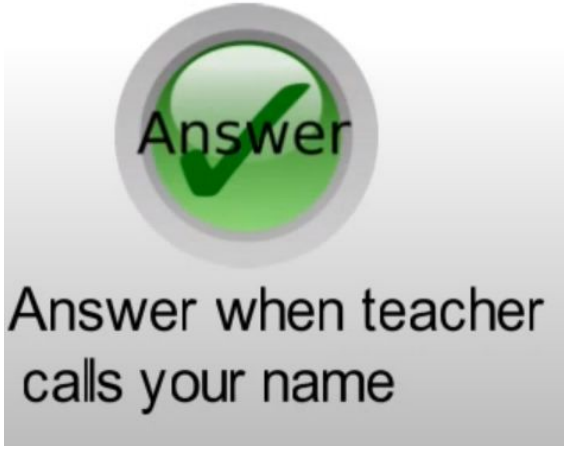
RULES IN THE ONLINE CLASSROOM

sign in on time

Find some quiet places to study

Listen!

Look at the screen!



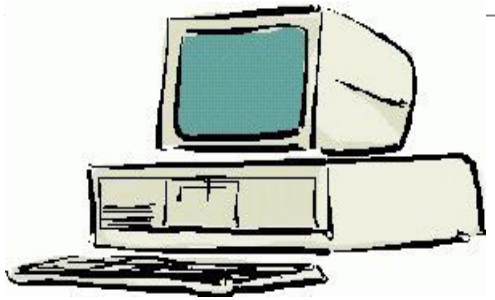
Answer when teacher calls your name

UNIT 1

Fundamentals of Computing and introduction to Database systems

COMPUTER BASICS

What is a Computer?



- An electronic device that takes input and **stores, retrieves, processes data**, and produces output.

- A computer is composed of **hardware and software**, and can exist in a variety of sizes and configurations.

Who Invented the Computer?

Charles Babbage

Types of Computers

Mini and Mainframe Computers

Very powerful, used by large organisations such an banks to control the entire business operation. Very expensive!

Personal Computers

Cheap and easy to use. Often used as stand-alone computers or in a network. May be connected to large mainframe computers within big companies.

CHARACTERISTICS OF COMPUTERS

The various characteristics of computers are as follows

1. **Speed**: Speed is the most important characteristics of computer .Computer having **more speed to perform jobs instantaneously**.

2. **Accuracy**: The computers are perfect, accurate and precise. Accuracy signifies the **reliability** of the hardware components of computers.

3. **Automatic**: A computer **works automatically, once programs are stored and data** are given to it, constant supervision is not required.

4. **Endurance**: A computer **works continuously and will not get tired** and will not suffer from lack of concentration.

5. **Reduction of cost:** Though **initial investment may be high**, computer substantially **reduces the cost of transaction**.

BASIC COMPUTER ORGANIZATION OR HARDWARE COMPONENTS:

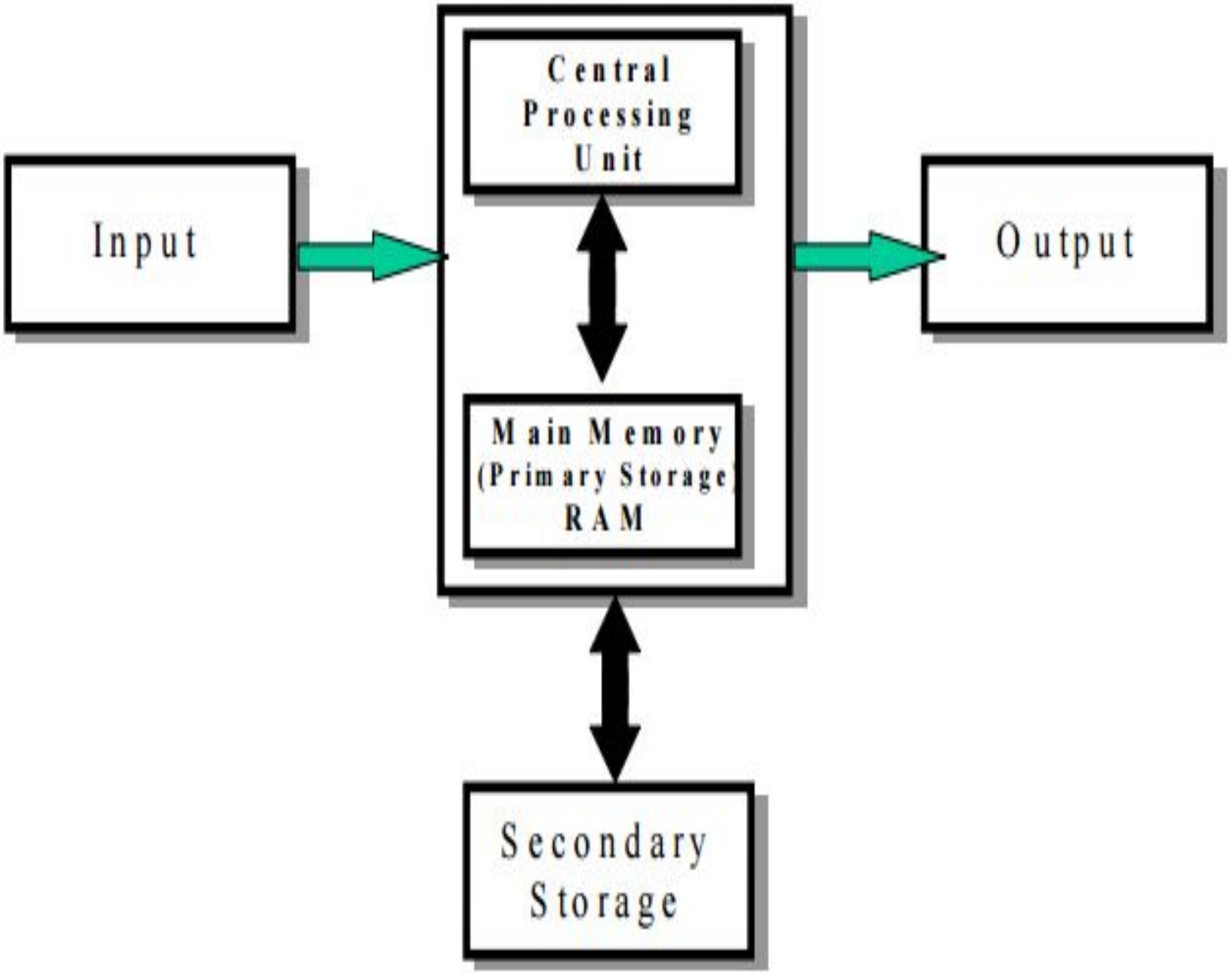
A standard fully featured desktop configuration has basically four types of featured devices or handware components

