

**AIM**

Introduction to Computer hardware: Physical identification of major components of a computer system such as motherboard, RAM modules, daughter cards, bus slots, SMPS, internal storage devices, interfacing ports. Specifications of desktop and server class computers. Installation of common operating systems for desktop and server use.

**COMPUTER HARDWARE**

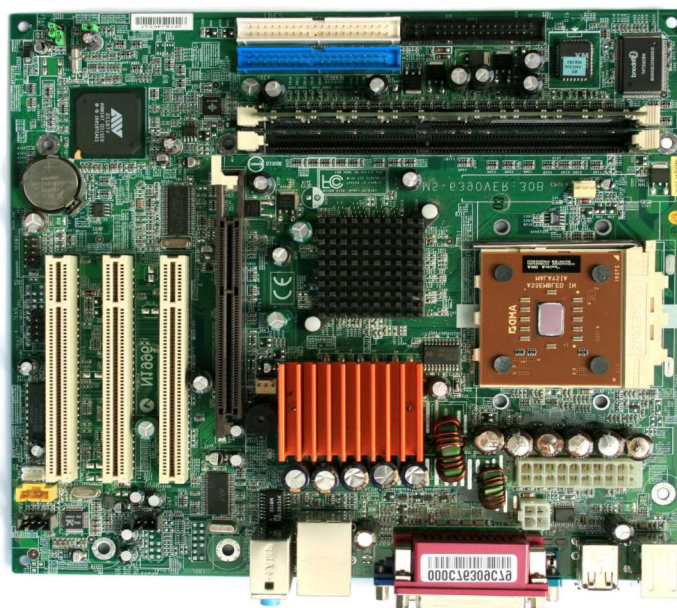
Computer hardware refers to the physical and tangible components of a computer system, including the central processing unit (CPU), motherboard, memory, storage devices, input/output devices, and other peripherals. These components work together to process data and perform tasks.

The purpose of computer hardware is to provide a platform for running software applications that allow users to perform various tasks efficiently.

**MOTHERBOARD**

The motherboard serves as a single platform to connect all of the parts of a computer together. It connects the CPU, memory, hard drives, optical drives, video card, sound card, and other ports and expansion cards directly or via cables. It can be considered as the backbone of a computer.

All crucial hardware like CPU, memory, hard drive, and ports for input and output devices are located on the motherboard. It is the biggest circuit board in a computer chassis.



## RAM MODULES

In computing, a memory module or RAM (random-access memory) stick is a printed circuit board on which memory integrated circuits are mounted.[1] Memory modules permit easy installation and replacement in electronic systems, especially computers such as personal computers, workstations, and servers. The first memory modules were proprietary designs that were specific to a model of computer from a specific manufacturer.



## DAUGHTER CARDS

A daughterboard is type of circuit board that plugs in or is attached to the motherboard or similar expansion card to extend its features and services. A daughterboard complements the existing functionality of a motherboard or an expansion card.



## BUS SLOTS

Bus slots, also known as expansion slots or expansion ports, are slots on the motherboard that can accommodate expansion cards to expand computer capabilities . These slots provide an installation point for a hardware expansion card to be connected. Expansion bus slots are long thin connectors provided on the motherboard near the backside of the computer and are used to connect all add-on cards in a computer system



## 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.



## INTERNAL STORAGE DEVICES

Internal storage devices are components within a computer or electronic device used to store data permanently. These devices include hard disk drives (HDDs) and solid-state drives (SSDs). They are crucial for storing operating systems, applications, files, and other data within the device itself.



