

## Chapter 1 'Computer System'

**Computer** : A Computer is an electronic device that can perform a variety of operations in accordance with a set of instructions called program.

➤ Functioning of a Computer.

Computer work on the principal of Input-Process-Output cycle(IPO cycle in short) That it needs certain input, carries out a process and produces the output .

➤ Functional Components of a Computer

**Central processing Unit:-**

- It guides , directs and governs computer performance.
- It is the brain of Computer
- It has two parts **Control Unit** and **Arithmetic Logic Unit**
- Control Unit control and guides the interpretation, flow and manipulation of all data and information.
- **ALU** performs all the four arithmetical (+,-,\*,/) and logical (<,>=,<=,>=,<>)

**Output Unit**

- The output unit is formed by the output devices attached to the computer  
eg  
VDU,Printer,plotter,speech synthesizer and coder etc.

**Memory Unit**

- The memory of computer is often called main memory or primary memory.
- Third component of CPU.
- A bit is an elementary unit of the memory. Eight bits together form a byte.
- A secondary memory space is needed as primary memory are temporary
- Eg USSB pendrive ,hard disk CDs

Secondary devices are also known

**Hardware:**

- The physical and tangible components of the computer.
- The components that can be seen and touched.
- The electronic ,electrical and mechanical equipment that makes up a computer is called hardware.
- Eg Input devices , output devices ,CPU , hard disk , modem,etc

## Software

- The set of programs that govern the operationof a computer system and make the hardware run.
- Types of software **System software** and **Application Software**
- System software further divided into **Operating system** and **language processor**.
- **Operating system** is a program which acts as an interface between a user and the hardware(i.e all computer resources)
- **Language processor** :-The system programs which convert high level program to low level program is known as language processor.
- There are three Type of language processor i.e assembler , interpreter, compiler
- **Assembler** converts the program written in assembly language into machine language.
- **Interpreter** converts HLL program into machine language by converting and executing it line by line.
- **Compiler** converts HLL program into machine language by converting and executing it in one go.
- **Application program:-** Is the set of programs necessary to carry out operations for a specified application.
- Application software is of tow type **Customised** and **Application Software**
- **Strengths and Weaknesses of a Computer**

Strengths	Weaknesses
Speed	Lack of decision Making power
High storage capacity	IQ Zero
Accuracy	
Reliability	
Versatility	

- Computers are sophisticated devices capable of performing huge variety of tasks with the help of different types of computers.
- On the basis of **Purpose wise computer** are of two types **Special purpose** and **General purpose**.

<b>Special purpose</b>	<b>General purpose.</b>
Perform specific tasks only	Can perform a variety of tasks depending on the program given

- On the basis of Principal of operation

<b>Analog Computers</b>	<b>Digital Computers</b>	<b>Hybrid Computers</b>
Work with continuous physical quantities like voltage , current, temperature,etc Take input in the form of volts , ampere , celcius	Work with digital data i.e discontinuous data (converted in the form of 0, 1 etc) <b>Configuration wise categories</b> <b>Embedded, personal/desktop, midrange servers/minicomputers, mainframecomputers , supercomputers.</b>	Combination of digital and analog computers

### Input Devices

- Input device is any hardware component used to enter data programs , commands and user responses into a Computer.
- Input Devices

Purpose	Input Devices
Voice	mic
Video	Web camera
Printing devices	Mouse , trackball
Scanning and reading devices	Scanners, MICR, OCR, OMR, bar code readers

### Output Devices

- Output devices produce output of the machine in human readable form.
- The most common output devices are computer monitors and printers.
- Graphical output with help of PLOTTERS.
- For sound output speakers is required..

### Memory Devices

- Internally characters are represented through a group of bits depending upon encoding scheme being used.
- **Encoding scheme** is a way of specifying binary codes for each character.
- **ASCII** is an encoding scheme represents a characters as a group of 8 bits or a byte
- **UNICODE** encoding scheme represents a character as a group of 16 bits or 2 bytes.
- Parts of main memory RAM , ROM and Cache memory.

## Storage Devices(The Secondary Memory Devices)

<b>Magnetic Media</b>	<b>Optical Media</b>	<b>Solid State Media</b>
<ul style="list-style-type: none"> <li>• Stores data in the form of tiny magnetised dots</li> <li>• Created, read, erased via tiny electromagnets</li> </ul>	<ul style="list-style-type: none"> <li>• Optical storage devices save data as patterns of dots that can be read using light</li> <li>• Laser beam is the usual light source</li> </ul>	<ul style="list-style-type: none"> <li>• Solid-state means 'no moving parts'.</li> <li>• Solid state storage devices are based on electronic circuits with no moving parts i.e no reels of tape , no spinning disc , no laser beams etc.</li> <li>• Store data using special type of memory called <b>flash memory</b> consist of millions of transistors wired in series on a single circuit board.</li> </ul>
Eg <ul style="list-style-type: none"> <li>• Hard disks</li> <li>• Floppy disks</li> <li>• Magnetic tapes</li> </ul>	<ul style="list-style-type: none"> <li>• CD ROMs</li> <li>• DVDs</li> <li>• Blu-ray disc</li> </ul>	<ul style="list-style-type: none"> <li>• Flash Memory</li> <li>• Memory cards</li> </ul>

## Communication Bus

- **Bus:-** Computer system uses number of buses which are collection of wires that transmit binary numbers one bit per wire.
- Microprocessor communicates with memory and others devices using buses.
- Address Bus(16 lines)

### Address Bus

- Address bus carries memory addresses.
- It has one wire for each bit , therefore 16 bits =16 wires.
- It is unidirectional(microprocessor to memory ).