1. Input Devices
2. Output Devices
3. Memory
4. Storage Devices

The Four Main Functions of Computers:-

A computer is designed for:

- Data entry(Initial function i.e input device)
- Data processing(CPU)
- Information output(viewed via **display monitor**)
- Data and information storage(hard disk drive)


Central Processing Unit
Input
Output
Main Memory (Primary Storage) RAM
Secondary Storage

Hardware & Software

The term **hardware** refers to the physical components of your computer such as the system unit, mouse, keyboard, monitor etc.

The **software** is the instructions that makes the computer work.

Hardware Components

Input Devices -- *"How to tell it what to do"*

- A keyboard and mouse are the standard way to interact with the computer. Other devices include joysticks and game pads used primarily for games.

Output Devices -- *"How it shows you what it is doing"*

- The monitor (the screen) is how the computer sends information back to you. A printer is also an output device.

Hardware Components

INPUT DEVICES

- The Mouse
  - Used to 'drive' Microsoft Windows
- The Keyboard
  - The keyboard is still the commonest way of entering information into a computer
- Tracker Balls
  - an alternative to the traditional mouse and often used by graphic designers

Hardware Components

INPUT DEVICES

- Scanners
  - A scanner allows you to scan printed material and convert it into a file format that may be used within the PC
- Light Pens
  - Used to allow users to point to areas on a screen
- Joysticks
  - Many games require a joystick for the proper playing of the game

Hardware Components

OUTPUT DEVICES

- VDU
  - The computer screen is used for outputting information in an understandable format
- Printers
  - There are many different types of printers.
  - In large organizations laser printers are most commonly used due to the fact that they can print very fast and give a very high quality output.

Hardware Components

OUTPUT DEVICES

- Speakers
  - Enhances the value of educational and presentation products.

Hardware Components

Storage Devices -- "How it saves data and programs"

- Hard disk drives are an internal, higher capacity drive which also stores the operating system which runs when you power on the computer.

- "Floppy" disk drives allow you to save work on small disks and take the data with you.

Hardware Components

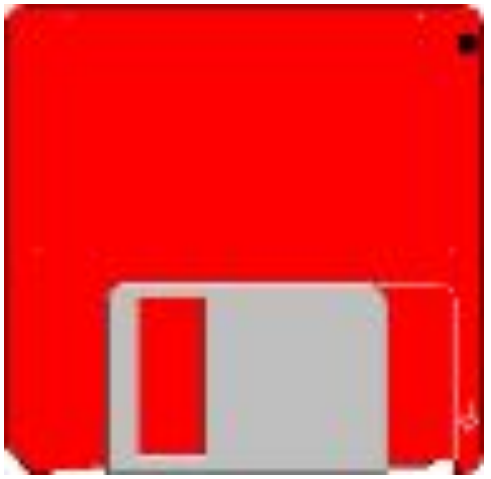
Hard Disks

- Speed:
  - Very fast!
  - The speed of a hard disk is often quoted as "average access time" speed, measured in milliseconds.The smaller this number the faster the disk.
- Capacity:
  - Often 40/80 Gigabytes.
  - A Gigabyte is equivalent to 1024 Megabytes.
- Cost:
  - Hard disks costs are falling rapidly and normally represent the cheapest way of storing data.

Hardware Components

Diskettes (Floppy Disks)

- Speed:
  - Very slow!
- Capacity:
  - Normally 1.44 Mbytes.
- Cost:
  - Very cheap.



Hardware Components

CD-ROM Disks

- Speed:
  - Much slower than hard disks.

