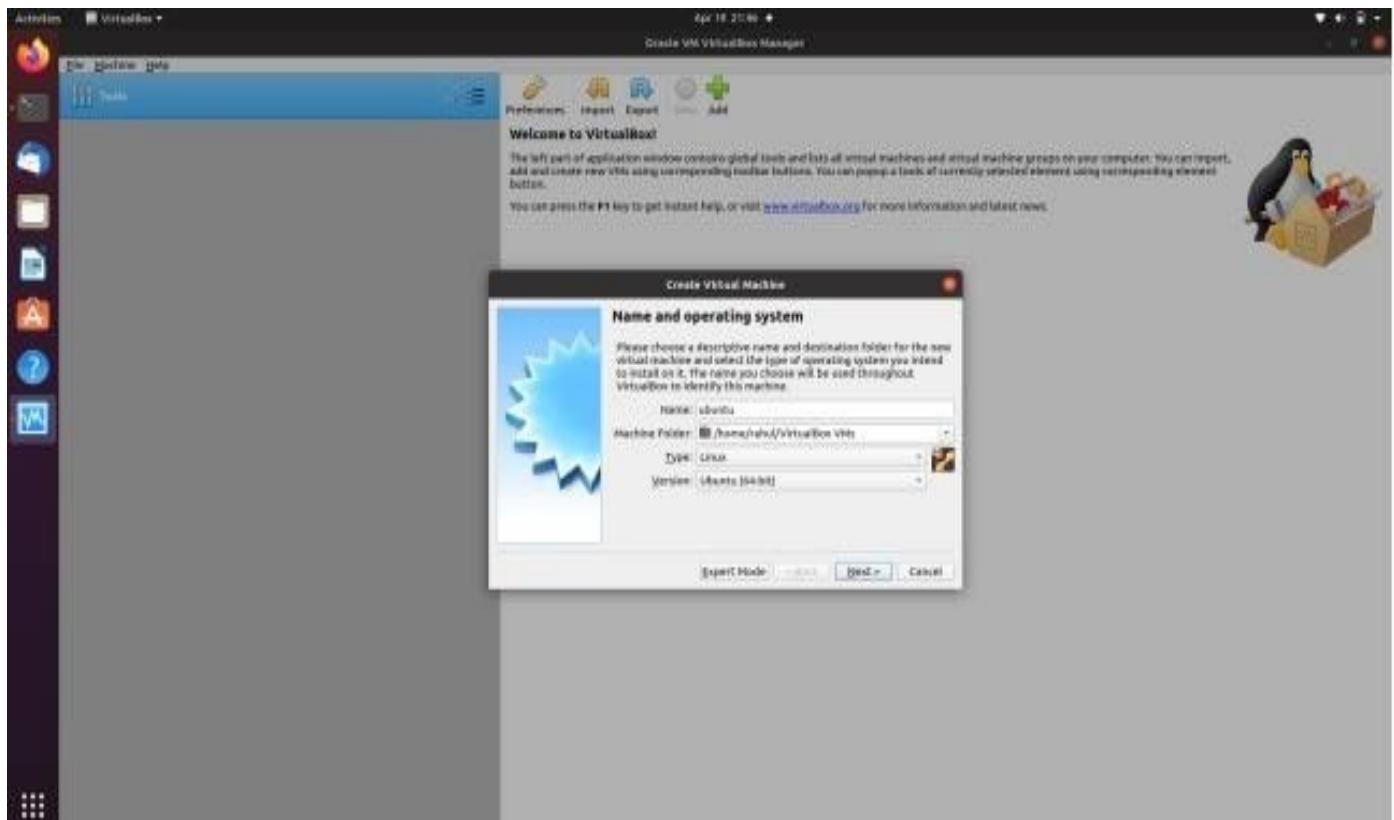
- `sudo apt-get install virtualbox`

```
Activities Terminal * Apr 19 21:43: * raha@rahal-HP-Laptop-15s-pr0xx:~$ sudo apt-get update  
[sudo] password for raha:  
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease  
Hit:2 http://packages.microsoft.com/repos/code_stable InRelease  
Get:3 https://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]  
Hit:4 https://brave-browser-api-releases.st.brave.com stable InRelease  
Get:5 https://security.ubuntu.com/ubuntu focal-security InRelease [124 kB]  
Get:6 https://in.archive.ubuntu.com/ubuntu focal-backports InRelease [388 kB]  
Get:7 https://in.archive.ubuntu.com/ubuntu focal-security/multiverse amd64 Packages [1 744 kB]  
Get:8 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [40.7 kB]  
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Get:25 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [7,764 kB]  
Get:26 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 DEP-11 Metadata [36.8 kB]  
Fetched 6,797 kB in 21s (319 kB/s)  
Reading package lists... done  
rahal@rahal-HP-Laptop-15s-pr0xx:~$ sudo apt-get install virtualbox  
Reading package lists... done  
Building dependency tree  
Reading state information... done  
The following package was automatically installed and is no longer required:  
    libbc-ares2  
Use 'sudo apt autoremove' to remove it.  
The following additional packages will be installed:  
    build-essential cpp-9-dev curl-tools dmidecode dpkg-dev fakeroot g++-9 gcc-9-base libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan5 libdouble-conversion libfakeroot libgcrypt20-dev libgpg-error2.1.0 liblberi1f libpcap2.0-0 libqtcore5c libqtdbus5 libqtgui5 libqtnetwork5 libqtprintsupport5 libqtserialport5 libqtsshell5 libqtsx11extras5 libstdc++9-dev libvncserver libvbox-virtio libvirt-virtinst make qt5-gtk-platformtheme qttranslations5-l10n virtualbox-dkms virtualbox-gt  
Suggested packages:  
    gcc-9-locales debugfs nasm debian-keyring g++-multilib g++-8-multilib gcc-8-doc gcc-9-multilib qt5-image-formats-plugins qtwayland libstdc++-9-doc make-doc vde2 virtualbox-guest-additions-lse  
The following NEW packages will be installed:  
    build-essential cpp-9-dev curl-tools dmidecode dpkg-dev fakeroot g++-9 libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl libdouble-conversion libfakeroot libgcrypt20-2.0.91 liblberi1f libpcap2.0-0 libqtcore5c libqtdbus5 libqtgui5 libqtnetwork5 libqtprintsupport5 libqtserialport5 libqtsshell5 libqtsx11extras5 libstdc++9-dev libvncserver libvbox-virtio libvirt-virtinst make qt5-gtk-platformtheme qttranslations5-l10n virtualbox-dkms virtualbox-gt  
The following packages will be upgraded:  
    cpp-9 gcc-9-base libasan5 libgcc-9-dev  
5 upgraded, 35 newly installed, 8 to remove and 282 not upgraded.  
Need to get 87.7 MB of archives.  
After this operation, 290 MB of additional disk space will be used.
```

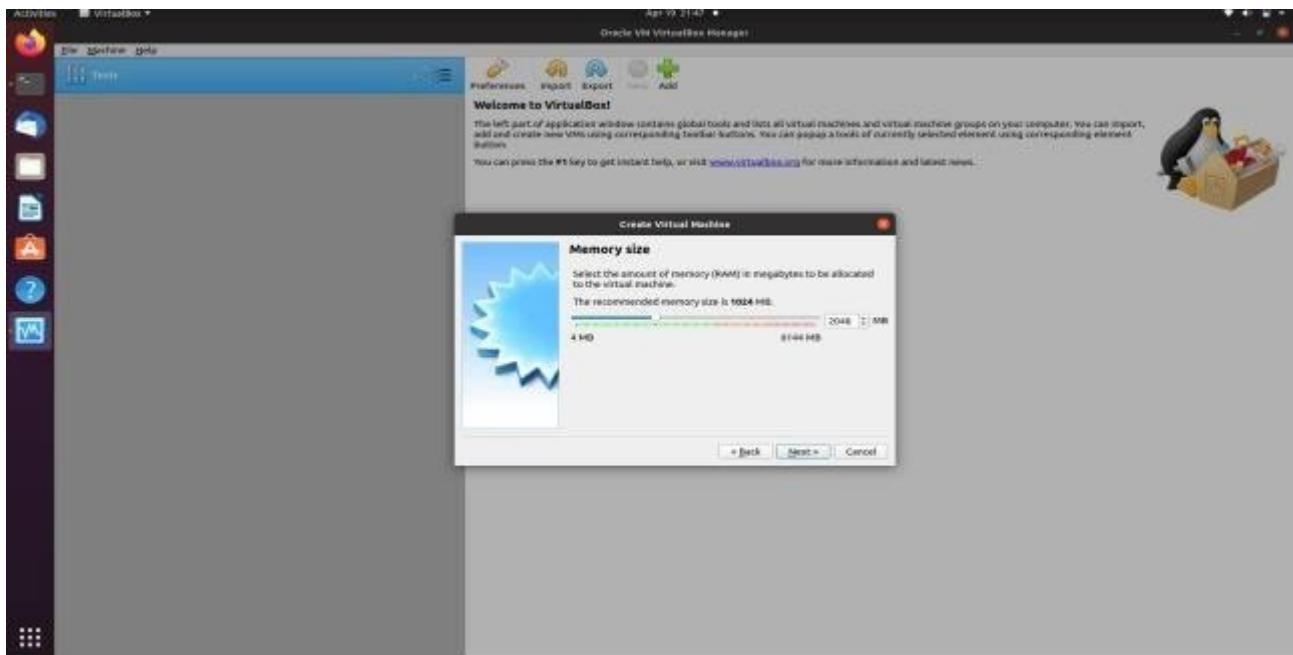
```
Activities VirtualBox * Apr 19 21:45: * raha@rahal-OptiPlex-5090:~$  
rahal@rahal-OptiPlex-5090:~$ cd /tmp  
rahal@rahal-OptiPlex-5090:~/tmp$ apt-get update  
Reading package lists... done  
Building dependency tree  
Reading state information... done  
The following packages were automatically installed and are no longer required:  
  libcurl4-openssl-dev libcurl4-openssl-dev:i386 libjs-jquery-common libjs-trove libxss-image-5.4.0-26-generic linux-modules-4.15.0.132.1.1  
Use 'sudo apt autoremove' to remove them.  
The following NEW packages will be installed:  
  virtualbox-ext-pak  
After this operation, 342 kB of additional disk space will be used.  
Get:1 http://in.archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 virtualbox-ext-pak all 6.1.32-1-ubuntu.20.04.1 [19.6 kB]  
Fetched 19.6 kB in 7s (2.573 kB/s)  
Preconfiguring packages ...  
Selecting previously unselected package virtualbox-ext-pak.  
(Reading database ... 227131 files and directories currently installed.)  
Preparing to unpack .../virtualbox-ext-pak_6.1.32-1-ubuntu.20.04.1_all.deb ...  
License has already been accepted.  
Unpacking virtualbox-ext-pak (6.1.32-1-ubuntu.20.04.1) ...  
Setting up virtualbox-ext-pak (6.1.32-1-ubuntu.20.04.1) ...  
virtualbox-ext-pak: downloading: https://download.virtualbox.org/virtualbox/6.1.32/Oracle_VirtualBox_Extension_Pack-6.1.32.vbox-extpack  
The file will be downloaded into /usr/share/virtualbox-ext-pak  
rahal@rahal-OptiPlex-5090:~/tmp$
```



Create virtual machine by just clicking on this new Click -> new we can install ubuntu so type ubuntu And choose the type



