Date : 09/02/2024

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.

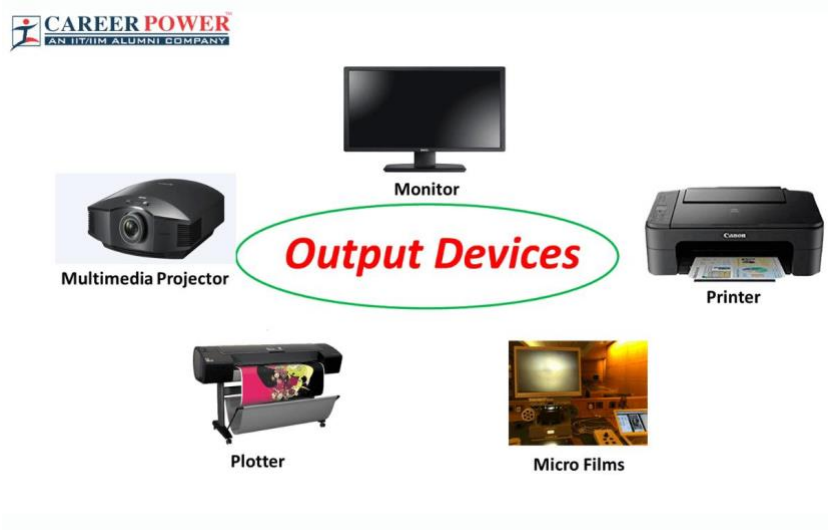
some output devices:

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 :

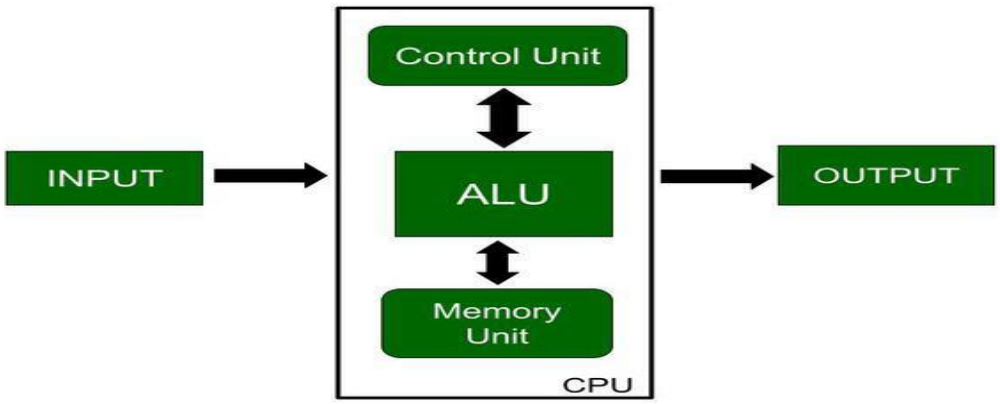
1. **CD (Compact disc)**: A CD is circular in shape and made up of thin platted glass and plastic polycarbonate material. It has a storage capacity of 600 MB to 700 MB of data. It has a standard size of 12 cm with a hole in the center of about 1.5 cm and 1.2 mm in thickness
2. **DVD (Digital Video/Versatile 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)

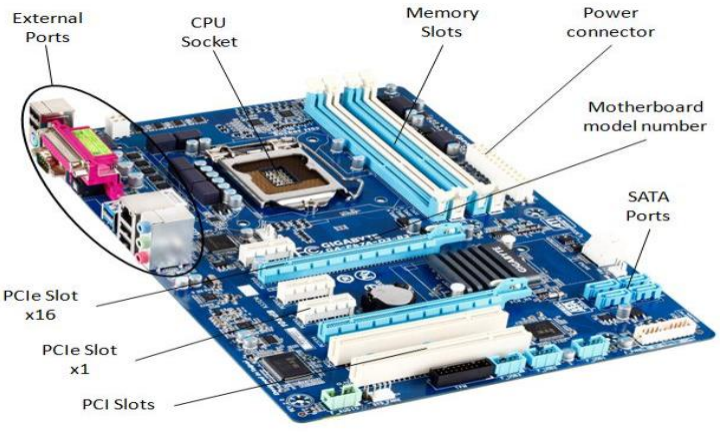
The CPU is also known as the heart of the computer. It consists of three units, generally known as the control unit, Arithmetic Logical Unit (ALU), and the memory unit. Below is the block diagram of the CPU is given:



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.

