

## **INTRODUCTION TO COMPUTING**

### **COMPUTER**

It is an **electronic machine** that **converts raw facts into required information** according to a **set of instructions** fed into it.

### **FUNCTIONING OF COMPUTER**

Computer system works by **combining input, storage space, processing, and output.**

#### **Input**

An input is the **information that we provide to the Computer.**

#### **Storage Space**

It is the place **where our input gets stored.** It is known as **Computer Memory** that keeps the data into it.

#### **Processing**

**Central Processing Unit** is responsible for **processing the data provided** by the user.

#### **Output**

Any information processed by and **sent out from a computer** or other electronic device is considered output.

## **CENTRAL PROCESSING UNIT**

- **CPU** performs **all types of data processing operations.**
- It **stores data,** intermediate results, and instructions (program).
- It **controls the operation** of all parts of the computer.

### **COMPONENTS OF CPU**

- Memory or Storage Unit
- Control Unit



- ALU (Arithmetic Logic Unit)

## ORGANIZATION OF A COMPUTER

**Charles Babbage** designed in **1856**, "**Analytical Engine**", the machine was planned to be fully automatic. It could do any basic **arithmetical functions for any mathematical problem** at the speed of **60 additions a minute**.

### THE MAIN COMPONENTS OF THIS ENGINE WERE

**STORE** to hold the numbers. It provided the data for problems and it could store intermediate results during the course of calculations.

**ARITHMETIC UNIT** was a device to perform the **arithmetical operations on the numbers that were stored**.

**CONTROL UNIT** to check the correctness of sequence of operations such as transferring data between the mill and store.

**INPUT DEVICE** to enter the numbers and instructions.

**OUTPUT DEVICE** to display the results.

## GENERATION OF COMPUTERS

The generations discussed below mainly refer to the **changes in hardware technology**.

### First Generation (1940-50)

- It consisted of **high-speed vacuum tube** switching devices.
- It had a very small memory and took about **200 milliseconds to add two digits** and about **2800 milliseconds to multiply**.
- In this era **stored program** proposed by Prof. **John von Neumann in 1946**.



### Second Generation (1950-60)

- Second Generation computers **uses transistors** and they were highly reliable as **compared to tubes**.
- The second major step in this generation was the **invention of magnetic core storage**.
- **Programming Languages** like **FORTRAN, COBOL** were developed during this period.

### Third Generation (1960-70)

- This period witnessed the **use of ICs (Integrated Circuits), circuits consisting of transistors, resistors and capacitors** mounted on a single **chip of silicon**.
- The **sizes were smaller and efficient** and the **computers were called minicomputers**.
- There was an **improvement in reliability and speed** as compared to **the second generation of computers**

### Fourth Generation(1970-Present)

- This generation may be identified by the **arrival of microprocessor chip**.
- The technology moved to **Very Large-Scale Integrated Circuits (VLSI)** which **holds around 50000 transistors in a chip**.
- Semiconductor memory storage units such as **RAM, ROM, etc were introduced**.

### Fifth Generation (Present)

- These computers use **ULSI (Ultra Large-Scale Integrated chips)**. They contain **millions of components on a single chip**.
- The fifth generation of computers **understands the natural human language**



## CLASSIFICATION OF COMPUTERS

### Analogue Computers

- The analogue machines do **not calculate directly with numbers**, they **measure continuous physical magnitudes such as temperature, pressure, voltage**.
- The **petrol pump** may have an analogue computer that converts the flow of pumped petrol into two measurements - **the quantity of petrol and the price for that quantity**.
- Computers are used for **scientific and engineering purposes**.

### Digital Computer

- The digital computer operates on **numbers or characters expressed as digits in number systems** like binary or decimal.
- Such computers are used both for scientific and business data processing.

### Special Purpose Digital computer

Special-purpose machines are **dedicated to one specific task**. A set of **instructions** for such machines is built into the machine **permanently**.

### General Purpose Digital computer

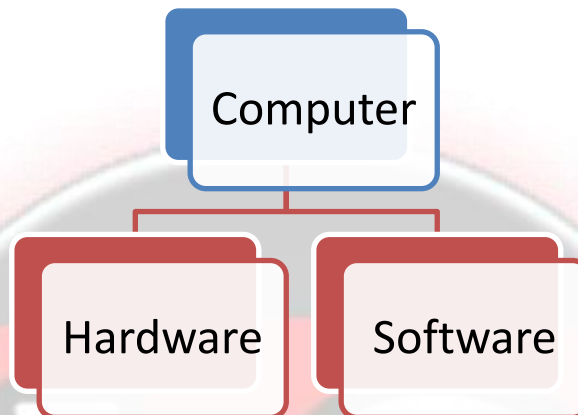
A general-purpose machine may be used to carry out **scientific as well as business purpose applications**.

## HYBRID COMPUTERS

Hybrid computer is a type of computer that offers the **functionalities of both a digital and an analogue computer**.

