LEARNINCREATION
GEEKS FOR STUDENTS

# COMPUTER

## FUNDAMENTAL

COMPUTER FUNDAMENTAL FOR BEGINNERS

# Course Objective –

The core objective of this e-book is to learn about Computer Fundamentals. This course e-book is for students, professional or any individual who is willing to learn the concept of computing or how computer works, how you can enter or edit data, calculation and how computer perform function with ease and via more effective way for better outcomes or productive gain. Here we learn about generation of modern computer, computer component, its application and much more.

# Preface –

This is the first edition of book in your hands. This book provides an introduction about Computer and its feature to start your career or you can learn these concepts to operate computer with more ease. As with rapidly changing and updating world we were trying to describe every detail topic in this e-book. We have tries or best to make this e-book a complete product and it's gratifying to know that a lot of people agree with our approach. *Dear reader, thank you very much for your love and faith. Your association makes us feel proud.*

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## Before You Start –

In this course of Computer Fundamental, we start computer learning from beginning and no prior knowledge is required to start this course. This course is purely designed for beginners to learn concept of Computer and its components, functioning, application and how computer process data. We designed this course for students, learner or any individual who willing to learn Computer Fundamental for his/her career enhancement.

# Table of Content –

## INTRODUCTION

We live in a 21st century. And In this era of Technology, Computer is an essential part of life. Today computer are everywhere and also have wide range of application, whether it's an education sector or a professional or business sector you need Computer and its application in order to complete your daily task.

Now a day's computer is not just a part of life - it's a life, and it's very essential to every individual to have knowledge about computer and its component.

Now a days computer is used in every sector, and it's all sort of Application are ranging from complex calculation in field of Frontline Research, Engineering simulation down to Teaching and printing book. The ease, with which Computer **can process data, store and retrieve it,** made it an important part in Office and Business sector.

Therefore it's really important to everyone to have a Basic knowledge about Computer, its internal strength and its weaknesses.

And that is what you are going to learn here, in this course.

### Common Terminology -

Let's learn some common terminology related to Computer Science. So it's easier to you to relate with this terms along your course journey.

- Hardware :

  It's refers to the Physical parts of the Computer, one that you can physically touch. For Example: keyboard, Mouse, Monitor etc.

- Software :

  It's refers to the Instruction (Programs) that's tells the Computer what to do. You cannot touch Software physically.

To better understand, what's a difference between Hardware and Software, carefully read the given condition.

**For Example:** Consider you have a pen drive storing Games or songs. The pen drive which you can touch is an example of Hardware but the Games which you can't touch because it's actually a set of instruction or a program is an example of Software.

- Data :

  It's refers to the Unprocessed raw facts and figures. For Example: a name (Albert), a number (23), marks (33%), year (2018), etc.

- Information :

  It's refers to the Processed data that is meaningful.
  To make you clear about the difference between Data and Information read below example. The above Data can be converted into Information.

  For example: Aghori, who had a roll no. 23 passed out in 2018, secured 33% marks in High school.

**What is Computer?**

Computer in a group of electronic device, like Monitor, CPU, Mouse, Keyboard etc. used to process data given by a User. Or you can also be said that -

**Computer is an Electronic device that can perform a variety of task (operation) according to a set of given instruction, knows as Programs.**

Actually, Computer is just a combination of a Hardware and Software, which transform the data into Information.

**Types of Computer?**

There are several types of Computer, listed below.

- Embedded Computer :

  Computer are comes in wide range of sizes and Power. The smallest one is embedded computer within the circuitry of application, such as wrist watch, television, washing machine, modern age cars.
  These computers are typically programmed for a specific task, such as tuning to a particular television frequency or keeping a accurate time.

- Programmable Computer:

  Programmable Computer are vary enormously in their computation power, speed, memory, and physical state.

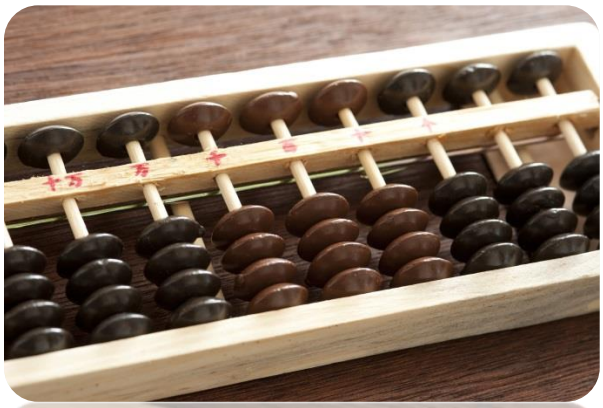
  They are small in size and can easily held in one hand and are knows as Personal Digital Assistant (PDAs). They are Used as Notepads, schedule system, and As an Address book.