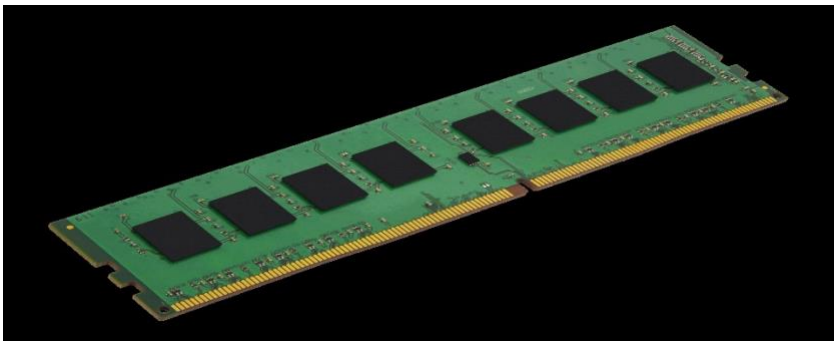


3. RAM (Random Access Memory)

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:-

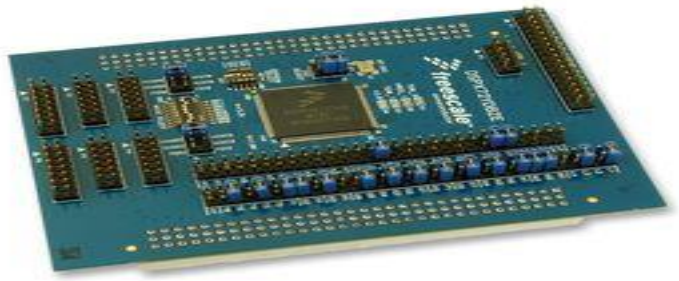
SRAM (Static RAM): SRAM basically consists of a flip-flop using a transistor or Mosfet (MOS). It is fast and has less access time. In this refreshing circuits are not required. But it is costly and requires more space. For e.g. cache memory.

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.

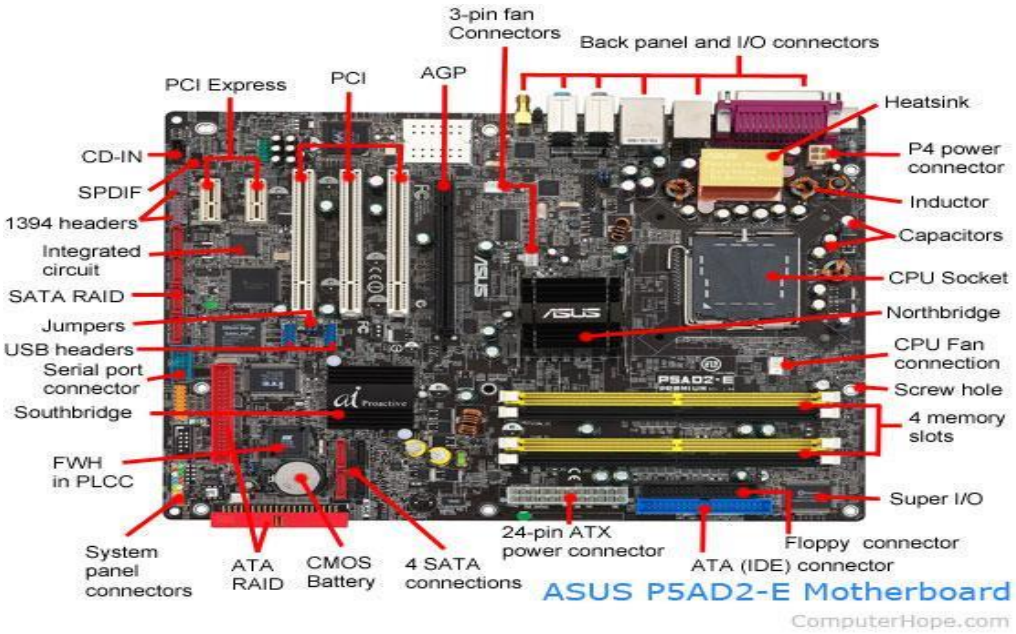
AGP (Accelerated Graphics Port): An older expansion slot primarily used for connecting graphics cards to the motherboard. It has been largely replaced by PCIe.

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.

