IT102
UNIT 1: COMPUTER FUNDAMENTALS

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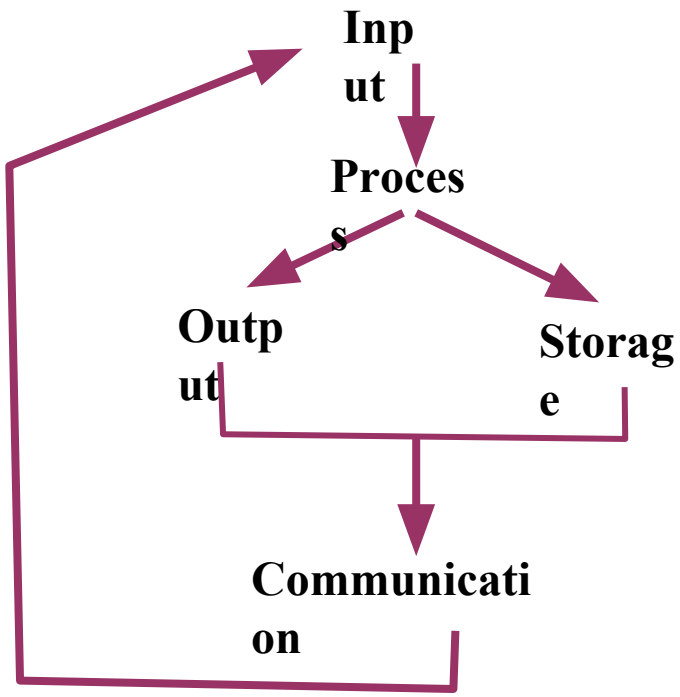
Topics to be covered

- Definition, history of computer terminology
- Input-output devices, storage devices
- Classification of computer
- Hardware, Types of software and firmware

What Is a Computer?

- **Electronic device** that can perform a variety of operations
  - **according to a set of instructions** called program.
  - then displays or prints the result.

- **INPUT-PROCESS-OUTPUT**
  - Capable of solving problem or manipulating data by accepting data
  - performing prescribed operation (mathematical or logical) on data
  - supplying the result of these operations as output.



What Is a Computer?

- The unique capabilities and characteristics of a computer
  - **Speed**
    - Quick performance & quick data input and information retrieval.
  - **Storage capacity**
    - Ability to store data
    - mass storage of data with appropriate format
  - **Accuracy**
    - Computer is programmed, so what ever input we give it gives result with accurately.
  - **NO IQ**
    - Computer does not work without instruction
  - **Versatility**
    - perform completely different type of work at the same time
  - **Diligence**
    - work for hours without any break and creating error

The Components of a Computer

The Components of a Computer

- What is an input device?

➢ Hardware used to enter data and instructions

➢ Converts the data into binary form that computer can understand

The Components of a Computer

- What is an output device?