  Capacity:
  - Around 650 Mbytes and more

Hardware Components

DVD Drives

- Speed:
  - Much faster than CD-ROM drives but not as fast as hard disks.
- Capacity:
  - Up to 17 Gbytes.
- Cost:
  - Slightly higher than CD-ROM drives.

Hardware Components

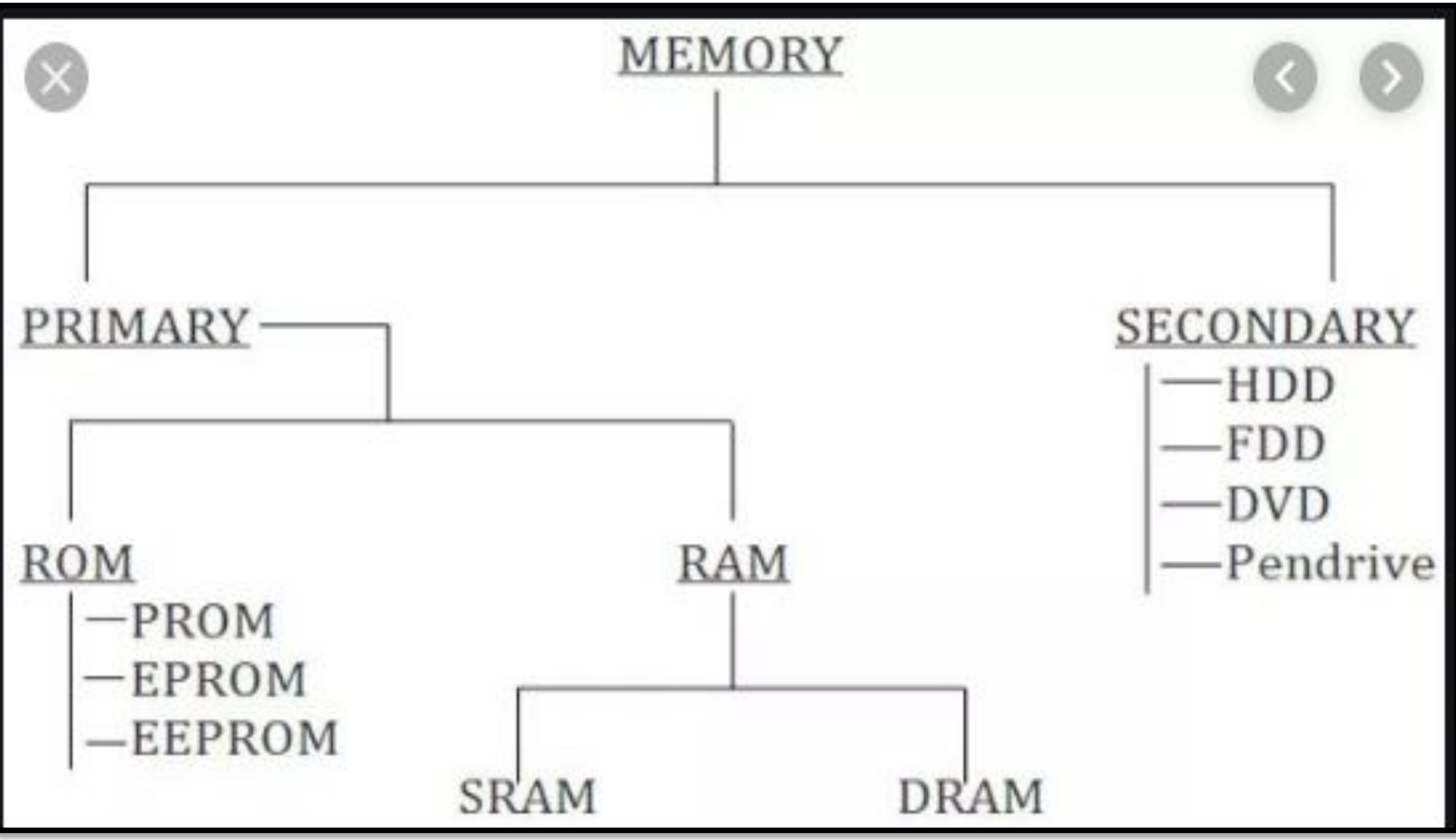
How Computer Memory Is Measured

- Bit
  - All computers work on a binary numbering system, i.e. they process data in one's or zero's. This 1 or 0 level of storage is called a bit.
- Byte
  - A byte consists of eight bits.
- Kilobyte
  - A kilobyte (KB) consists of 1024 bytes.
- Megabyte
  - A megabyte (MB) consists of 1024 kilobytes.
- Gigabyte
  - A gigabyte (GB) consists of 1024 megabytes.

Hardware Components

Some of the Factors
That Impact on a Computer's Performance

- CPU speed
- RAM size
- Hard disk speed and capacity


MEMORY
PRIMARY
SECONDARY
HDD
FDD
DVD
Pendrive
ROM
RAM
PROM
EPROM
EEPROM
SRAM
DRAM

Primary Memory

- **Primary memory** is also known as **internal memory.**
- This is a section of the **CPU** which holds **program instructions, input data and intermediate results.**
- **Primary memory** is also known as **main memory.**
- **Characteristic:** Faster access time, less storage capacity and higher costs as compared to secondary storage units.
- Primary storage comes as an **integral part of all computer systems and includes all small locations to which unique numbers called and ADDRESS is assigned.**
- **Storage capacity : few kilobytes** on small computers to **several thousand kilo bytes and megabytes** on larger machines

CONT'D

Primary Memory:-

1. **RAM: Random Access Memory (RAM) :**

Is a memory scheme within the computer system responsible for **storing data on a temporary basis**, so that it can be **promptly accessed by the processor as and when needed.**

It is **volatile in nature**, which means that **data will be erased once supply to the storage device is turned off**.