  Some PDAs equipped with cellular phone, in order to connect with World Wide Networks to exchange information regardless of location.

Computer is not an overnight invention, human uses computer since a ancient period of time. Ancient people use stone for calculation or a manual technique to compute calculation. Later on, many attempts had been going on for developing faster computing device and then, Abacus is invented which was used to do calculation faster.

Let's us take a look at the development of computer through various stage.

- Abacus:



Abacus is invented around 3000 years ago, before the birth of Jesus Crist. Mesopotamians discovered the earliest form of bead-and-wire counting system, which subsequently came to be known as Abacus.

An Abacus is consisting of beads divided into two parts which are movable on the rods of the two parts.
Addition and Multiplication etc. of numbers is done by using the place value of the digit of the numbers and position of the beads in Abacus.

Later on, after many development in Abacus we get a "Napier's Logs" and "Bones", then a "Pascal Adding Machine", after that we get a computer in shape of Leibnitz's Calculator and after many several development we get a shape of computer which you see today.

Hey! Albert here,
We are going here to describe you History about Modern Computer, If you still continue with your learning you are doing great dear!! Keep it up.

**The Generation of Modern Computer**

The terms **"Computer Generation"** is often used to describe the relation to the hardware and computer. Each phase of computer development is knows as a separate generation of Computer. Each phase of development is characterized by type of circuit it's utilizes.

Most computer now a days, use the idea of 'stored program computer' that was proposed by Dr. John Von Neumann in 1945.

The Von architecture is based upon the following three concepts –

- Data and Instruction (Program) are stored in a single read-write memory.
- The memory contents are addressable by location.
- Execution takes place in a sequential manner or fashion. I.e. from one instruction to the next unless modified explicitly.

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## First Generation of Computer

The First generation Computer are used thermionic valves (vacuum tubes) and machine language was used for giving instruction. The first generation computer used the concept of "store program".
The computer of this generation was very large in size and their programming is very difficult task. Some Computer of this generation is given below.

- ENIAC
- EDVAC
- EDSAC
- UNIVAC-1

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## Second Generation of Computer

A Big revolution in Electronic took place while the development of Second generation Computer is going on makes it's more efficient to use.

The Second Generation Computer begins with the advent of transistorized circuitry, invention of magnetic core and development of magnetic disk storage device. These new developments made these computers much more functional and reliable.

The increased reliability and availability of larger memory leads the development of some higher level language (HLL) such as - FORTON, COBOL, Algol and Snobol etc.
Operating system came into being with the high speed CPUs and magnetic disk storage. Commercial application rapidly developed during this phase with the wide variety of uses in Business and Industries cover 80% of market.

List of Some Second Generation Computer -

- IBM 1401
- IBM 1620
- IBM 7094
- CDC 1604
- CDC 3600
- RCA 501
- UNIVAC 1180

HI, Aghori here dear, please note down some Important notes I'm going to tell you. Open your notepad and start writing some key features of Second Generation Computer.

- Transistor replaced the uses of vacuum tubes.
- Small size of Computer as compared to first generation Computer.
- Generation of heat amount by system is less.
- Electricity consumption is also very low then first generation.
- More reliable and faster.
- Core memory developed.
- Magnetic disk and tapes are comes in existence.
- First operation system developed during this phase of development.
- Many Programing language and Assembly language are developed.

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## Third Generation of Computer

The Third generation Computer using Integrated Circuit (IC or chips) makes them more reliable, faster and relatively inexpensive. Now due to more innovation in Third's Generation less human labor is required at assembly stage.

The size of a main memory is also reached up to 4 megabytes. Magnetic disk technology is also improved and it makes drive having capacity to contain up to 100 MBs. The CPUs become more powerful with the capacity of carrying out 1 Million instructions per second (MIPS).

List of Some Third Generation Computer -

- IBM 360
- ICL 1900 series
- IBM 370/168
- ICL 2900

List of some Mini Computer Developed during this phase.