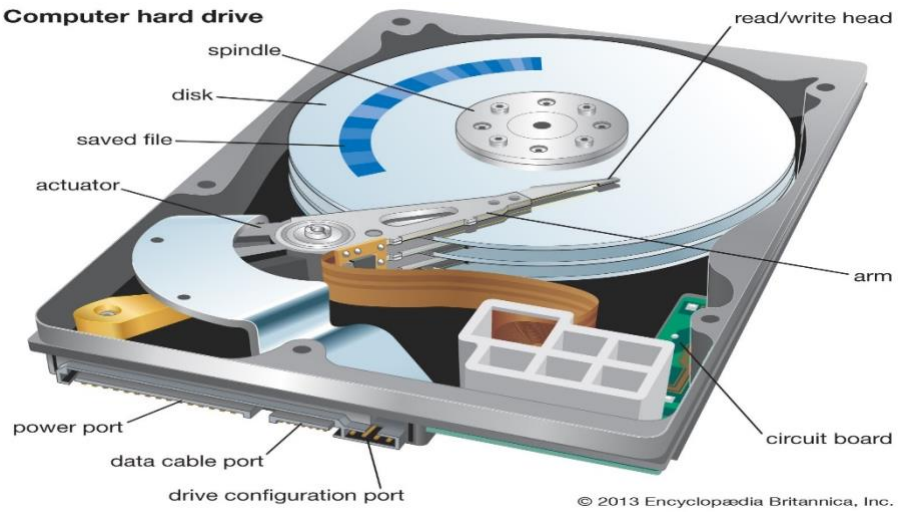
7.internal Storage Devices :

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.

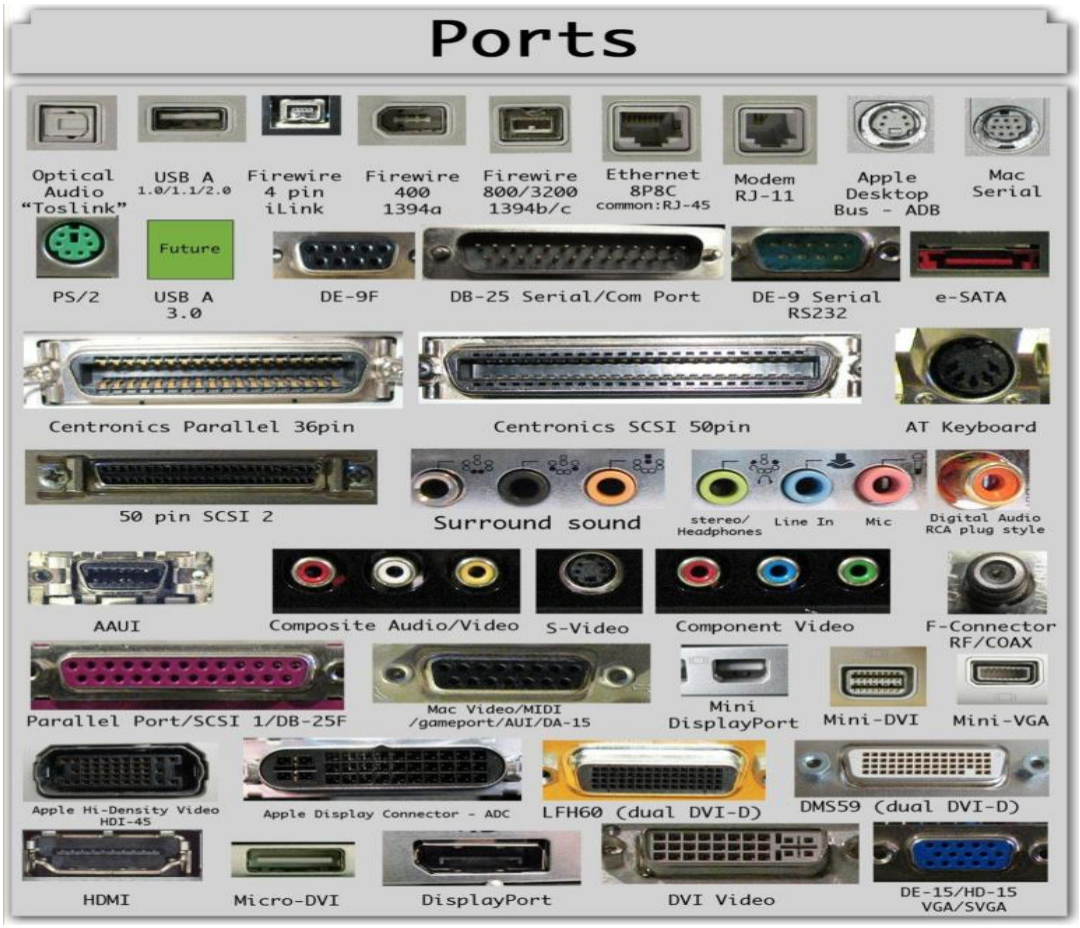


SSD(SOLID SATA DRIVE) :

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



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.

