# Digital Computer | Evolution, Types, Advantages, Classification and Components

In this article, you will learn about **digital computers**, different types of digital computers, their advantages & disadvantages, features, classification, uses, and evolution.

## *Digital Computer*

**Page Contents**

## What is a Digital Computer?

**Digital Computer** is a machine or a device that helps to process any kind of information.

These are the devices through which we provide some input and get the output within a fraction of seconds.

The operations that are conducted internally in the device happens using the binary number system since the computer understands only digits ie 0's and 1's.

All the content that is written in English will be converted to binary language and thus computers and humans communicate with each other.

Some of the basic examples of digital devices are Personal computers, Desktops, Laptops, Smartphones, and Mobile.

There are mainly three parts in a **digital computer** and it consists of –

- **Input**: The user normally provides the data to the device that is known as input.

- **Processing**: The input that is provided by the user is processed internally using some defined sequence.

- **Output**: Once the processing is completed, based on the input, the output is displayed to the user.

TEST YOUR KNOWLEDGE ON COMPUTER QUIZ

## Different types of Digital Computer

Digital computers are a device that needs to be programmed in order to receive the desired output.

It uses electronic technology to generate, store and process different types of data.

Based on the size and type of the device, these digital computers are classified into four categories.

- Microcomputer

- Minicomputer

- Mainframe computer

- Supercomputer

## Microcomputer

A Microcomputer is not really expensive and it comes with a microprocessor as its **Central processing unit** and input/output devices.

These computers are generally called personal computers and a few of the examples are IBM pc, Apple, Dell.

## Minicomputers

Minicomputers are known as mid-range computers that contain one or more processors.

They support multiprocessing which means these multiple processors share the same computer memory and other required peripheral devices to perform the given task.

Minicomputers are generally used for processing transactions, file handling, managing database.

## Mainframe computers

Mainframe computers are generally large size computers mainly used for storing large amounts of data and processing. It is knc

for its high level of reliability.

These machines are used by an organization that requires crucial applications such as census, customer statistics for large calculations which require a high volume of data processing.

## Super Computers

Supercomputers are very expensive and the world's fastest computers are available.

These computers have thousands of processors that perform trillions of calculations per second and hence the fastest known ever.

Supercomputers are used extensively in enterprises and organizations that require massive calculations.

## Classification of computers

Computers can be categorized into Analog, Digital, and Hybrid Computers. Each category is used for its own purpose and has its own significance.

## Analog Computers

Analog computers are mainly based on voltages and current with continuous electrical signals and display the output continuously.

These computers store the data and perform calculations quite differently than digital computers which make use of symbolic representation.

These are generally slower in speed compared to digital computers. One of the examples is a thermometer.

## Digital Computers

Digital computers are computers that process the data in binary form ie.0’s and 1’s.

The main benefit of digital computers is that they are quick and re-programmable.

Some of the examples are laptops, smartphones, and calculators.

## Hybrid Computers

Hybrid computers are a special purpose computer that has a combination of both Analog and digital computers.

They are digital computer which accepts Analog signals and converts them to digital form.

These are generally used for scientific applications, airplanes, and hospitals.

Some of the examples include electrocardiogram machine, ultrasound machine, monitoring machine.

## Advantages and disadvantages of Digital/Analog computer

The main advantage of Digital computers is that they can store loads of data and it is very accurate.

Analog computer is quick and hence fastest. Digital computers are comparatively slower than Analog and this is the main disadvantage.

Analog computers stores fewer data and hence digital computers are great for memory is considered.

## Features of Digital computer

- Good Memory – Digital computers can store a large number of data and can retrieve data in a fraction of

second. The data can be stored for any duration and retrieved anytime.

- Very Flexible – These computers can perform multi-tasking without any human interference and hence they are very flexible and versatile.

- Automatic – These devices once started are automatic. They do not need any intervention until required by the task specifically.

- Good Speed – Digital computers are high in speed and carry out all the operations with very fast speed.

- Accurate – These devices help in storing all the information which helps in retrieving accurate data at any point in a given time.

## Components of Digital Computer

A digital computer has the following basic components –

- **Input device**

- **CPU**

- **Output device**

## Input Device

The Input device is basically the devices that are attached to the system such as a **mouse**, keyboard, and **scanner**.