RAM stores data **randomly** and the **processor** accesses these data randomly from the **RAM storage**.

RAM is considered **"random access"** because you can access any **memory cell** directly if you know the row and column that intersect at that cell.

TYPES OF RAM:

There are two types of RAM used in PCs –

Dynamic RAM (DRAM):
The information stored in Dynamic RAM has to be **refreshed after every few milliseconds** otherwise it will get erased. DRAM has **higher storage capacity** and is **cheaper than Static RAM**.

Static RAM (SRAM):
The information stored in Static RAM need **not be refreshed**, but it remains stable as long as power supply is provided. SRAM is **costlier** but has **higher speed than DRAM**.

CONT'D

2. ROM (Read Only Memory):

ROM is a **permanent form of storage**.

ROM stays **active regardless of whether power supply** to it is **turned on or off**.

ROM devices do not allow **data stored on them to be modified**.

CONT'D

1. PROM (Programmable Read Only Memory):

These are ROMs which can be programmed.

A **special PROM programmer** is used to enter the **program on the PROM**

Once the chip has been **programmed**, **information** on the **PROM cannot be altered**. (Non-Erasble)

PROM is non volatile ie. data is not lost when power is switched off.

CONT'D

2. EPROM/EROM (ERASABLE PROGRAMMABLE READ-ONLY MEMORY):

Is a type of **programmable read-only memory** (PROM) chip that retains its data when its **power supply is switched off.**

To erase the EPROM, it is exposed to an **ultraviolet light** for **approximately 20 minutes**.

CONT'D

3. EEPROM (ELECTRICALLY ERASABLE PROGRAMMABLE READ-ONLY MEMORY):

Is **user-modifiable ROM** that can be **erased and reprogrammed** (written to) **repeatedly** through the application of **higher than normal electrical voltage.**

Unlike **EPROM** chips, **EEPROMs do not need to be removed from the computer to be modified**.

However, an **EEPROM chip has to be erased and reprogrammed in its entirety, not selectively**. .

It also has a **limited life** (it can be reprogrammed limited to **tens or hundreds of thousands of times)**.

In an EEPROM that is **frequently reprogrammed** while the **computer is in use**, the life of the EEPROM can be an **important design consideration**.

SECONDARY Memory

Secondary storage is a memory that is **stored external to the computer**.

It is used mainly for **permanent and long term storage of programs and data.**

Characteristic: Slow, Cheap, Large capacity, Not connected directly to the processor.

It allows a **user** to **store data** that may be, **instantly and easily retrieved transported** and used by applications and services.

CONT'D

1. HARD DISK:

A hard disk is part of a unit -- often called a ***disk drive***, ***hard drive*** **or** ***hard disk drive*** -- that stores and provides **relatively quick access** to **large amounts of data** on an **electromagnetically charged surface or set of surfaces.**

Today's computers typically come with a **hard disk** that can contain anywhere **from billions to trillions of bytes of storage.**

Non-volatile memory hardware device that **permanently stores and retrieves data on a computer**.

All computers have a hard drive installed in them, which is used to store files for the **operating system.** software programs, and a user's personal files.

A computer cannot function without a hard drive installed, as it requires one to function properly.


SEAGATE
Desktop HDD

CONT'D

2. FLOPPY DISK:

The **floppy disk** is a removable magnetic storage medium.

Floppy disks are used for **moving information between computers, laptops or other devices.**

Some early digital cameras **electronic music instruments** and older computer game consoles use floppy disks.

Floppy disks are inserted in to a **floppy disk drive** or simply **floppy drive** to allow data to be read or stored.

Floppy disks **store much less data than a CD-ROM disk or USB flash drive.**


ComputerHope.com

CONT'D

3. COMPACT DISK (CD):

Is a digital **optical disc** data storage format that was **co-developed by Philips and Sony and released in 1982.**

The first CD-ROMs could hold about 600 MB of data, but now they can hold up to 700 MB.

CD-ROMs share the same technology as audio CDs, but they are formatted differently, allowing them to store many types of data.