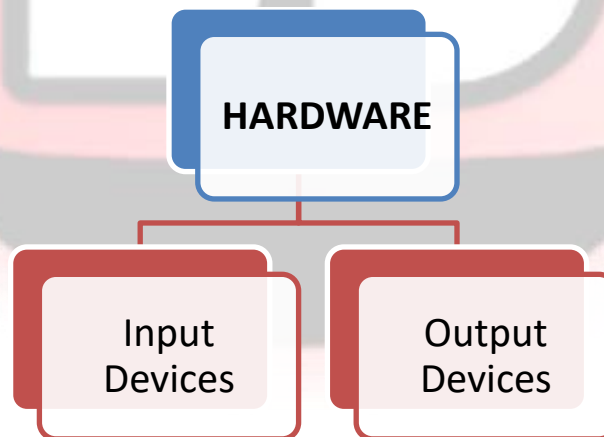


## PARTS OF COMPUTER



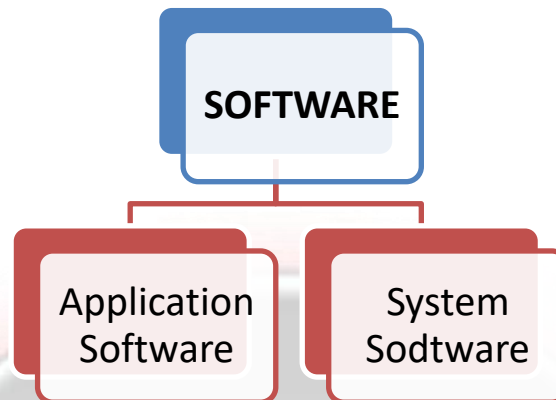
### HARDWARE

The **physical components**, of which a computer is made up, are known as hardware.



### SOFTWARE

Software is a **set of instructions, data or programs** used to operate computers and execute specific tasks.



## DATA PROCESSING AND METHODS

- Data processing is the method of **collecting raw data** and **translating it into usable information**.
- The raw data is **collected, filtered, sorted, processed, analyzed, stored, and then presented in a readable format**.

### PROCESS OF DATA PROCESSING

#### Collection

raw data should be **gathered from defined and accurate sources** so that the subsequent **findings are valid and usable**.

#### Preparation

Data preparation is the process of **sorting and filtering the raw data to remove unnecessary and inaccurate data**.

#### Input

The raw data is **converted into machine readable form and fed into the processing unit**.





## Data Processing

The raw data is subjected to various data processing **methods** using **machine learning and artificial intelligence** algorithms to generate a desirable output.

## Output

The data is finally **transmitted and displayed to the user in a readable form** like graphs, tables, vector files, audio, video, documents, etc.

## Storage

The last step of the data processing cycle is storage, **where data and metadata are stored for further use.**

## METHODS OF DATA PROCESSING

### Batch Processing

- Batch processing is a technique in which number of **similar transactions** to be processed are **grouped together** and then **processed sequentially at once.**
- This method utilizes technological resources very effectively, especially where **large numbers of transactions are involved.**

### On-Line Processing

In online processing the system **processes data as it is being entered.**

### How OLIP Systems work

- In on-line processing transaction data is **directly fed in the secondary storage device** under CPU control without being sorted.
- **Each item entered** will have a **transaction code.**



- The **validation of this item will take place** before it gets stored on **secondary storage device**.
- The **program then processes** the validated data and updates the master record immediately.

## FEATURES OF ON-LINE PROCESSING

### Record Locking

- In on-line processing, it may be possible that two **people are trying to update the same record at the same time**.
- To avoid this, the provision of record locking is provided. In this the **record under use is locked** so that no one else can update it at the same time.

### Check pointing and logging

Check pointing keeps track of the **master file, both before and after update**.

### Centralized and Distributed Data Processing

- In this system, several dumb terminals are attached to a central mainframe computer.
- Dumb terminals are the machines using which user can input the data and see the results. But the actual data processing is carried out by the central processor.

## COMPUTING ENVIRONMENTS

**Computing environments** refer to **the technology infrastructure and software platforms** that are **used to develop, test, deploy, and run software applications**.

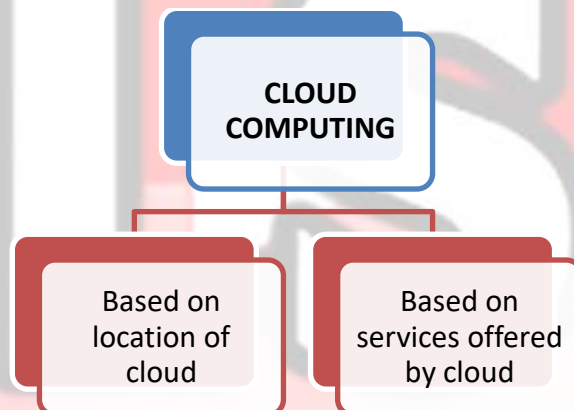




## CLOUD COMPUTING

- It is the **on-demand delivery** of IT resources over the Internet with pay-as-you-go pricing.
- Instead of buying, owning, and maintaining physical data centres and servers, you can access **technology services, such as computing power, storage, and databases**, on an as-needed basis from a **cloud provider like Amazon Web Services (AWS)**.

## TYPES OF CLOUD COMPUTING



### Location of the cloud

#### Public cloud

- In **Public cloud** the computing infrastructure is hosted by the cloud vendor at the vendor's premises.
- The customer has no visibility and control over where the **computing infrastructure** is hosted.

### Private cloud

- The **computing infrastructure** is dedicated to a particular organization and not shared with other organizations.
- Private clouds are **more expensive and more secure** when compared to public clouds.

### Hybrid cloud

The usage of both **private and public clouds together** is called **hybrid cloud**.

### SERVICE OFFERED

#### Infrastructure as a service

it involves **offering hardware related services** using the principles of cloud computing. These could include some kind of **storage services or virtual servers**.

#### Platform as a Service

Platform as a Service (PaaS) provides a **runtime environment**. It allows **programmers to easily create, test, run, and deploy web applications**

#### Platform as a Service

It includes a complete **software offering on the cloud**. **Users can access a software application** hosted by the cloud vendor **on pay-per-use basis**.

### MAJOR PLAYERS IN CLOUD COMPUTING

- Amazon Web Services (AWS) Cloud
- Google Cloud - Google Apps & Google App Engine
- Microsoft Cloud (Azure)
- Oracle Cloud
- SUN Microsystems