- ICL- 2903 Manufactured by International Computers Limited.
- CDC -1700 Manufactured by Control Data Corporation.

Listen dear, Please note down some key features of Third Generation Computer.

- Integrated Circuit developed.
- Computer are becomes smaller, reliable and faster.
- Lower power consumption.
- High level language appeared.

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## Fourth Generation of Computer

The advents of microprocessor chip lead the beginning of Fourth Generation Computer. Medium Scale Integrated (MSI) yield to Very Large Scale Integrated (VLSI) circuits packing about 50000 transistors in a chip.

Semiconductor memories come in existence and replace the magnetic core memories. Microprocessor also advent at this time and leads an extremely powerful personal computer. Computer cost comes down so rapidly that it's found even in home and most of the offices.

In 1995 the most popular CPUs were Pentium, Power PC etc. The Hard disk are now also available with 80 GB available space. The CD-ROMs (Compact Disk- Read Only Memory) also becoming popular day by day which have a capacity of store data up to 650 Mbs.

## Functioning of Computer

Before learning functioning of Computer first read carefully this example.

If you want to make a Tea. Then what would you do?
First you take a fry pan, and then pour a glass of water into it. Then added a sugar, milk and a Tea Leaves into it, then you boil it for 15 min and after 15 min, you switch off the gas, and finally your Tea is ready.

Now conclude what you do, to make a tea -

- First you give some Input. (Added sugar, tea-leaves, milk etc.)
- Then you wait for a Processing (waiting while tea is boiling.)
- And at last you got an Output (your tea is Ready to drink)

Now, after reading above example, I thought you got an idea that How Computer really works. It takes Input by user. Process the given data and finally gives you an Output. That's a method of Functioning of Computer.

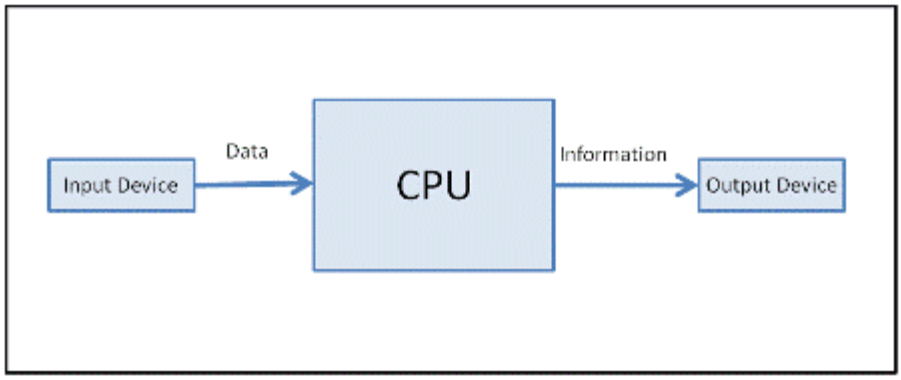
**Functioning Of Computer?**

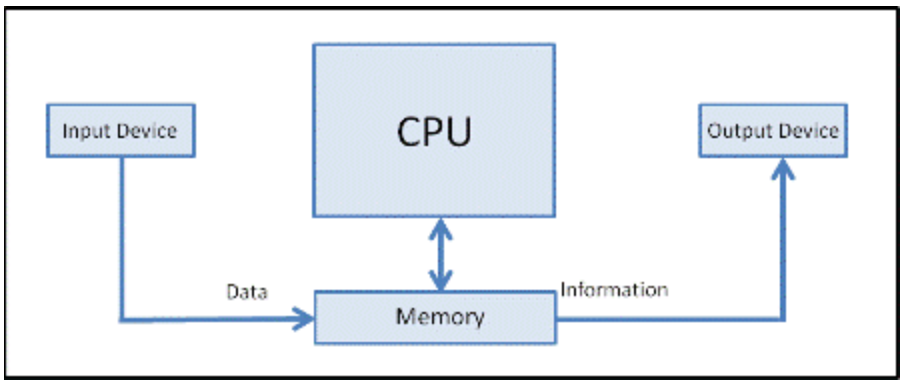
Now, after knowing how computer really works. Let's start learning about the Functional Component of a Computer system.

A Computer mainly has a "four" function.

