BASIC COMPUTER ORGANISATION

A computer is an electronic device, under the control of instructions stored in its memory that can accept data (input), process the data according to specified rules(Program) on processor & produces information (output), and store the information for future use

Data vs Information

Data are raw numbers or other findings which, by themselves, are of limited value.

Information is data that has been converted into a meaningful and useful context.

Computers are being used extensively nowadays in everyday life/every field

In the form of laptop, desktop, smartphone,gadgets etc.

Advantages of computer

- Speed
- Accuracy
- Huge storage
- Versatility
- Tirelessness

Disadvantages of computer

- Data security issue
- Computer crimes
- Health risk
- Bad impact on environment if not properly disposed off

Any digital computer performs five functions in gross term.

1. Take data as input
2. Stores data/instructions
3. Process those stored data
4. Generate the output
5. Control all above steps

Functional components of a computer

Central Processing Unit

microprocessor unit

Control Unit

Arith./Logic Unit

INPUT DEVICE

OUTPUT DEVICE

Memory Unit

Von Neumen Computer Architecture
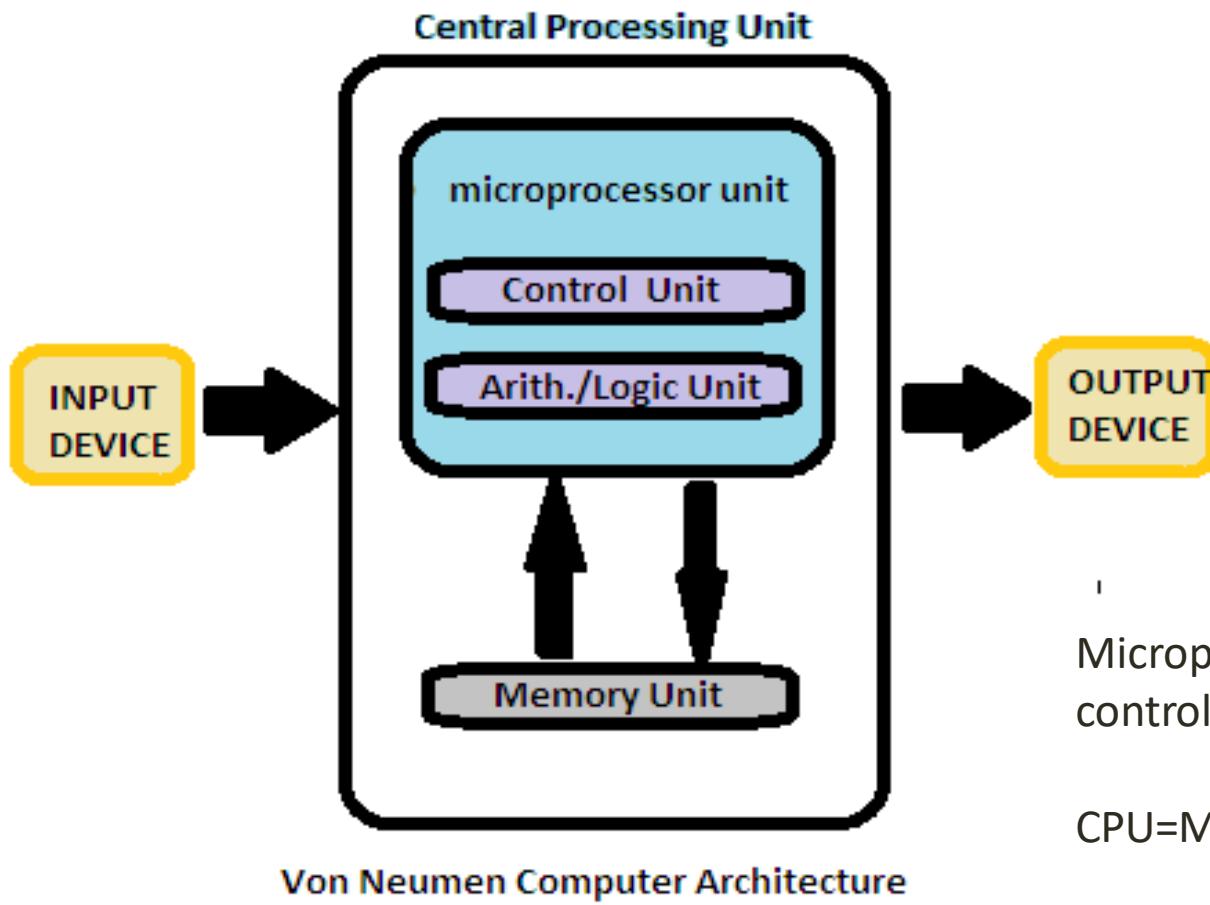
Microprocessor unit(mpu) = (CU+ALU)
control unit+arithmatical logical unit

CPU=MPU+Memory Unit

Input/Output Units

Input Unit

A device through which data and programs from the outside world enter the computer system.