Click on -> Next

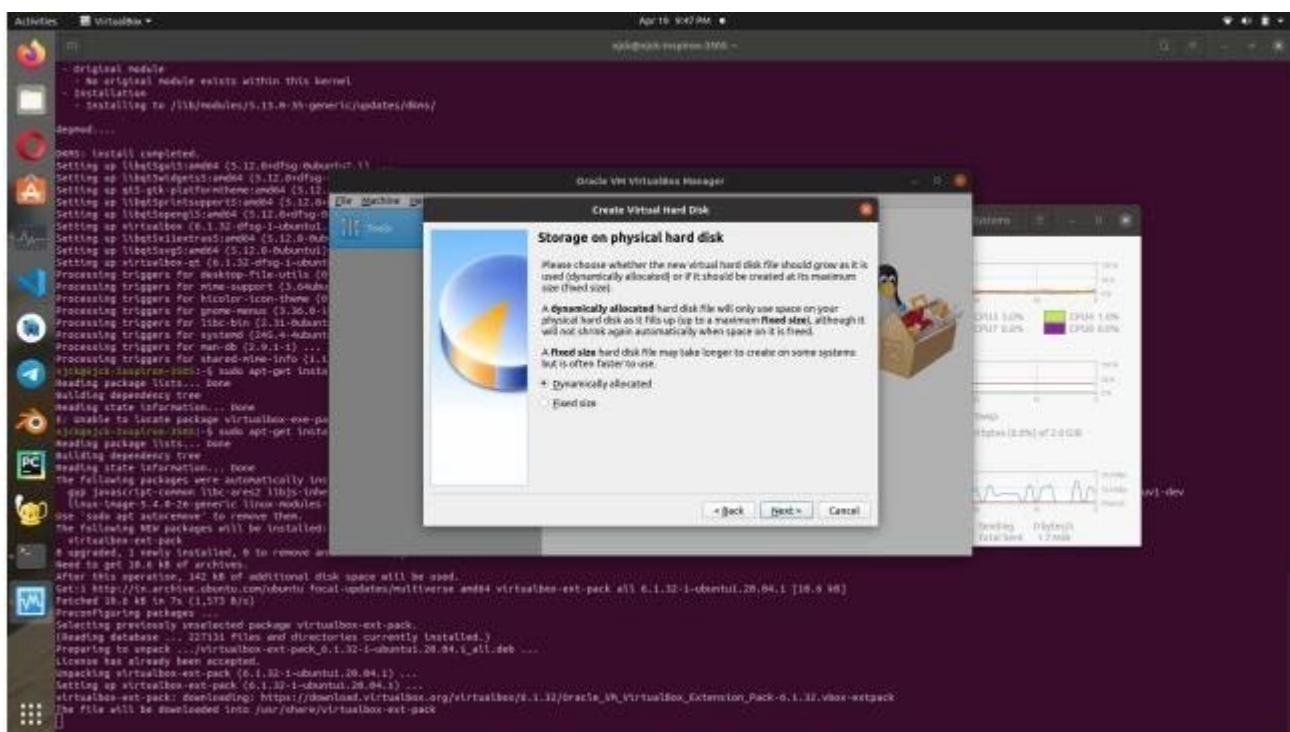


Click next



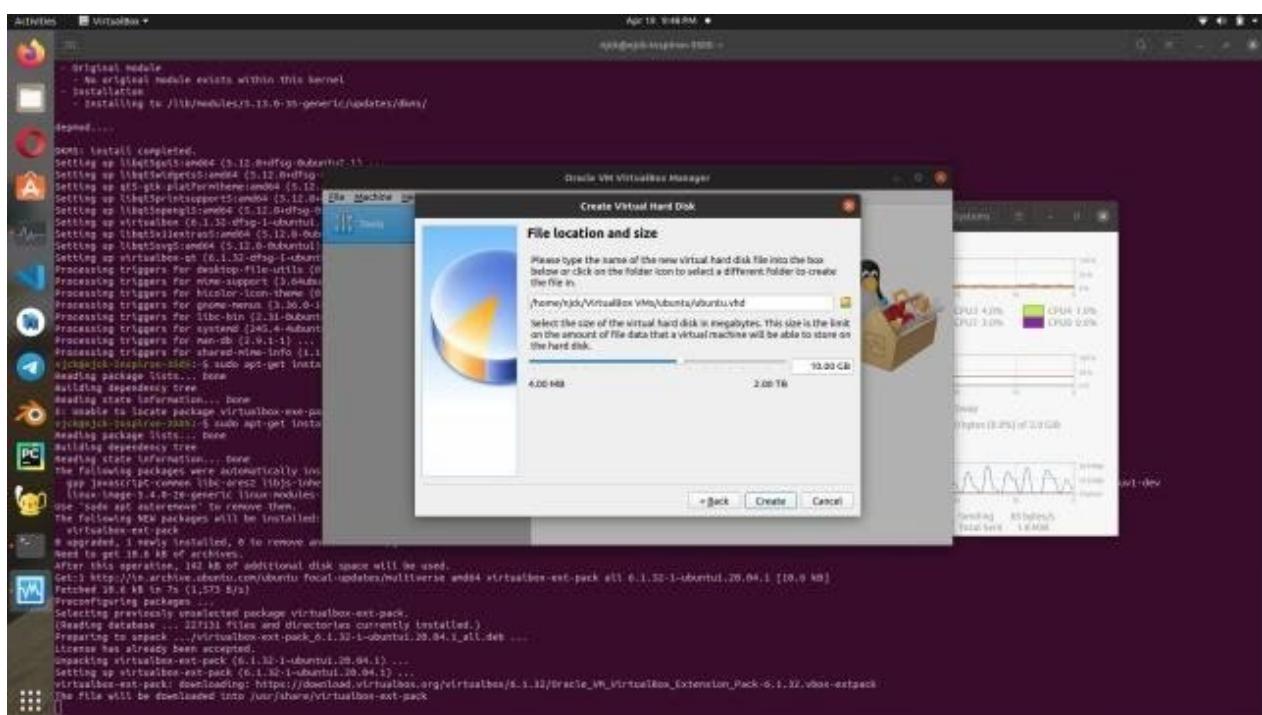
Select the Virtual hard disk Click->

Next

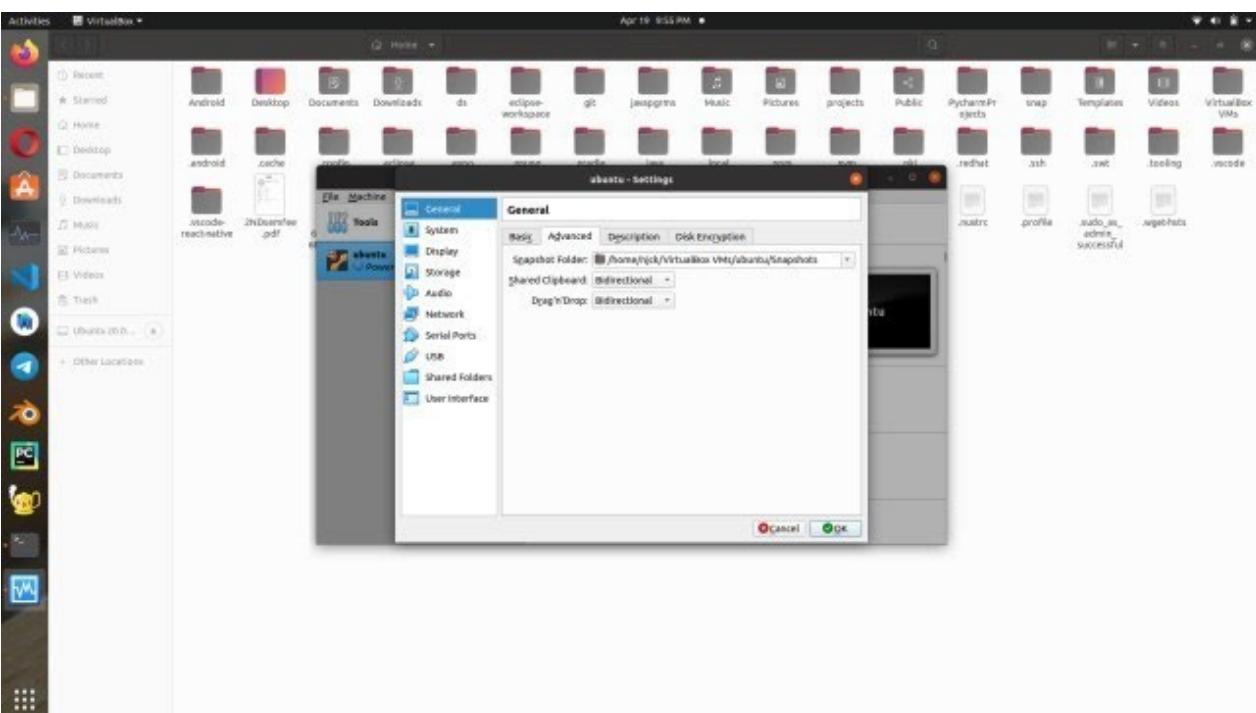
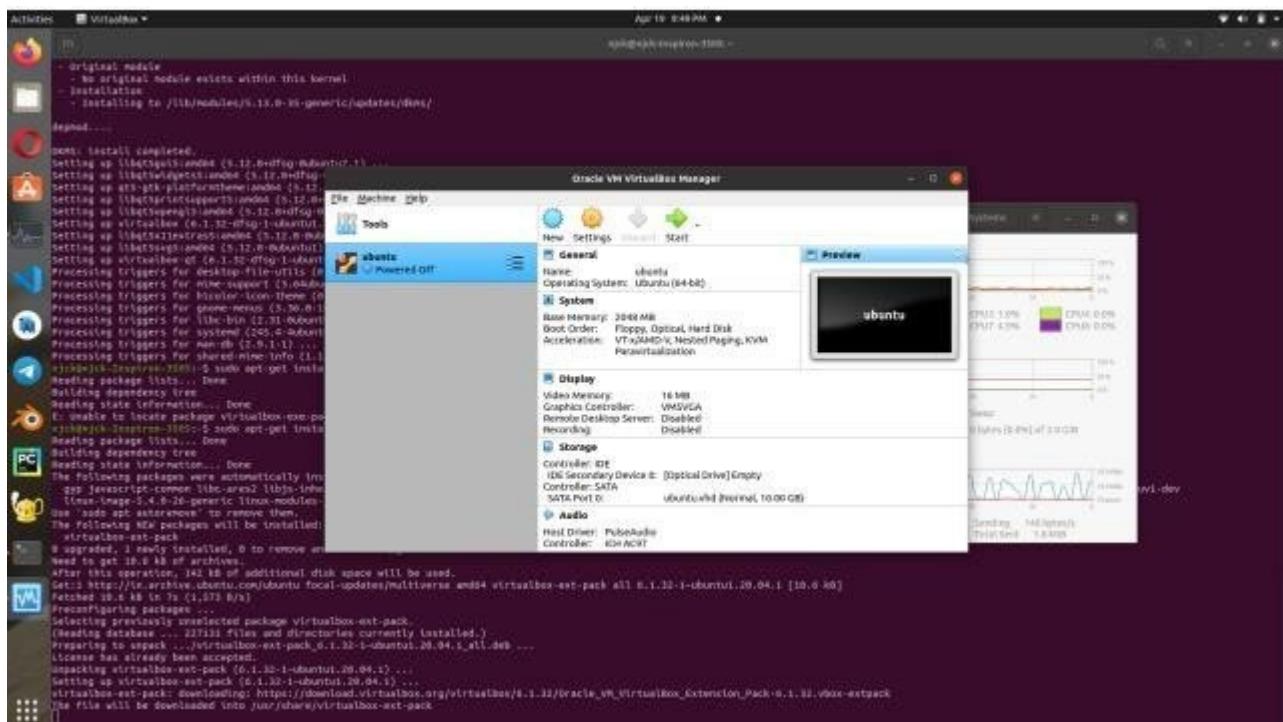


Select Dynamically allocated memory. Click-

>Next



Select size of the virtualbox Click->create



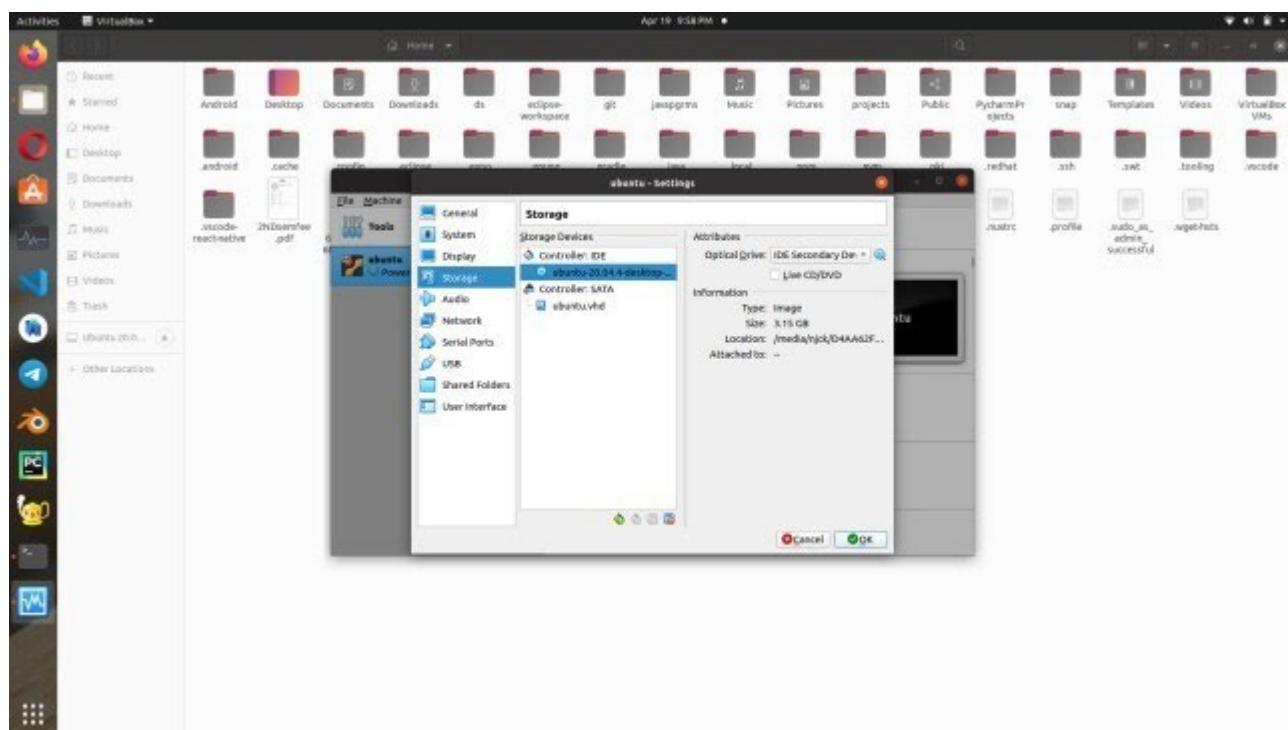
Settings -> General-> Advanced

Set Shared clipboard and Drag 'n' Drop as Bidirectional.

Click -> ok

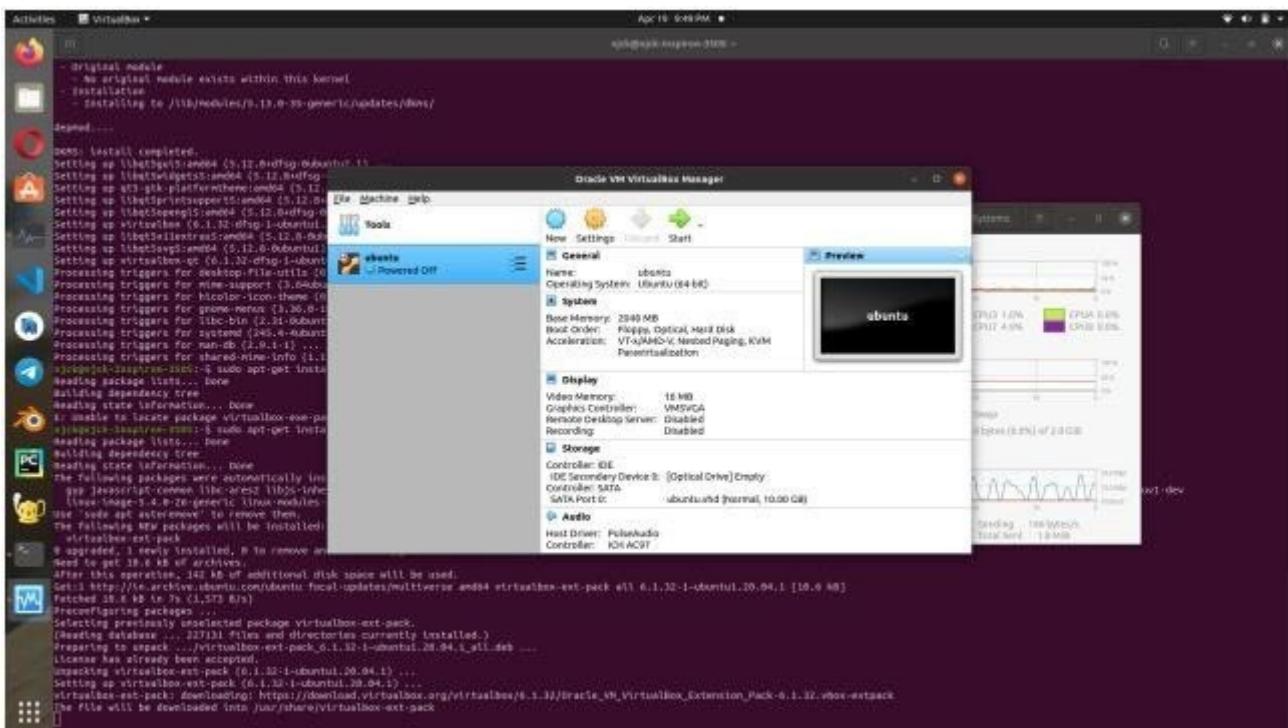
Download Ubuntu from <https://ubuntu.com/download/desktop/>

this site.

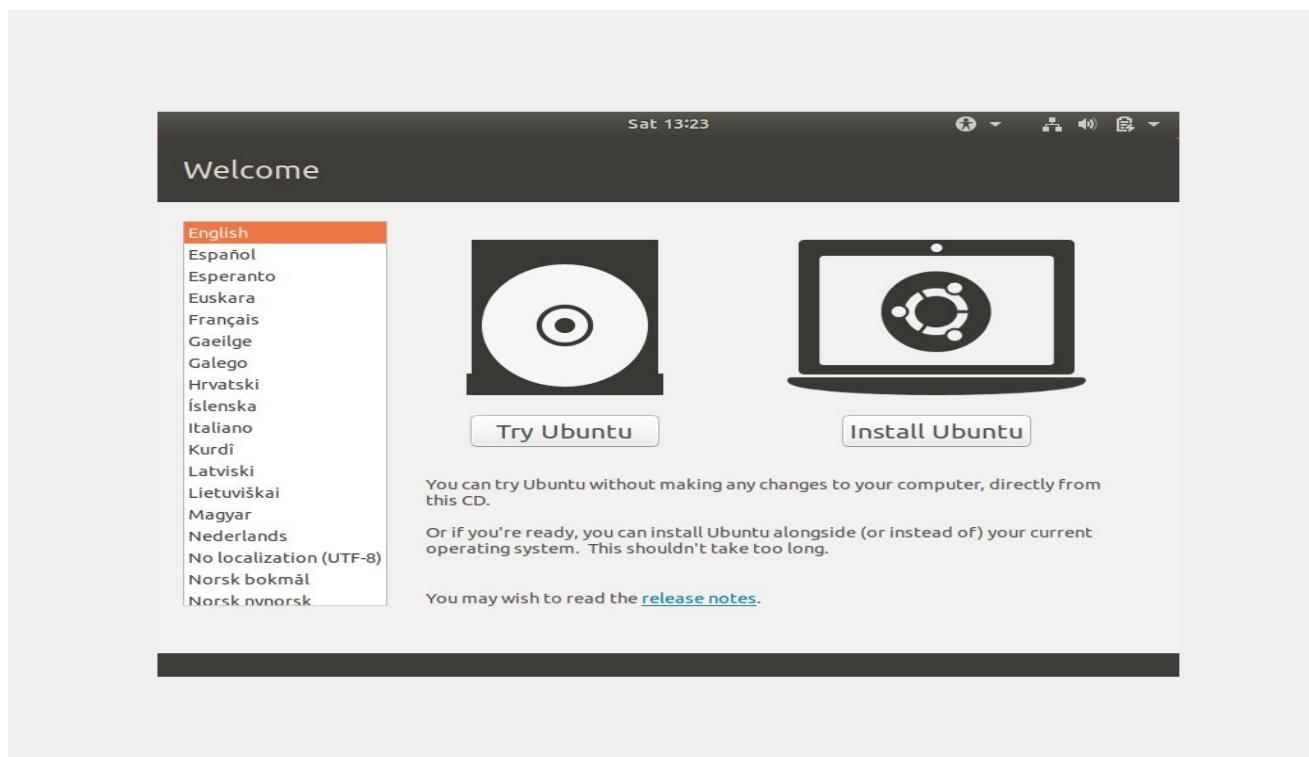


Settings->Storage->Attributes->optical Drive select
downloaded ubuntu iso file.