768 × 576

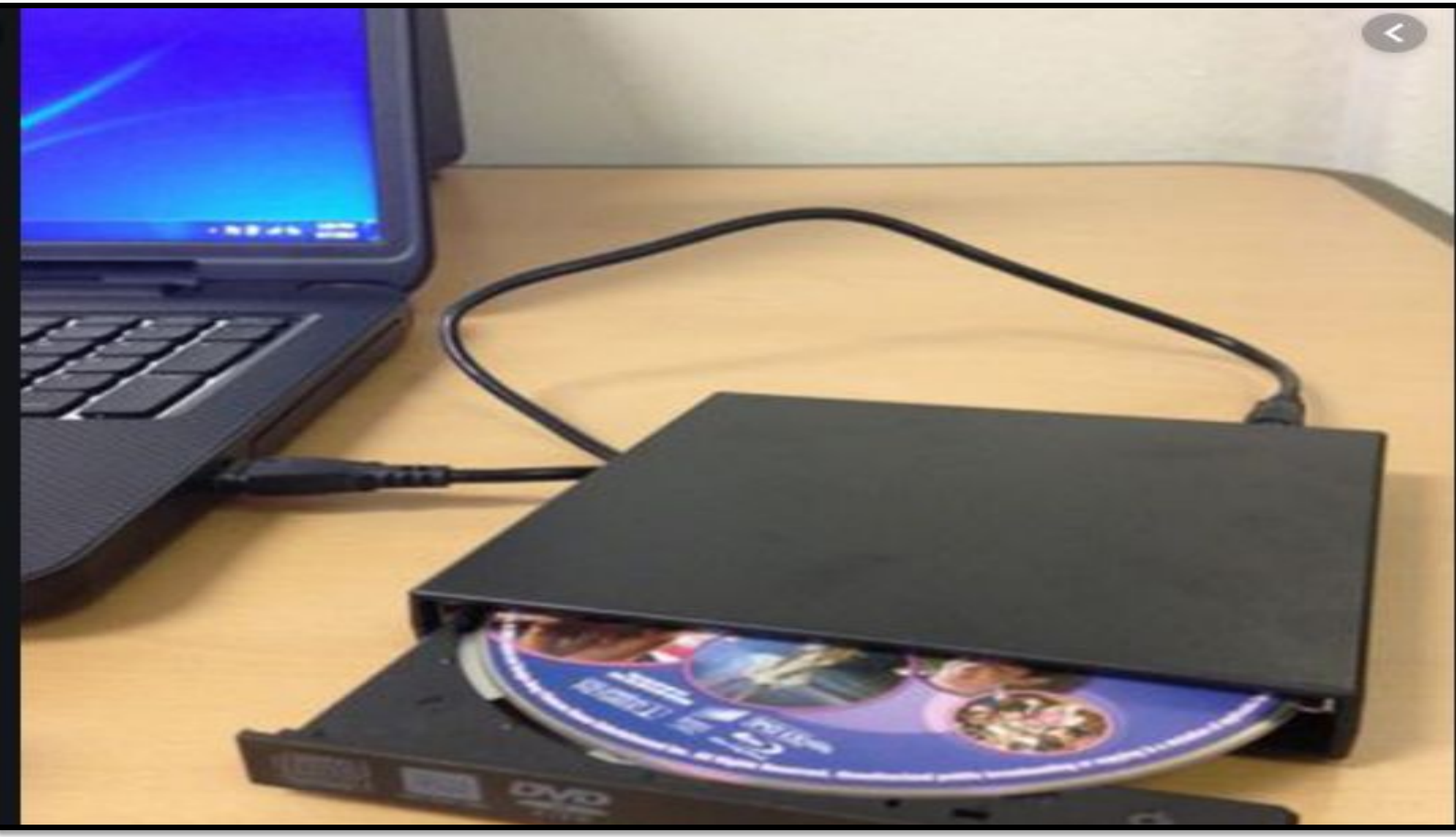
CONT'D

4. DVD (DIGITAL VERSATILE DISC):

Digital optical disc storage **format invented and developed in 1995.**

The medium can store any kind of **digital data** and is widely used for **software and other computer files** as well as video programs watched using DVD players.

DVDs offer higher storage capacity than compact discs while having the same dimensions



CONT'D

4. PEN DRIVE:

Small self powered drive that connects to computer digitally through USB port.

It enables you to read, write, delete and move from one source to another.

Stores data from 1 GB to 64 GB


Transcend
32GB

Revision:

Q. Types of memory

Q. List down storage devices

Q. What's the use computer

Q. Difference between SRAM and DRAM

Q. How the memory is measured?

Q. What are input devices and list down input devices?

Q. What are output devices and list down output devices?

Software Component

1. Operating system

An operating system (OS) is system software that manages computer hardware and software resources and provides common services for computer programs E.g. Windows 10 ,Linux etc.

Software Component

2. Applications software

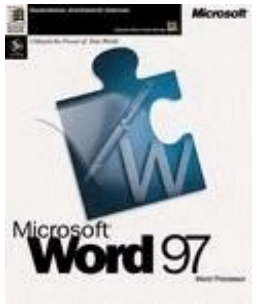
An application program is the type of program that you use once the operating system has been loaded.

Examples include word-processing programs, spreadsheets and databases

Software Component

Application Software

- Word processing applications
  - Microsoft Word
- Spreadsheets
  - Microsoft Excel
- Database
  - Microsoft Access



Information Network

Uses of Network

If ten people are working together within an office it makes sense for them all to be connected.

- In this way theoffice can have a single printer and all ten people can print to it.
- In a similar way other devices such as modems or scanners can be shared.
- Even more useful is theability to share information when connected to a network.