Output unit

A device through which results stored in the computer memory are made available outside the computer system.

Input Devices

Input devices can send data or information to a computer or another device.

Keyboard: It is an input device which sends data in to the computer. The data send depends on the key pressed by the user.

Mouse: A mouse is a small handheld input device which controls a cursor in a graphical user interface. It can move and select text, files, folders etc. on our computer according to the user input.

Scanner: Scanner optically reads and document, file or image and then changes it into digital signal and sends to the computer.

OMR: optical mark recognition/ reader, is used to read marks on a document and send them to computer.

OCR: OCR stands for optical character Recognition, is an input device which reads printed text and sends that to computer.

MICR: Magnetic Ink Character Reader is an input device which generally finds application is banks to process cheques.

Microphone: it receives audio generated by some input source and sends the same to a computer. **Webcam:** it sends the captured images to a computer.

Graphics Tablets: This input device is used to draw using hand.

Trackballs: an upside down mouse ,encased within a socket. Is a cursor control device.

Barcode reader: It is used to read the barcode of various items and feed the same to computer.

Gamepad: Also known as joy pad is the input controller for video games.

Joystick: these input devices are used to control video games.

Output Devices

A device that can receive data from computer or another device and create output with that data is called output device. Examples of various output devices are as :

Monitor: A monitor is an output device that is responsible for receiving data from a computer and displaying that information as text or images for users to see.

Speakers: Receives sound signal from a computer and then plays that sound signal and thus we hear songs or music or any other audio.

Projector: Gets data from a computer and displays or projects the same information onto a screen or a wall. Projector cannot directly accept data from a user and send that data to another device.

Both Input / Output Devices

An input/output device is capable of receiving data from users or another devices and also sending data to another devices or computers. That means a devices which can be used as both input device and output device are called Input / Output (I/O) devices. Some examples of input/output devices are as:

USB drive: Also known as pen drive or flash stick works as both input device to computer and as an output device. USB drives receive or save data from a computer as an input and it can also send data to a computer or another device.

Facsimile: Facsimile or FAX machine has a scanner which is an input device and a small printer to provide output.

Modems: It is used to transmit and receive data from one computer to another computer or other devices using telephone lines

CD-RW drives and DVD-RW drives: Receives data from a computer as input to copy onto and save into writable CD or DVD. We also use CDs or DVDs to transfer data to a computer.

Touch Screen: Touch screen is both input and output device. By touching the screen input is provided and being a screen, it is used as an output device.

Headsets: Headset consists of speaker as an output device and microphone functions as an input device.

Central processing unit – Comprises three parts

1.Arithmetic/Logic Unit

Performs basic arithmetic operations such as addition and subtraction Performs logical operations such as AND, OR, and NOT. Most modern ALUs have a small amount of special storage units called registers that can be accessed faster than main memory.

2.Control unit

It organizes the computer to work computer as single unit & generates control signals for various devices regarding read/write or execute operation

3.Memory

A collection of cells, each with a unique physical address Most computers are byte-addressable

Cell at address 1111

0	1	2	3	4	5	6	7	← Bit position
1	0	1	0	1	0	1	0	← Contents
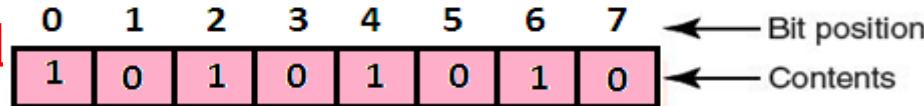
Memory Units – How much memory is required for a file/data/progam etc. is measured by memory units. Following are the memory units. $2^{10}=1024$

UNIT	STORAGE	ABBREVIATION
Bit	Binary Digit, Single 1 or 0	B
Nibble	4 bits	-
Byte/Octet	8 bits	B
Kilobyte	1024 bytes	KB
Megabyte	1024 KB	MB
Gigabyte	1024 MB	GB
Terabyte	1024 GB	TB
Petabyte	1024 TB	PB
Exabyte	1024 PB	EB
Zettabyte	1024 EB	ZB
Yottabyte	1024 ZB	YB

PRIMARY MEMORY

RAM and ROM

Random Access Memory (RAM)

Memory in which each location can be accessed and changed

Read Only Memory (ROM)-PROM,EPROM,EEPROM

Memory in which each location can be accessed but *not* changed

RAM is volatile, ROM is not

RAM- RANDOM ACCESS MEMORY

1. it is stored on the motherboard in modules that are called DIMMs(Dual inline memory module).Becoz DIMMS have 2 dual rows of pins one on each side.

2. DIMMs i.e memory module pins can have 168, 184,240 or 288 pins.

3. RAM is installed on the motherboard in the memory slots.

4. a motherboard can have various number of memory slots. The average motherboard will have between 2 and 4 memory slots.