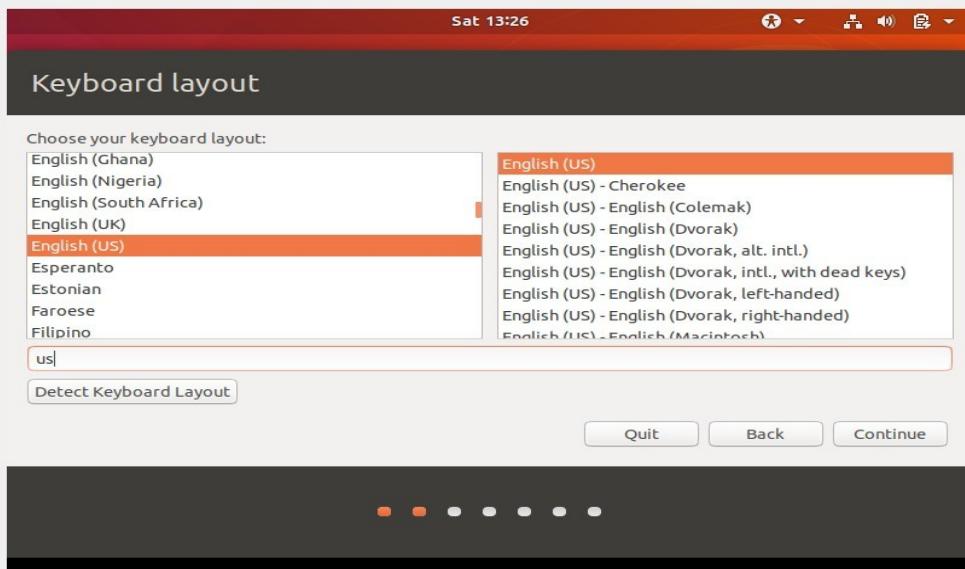
Click -> ok



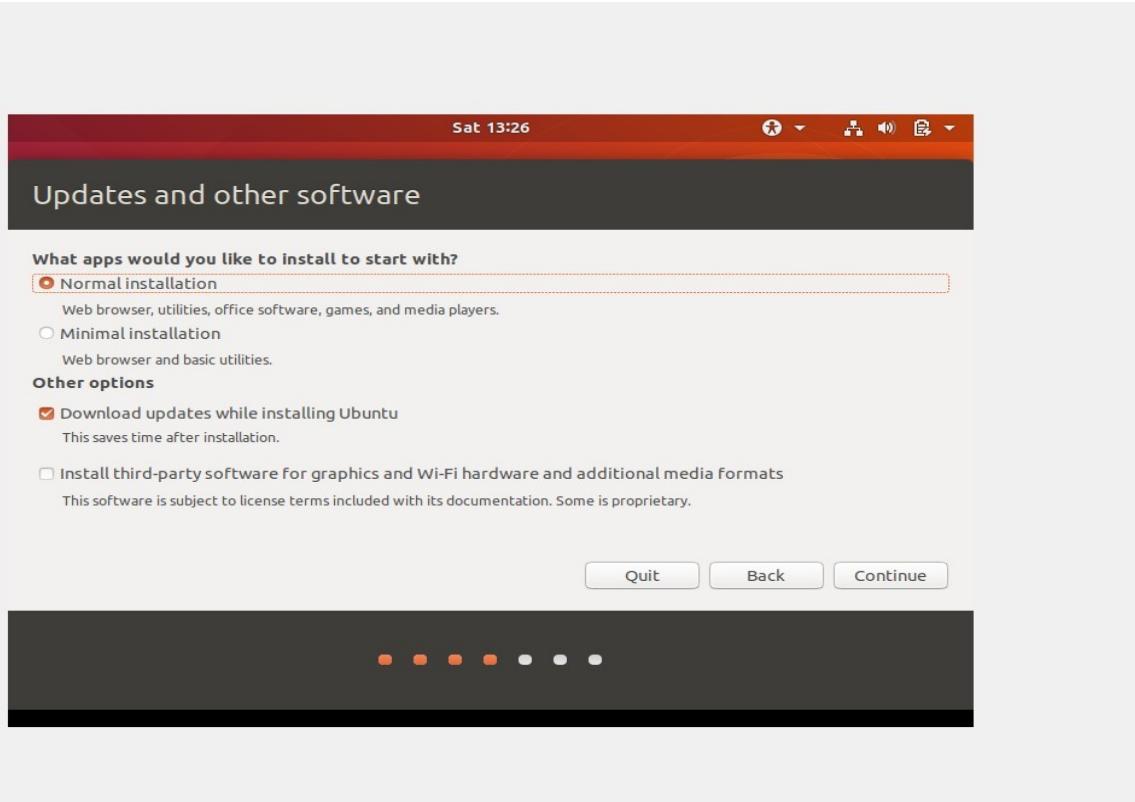
Click-> Start



Click Install Ubuntu

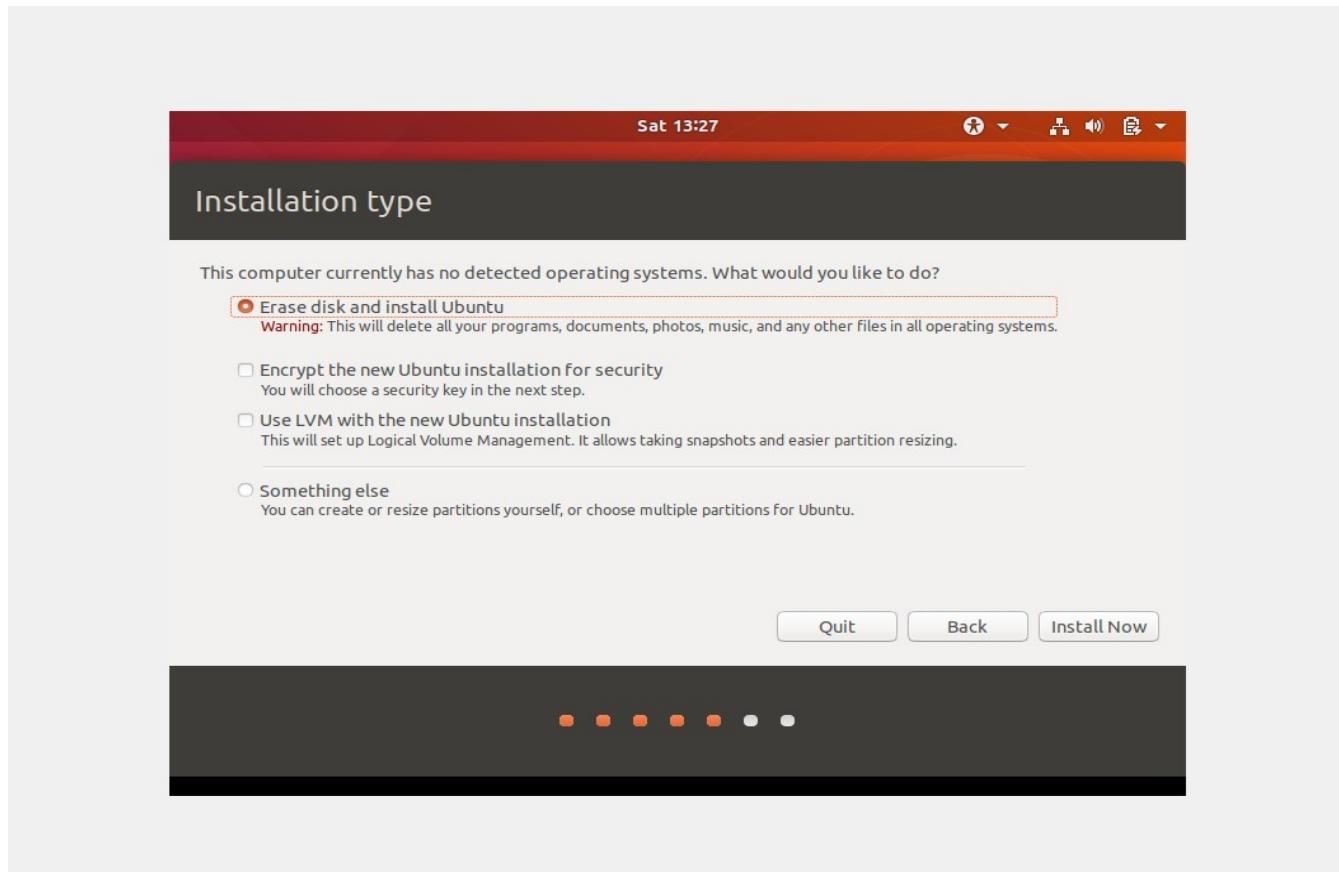


Click -> Continue

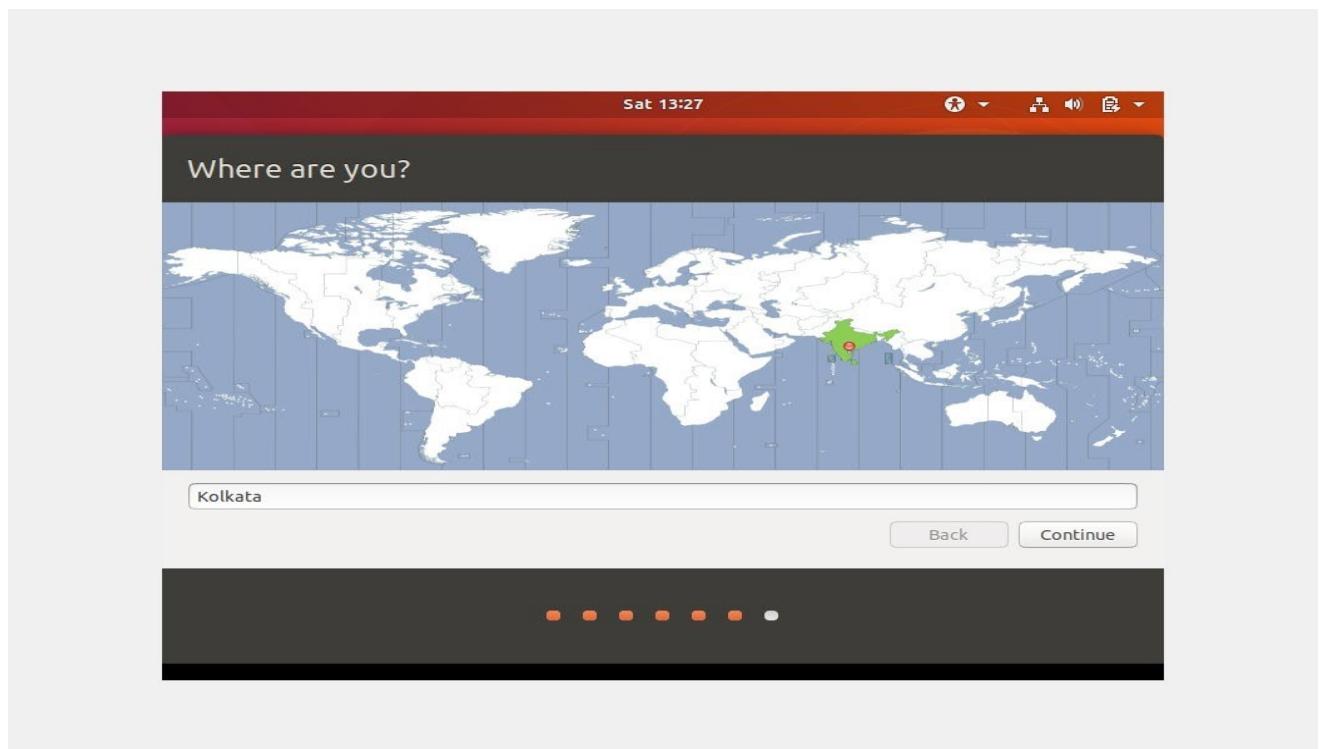


Select Normal installation and Download updates while installing ubuntu.