➢ Hardware that conveys information to a user

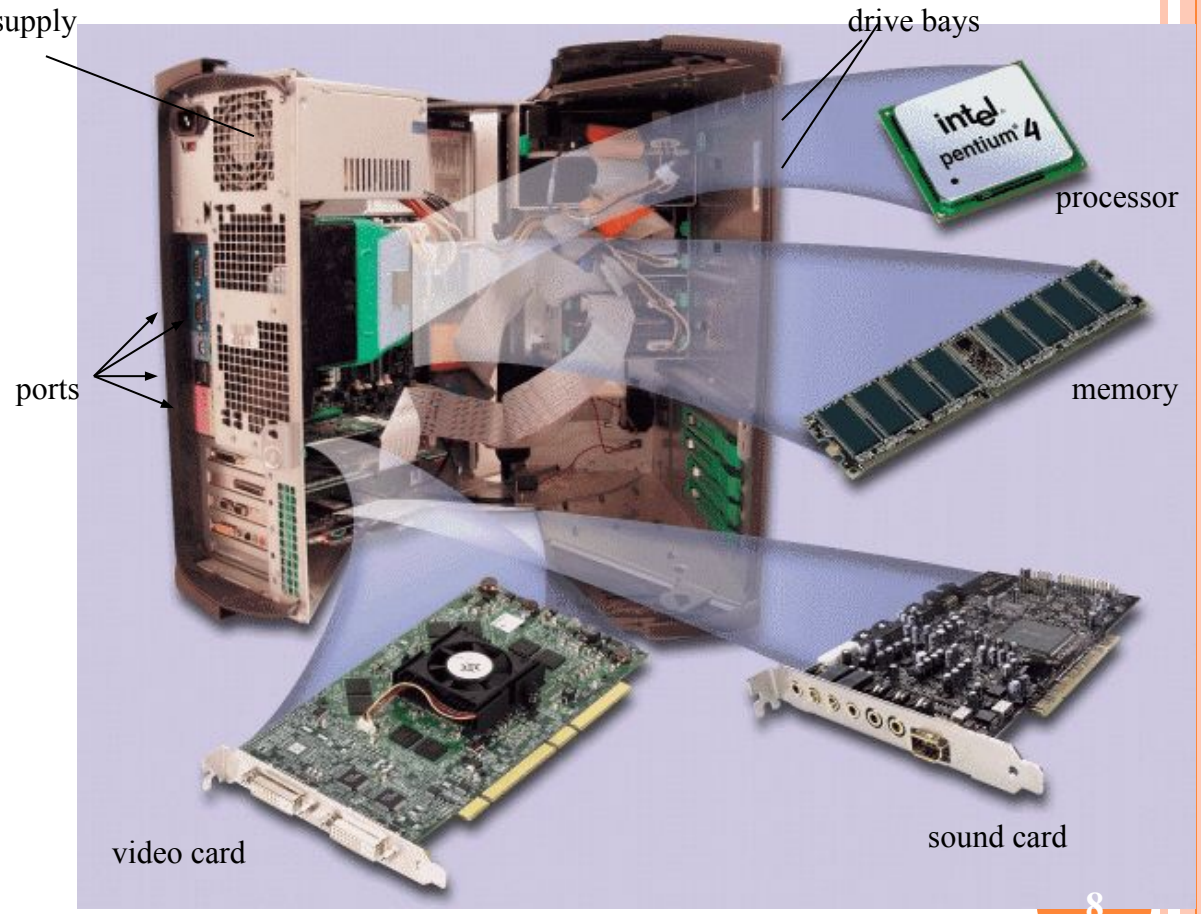
➢ convert electronic data produced by tl computer system

The Components of a Computer

- What is the system unit?

➢ Box-like case containing electronic components used to process data

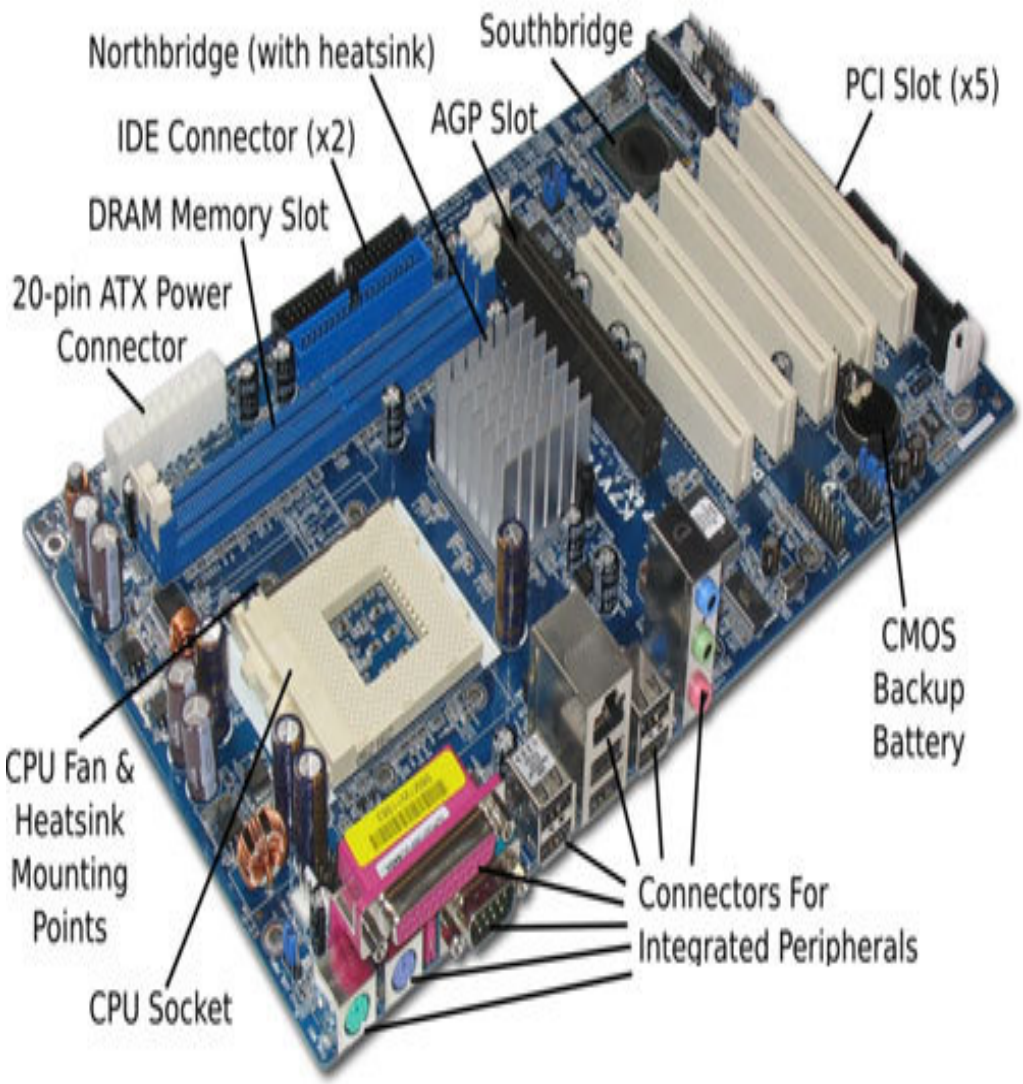
➢ Processor
  - ➢ Memory
  - ➢ Adapter cards
  - ➢ Ports
  - ➢ Drive bays
  - ➢ Power supply