Information Network

- **LAN**
  - A LAN (Local Area Network) is a system whereby individual PCs are connected together within a company or organization

- **MAN –**
  MAN or Metropolitan area Network covers a larger area than that of a LAN and smaller area as compared to WAN. It connects two or more computers that are apart **but resides in the same or different cities.**

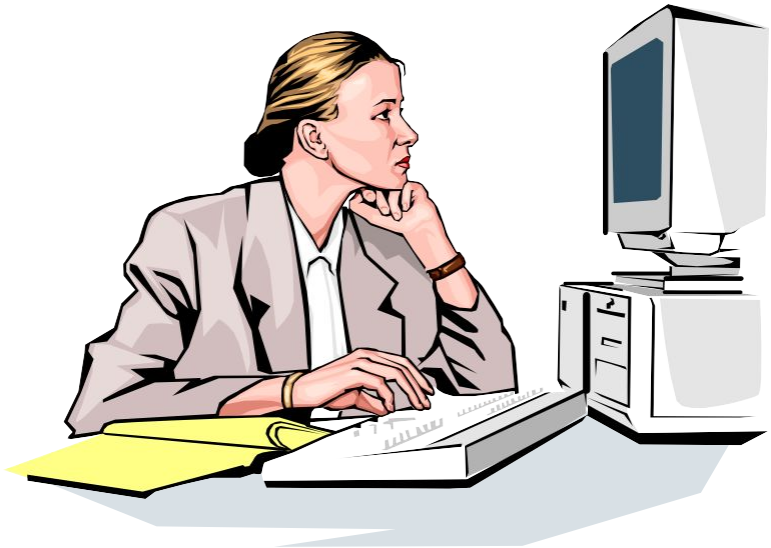
- **WAN**
  - A WAN (Wide Area Network) as the name implies allows you to connect to other computers over a wider area (i.e. the whole world).

Uses of Computer

PC at Home

Common uses for the computer within the home

- Computer games
- Working from Home
- Banking from Home
- Connecting to the Web



Uses of Computer

Computers in Daily Life

- Accounts
- Games
- Educational
- On-line banking
- Smart ID cards
- Supermarkets
- Working from home (Tele-working)
- Internet

Computer Threats

The term **“threat”** is defined as any kind of software potentially or directly capable of inflicting damage to a computer or network and compromising the user's information or rights (that is, vulnerabilities that can result in hacker attacks).

Types of Computer Threats

1. Computer Viruses

A computer virus is a program written to alter the way a computer operates, without the permission or knowledge of the user. A virus replicates and executes itself, usually doing damage to your computer in the process.

2. Computer Worms

Worms have become a lot more widespread than viruses and other types of computer threats recently. Like viruses, they are able to reproduce themselves and spread their copies, But don't require the activation of their host file.

3. Scareware

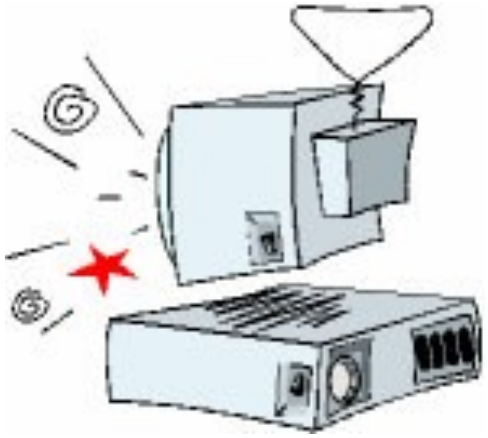
Scareware is the malware tricking the victim into buying the software by displaying the false virus alerts.

4. Keylogger

Keyloggers also called the keystroke logger, could easily track all real-time activity in the computer of the user. While using the computer, the Keyloggers would be running in the background as well as records everything making the user pass information to a hacker easily.

How To Improve Computer Security?

For safeguarding the system from cyber security attacks, it is much more important to have high advance software on the PC. Below are some of the steps you need to follow for improving your Computer Security System



- Use best antivirus software with internet protection system
- Never download untrusted email attachments
- Do not download software from unreliable sites
- Having a good network firewall security system is a good option

Operating Systems

What is OS?