Click->continue

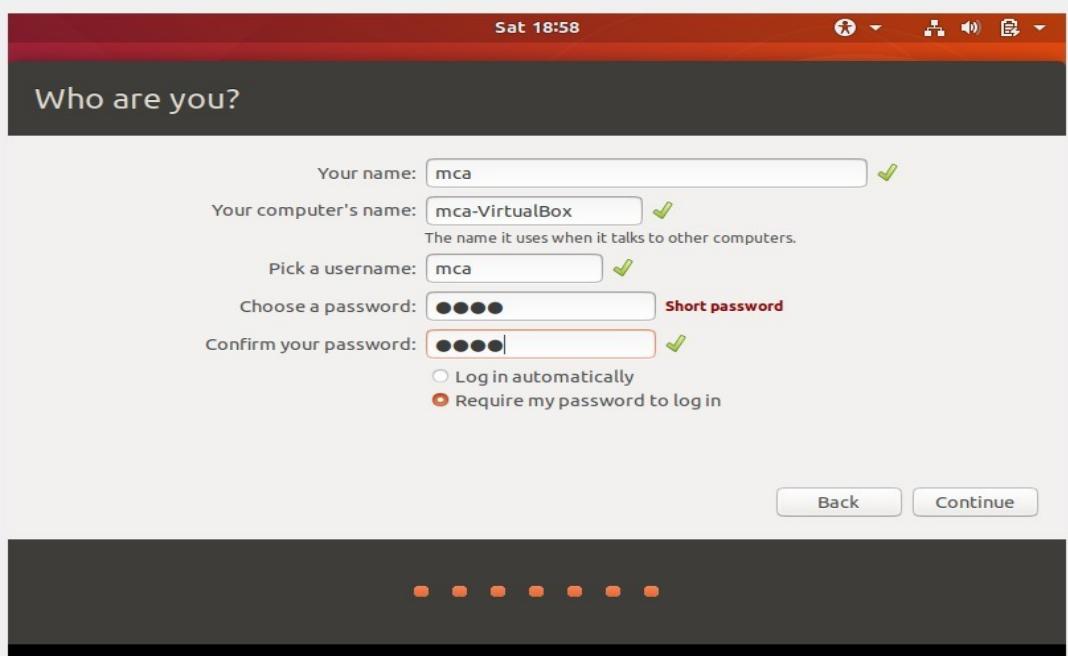


Click on-> Install Now



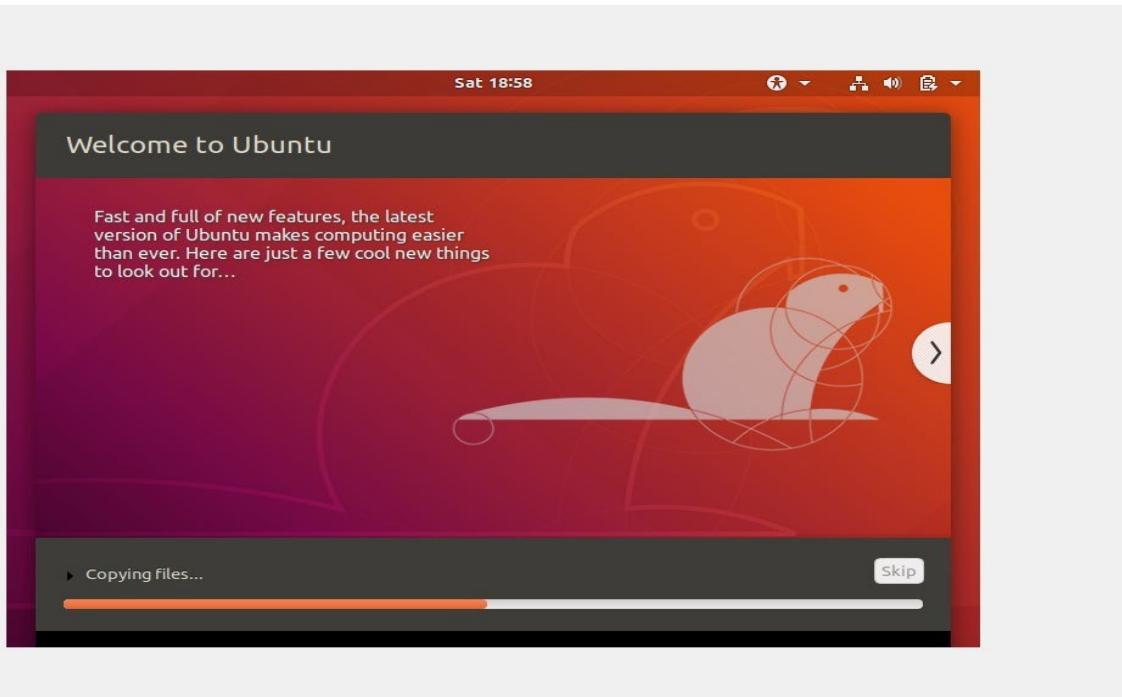
Select India

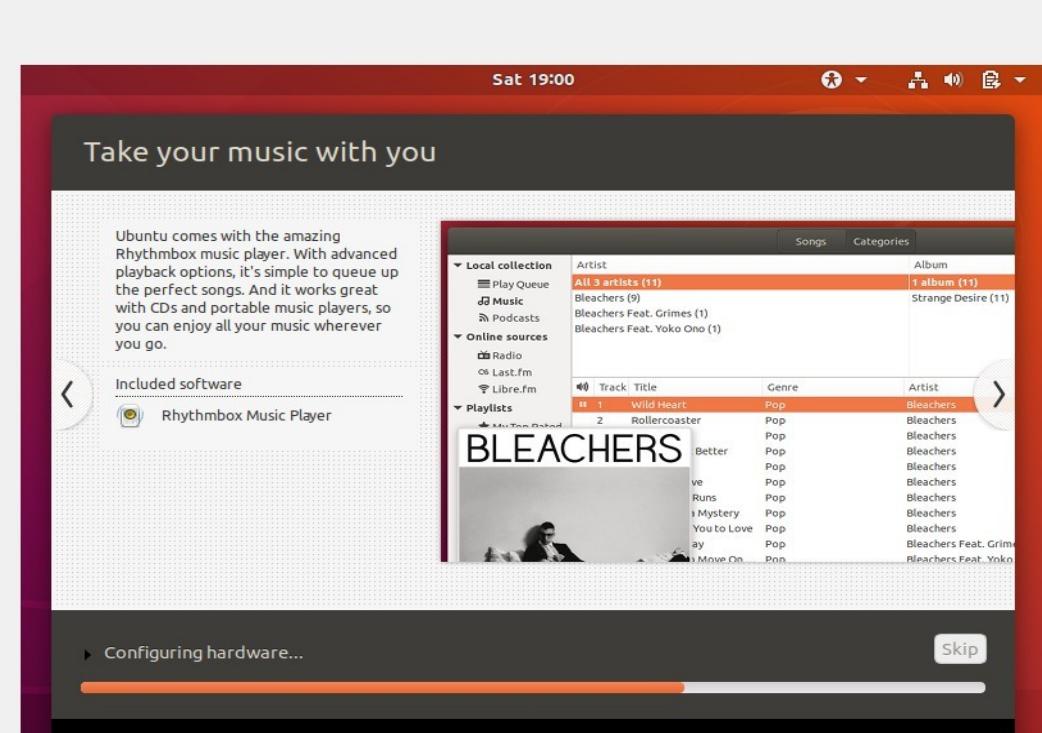
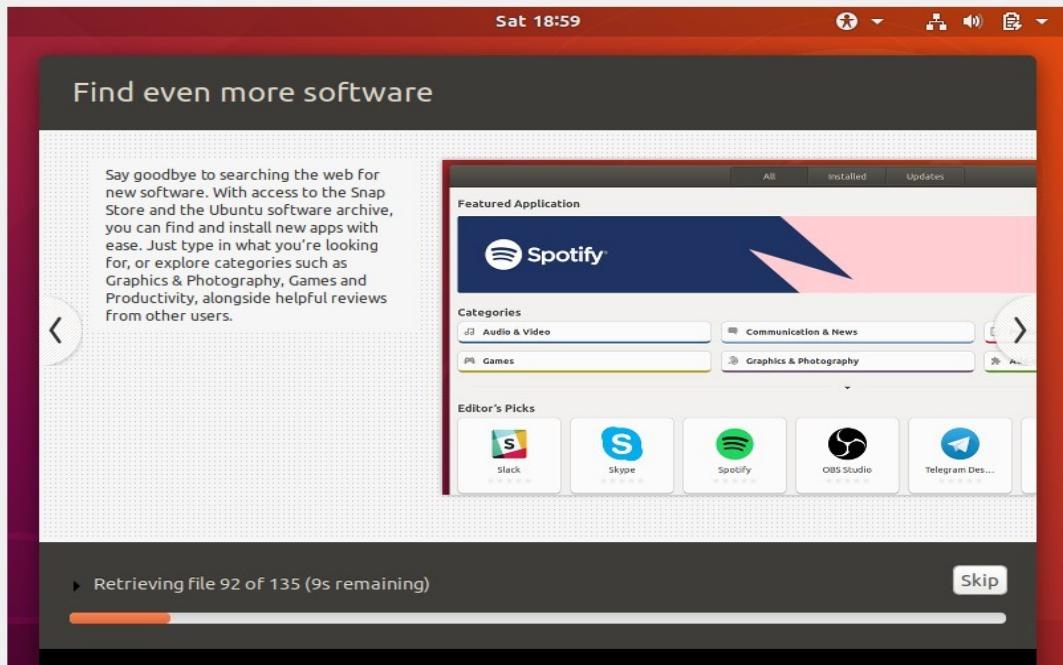
Click on -> Continue

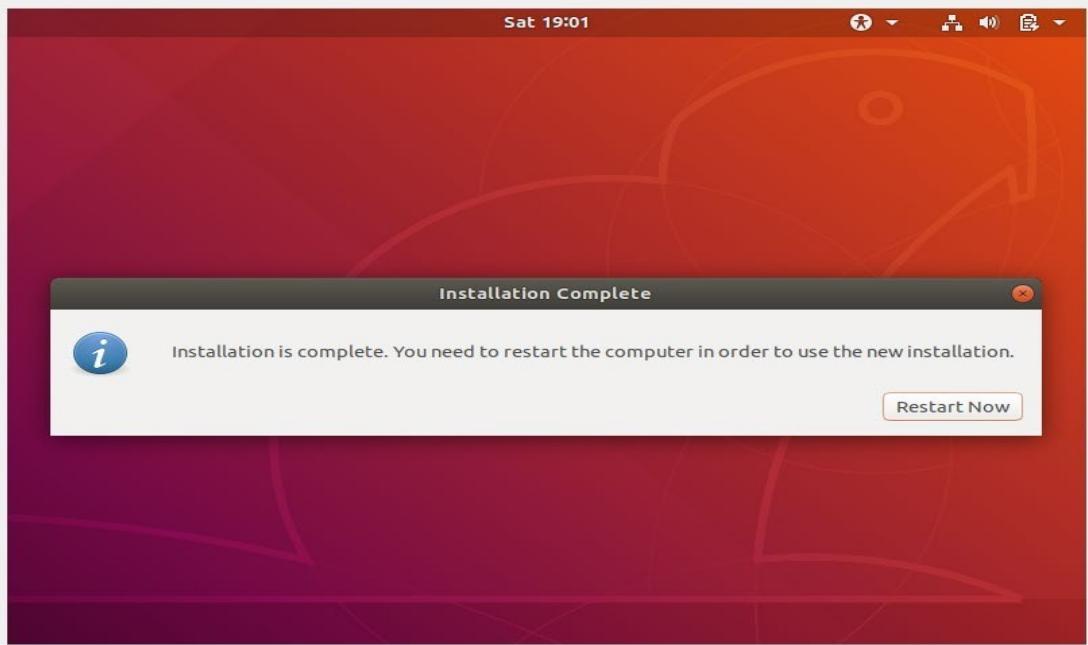


set Username and Password

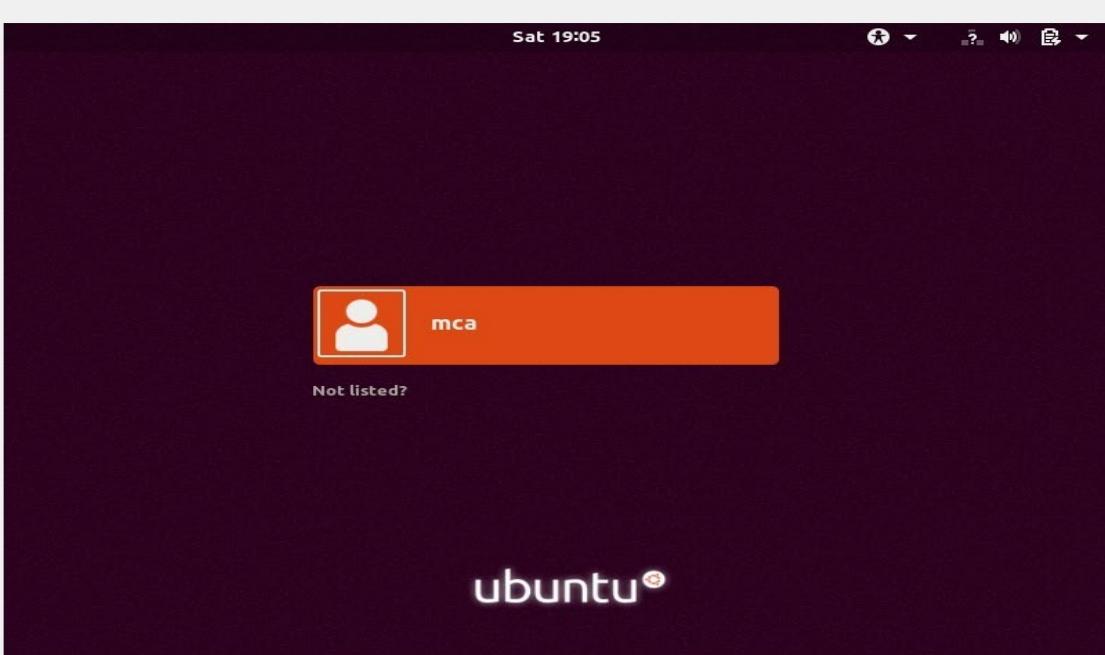
Click on -> Continue







Click -> Restart Now



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.

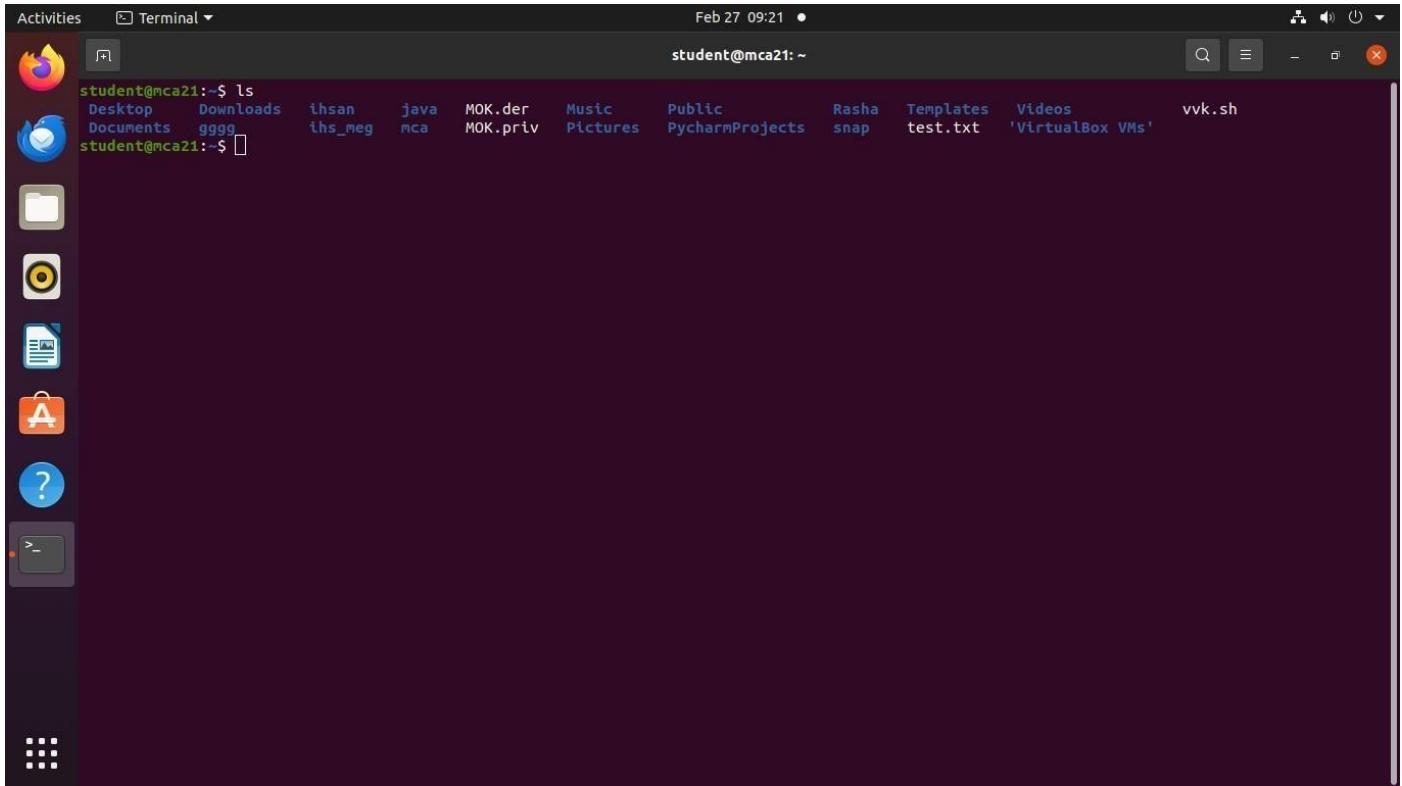
1. man
2. ls, echo, read
3. more, less, cat
4. cd, mkdir, pwd, find
5. mv, cp, rm ,tar
6. wc, cut, paste
7. head, tail, grep, expr
8. chmod, chown
9. Redirections & Piping
10. useradd, usermod, userdel, passwd
11. df,top, ps
- 12 ssh, scp, ssh-keygen, ssh-copy-id

BASIC LINUX COMMANDS

ls: List the directory (folder) system.