1. Accepts Data - INPUT
2. Process Data - PROCESSING
3. Produce Result - OUTPUT
4. Stores Results/Data - Storage

These are the functional component required to make a Computer functional and these all units combines to make a functional system. It's a cycle which is followed by computer every time when you (user) give some Inputs to a computer, named as I.P.O Cycle **(Input-Process-Output Cycle)**.






Each time when you give a Input data to a computer it repeats the cycle. The first stage of this cycle is to take Input by the users which is completed with the help of Input Unit.
The second stage is to Process the given data which was done by the Central Processing Unit shortly named as CPU.
Third stage is to show the Output or Result of the given Input to user, and this is completed with the help of Output Unit.
And this whole process is completed with the help of "memory".

Memory is the brain of computer which holds the data during its processing. Or in shorts, "Memory" is the storage brain of a Computer.

**"Input unit of a computer system is responsible for the Input phase. Similarly Central Processing Unit and Output Unit is also responsible for Process and Output phase respectively."**

**Characteristics of Computer?**

Computer is so popular now a day, do you ever think why? Which qualities of Computer make it so popular that today everywhere we use Computer for our daily task.

No doubt, that today's Computer has wide range of application in every sector such as in Education and Research sector, Business and Office sector etc.

Let's learn the strengths of Computer which makes it so popular -

- Speed -

  Computer is much faster as compared to Human beings. Computer can perform the task in a minute which may takes days if performed manually.
  Modern computer are so fast that millions of instruction can executed in a single second.

- High Storage -

  Second reason which makes a Computer so popular is the Storage capacity of computer. You can store large amount of data or information just in a small space.
  A 3-4 cm long flash drive (pen-drive) can store a several gigabytes of data; there is no need to have a large space to store files and folder in a room. Your 4.7 inch diameter Compact disk can store a data of hundreds books. and will still have a space to store your lovely song collection.

- Accuracy -

  Computer can perform the high level calculation or comparison accurately which makes its works more accurate.

- Reliable -

  Computer is more reliable than human beings because it's immune to tiredness and boredom or being a fatigue like humans.

- Versatility -

  Computer is more versatile than a human. Because it can perform repetitive jobs efficiently, also able to solve variety of given information and do hazardous jobs in a hostile environment. Computer can perform that work also which makes a error in human mind.

For instance, observing the motion of very fast moving object. Also it can work with different types of data like graphics, audio, visual, character etc.

Hello Friends, In spite of having so many features or characteristics, Computer also have some limitation. Now be ready to discuss that also -

- Lack of Decision-Making power -

  Computer doesn't have a decision making capability of its own. Computer can't makes a decision by its own

- Zero IQ -

  Computer is an intelligent machine with a zero IQ. You need to tell each and every step to its in order to take desired output.

- No Heuristics -

  Heuristics means learning from the past experience. If a computer commits an error once and similar condition occur again. Computer will commit the same error again. It cannot learn from the past experience.

## Basic Application

In 1950s when computers are so giant only huge Institution or Government are used them for a specific-purpose. Later in 1960s Business world also started using computer for their office task. But revolution in computer application comes in 1970s when Personal Computer (PCs) are invented and computer are used in nearly every field of life.

Some Major Application of Computer are given below -

- Business and Offices
- Medicine and Health Care
- Education and Research sector
- Communication
- Science and Engineering
- Manufacturing
- Government
- Military and Defense
- Television and Theatre
- Law Enforcement
- At Homes

## Components of Computer

Computer is a machine having component such as Input Devices, Processing Unit, Output Devices, Memory device which constituently makes a Computer System. In this section we learnt about these constituent of Computer commonly known as component or parts of computer.

Mainly computer consist of three unit which we already discussed above named as -

- Input Unit
- Processing Unit
- Output Unit


This is the input stage, and the code is written by a coder


This is the process stage, the code is compiled.


The program is executed, and the instructions followed!

Let's discuss about every Unit one by one.

**INPUT UNIT**

The Input Unit is responsible for accepting input (data or information) from the user via Input devices, such as - Keyboard, Mouse etc.
Let's discuss Input devices one by one.

- Keyboard -

  Keyboard is a Typewriter like devices used to give a command to the computer in the form of letter, number or by symbols.

  Keyboard contains a matrix of switch which helps computer to understand what you type. Simply, each key in keyboard contain a switch which is unique and when you press certain key its gives a digital code to system to determine which key is pressed by user.