The Components of a Computer

What is the magical inside the black box?

- **Motherboard**
  - Main circuit board in system unit
  - Contains adapter cards, processor chips, and memory chips
  - Also called system board
  - In most computers, the motherboard is a big green board, but many come in different colors like black, red and yellow.



Power Supply Unit

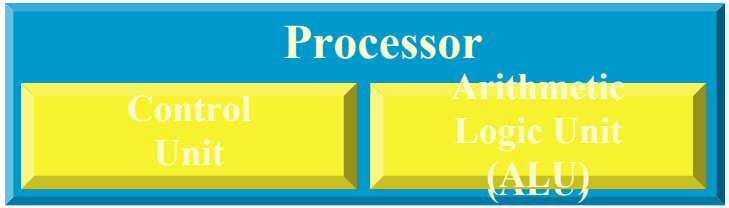
- A power supply unit (PSU) converts mains AC to low-voltage regulated DC power for the internal components of a computer.

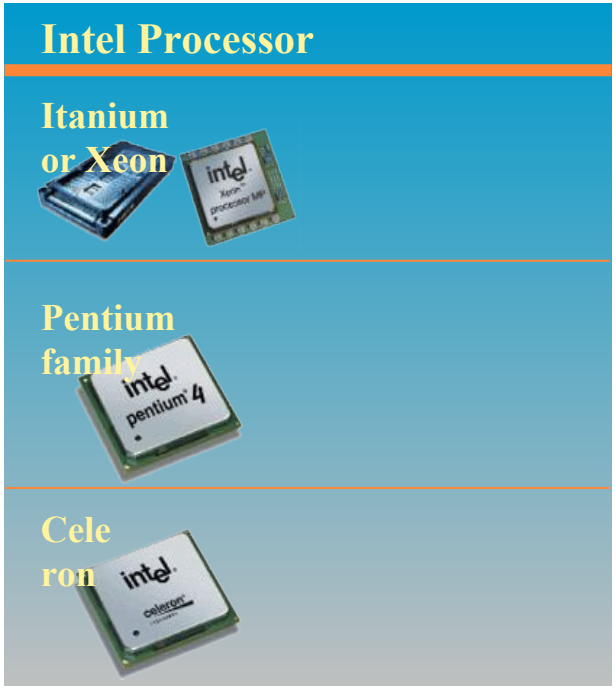
The Components of a Computer :Processor

- What is the central processing unit (CPU)?