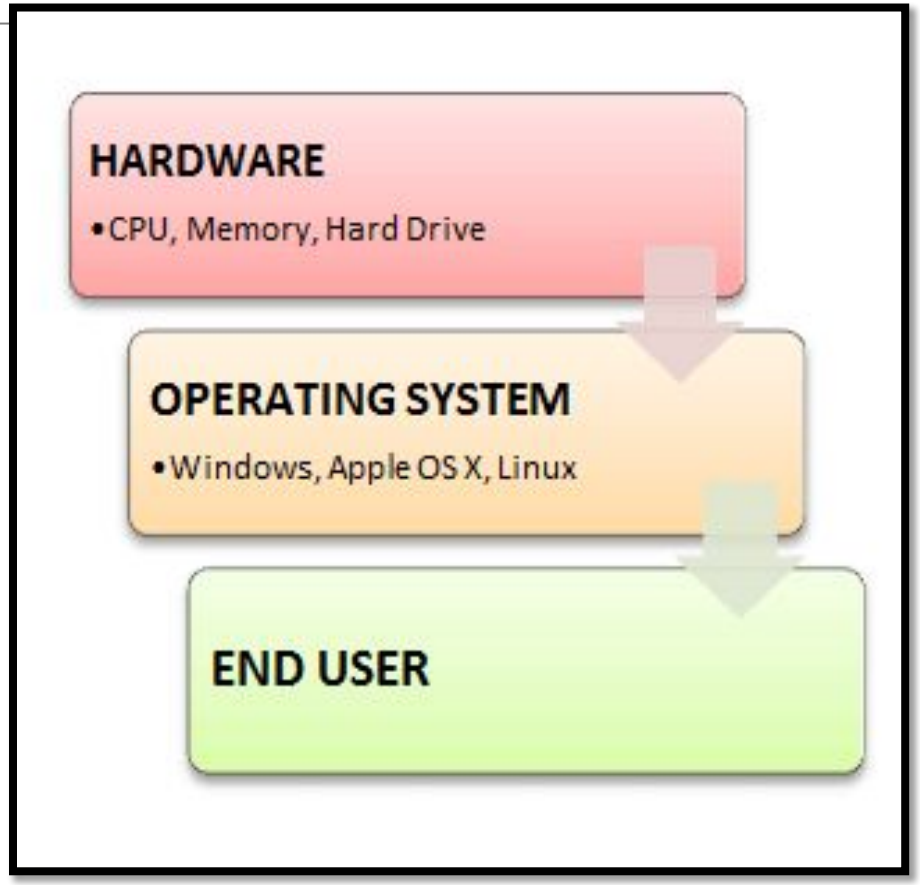
Operating System is a software, which makes a **computer to actually work.**

It is the **software** the enables all the **application programs we use.**

The **OS organizes and controls the hardware.**

OS acts as an **interface** between the **application programs** and the **machine hardware.**

Examples: Windows, Linux, Unix and Mac OS, etc.,



What OS does?/ OBJECTIVE???

An operating system performs basic tasks such as,

- controlling and allocating memory,
- prioritizing system requests,
- controlling input and output devices,
- facilitating networking and
- managing file systems.

Structure of Operating System

Operating Systems functions:

The main functions of operating systems are:

1. Program creation
2. Program execution
3. Input/Output operations
4. Error detection
5. Resource allocation
6. Accounting
7. protection

HISTORY OF OS

Operating systems were first developed in the **late 1950s to manage tape storage.**

The **General Motors Research Lab** implemented the first OS in the early **1950s for their IBM 701**

In the **mid-1960s,** operating systems started to **use disks**

In the **late 1960s**, the first version of the **Unix OS** was developed

The first **OS** built by **Microsoft** was **DOS.** It was built in **1981.**

The present-day popular **OS Windows** first came to existence in**1985** when a **GUI** was created and paired with **MS-DOS**.

ADVANTAGE OF OS

- **Allows** you to **hide details** of **hardware** by creating an abstraction
- Easy to use with a GUI
- It provides the computer system resources with easy to use format
- Acts as an **intermediator** between all **hardware's and software's** of the system

DISADVANTAGE OF OS

It is never entirely **secure** as a **threat** can occur at any time.

If any **issue occurs in OS**, you may **lose all the contents** which have been stored in your system

Operating system's software is quite expensive for **small size organization** which adds burden on them.

Example: Windows

Types of OS

Operating System can also be classified as,-

Single User Systems: WINDOWS

Multi User Systems: LINUX(Lovable Intellect Not Using XP), UNIX(UNiplexed Information Computing System)

INTRODUCTION TO WINDOWS

Windows OS, computer **operating system** (OS) developed by **Microsoft Corporation** to run **personal computers (PCs).**