5. In order for a program to run , it needs to be loaded into RAM first.

6. Increasing the RAM will make the computer run faster.

7. RAM requires constant electrical power to store data if power will turn off the data will erase.

TYPES OF RAM

DRAM- contains capacitors.capacitors have to be refreshed with electricity constantly.DRAM- operates Asynchronous with the system clock

SDRAM- synchronous dynamic RAM. used today in RAM DIMMs. SDRAM-operates synchronous with the system clock

All signals are tied to the system clock for a better controlled timing.

RAM- the term 64 bit or 32 bit data path refers to the number of bits of data that are transferred in 1 clock cycle.

SECONDARY MEMORY

Secondary Storage Devices Magnetic Tape
mass auxiliary storage device

Floppy disk

Hard disk
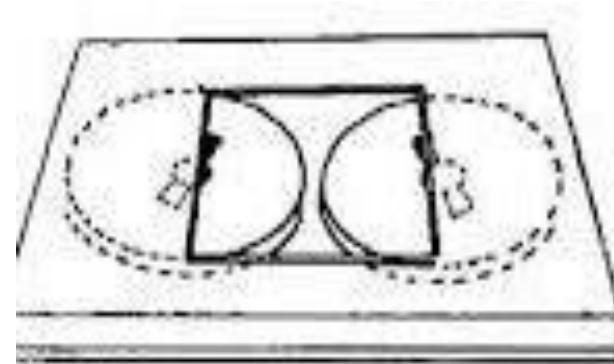
CARTRIDGE

Secondary Storage Devices

Hard disk

Fixed Head HDD / Movable head HDD
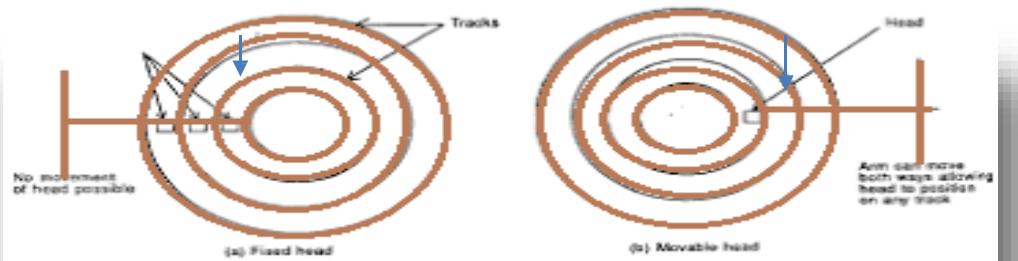
A hard disk is a set of stacked disks. Each disk has data recorded electromagnetically in concentric circles, or tracks, on the disk Hard Drive Types

1. Parallel Advanced Technology Attachment (PATA)
2. Serial ATA (SATA)
3. Small Computer System Interface (SCSI)
4. Solid State Drives (SSD)

Upto 12 TB sized HDD is available in the market

GENERATIONS IN COMPUTERS

DEPENDING UPON THE TECHNOLOGY USED, COMPUTERS WERE CLASSIFIED AS:

Generation means improvement in the miniaturization,speed,power and memory

Generations	Time Perriod	Technology
First Generation	1946-1955	Vacuum Tubes
Second Generation	1955-1965	Transistors
Third Generation	1965-1975	Integrated Circuits(ICs)
Fourth Generation	1976-1988	Microprocessor/Large Scale integration
Fifth Generation	Since 1988	Artificial Intelligence

TYPES OF COMPUTERS

TYPES OF COMPUTERS

❖**Supercomputer**.

❖**Mainframe**.

❖Server Computer.

❖Workstation Computer.

❖**Personal Computer** or PC.

❖**Microcontroller**.

❖Smartphone.

❖Wearable computers-watches, google glass etc

❖Tablet,laptop etc..

BASED ON PURPOSE

❖**Microcomputers (personal computers)-**laptop,tablet,smartphones,smartbooks,programmable calculator,video game console,handheld game consoles etc

❖**Minicomputers (mid-range computers)-**medium sized business organisations,laboratories,hospital CAT scanners

❖**Mainframe computers-**bank ,govt and large corporations

❖**Supercomputers-**weather forecasting, fluid dynamics, nuclear simulations, astrophysics, complex scientific computations

BASED ON FUNCTION

❖**Servers-**database server, file server, web server, terminal server

❖**Workstations**

❖**Information appliances**-these are designed to perform user friendly function. these are battery operated mobile devices like playing music,photography,videography,wearable devices

❖**Embedded computers-**washing machine, DVD player ,automobile etc

BASED ON USAGE

❖**Public Computers-cybercafes,school,libraries**

❖**Personal Computer**

❖**Shared computer-thin client computers(**Such systems normally require a system administrator to set up and maintain the hardware and software.)

❖**Display computer-** display selected material (usually **audio-visual, or simple slide shows**) in **a shop, meeting or trade show.**