These input devices take the input from the user and convert it to binary language which is understandable by the computer making it easy to understand.

## Central Processing Unit (CPU)

CPU is the Central Processing Unit which is known as the brain of the computer as it controls the entire computer system.

Once the user provides input through the input device such as a keyboard or mouse, the same is processed in the Central processing unit.

This first get the instructions from the memory and then decides what needs to be done.

Hence CPU performs all the computation parts and sends them to the output device.

CPU has different components within, which have different responsibilities.

- **Arithmetic Logic Unit** (ALU) – The main function of ALU is that it performs all the arithmetic and mathematical calculations which include addition, subtraction, multiplication, and division.

- **Control Unit** – The task of the Control unit is that it mainly allows the data to move from and to CPU and manages the operations performed by ALU. All the instructions that are sent are picked, decoded, and analyzed. It then sends the instruction to input/output devices accordingly.

- **Memory** – This part is mainly used to store the data and is named as “Internal memory”.  The internal memory has been divided into multiple locations which store the instructions. Each of these locations has a unique address and has the same size. With this unique address, the computer will read the data stored in the memory without having to search the entire memory location. Whenever a program is run, the data will be stored in the internal memory and it would remain till the end of the execution. This internal memory is named RAM ie. **Random Acces Memory**.

Must Read:-

**A-Z Shortcut Keys of Computer**

**5 Major Components of Computer**

**Characteristics of Computer**

**What is Cloud Computing?**

**Full form of Computer**

**Fundamentals of Computer**

**Difference between data and information**

**Difference between system software and application software**

**Types of Servers**

## Output Devices

Output Devices are the devices that are attached to the computer which convert the binary data from the computer to language

which humans understand.

Some of the common output devices are Monitor, plotter, and printer.

## Where Digital computers are mainly used?

As digital computers are mainly used to store data it is almost used everywhere to store photos, music, documents, and files.

Students use it for mathematical calculations, computations. It is used by spacecraft, health domains, schools, colleges, large or small organizations, factories.

Digital computers are used worldwide and it has been a very powerful device.

> **Must Read:-** **Difference between System Software and Application Software?**

## Evolution of Digital computer

## First Generation of Computers

In the early years of the computing era, the first **generation of computers** was evolved in 1940 – 1956 which was named

Vaccum Tubes.

Using this system, it would take weeks to execute the problem and get the results.

Earlier then the input used to be punch cards and output would be printouts.

An example of first-generation computers is the **ENIAC** computer.

## Second Generation Computers

The second generation of computers were transistors that replaced the vacuum tubes in the year 1956 -1963.

Transistors were faster, cheaper, efficient, and smaller compared to an earlier generation.

The output remained the same as the first generation. (punch cards and printout).

## Third Generation of Computers

The third generation of computers were Integrated circuits that replaced Transistors in the year 1964-1971.

Integrated circuits were miniature transistors and they were placed above the silicon chips and named semiconductors.

They proved to be very efficient compared to previous versions in terms of speed and size. Here input and output changed to keyboards and monitors.

## Fourth Generation of Computers

The fourth generation of computers was Microprocessors that replaces Integrated circuits in the year 1971- present.

Thousands of integrated circuits started to be built on the single silicon chip and this brought the fourth generation of the computer into life.

These were small, efficient, smart computers that became more powerful.

It could be connected to different input and output devices. Eventually, they were able to connect to networks and led to internet development.

## Fifth Generation of Computers

The fifth generation of computers is **Artificial Intelligence** (**AI**)

These are computing devices based on artificial intelligence which are still getting developed with a lot of progress day by day.

These include applications such as voice recognition and parallel processing.

The idea of fifth-generation computing is to create new devices that understand human language input and are capable of learning and giving output independently.

**Conclusion**:-

**Digital computers** are very vastly used in the current era and it is helpful in day to day activities.

In addition to scientific and engineering use, it is also used in automated industrial processes, transportation systems and to analyze other statistical data.

The Digital computer can work endlessly, efficiently, accurately without getting tired soon.

TEST YOUR KNOWLEDGE ON COMPUTER QUIZ