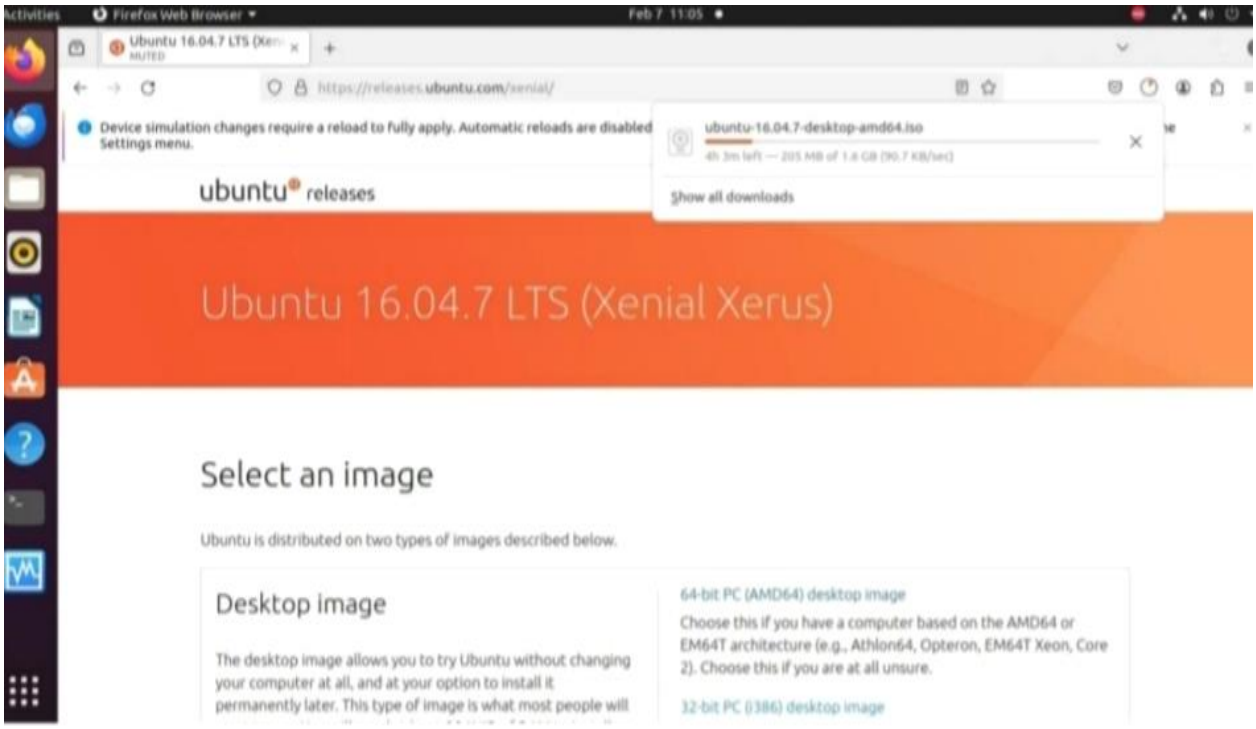
▪ **Mail Server**: A mail server is a central computer that stores electronic mails for Clients over the network. It is much like the post office that obtains emails sent To the users and stores them until it is not requested by the user. It uses Standard email protocols, like simple mail transfer protocol (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