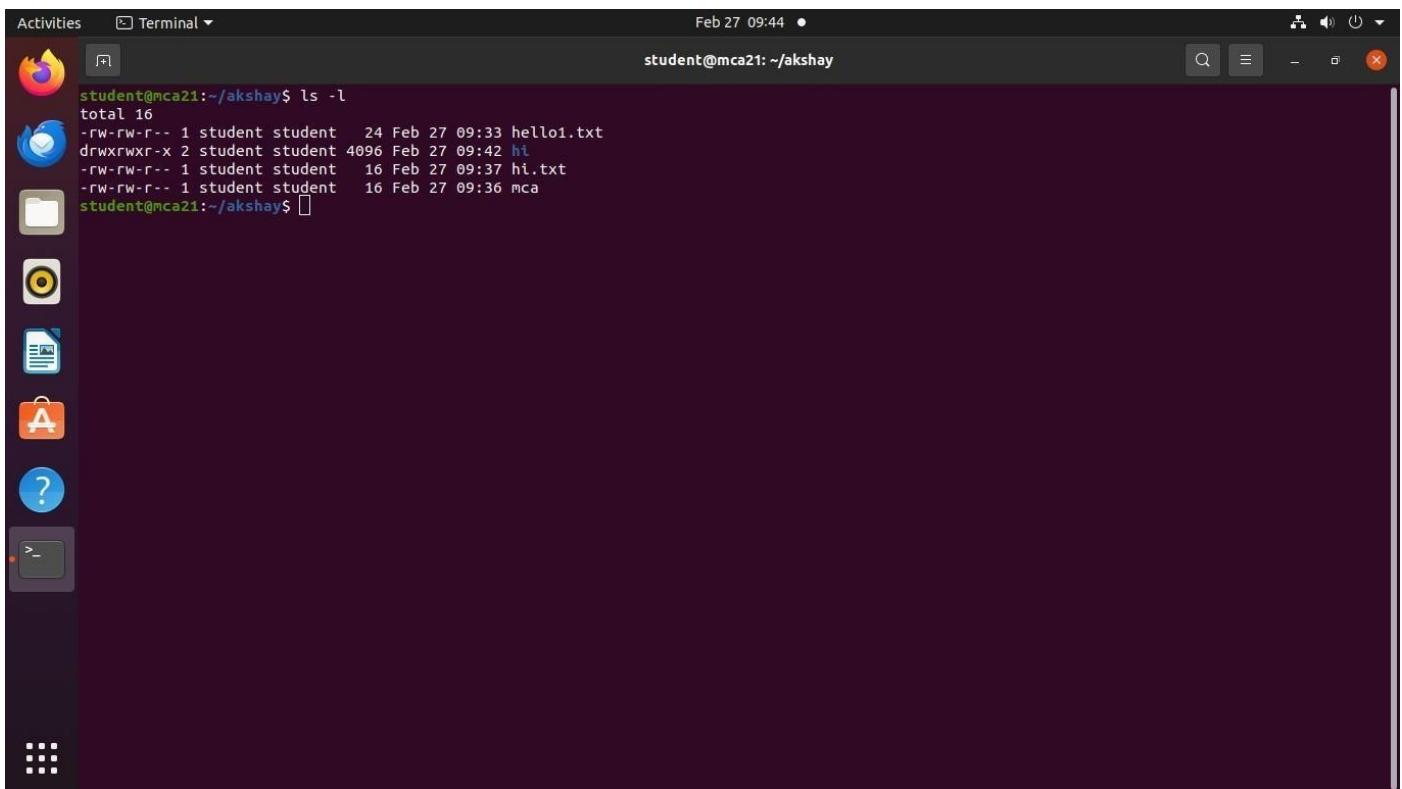
ls -a: Will show the hidden file.

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



A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for Dash, Home, Applications, Documents, Files, Terminal, Help, and a search bar. The main area shows a terminal window titled "Terminal". The terminal output is as follows:

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



A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for Dash, Home, Applications, Documents, Files, Terminal, Help, and a search bar. The main area shows a terminal window titled "Terminal". The terminal 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

```
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.

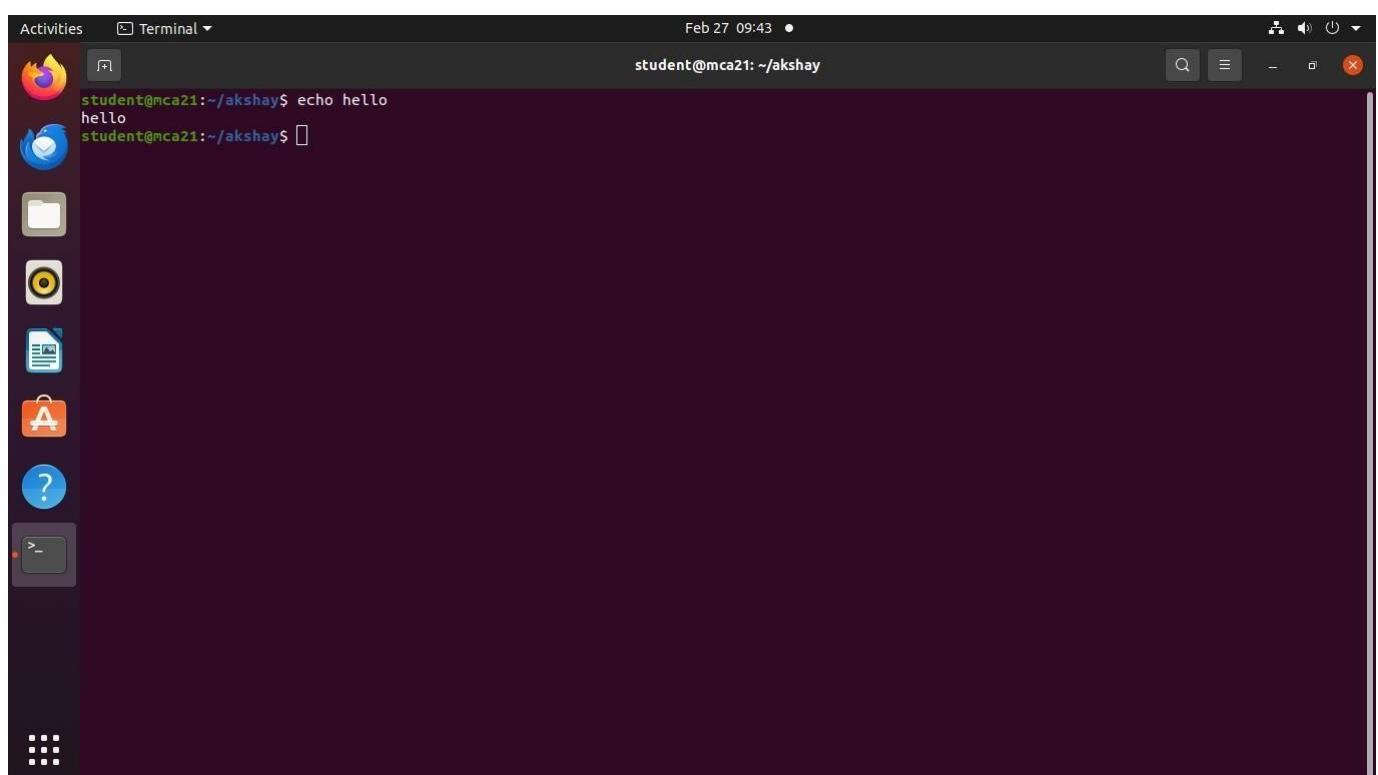
  -a, --all
    do not ignore entries starting with .

  -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 the Dash, Home, Applications, Files, Terminal, and Help. 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$
```

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
gbgfdedbngfngnhnmhj
gfdgfffffff
fdggfgkfovklf
dcdcvdokd
deedhfugduhjd
dcjkdhnvckkkkkkkkkf
fdfdhhhhhjhj
vckjnnnnnnnnn
safdhksjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
dhvvvvvvvvvvvvvvvvvvvcv
dsssssssjcncdd
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.

```

mca@mca-HEIM-S:~-
      # dash, precede the filerlist with "--".
      .
      . The file to edit is read from stdin. Commands are read from stderr, which should be a tty.
      -t (tag) The file to edit and the initial cursor position depends on a "tag", a sort of goto label. (tag) is looked up in the tags file, the associated file becomes the current file and the associated command is executed. Mostly this is used for C programs, in which case (tag) could be a function name. The effect is that the file containing that function becomes the current file and the cursor is positioned on the start of the function. See ":help tag-commands".
      .
      .q [errortfile]
      Start in quickFix mode. The file [errortfile] is read and the first error is displayed. If [errortfile] is omitted, the filename is obtained from the 'errortfile' option (defaults to "Atecc.Err" for the Amiga, "errors.err" on other systems). Further errors can be jumped to with the "icn" 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 eview   The GUI version in easy mode. Starts a new window. Can also be done with the "-y" argument.
      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-pattern" for the available search patterns.
      .
      .(command)
      Manual page vim(1) line 41 (press h for help or q to quit)
  
```

Cat :

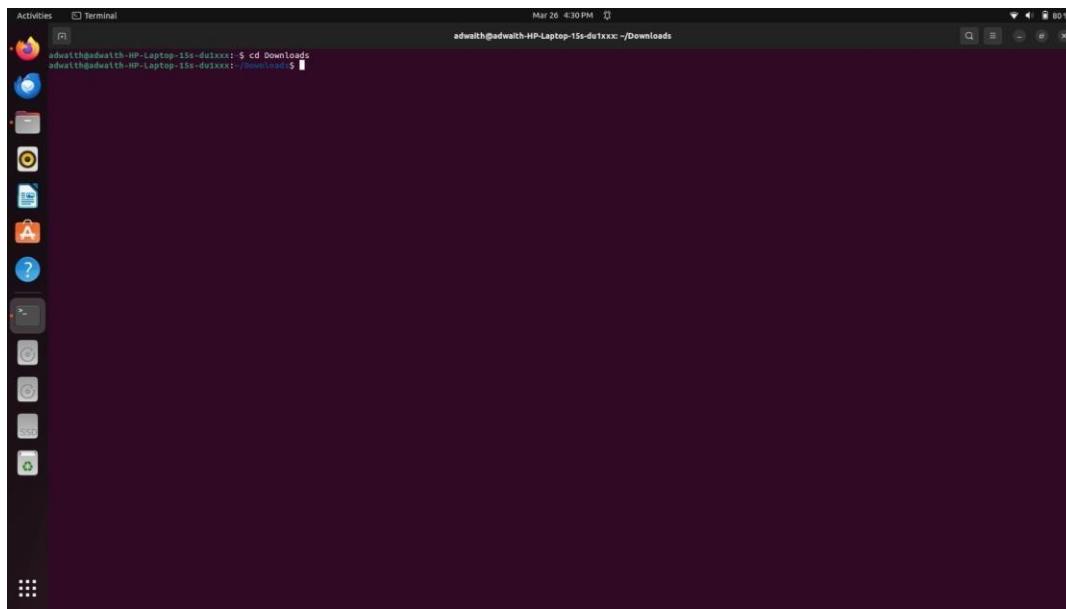
It is used to list the contents of a file on the standard output.

```

Activities Terminal ▾ Feb 27 11:40 •
student@mca21: ~/Desktop
student@mca21:~/Desktop$ cat -n nsd.txt
  1  hdhsjkbbc
  2  dcfcd
  3  vfvfb
  4  fvdfb
  5  dvfdbfdb
  6  bfgfbngfnhbnm
  7  h
  8  fbgfbgnbg
  9  gnhg
 10 n
 11 h
 12 nhognhgnhnmnnnnnnnnnndgfhbfbgbgf
 13 fbgbg
 14 gbgfdbngfnghnvhj
 15 gfdgffffffffffff
 16 fdggfkgfovklf
 17 dcdcdvdkd
 18 deedhfugduhjd
 19 dcjkdhnvcckkkkkkkkf
 20 fdfdhhhhhhj
 21 vckjnnnnnnnn
 22 safdhksjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
 23 dhvvvvvvvvvvvvvvvcv
 24 dssssssjcnddd
 25 ccccccccccccccccccx
 26
student@mca21:~/Desktop$ 
  
```

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 containing 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, showing the user's home directory. The desktop background is dark purple.

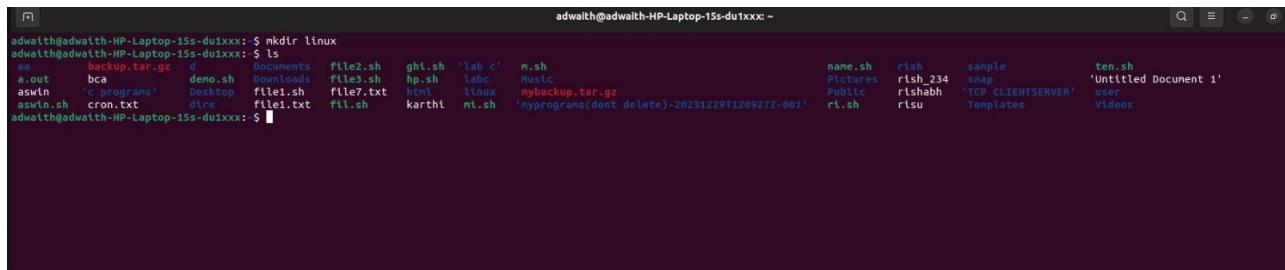
```
adwraith@adwraith-HP-Laptop-15s-du1xxx: ~
```

```
adwraith@adwraith-HP-Laptop-15s-du1xxx: ~$ cd Downloads
```

```
adwraith@adwraith-HP-Laptop-15s-du1xxx: ~/Downloads$
```

mkdir :

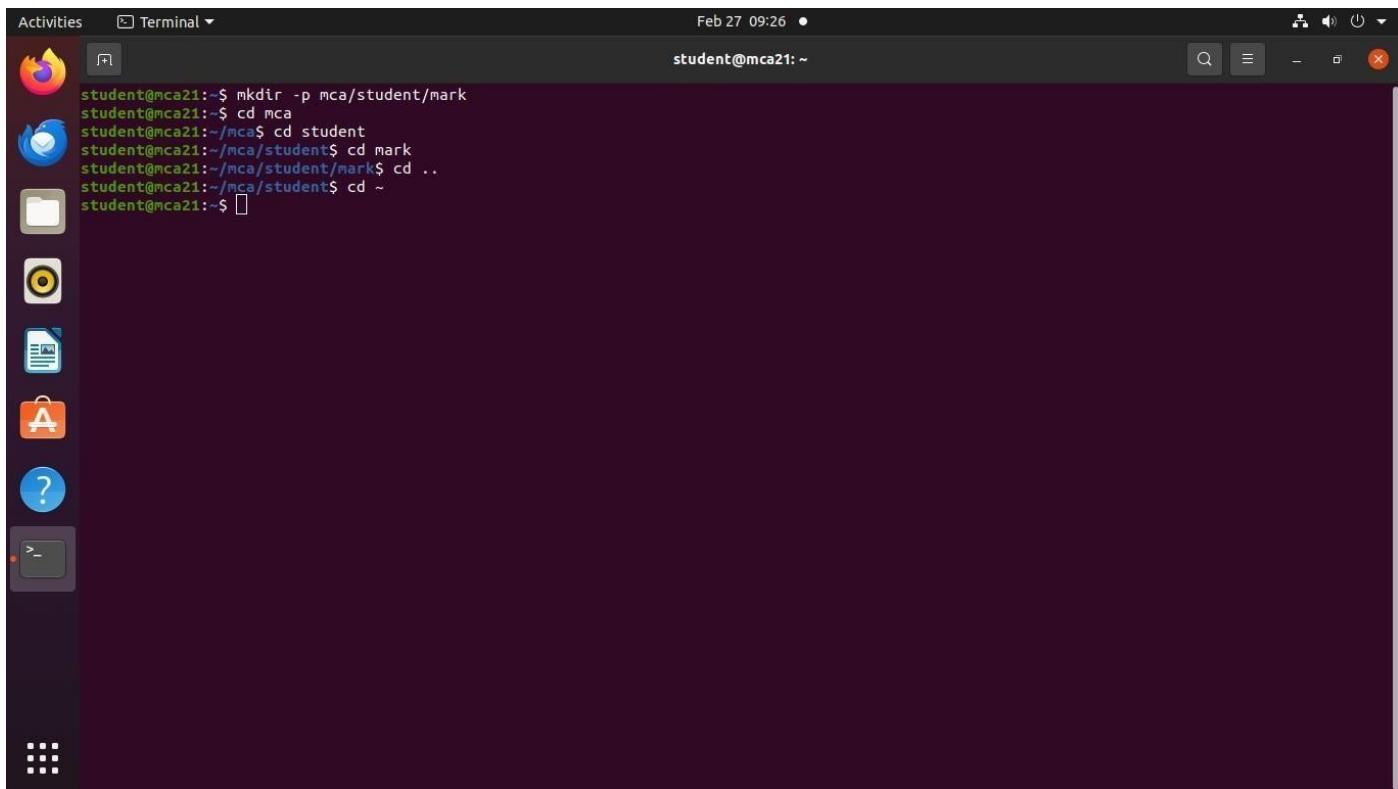
Create a new directory (folder).