## SSD (SOLID STATE DRIVE)

A solid-state drive (SSD) is a solid state storage device that uses integrated circuit assemblies to store data persistently, typically using flash memory, and functions as



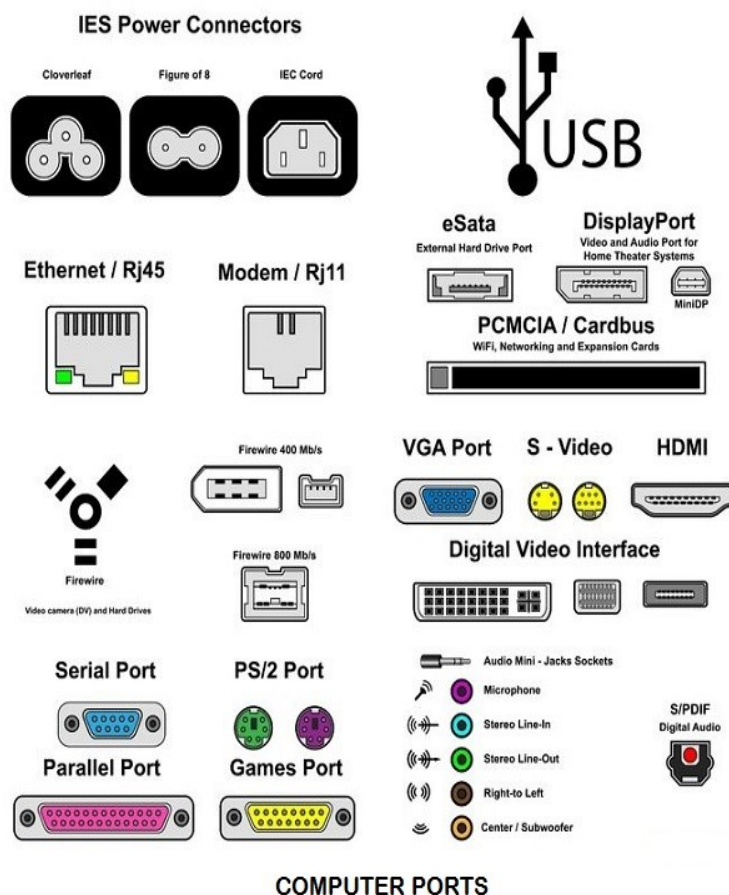
secondary storage in the hierarchy computer storage. It is also sometimes called a semiconductor storage device, a solid-state device, or a solid-state disk. SSD also has rich internal parallelism for data processing.

## HDD (HARD DISK DRIVE)

A hard disk drive (HDD) is an internal or external computer component that stores data, such as the operating system, applications, and user files. HDDs are “non-volatile” storage devices, meaning they retain stored data even when power isn't being supplied. HDD means data is retained when our computer system is shut down. HDD 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.

## INTERFACING PORTS

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.



Some common interfacing ports are:

USB (Universal Serial Bus)

HDMI (High Definition Multimedia Interface)

VGA (Video Graphics Array)

Ethernet

Serial (RS-232)

Parallel (Centronics)

GPIO (General Purpose Input/Output)

SPI (Serial Peripheral Interface)

Audio (3.5mm jack, RCA)

PS/2 (for keyboards and mic)

Thunderbolt

SATA (Serial ATA)

## DESKTOP

A desktop computer (often abbreviated desktop ) is a personal computer designed for regular use at a stationary location on or near a desk (as opposed to a portable computer) due to its size and power requirements. Unlike portable computers, desktops are larger and have specific power requirements.

A typical desktop system includes the following components:

**Monitor:** Displays visual output.

**Keyboard:** Used for input.

**Mouse:** Another input device.

**Computer Case:** Contains the motherboard, processor, memory, and other electronic components.

**Disk Storage:** Usually one or more hard disk drives, solid-state drives, and optical disc drives.

**Speakers:** For audio output.

**Printer** (often optional): For producing hard copies of documents



## SERVER OPERATING SYSTEM

A server is a hardware device or software that processes requests sent over a network and replies to them. A client is the device that submits a request and waits for a response from the server.

A server operating system is a type of operating system that is designed to be installed and used on a server computer. It is advanced version of operating system, having features and capabilities required within a client-server architecture or similar enterprise computing environment.