➢ **Interprets and carries out basic instructions that operate a computer**

- **Control unit** directs and coordinates operations in computer
- **Arithmetic logic unit (ALU)** performs arithmetic, comparison, and logical operations





The Components of a Computer :Memory

- Memory can be divided into two parts
- **Primary Memory : RAM, ROM**
  - Stores all or part of the program that is being executed
  - **RAM(Random access Memory)**
    - short-term storage of data or program
    - Its contents will be lost when the computer turned off.
  - **ROM(Read only memory)**
    - store important or frequently used programs
    - can only be read from. It cannot be written to.

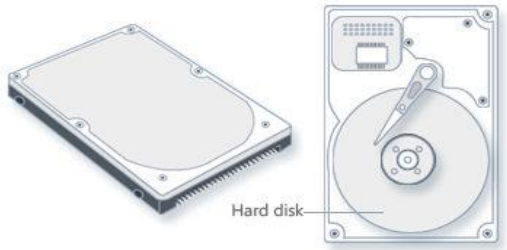
The Components of a Computer :Memory

- **Secondary Memory : Storage Devices**

- devices that store information .
- disk preserves the information even when your computer is turned off
- **Floppy disk FDD And Hard disk drive (HDD)**
- **CD and DVD drives**
- **CD-Recordable (CD-R)**
- **CD-Rewritable (CD-RW)**
- **USB flash drives**
- **Magnetic tapes**

The Components of a Computer :Memory

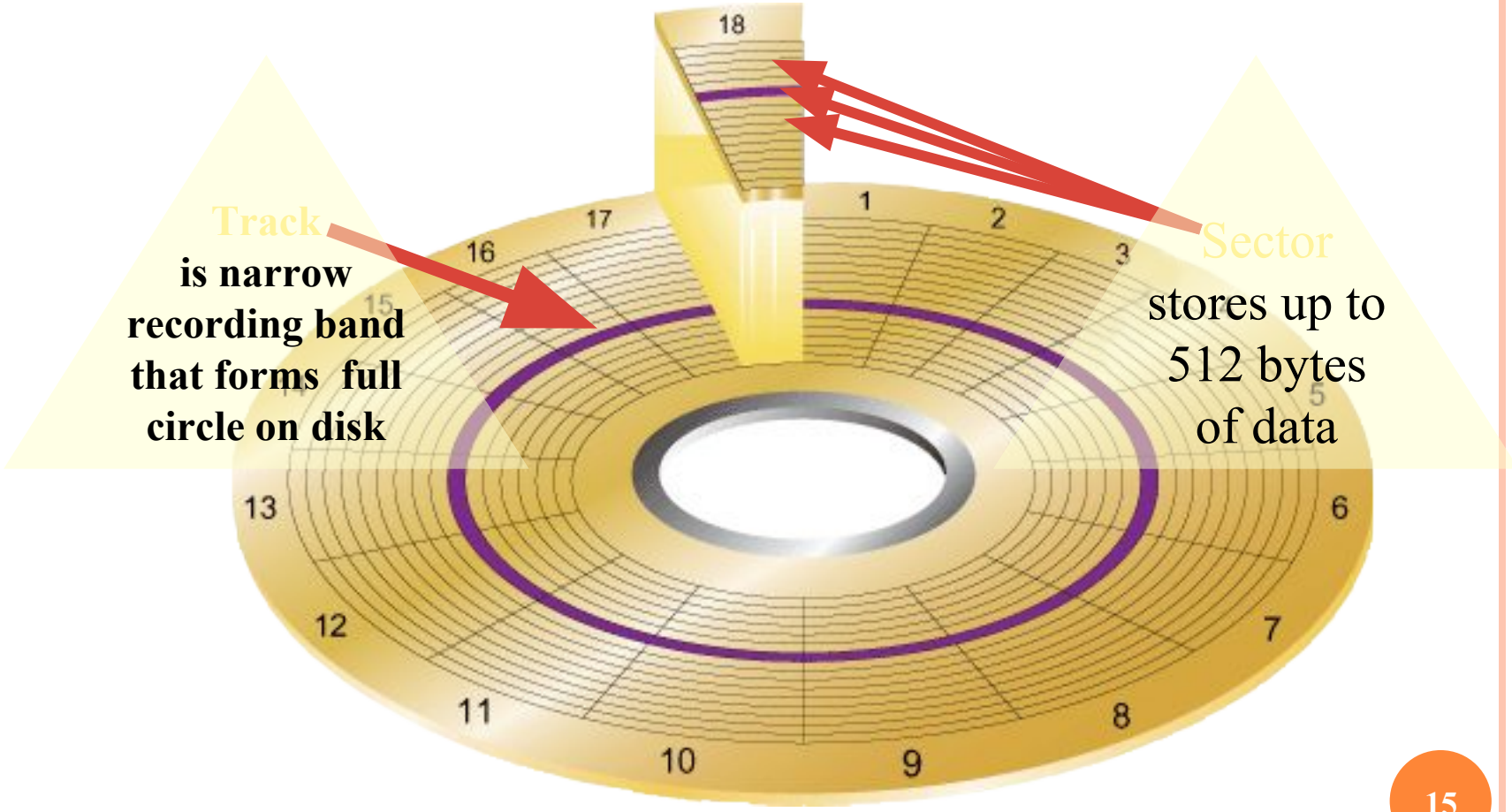
- **Hard disk drive**
  - stores information on a hard disk—a rigid platter or stack of platters with a magnetic surface
  - can hold massive amounts of information.