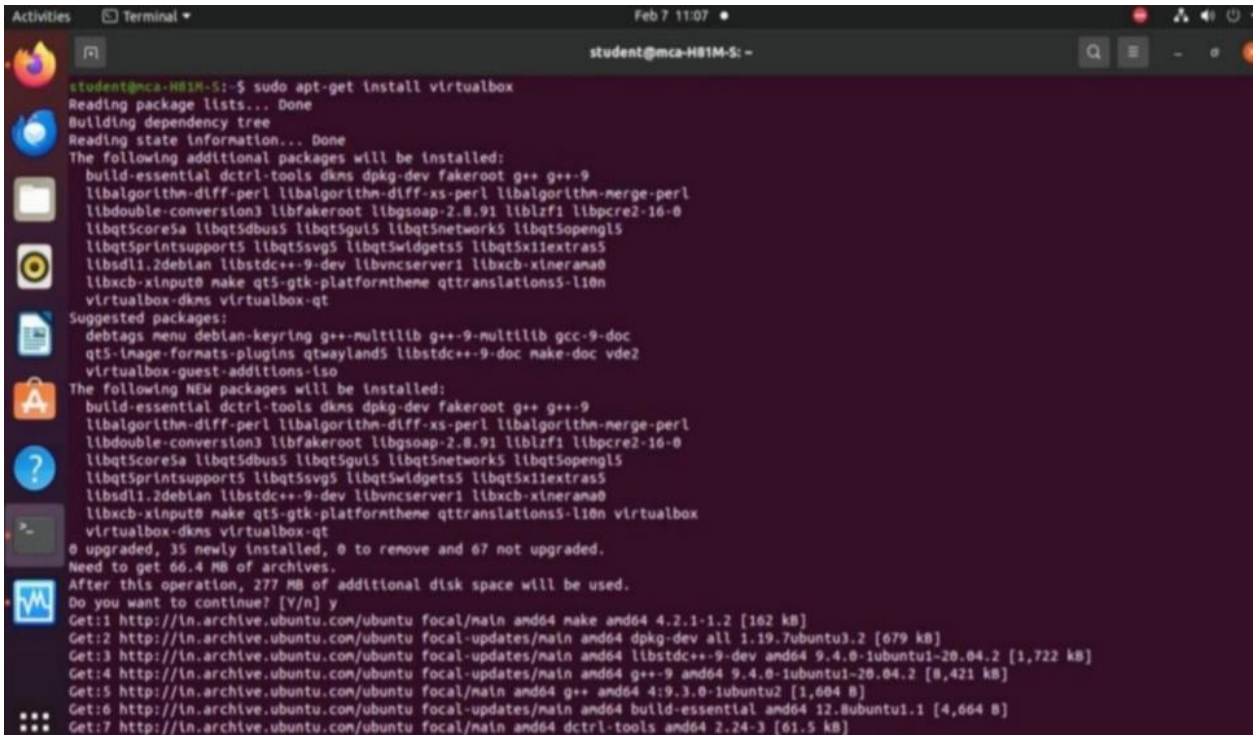
Virtual box by Oracle is a powerful virtualization software that allows users to run Multiple operating system on one physical computer. VirtualBox is an open-source Software for virtualizing the x86 computing architecture. It acts as a hypervisor creating A VM (Virtual machine) where the user can run 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

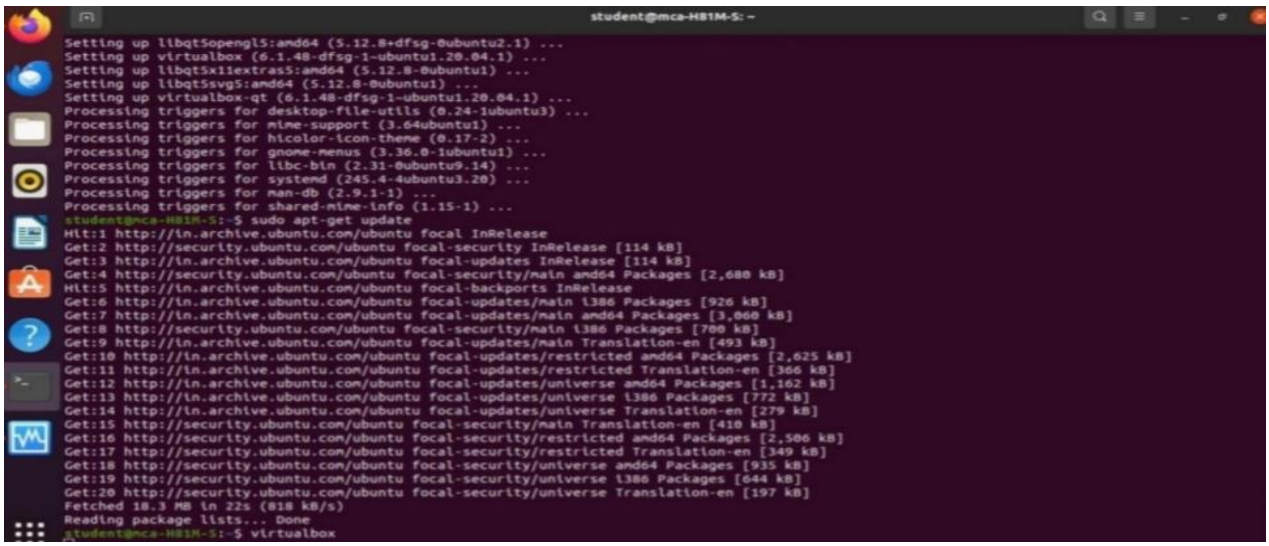


VIRTUAL BOX INSTALLATION :

Sudo apt -get install virtualbox



Sudo apt -get update



Create virtual machine by just clicking on this new

Click -> new

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