### Data Bus

- It carries data in binary form , between the processor and other external units , such as memory.
- Size is 8 or 16 bits.
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## **Control Bus**

Control Bus consists

- controlling  $\mu$ P (micro processor)operations.
- Control line may specify whether memory is being written to(data stored in memory) or read from.
- It is unidirectional and partly bi-directional.

## **Ports**

- Ports are used to connect external devices to the computer.
- Serial ports , Parallel Ports ,USB , AGPPorts , InfraRed Port , Bluetooth, Networks Ports

## **E-Waste Disposal**

- Electronic waste , e-Waste , e-Scrap or Waste Electrical and Electronic Equipment(WEEE) describes discarded electrical or electronic devices. “
- Electronic waste also defined as discarded computers ,office electronic equipment , entertainment device electronics , mobile phones , television sets and refrigerators.
- This includes used electronics which are destined for reuse , resale , salvage , recycling or disposal.

## **Different Characteristics of E-Waste**

- The fastest growing segment of waste (ii)most valuable due to its basic composition
- Very hazardous if not handled carefully.

## **E-Waste Disposal Process**

- Dismantling i.e removal of parts containing dangerous substances(PCB, CFCs)
- Segregation of ferrous metal , non-ferrous metal and plastic.
- Refurbishment and reuse
- Recycling / recovery of valuable materials
- Treatment / disposal of dangerous materials and waste

### **Benefits of e-Waste Recycling**

- Allows for recovery of valuable precious metals.
- Protects public health and water quality
- Creates Jobs
- Toxic Waste

Save landfill space.

### **Compilers**

- Is a program /software that converts source code into machine code in one go. And it also produces list of errors in the program, if any

### **Interpreters**

- It is a program/software that converts a source code into machine code line by line. It moves to next line only if the current line is error free.

### **Integrated Development Environment (IDE)**

- Is an application program consisting of different development tools needed for developing an application.
- An IDE typically consists two or more of the following tools:
  - ✓ Source Code Editor
  - ✓ Compiler
  - ✓ Debugger
  - ✓ Graphical User Interface(GUI)builder
  - ✓ Code generator

**Computer security**-Is the ability of a system to protect information and system resources with respect to confidentiality and integrity.

### **Basic Components of Computer Security(CIA)**

- **Confidentiality**- Ensuring that information is not accessed by unauthorized persons.
  - **Integrity** –Ensuring that information is not altered by unauthorized persons in a way that is not detectable by authorized users.
  - **Authentication**-Ensuring that users are the persons they claim to be.
- Other area include

Access control ,No repudiation, Availability

- **Threat** - Is a potential violation of security. When a threat is actually executed, it becomes **attack**.  
Those who execute or cause threats to be executed are called attackers.
- **Malware**- Is a a general term used to refer to viruses, worms, spyware, adware etc. In other words, it is unwanted software that someone else wants to run on some one else computer. It infects computer, making it behave in a way, which no one approve of.
- **Viruses**- Malicious codes/programs that cause damage to data and files on a system.
  - ✓ Viruses can attack on operating system, boot block, system areas, files and application –program macros.
  - ✓ **Worms**- Is a self –replicating program which eats up the entire disk space or memory.
  - ✓ **Trojan Horses**- A trojan horse is a program that appears useful first but actually performs malicious functions such as deleting or damaging files.
  - ✓
- **Spyware**- Is a software which is installed on any computer to spy on the activities and report this data to people willing to pay for it.
- **Adware** – Are the programs that deliver unwanted ads to the computer(generally in Pop-Ups form).Adware consume our network
  - It is similar to spyware—however, it may be installed with user consent.
- **Spamming** -Refers to the sending of bulk-mail by an identified or unidentified source.
  - ✓ In non-malicious form, bulk-advertising mail is sent to many accounts.
  - ✓ In malicious form(eg, e-mail bombing), the attacker keeps on sending bulk mail until the mail-server runs out of disk space.
  - ✓ **SPIM** It is a SPAM sent via instant messaging systems such as Yahoo Messenger, MSN Messenger and ICQ.
- **PC Intrusion** – PC Intrusion **can occur in any of the following form**
  - ✓ **Sweeper Attack**
  - ✓ **Denial services**
  - ✓ **Password Guessing**
- **Phishing**-In phishing, creator sends fake email in the hope of gaining personal/financial information.

- **Pharming-** It is actually a code installed on the hard drive of a user's computer or on actual web server , code redirects user to a fake website without user knowing.
- **Firewall-** Is a network security system, either hardware-or software-based, that controls incoming and outgoing net-work traffic based on a set of rules.
- A firewall forms a barrier through which the traffic going in each direction must pass. A firewall security policy