A screenshot of a Linux terminal window. The user has run the command 'mkdir linux' to create a new directory named 'linux'. The terminal then lists all files and directories in the current directory, which includes a tar.gz file, several shell scripts, and other files like 'mybackup.tar.gz' and 'myprograms(dont delete)-20231229T120927Z-001'.

```
adwraith@adwraith-HP-Laptop-15s-du1xxx: ~$ mkdir linux
```

```
adwraith@adwraith-HP-Laptop-15s-du1xxx: ~$ ls
```

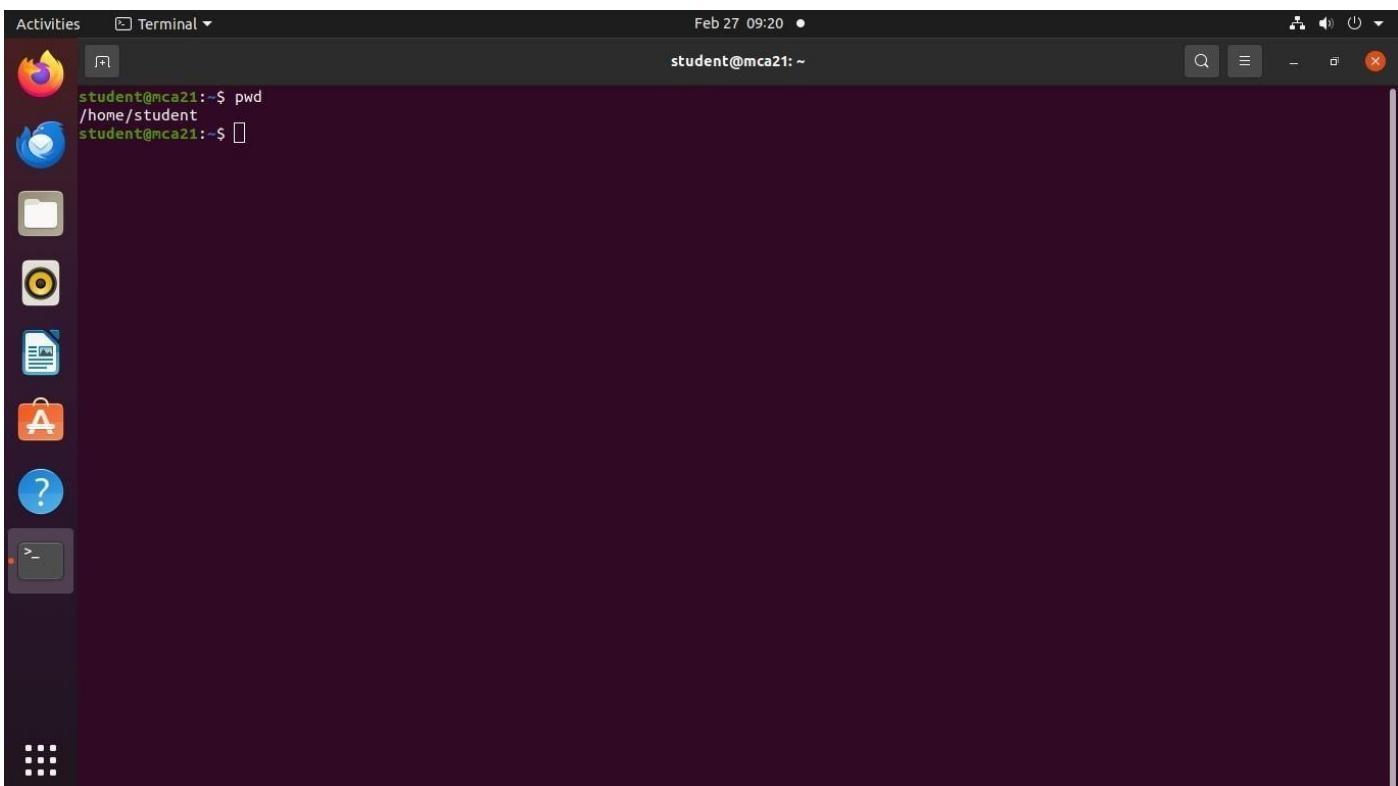
```
aa backup.tar.gz d Documents file2.sh ghi.sh 'lab c' m.sh  
a.out bca demo.sh Downloads file3.sh hp.sh labc Music  
asln 'c programs' Desktop file1.sh file7.txt html linux mybackup.tar.gz  
asln.sh cron.txt dire file1.txt fil.sh karthi ml.sh 'myprograms(dont delete)-20231229T120927Z-001'  
adwraith@adwraith-HP-Laptop-15s-du1xxx: ~$
```

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" with the command line "student@mca21:~\$". The terminal history shows:

```
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" with the command line "student@mca21:~\$". The terminal history shows:

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

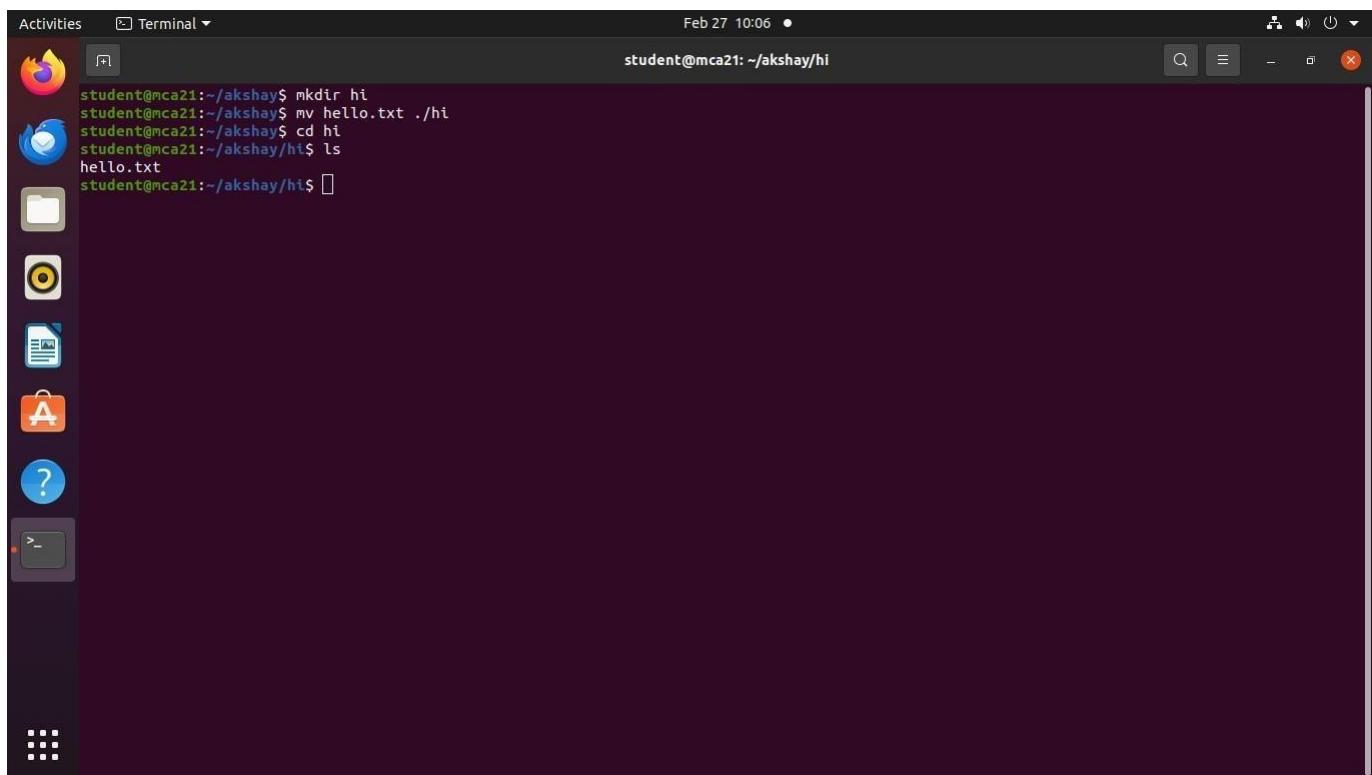
find :

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 :

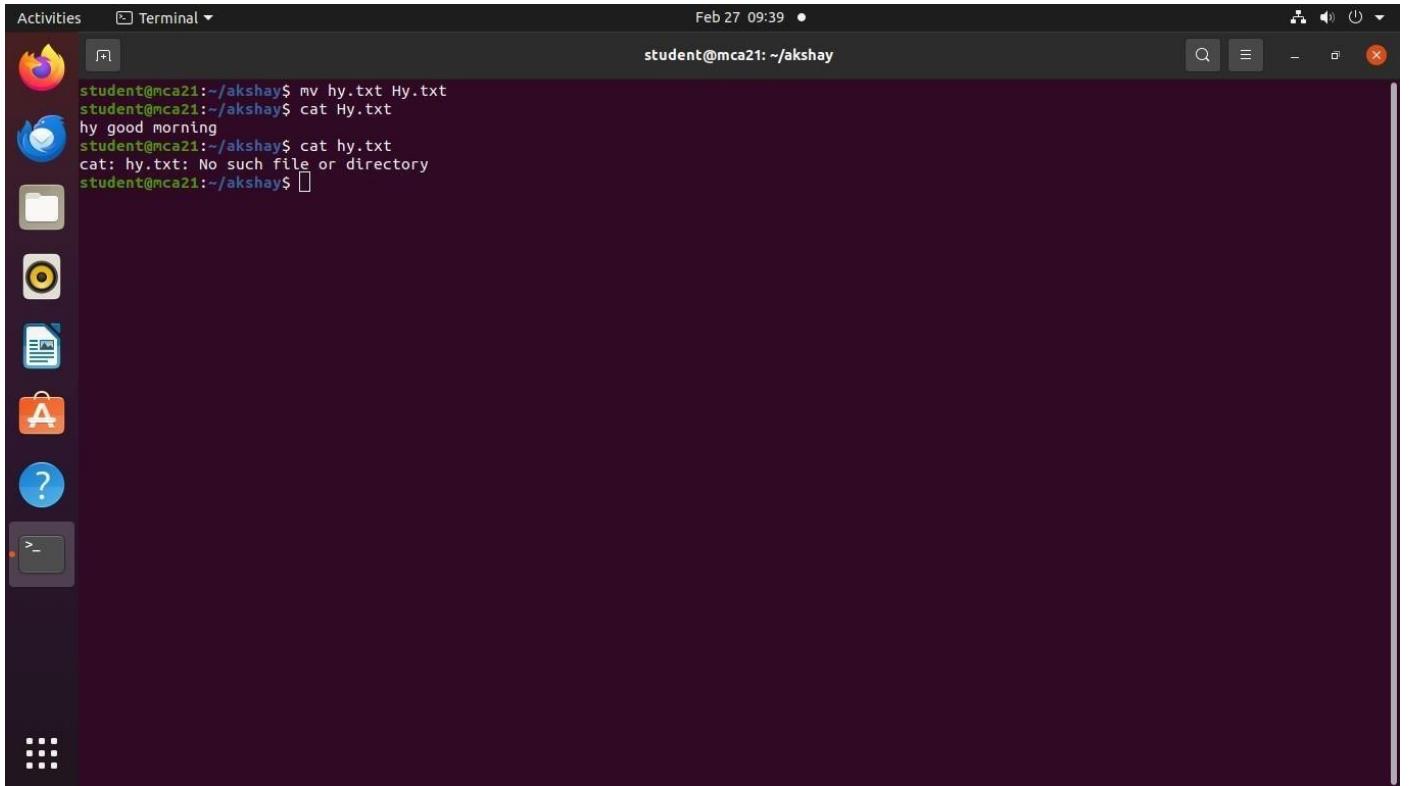
It is used to move one or more files or directories from one place to another in a file system like unix.



The image shows a screenshot of an Ubuntu desktop environment. On the left, there's a dock with various icons: Dash, Home, Applications, Help, and others. In the center, a terminal window is open with the following command history:

```
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$
```

The terminal window has a dark theme. At the top, it shows "Activities Terminal" and the date "Feb 27 10:06". The title bar says "student@mca21: ~/akshay/hi". To the right of the terminal, there's a file manager window showing a single file named "hello.txt" in a folder named "hi".

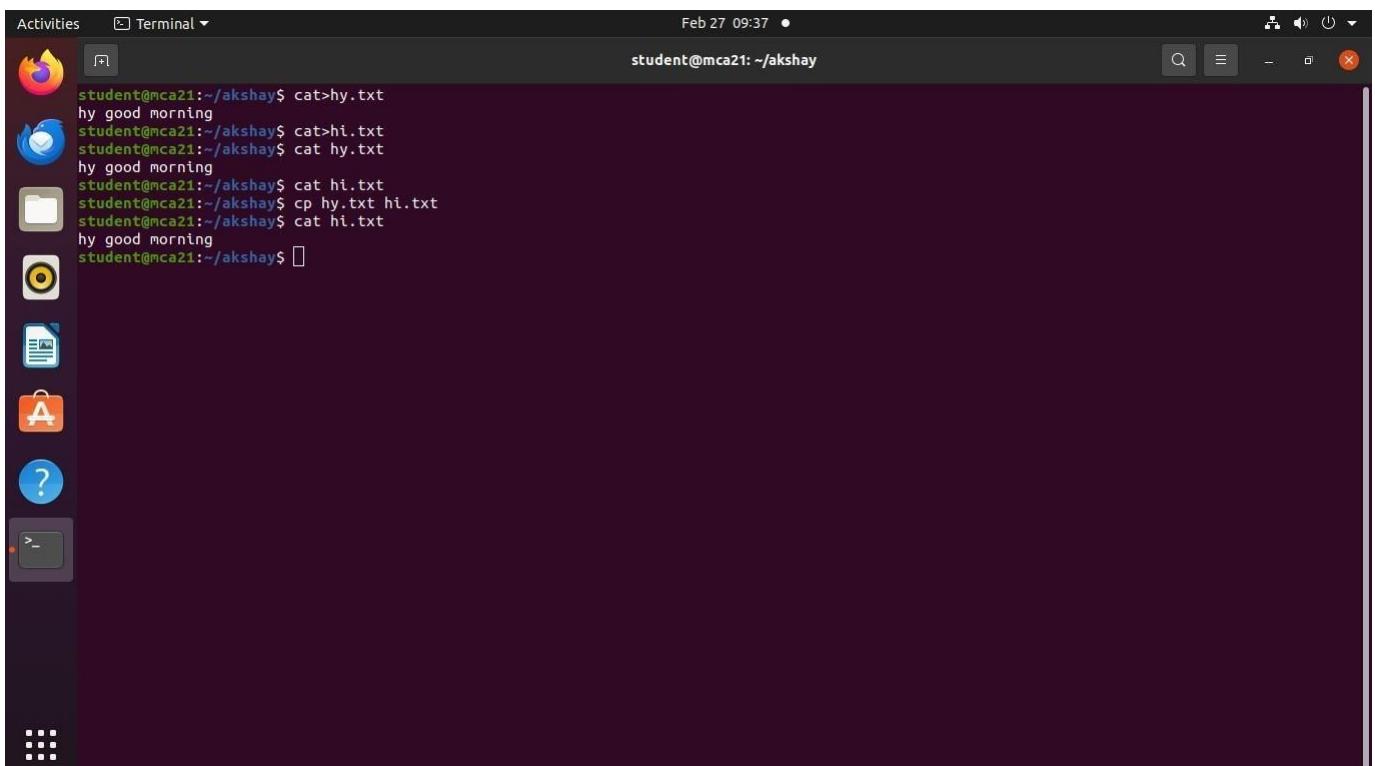


Activities Terminal Feb 27 09:39 ● student@mca21: ~/akshay

```
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.