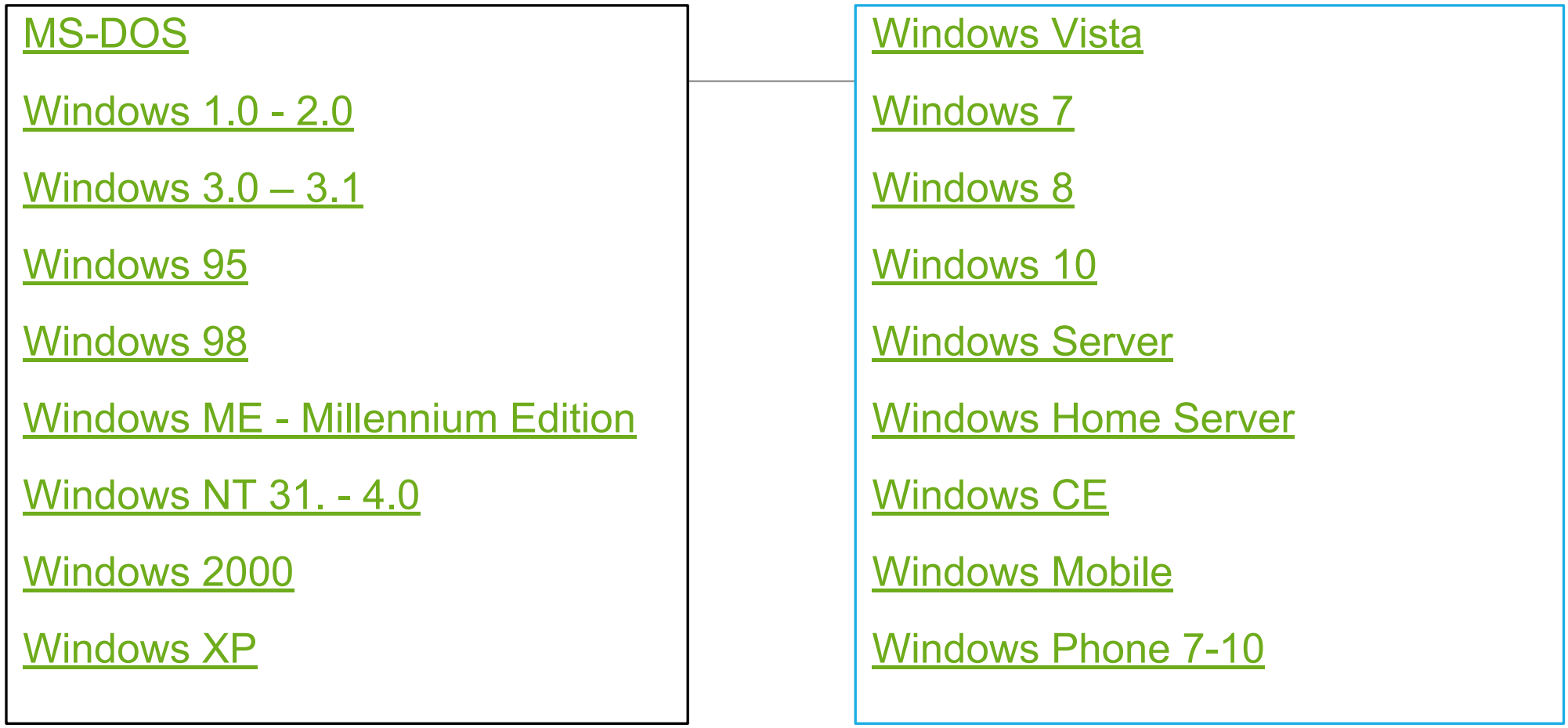
The **co-founder of Windows, Bill Gates, along with Paul Allen** announced Microsoft Windows on **November 10, 1983**, according to Brittanica.

The **first version of Windows,** released on **November 20, 1985**, was simply a GUI offered as an extension of Microsoft's existing disk operating system, or **MS-DOS.**

Each version of **Windows** includes a **graphical user interface**, with a **desktop** that allows users to view files and folders in windows.

For the past two decades, Windows has been the most widely used operating system for personal computers PCs.

Designed to work on **INTEL and AMD processor therefore** installed on multiple brands of hardware, such as **Dell, HP, and Sony computers, as well as home-built PCs.**


MS-DOS
Windows 1.0 - 2.0
Windows 3.0 – 3.1
Windows 95
Windows 98
Windows ME - Millennium Edition
Windows NT 31. - 4.0
Windows 2000
Windows XP
Windows Vista
Windows 7
Windows 8
Windows 10
Windows Server
Windows Home Server
Windows CE
Windows Mobile
Windows Phone 7-10

FEATURES OF WINDOWS OS

Speed

Compatibility

Search and Organization

Safety and Security

Taskbar/Start menu


Windows1
1985
Windows 3.1
1992
Windows 95
1995
Windows XP
2001
Windows
Vista 2006
Windows 7
2009
Windows 8
2012
Windows 10
2015


Windows98
Windows95
MICROSOFT
Windows2000
Windows xp
Windows Vista
Windows7

INTRODUCTION TO LINUX

Linux is an **operating system or a kernel.**

It is distributed under an **open source license.**

Its functionality list is quite like **UNIX.**

Linus Torvalds when he was a computer science student has developed this as an hobby

Application programs build on the operating system.

It forms the **interface between the hardware and application programs** as well as the interface between the hardware and people (users).

Why Linux

- Free and open-source.
- Powerful for research datacenters
- Personal for desktops and phones
- Universal
- Community (and business) driven.

The most common OS used by BU researchers when working on a server or computer cluster


debian
archlinux
openSUSE
CentOS
ubuntu
fedora
redhat
Linux Mint
gentoo linux


Activities
Wed 16:20
Type to search...
GNU 30th
Celebrating 30 years
GNU 30th anniversary – GNU Project – Free Software Foundation
00:15.9
Clocks
Music
Documents
Maps

FEATURES OF LINUX OS

Portable – Portability means softwares can works on different types of hardwares in same way. Linux kernel and application programs supports their installation on any kind of hardware platform.

Open Source – Linux source code is freely available and it is community based development project. Multiple teams works in collaboration to enhance the capability of Linux operating system and it is continuously evolving.

Multi-User – Linux is a multiuser system means multiple users can access system resources like memory/ ram/ application programs at same time.

Multiprogramming – Linux is a multiprogramming system means multiple applications can run at same time.

Security – Linux provides user security using authentication features like password protection/ controlled access to specific files/ encryption of data.

Comparison

Linux	Windows
Open Source	Closed Source
Free	Cost 150-320
Free Software	Cost Software
Secure	Insecure
NO	Virus, Malware
Low Hardware Cost	High Hardware Cost
Customizable add features	Not Customizable

VIVA QUESTIONS:

What is an operating system?

What is the main purpose of an operating system?

How Can I Avoid Computer Viruses?

How Can I Protect My Home Computer?

Types of network

Disadvantage of network

THANK YOU