- **CD(compact disk) and DVD(digital versatile disk) drives**
  - CD drives use lasers to read (retrieve) data & write (record) data onto CDs
  - CDR discs can be written once and read many times
  - CD-RW discs can be written many times
  - DVDs hold approx 7 times the information that CDs do in the same amount of storage space

The Components of a Computer :Memory

- **How is data stored? What are tracks and sectors?**
- stored in single track
- Track divided into evenly sized sectors that store items



Formatting prepares disk for use and marks bad sectors as unusable

The Components of a Computer :Memory

- **PC Card**
  - Adds capabilities to computer
  - Credit-card-sized device commonly used in notebook computers

PC CARDS

Category	Thickness	Use
Type I	3.3 mm	RAM, SRAM, flash memory
Type II	5.0 mm	Modem, LAN, SCSI, sound, TV tuner, hard disk, or other storage
Type III	10.5 mm	Rotating storage such as a hard disk

STORAGE CAPACITY

Name	Abbreviation	Number of Bytes
Byte	B	1
Kilobyte	KB	1,024 Bytes
Megabyte	MB	1,024 Kilobytes (about 1 million)
Gigabyte	GB	1,024 Megabytes (about 1 billion)
Terabyte	TB	1,024 Gigabytes (about 1 trillion)
Petabyte	PB	1,024 Terabytes (about 1 quadrillion)

Computer Hardware, Software and Firmware

- **Hardware**
  - Physical components of computers
  - It provides shape and size and support software for proper functioning
  - Ex: Input devices, output devices, Registers, CPU, Hard Disk, printers, and Mouse etc which are touchable, visible, replaceable
- **Monitor**
  - Displays information in visual form, using text and graphics.
  - CRT (cathode ray tube) & LCD (liquid crystal display)

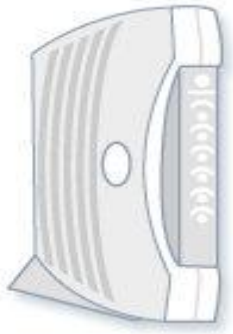
LCD Monitor

CRT Monitor

Computer Hardware, Software and Firmware

- **Modem**
  - To connect the computer to the Internet
  - sends and receives computer information

  over a telephone line or high-speed cable



- **Mouse**
  - small device used to point to and select items on computer screen
  - 2 buttons: A primary button (left button) &

    a secondary button
  - A wheel between the two buttons, which allows you to scroll smoothly through screens

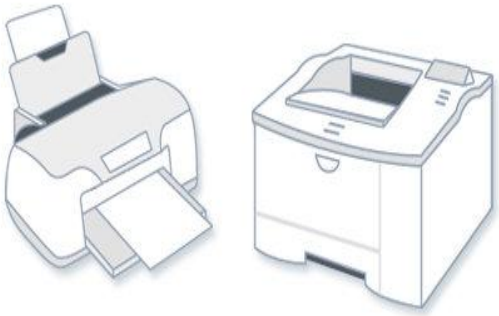
Mouse Actions

- **Left Click :** Used to select an item.
- **Double Click :** Used to start a program or open a file.
- **Right Click :** Usually used to display a set of commands.
- **Drag and Drop :** It allows you to select and move an item from one location to another. To achieve this place the cursor over an item on the screen, click the left mouse button and while holding the button down move the cursor to where you want to place the item, and then release it