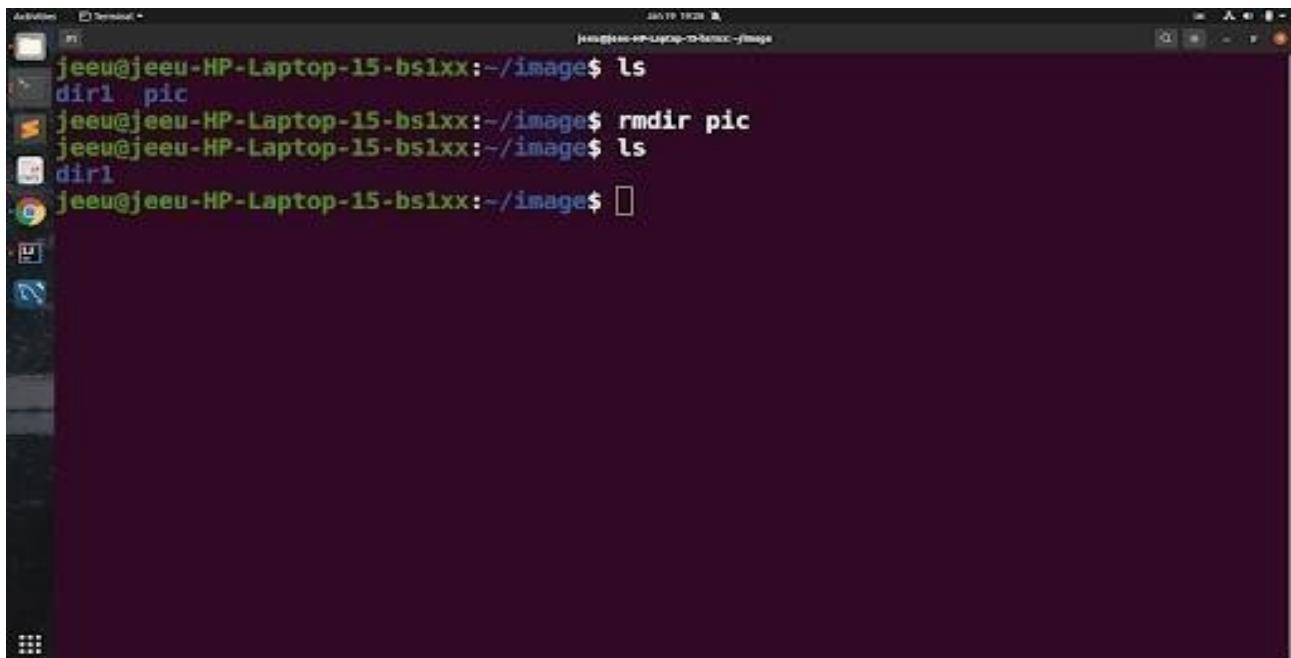


Activities Terminal Feb 27 09:37 ● student@mca21: ~/akshay

```
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.



```
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$
```

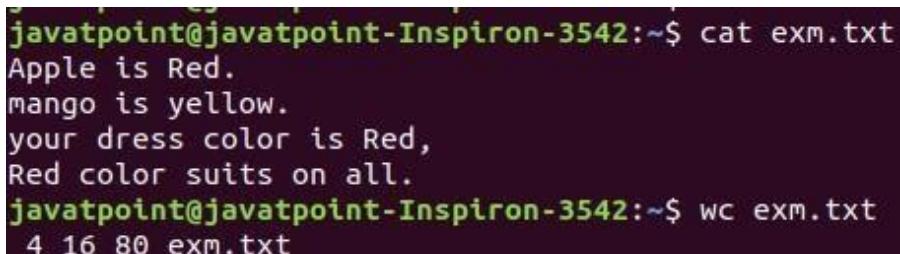
tar :

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
dr
-r
-r
-r
-r
dr
-r
-r
dr
dr
dr
dr
dr
dr
dr
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 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
vfvfb
```

tail :

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

```
student@mca21:~/Desktop$ tail nsd.txt
dcdcvdokd
deedhfugduhjd
dcjkdhnvckkkkkkkkkkf
fdfdhhhhhhhj
vckjnnnnnnnnn
safdhksjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjjj
dhvvvvvvvvvvvvvvvvvvvvvvvvv
dsssssssjcncdd
cccccccccccccccccccx
```

grep :

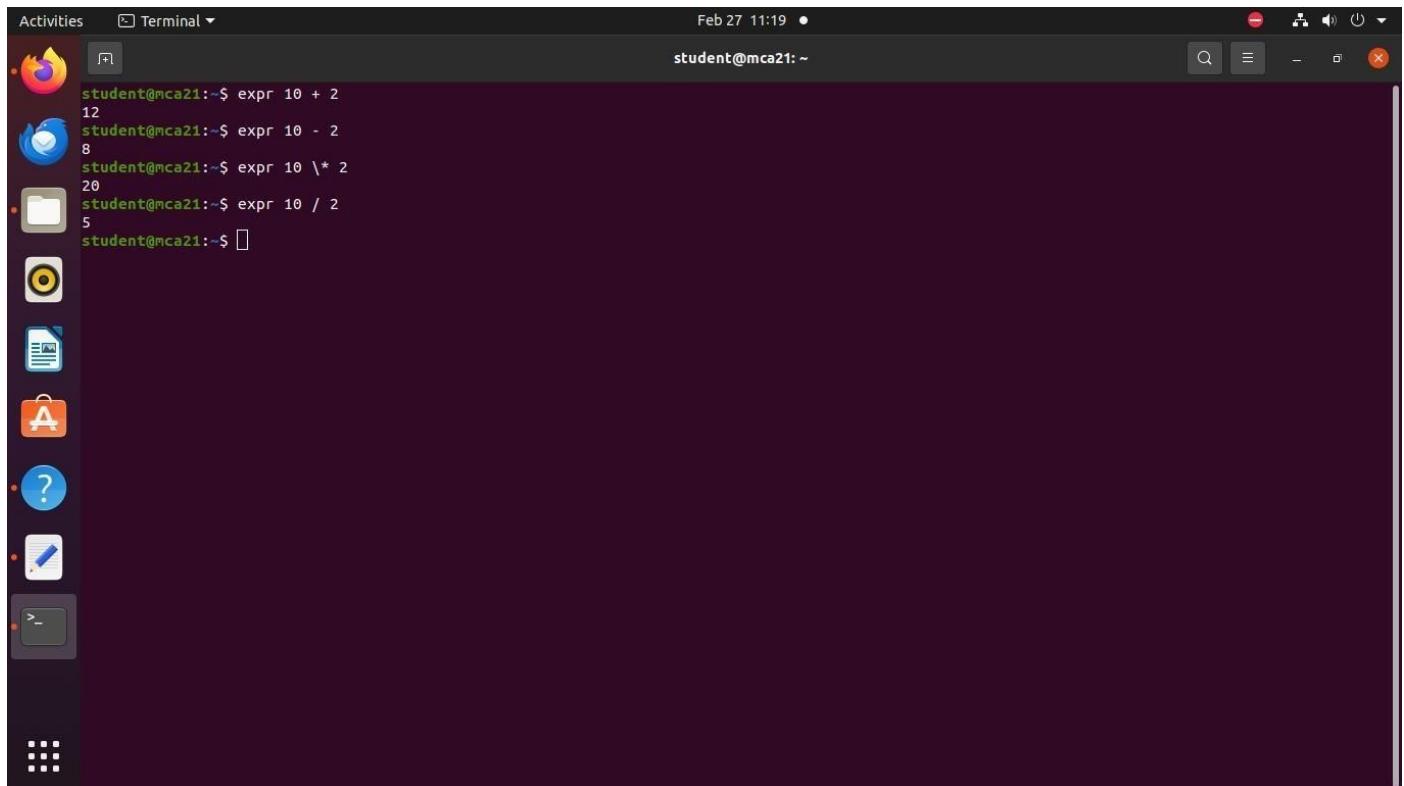
Grep command is used to search through all the text in a given file.



```
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.

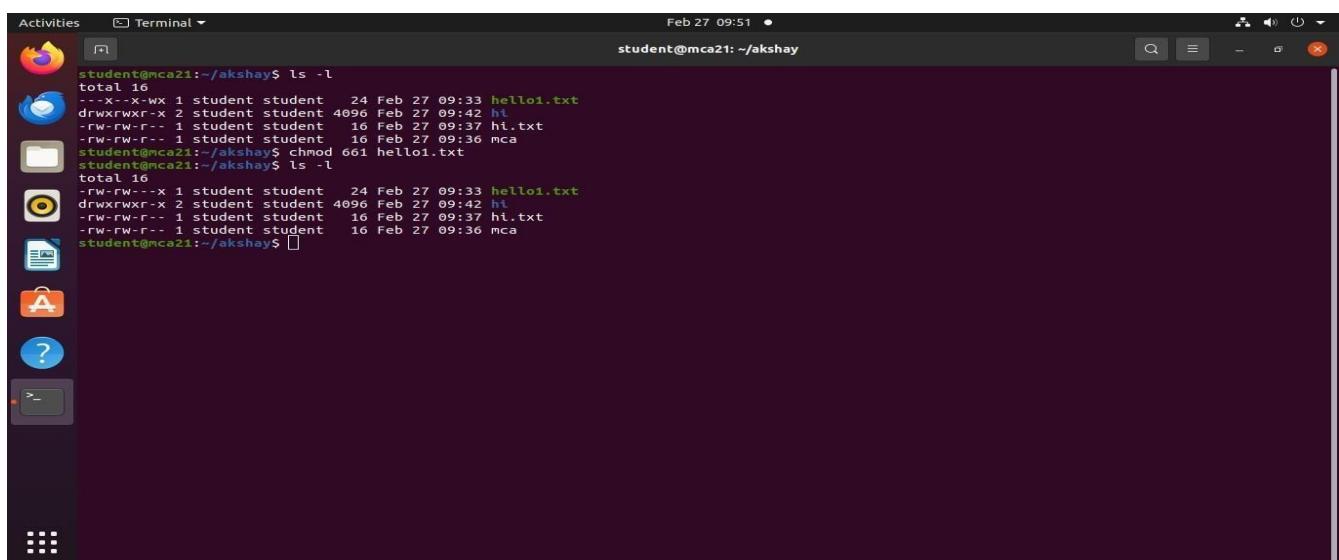


A screenshot of an Ubuntu desktop environment. On the left is a vertical dock with icons for Dash, Home, Activities, Applications, Help, and a terminal window. The main area shows a terminal window titled 'Terminal' with the command 'student@mca21:~\$'. The terminal displays the following output:

```
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 vertical dock with icons for Dash, Home, Activities, Applications, Help, and a terminal window. The main area shows a terminal window titled 'Terminal' with the command 'student@mca21:~/akshay\$'. The terminal displays the following output:

```
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 ht
-rw-rw-r-- 1 student student 16 Feb 27 09:37 ht.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-r-- 1 student student 24 Feb 27 09:33 hello1.txt
drwxrwxr-x 2 student student 4096 Feb 27 09:42 ht
-rw-rw-r-- 1 student student 16 Feb 27 09:37 ht.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
-rwxr-w-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 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-r--xr-x 1 mca mca 8980 Nov 16 13:29 examples.desktop
-rw-rw-rxr-x 1 mca mca 6 May 7 14:42 file1.txt
-rw-rw-rxr-x 1 mca mca 0 May 7 14:24 file.txt
-rw-rw-rxr-x 1 mca mca 779 May 7 14:49 linux.txt
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Music
-rw-rw-rxr-x 1 mca mca 0 May 7 14:21 new1.txt
-rw-rw-rxr-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
drwxr-wxr-x 2 mca mca 4096 Mar 14 15:26 vismaya
-rw-rw-rxr-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-r--xr-x 1 mca mca 8980 Nov 16 13:29 examples.desktop
-rw-rw-rxr-x 1 mca mca 6 May 7 14:42 file1.txt
-rw-rw-rxr-x 1 mca mca 0 May 7 14:24 file.txt
-rw-rw-rxr-x 1 mca mca 779 May 7 14:49 linux.txt
drwxr-xr-x 2 mca mca 4096 Nov 16 13:36 Music
-rw-rw-rxr-x 1 mca mca 0 May 7 14:21 new1.txt
-rw-rw-rxr-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
drwxr-wxr-x 2 mca mca 4096 Mar 14 15:26 vismaya
-rw-rw-rxr-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 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 - 10:20:03 up 25 min, 1 user, load average: 0.01, 0.52, 0.41
Tasks: 267 total, 10 running, 165 sleeping, 0 stopped, 90 zombie
CPU(s): 4.8% us, 4.8% sy, 0.0% id, 1.2% wa, 0.0% hi, 0.0% si, 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     TIME+ COMMAND
15183 adwath  20   0  559100 56044 43938 R 45.5  0.7 0:00.66 gnome-terminal-
1595 adwath  20   0  5635184 268780 128866 S 27.3  3.4 1:27.77 gnome-shell
2426 adwath  20   0  11.6g 370660 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_flushq
  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_kthred
 13 root     20   0      0      0   0 I 0.0  0.0 0:00.00 rcu_tasks_trace_kthred
 14 root     20   0      0      0   0 S 0.0  0.0 0:00.07 ksoftirqd/0
 15 root     20   0      0      0   0 I 0.0  0.0 0:01.17 rcu_prempt
 16 root     rt   0      0      0   0 S 0.0  0.0 0:00.01 migration/0
 17 root     -51   0      0      0   0 S 0.0  0.0 0:00.00 idle_inject/0
 19 root     20   0      0      0   0 S 0.0  0.0 0:00.00 cpuhp/0
 20 root     20   0      0      0   0 S 0.0  0.0 0:00.00 cpuhp/1
 21 root     -51   0      0      0   0 S 0.0  0.0 0:00.00 idle_inject/1
 22 root     rt   0      0      0   0 S 0.0  0.0 0:00.00 migration/1
 23 root     20   0      0      0   0 S 0.0  0.0 0:00.00 ksoftirqd/1
top - 10:29:06 up 25 min, 1 user, load average: 0.81, 0.52, 0.41
```

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: ~
```

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=0.955 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