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

Mainly three types:

**File server:**It is a computer on a network that is used to store and distribute files. It allows multiple users or clients to share files, which is stored on a server. Furthermore, it can improve performance by maximizing readability and writing speeds.

**Mail server:**A mail server is a central computer that stores electronic emails for clients over the network. It is much like the post office that obtains emails sent to the user and stores them until it is not requested by a user. It uses standard email protocols to send and receive an email like, simple mail transfer protocol (SMTP) handles outgoing mail requests and sends messages. The POP3 and IMAP protocols are used to process incoming mail and also receive messages. These protocols handle all the connections when users log on to a mail server by using email or webmail interface.

**Web Server:**A web server offers web pages or other content 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 is used by a computer or 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 the server.

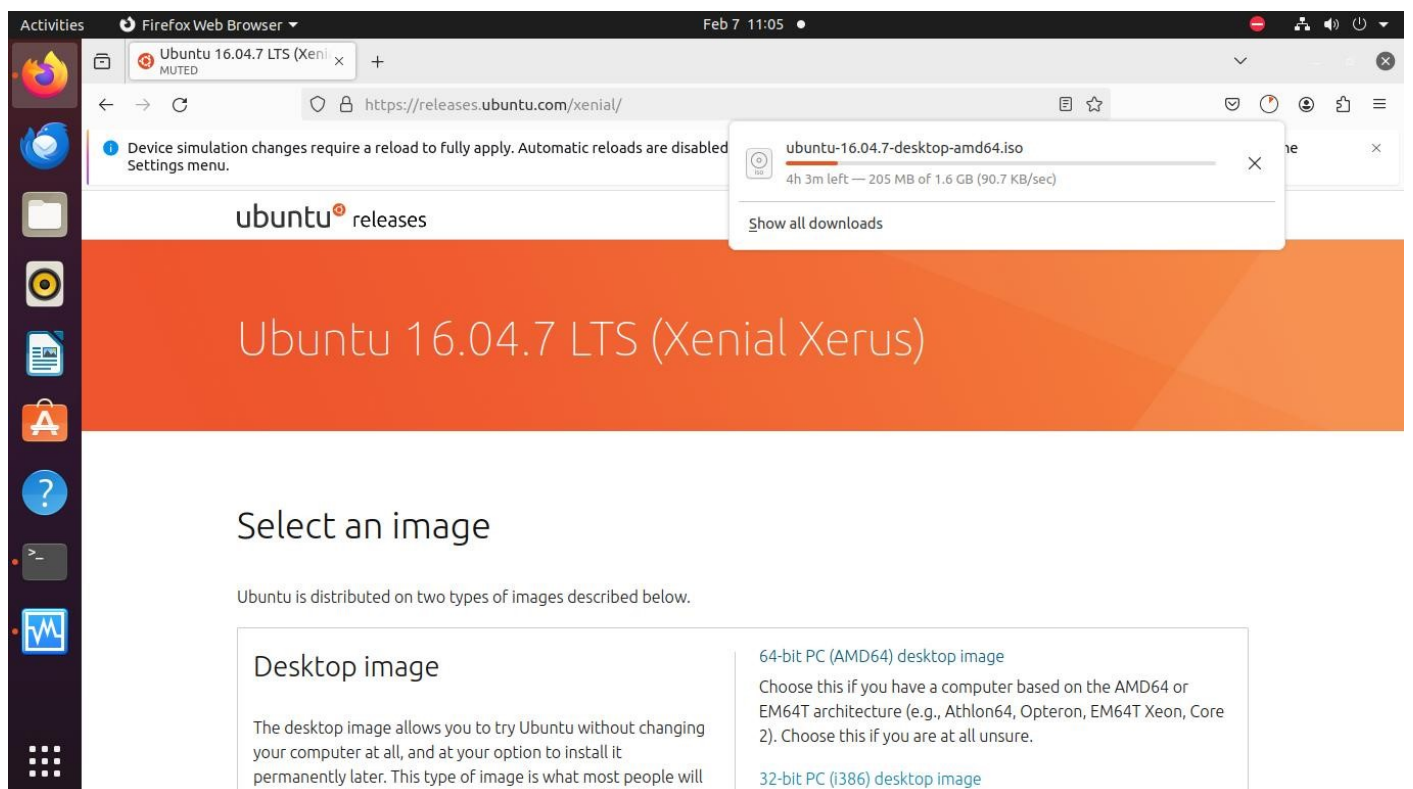
# INSTALL UBUNTU ON VIRTUALBOX

Virtualbox by Oracle is a powerful virtualization software that allows users to run multiple operating systems on one physical computer.

VirtualBox is 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 operating system where VirtualBox runs is called the "host" OS.

The operating system running in the VM is called the "guest" OS. VirtualBox supports Windows, Linux, or macOS as its host OS.

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



## VirtualBox Installation:

```
sudo apt-get install virtualbox
```



```
Activities Terminal Feb 7 11:07 student@mca-H81M-S: ~
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 dctrl-tools dkms dpkg-dev fakeroot g++ g++-9
  libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl
  libdouble-conversion3 libfakeroot libgsoap-2.8.91 liblzfl1 libpcre2-16-0
  libqt5core5a libqt5dbus5 libqt5gui5 libqt5network5 libqt5opengl5
  libqt5printsupport5 libqt5svg5 libqt5widgets5 libqt5x11extras5
  libstdl1.2debian libstdc++-9-dev libvncserver1 libxcb-xinerama0