Computer Hardware, Software and Firmware

- **Speakers**
  - Used to play sound
  - built into the system unit or connected with cables

- **Printer**
  - transfers data from a computer onto paper
  - print in black and white or in full color
  - can produce high-quality photographs when used with special paper



Inkjet laser

  - 2 types of printers : inkjet printers and laser printers

Computer Hardware, Software and Firmware

- **Keyboard**
  - used mainly for typing text into your computer
  - **function keys** → on the top row → perform different functions
  - **numeric keypad** → on the right side of most keyboards → allows to enter numbers quickly.
  - **navigation keys** →such as the arrow keys → allow to move cursor position within a document or webpage.

Computer Hardware, Software and Firmware

- **Software**
  - collection of program and other associated documents
  - helps to control, manage and integrate the components of computer system to accomplish a specific task
  - enable the user to interact with a computer
  - non-touchable, non viable set of instructions coded in computer languages.
  - Examples are operating system, compiler and interpreter, application software etc

Computer Hardware, Software and Firmware

- **Firmware**
  - Pre written program that is stored in ROM
  - Added at the time of manufacturing, is used to run user programs on the device.
  - It configures the computer and not easily modified by users
  - Ex : instructions coded in BIOS(basic input output service)
  - Provides instruction on how that device should operate
  - Its combination of software and hardware.
  - ROMs, PROMs and EPROMs that have data or programs recorded on them are firmware.

Q1: Identify Personal Computer?

(A)

(B)

(C)

Identify LCD Monitor

(A)

(B)

FILL IN THE BLANK

- In personal computer, components that we can touch and see are know as _____.
  - (A) Hardware
  - (B) Software.

- PSU – Power _____ Unit
  - (A) Support
  - (B) Section
  - (C) Supply

- _____ used to store the data.
  - (A) Keyboard
  - (B) Mouse
  - (C) Hard Disk

FULL FORM

- What is full form of RAM?

(A) Read Access Memory

(B) Random Advance Management

(C) Random Access Memory

- What is the full form of CRT?
  - A. Crystal Ray Tube
  - B. Cathode Ray Tube

Computer can Perform

(A)Store data

(B)Process Data

(C) A & B BOTH

Is a printer an input device or Output device?