```

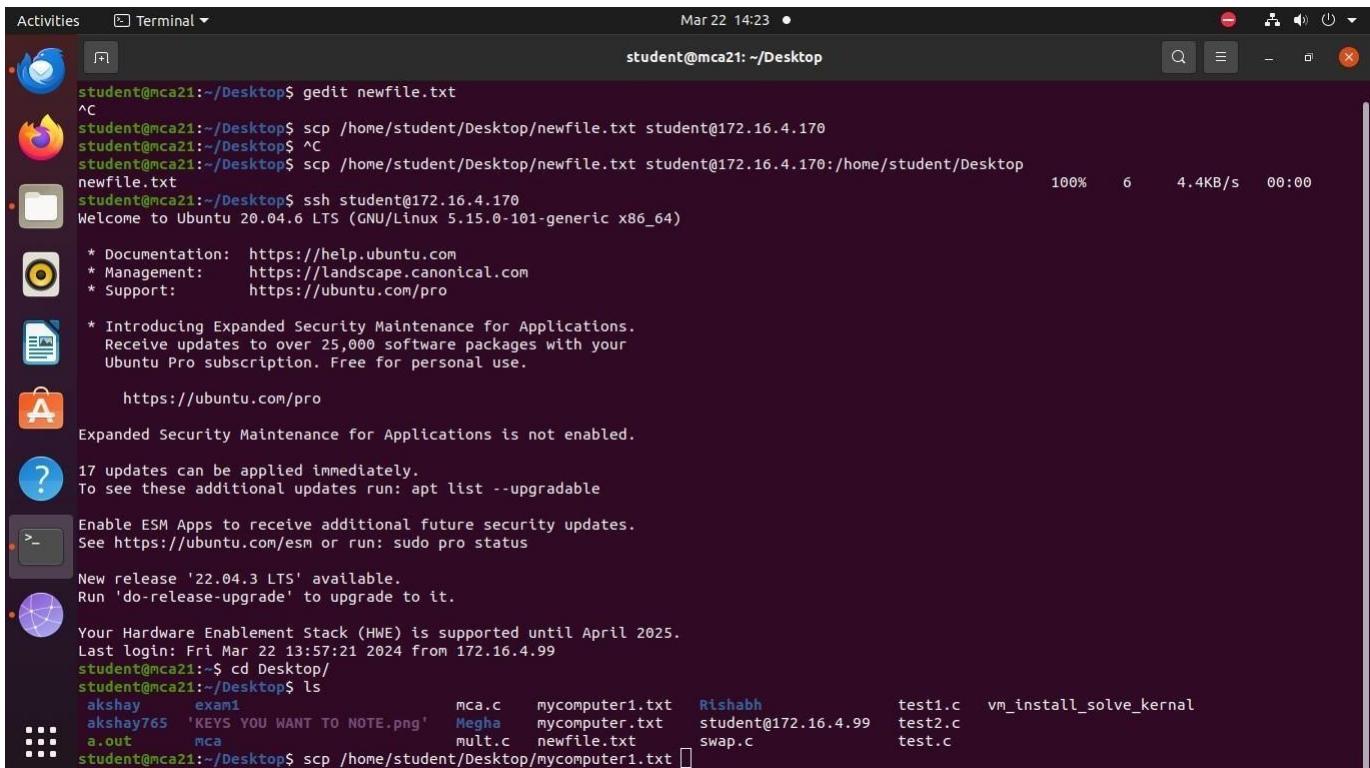
scp :

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" To logout

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
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.

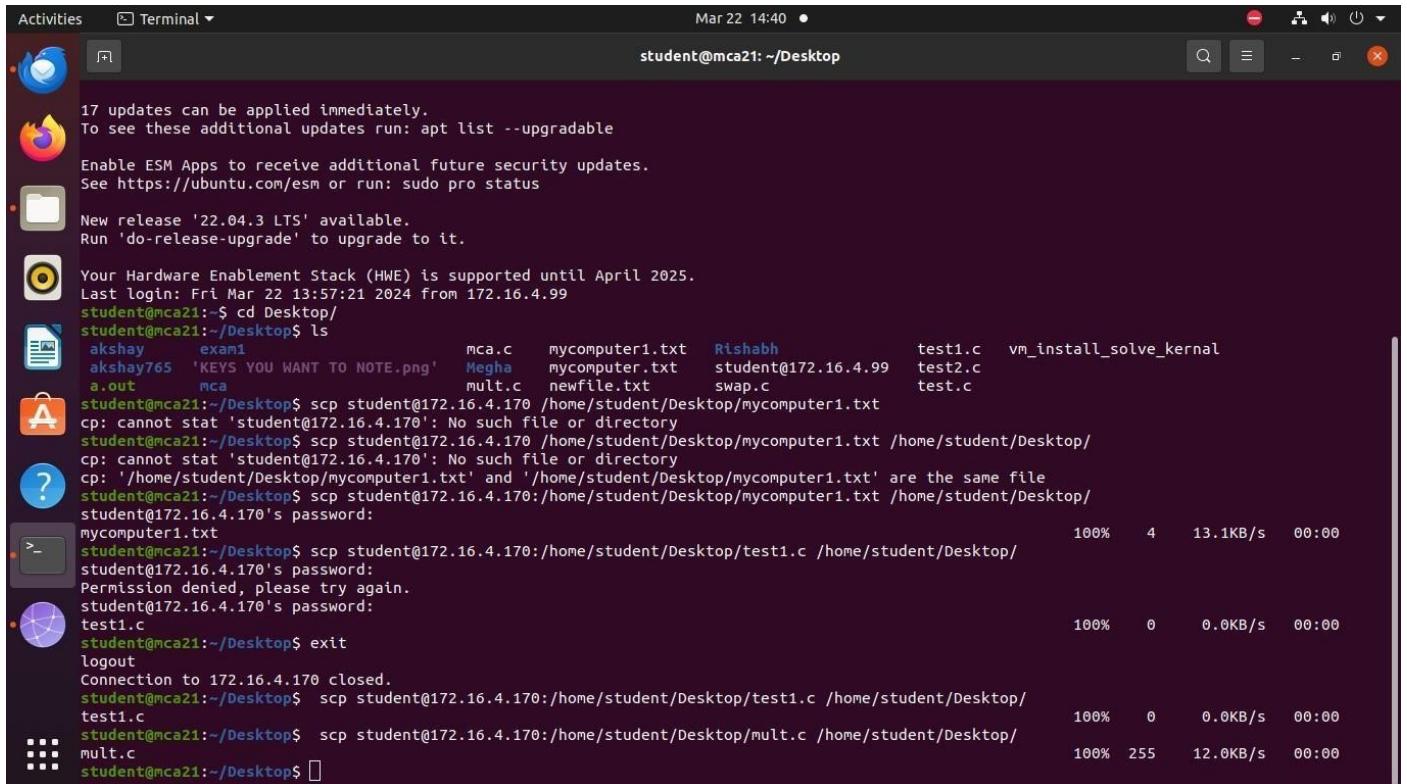
17 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

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    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 /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 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.

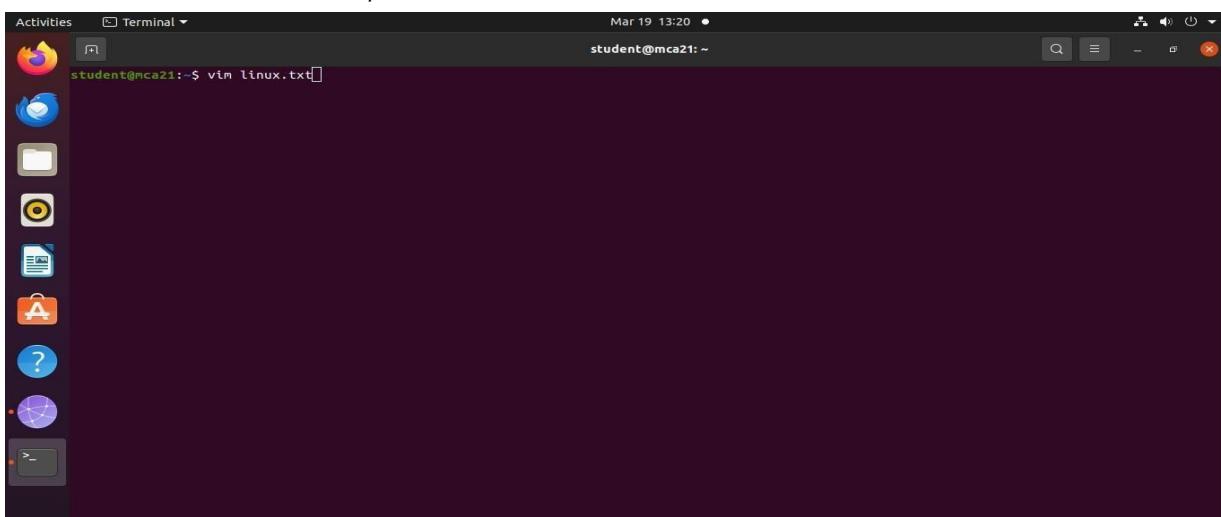
Vi editor has some special features such as Vi modes and syntax highlighting that makes it powerful than other text editors. Generally, it has two modes:

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.

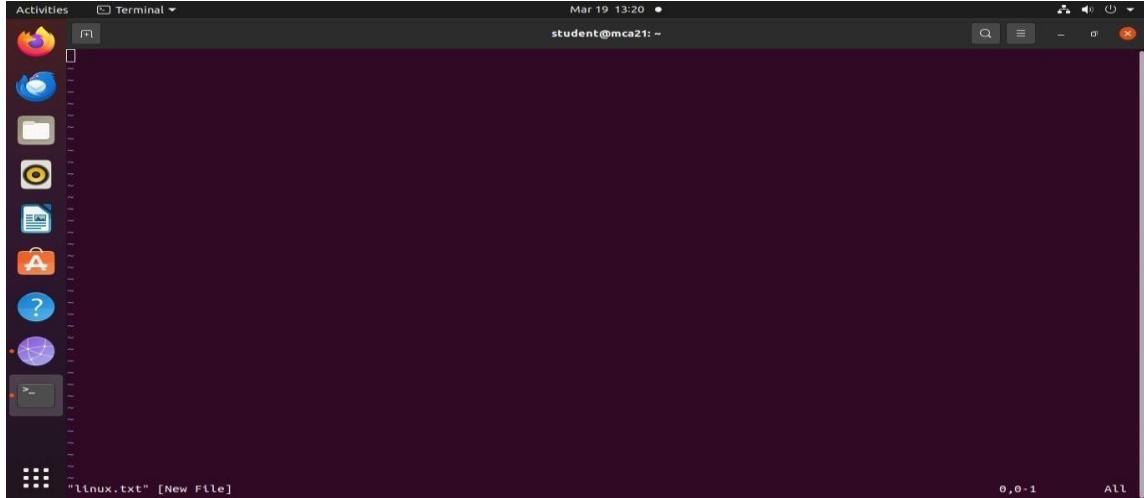
Insert Mode :

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.

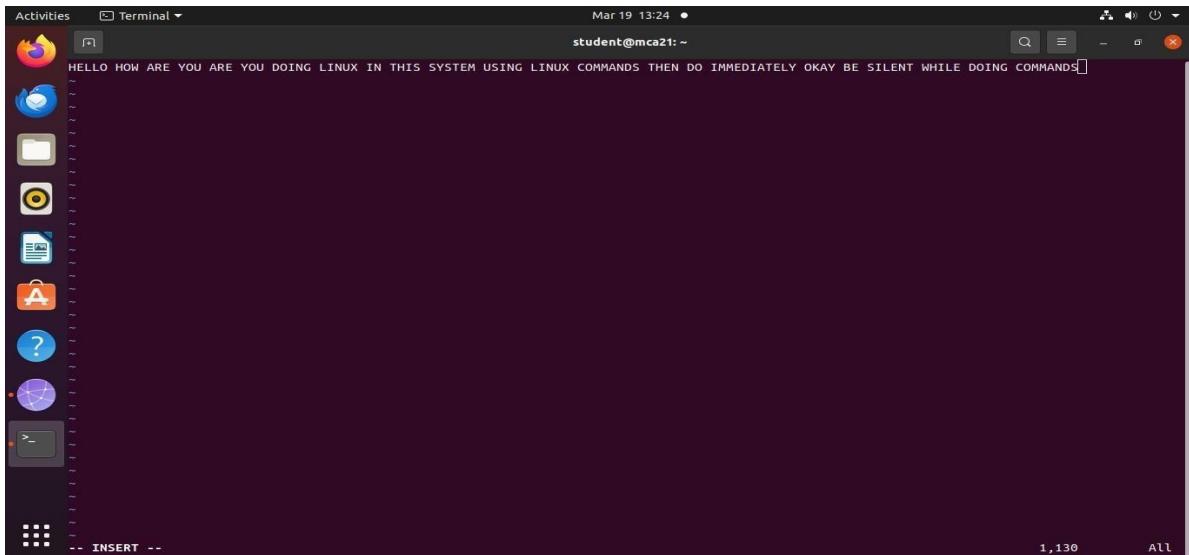
To invoke the vim editor,execute the vim command with the file name :



The file linux.txt is opened.



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



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
```

Terminal

8,10 All

This screenshot shows a Linux desktop environment with a dark theme. A terminal window is open in the top panel, displaying a shell script named 'helloworld.sh'. The script contains several echo commands. The terminal window has a title bar with 'Activities' and 'Terminal' and a status bar showing the date and time. The desktop background is visible behind the window.

Activities Terminal Mar 19 13:24 *

```
student@mca21: ~
```

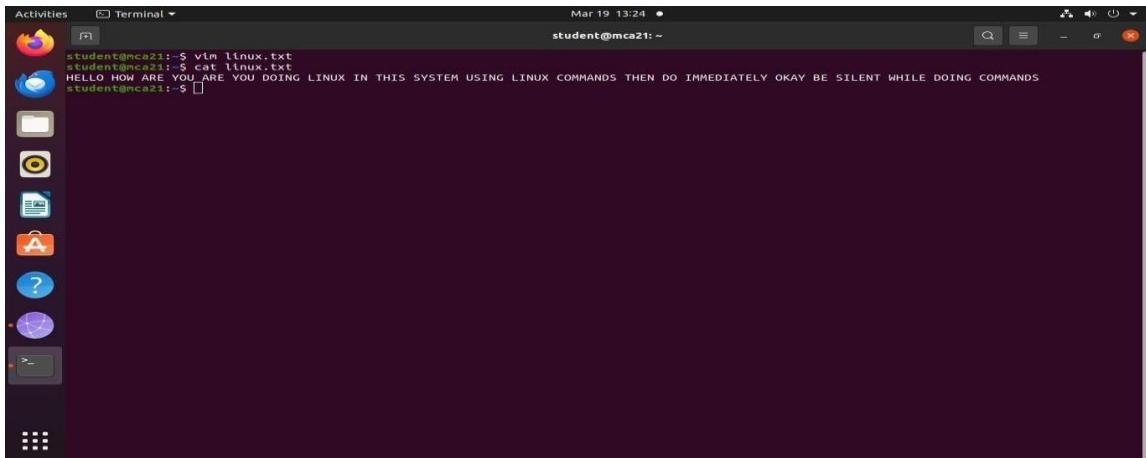
```
HELLO HOW ARE YOU ARE YOU DOING LINUX IN THIS SYSTEM USING LINUX COMMANDS THEN DO IMMEDIATELY OKAY BE SILENT WHILE DOING COMMANDS
```

Terminal

:wq

This screenshot shows a Linux desktop environment with a dark theme. A terminal window is open in the top panel, displaying a command being run. The command is 'HELLO HOW ARE YOU ARE YOU DOING LINUX IN THIS SYSTEM USING LINUX COMMANDS THEN DO IMMEDIATELY OKAY BE SILENT WHILE DOING COMMANDS'. The terminal window has a title bar with 'Activities' and 'Terminal' and a status bar showing the date and time. The desktop background is visible behind the window.

We can view the file by using cat command



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, terminal, and system settings. The main area is a terminal window titled 'Terminal'. The terminal shows the following command-line session:

```
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:~$
```



A screenshot of a terminal window showing the execution of a shell script named 'helloworld.sh'. The terminal shows the following command-line session:

```
student@mca21:~$ ./helloworld.sh
Hello world
/usr/bin/
/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:~$
```