  libxcb-xinput0 make qt5-gtk-platformtheme qttranslations5-l10n
  virtualbox-dkms virtualbox-qt
Suggested packages:
  debtags menu debian-keyring g++-multilib g++-9-multilib gcc-9-doc
  qt5-image-formats-plugins qtwayland5 libstdc++-9-doc make-doc vde2
  virtualbox-guest-additions-iso
The following NEW packages will be installed:
  build-essential dctrl-tools dkms dpkg-dev fakeroot g++ g++-9
  libalgorithm-diff-perl libalgorithm-diff-xs-perl libalgorithm-merge-perl
  libdouble-conversion3 libfakeroot libgsoap-2.8.91 liblzfl1 libpcre2-16-0
  libqt5core5a libqt5dbus5 libqt5gui5 libqt5network5 libqt5opengl5
  libqt5printsupport5 libqt5svg5 libqt5widgets5 libqt5x11extras5
  libstdl1.2debian libstdc++-9-dev libvncserver1 libxcb-xinerama0
  libxcb-xinput0 make qt5-gtk-platformtheme qttranslations5-l10n virtualbox
  virtualbox-dkms virtualbox-qt
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 4:9.3.0-1ubuntu2 [1,604 B]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 build-essential amd64 12.8ubuntu1.1 [4,664 B]
Get:7 http://in.archive.ubuntu.com/ubuntu focal/main amd64 dctrl-tools amd64 2.24-3 [61.5 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 dkms all 2.8.1-5ubuntu2 [66.8 kB]
```

## sudo apt-get update

```
Activities Terminal Feb 7 11:06 student@mca-H81M-S: ~
Setting up libqt5opengl5:amd64 (5.12.8+dfsg-0ubuntu2.1) ...
Setting up virtualbox (6.1.48-dfsg-1-ubuntu1.20.04.1) ...
Setting up libqt5x11extras5:amd64 (5.12.8-0ubuntu1) ...
Setting up libqt5svg5:amd64 (5.12.8-0ubuntu1) ...
Setting up virtualbox-qt (6.1.48-dfsg-1-ubuntu1.20.04.1) ...
Processing triggers for desktop-file-utils (0.24-1ubuntu3) ...
Processing triggers for mime-support (3.64ubuntu1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.14) ...
Processing triggers for systemd (245.4-4ubuntu3.20) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for shared-mime-info (1.15-1) ...
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]
Get:4 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [2,680 kB]
Hit:5 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
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 [2,506 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