A. Input Device

B. Output Device

History of Computer

- **Generation of Computers**

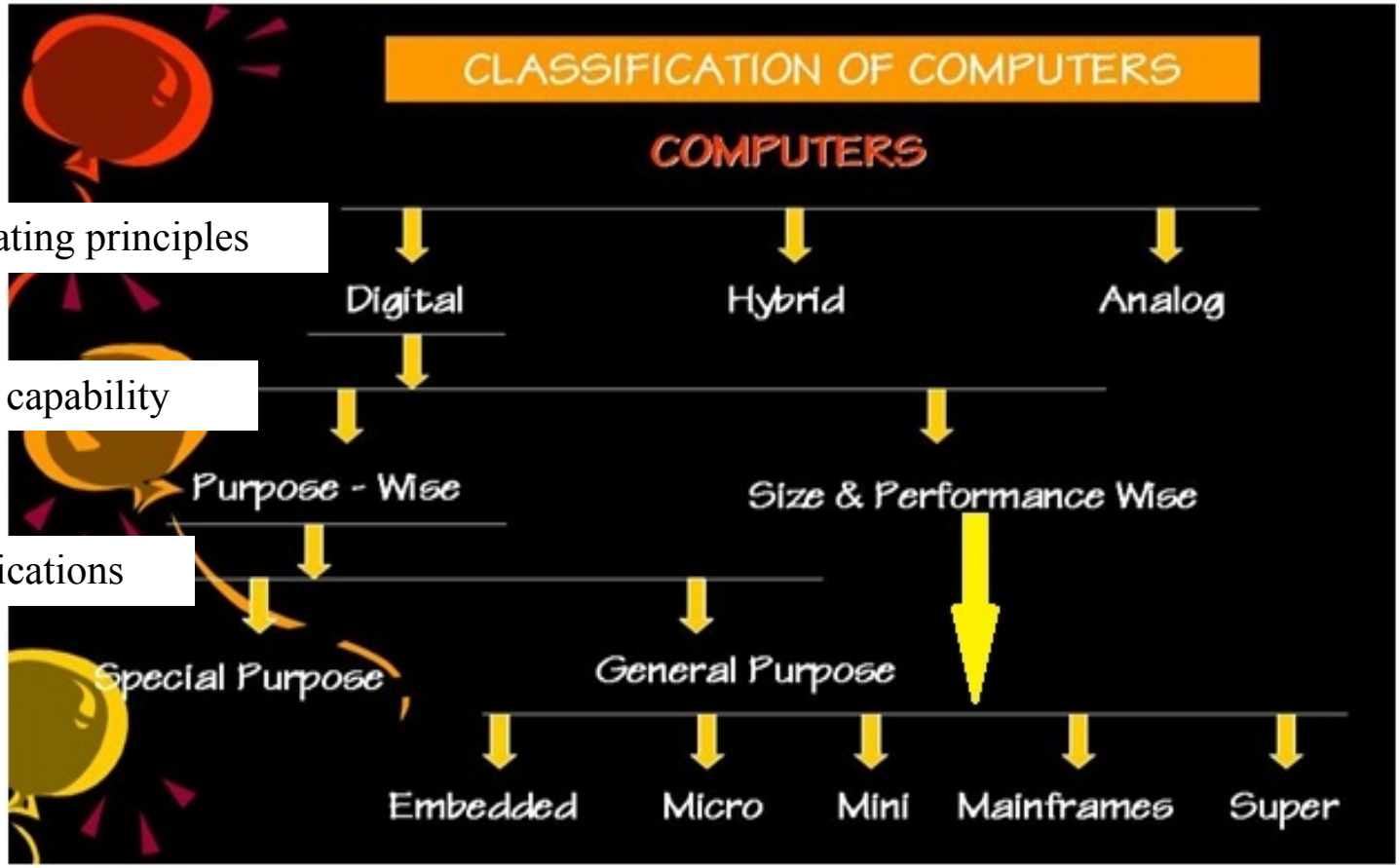
First (1940-1956)	Vacuum Tubes	Very large. Generated immense heat. Very expensive.
Second (1956-1963)	Transistors	Continued to be large and expensive.
Third (1964-1975)	Integrated Circuits (IC's)	Significant reduction in size and cost
Fourth (1975-1989)	very large scale Integration (VLSI)	Microprocessor has minimized the size of PC
Fifth (In progress)	Artificial Intelligence	knowledge Information processing Systems

Classification of Computer

Based on operating principles

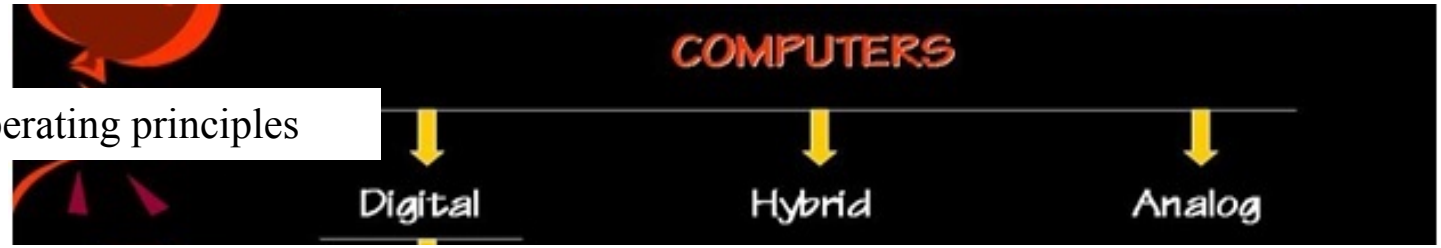
Based on size and capability

Based on applications



Classification of Computer

Based on operating principles



- **Digital computers**
  - Operate , store and process data in the digital form (binary numbering system).
  - Perform complex and repetitive calculations accurately.
  - Store large amount of data.
  - Provide information in textual and graphical manner.
  - PCs used in offices and homes are *digital computer*.

Classification of Computer

- **Analog computers**
  - Represent data in the form of continuous electrical signals.
  - Normally used in the process industry or in measuring instruments -directly measure physical parameters- voltage, current, weight, pressure, temperature etc...
  - Used for scientific engineering application

- **Hybrid computers (digital + analog)**
  - Combination of analog computer and digital computer because it encompasses the best features of both.

Classification of Computer

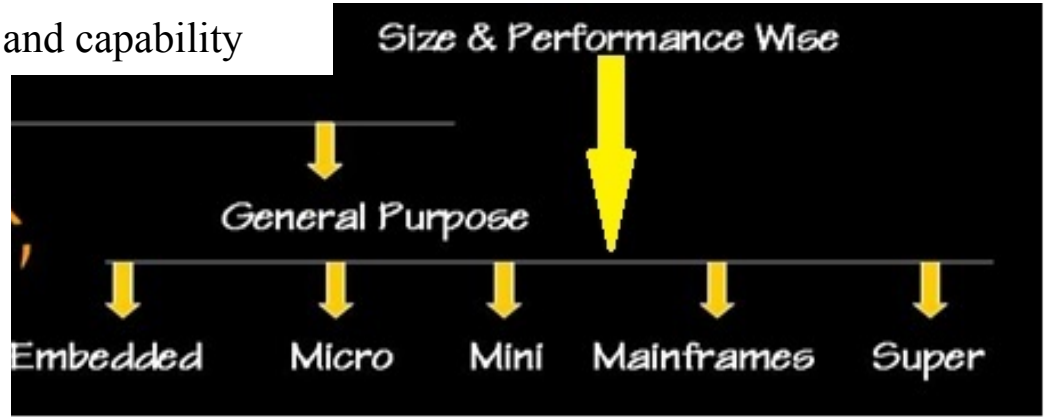
Based on applications

- **General purpose computers**
  - can work in all environments.
    - Laptop, desktop & workstations
    - Minicomputers
    - Supercomputers

- **Special purpose computers**
  - Its a computer designed for a particular function, executing the same stored set of instructions whenever requested
    - microwave ovens
    - washing machine
    - medical diagnostic equipment

Classification of Computer

Based on size and capability



- **Microcomputers**
  - Designed to be used by individuals
  - Smallest general purpose processing system
  - EX : Desktops, Laptops, Notebooks, Tablet PCs

Classification of Computer

- **Minicomputers**
  - Capable of handling large amount of data, input, output from multiple users working simultaneously.
  - More powerful and more expensive than microcomputers
  - Ex: server, which is used for managing internal company networks or Web sites.

- **Mainframe Computer**
  - very large computer with massive memory and extremely rapid processing power
  - Ex: scientific or military application where a computer must handle massive amounts of data or many complicated processes

Classification of Computer

- **Super Computers**
  - The fastest, most powerful, most expensive computer
  - Used for applications requiring complex mathematical calculations
  - Ex: used in scientific research, weather prediction, aircraft design, nuclear weapon and so on
  - In India, center for development of advance computing (C-DAC), Pune has developed the supercomputer “PARAM”.

Computer Applications in Society

- What are some examples of computer applications in society?

- **Education**
- **Finance**
- **Government**
- **Healthcare**
- **Science**
- **Publishing**
- **Travel**
- **Industry**
- **Telecommuting**

General Faults of Computer System

Faults	Information related to faults	Solution
Missing DLL File	• Has information for operating system on how to perform certain functions. • When your PC can't read the particular DLL file, it doesn't know how to respond in certain situations.	• restore them by downloading them back onto PC
Applications That Won't Install	• computer doesn't have enough hard drive space.	• free up some space by getting rid of files and folders you don't need • Delete temporary files, duplicate files or data for software you've uninstalled.
Applications Run Slowly	• operating system might be missing updates or computer doesn't have enough hard drive space / Main memory space	• scan, clean and optimize memory space.

General Faults of Computer System

Faults	Information related to faults	Solution
Abnormal Applications Behavior	• Without any reason, it is doing something strange • Word document will no longer show the top margin of your document	• Restart computer • Conducting an internet search for the type of problem you're experiencing • Consult user manual may
Blue Screen of Death (BSoD)	• comes up on your computer as blue screen with a bunch of white text. • Reasons : failing hardware, damaged software, corrupt DLL files, problems with drivers and more	• The remedy for a blue screen of death depends on the original problem • The screen provides you with codes that can help you identify and fix your computer problems.