  For example - When you pressed "A" the code which is received by system is like something 01000001 (in binary), and through this binary code computer get an information that user pressed "A".

- Mouse -

  The Mouse is rolling device with a roller on its base.
  Mouse controls the movement of pointer (commonly called as Mouse pointer). Mouse may have a two or sometimes three button and it may or may not have a wheel.

- Joysticks -

  Joysticks mostly used for a gaming purpose, such as flight simulators. Its helps to input directional data like mouse by switching it right, left, up and down.

- Scanner -

  A Scanner is just like Photocopier. A photocopier printed the given data (print images/page on a paper), while Scanner create a electronic form of given images/page. Which can later be modified, manipulated or change according to requirement.

Hello Friends, Do you like us!!

If you think we give you something valuable, connect with us on Social media. Apart from these there are some more input devices. Go and Google about them and note down in your notes so you won't forget, also be update with our upcoming event and courses. Keep Learning, You are doing well

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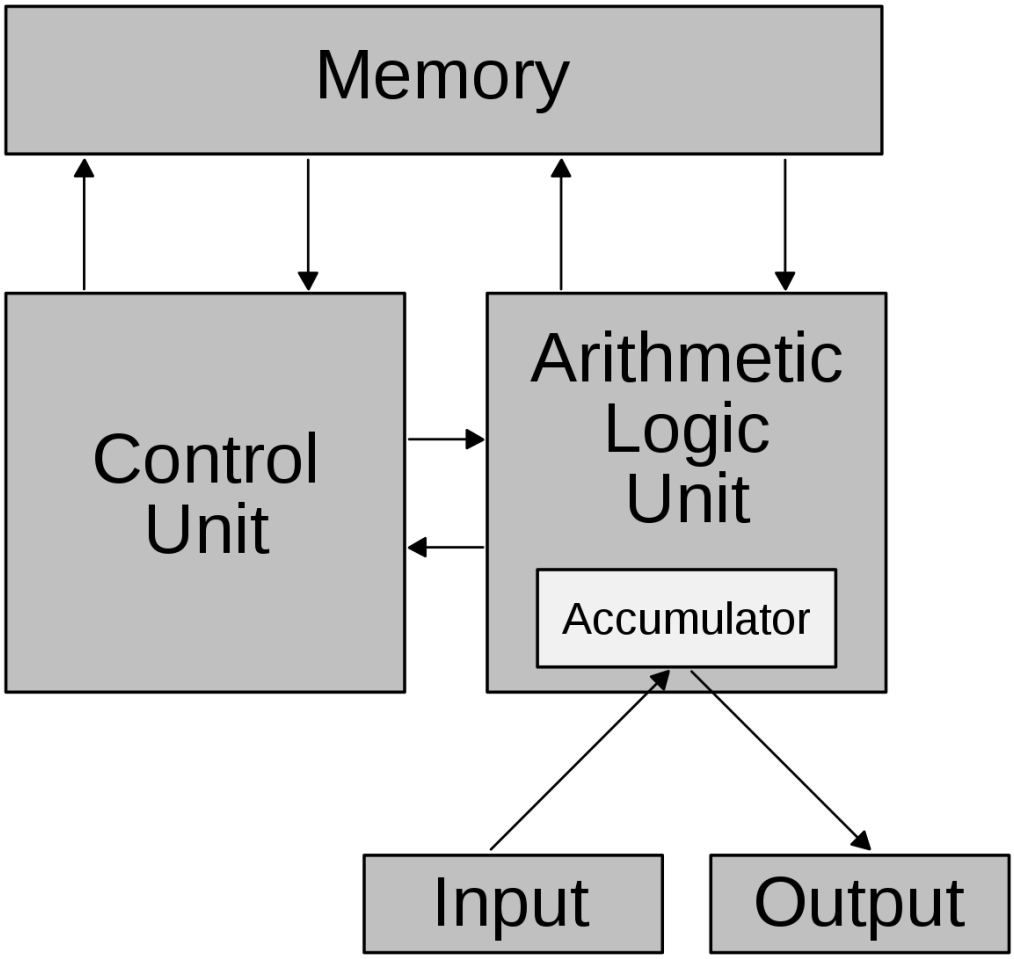
**PROCESSING UNIT**

The Processing Unit or the CPU (Central Processing Unit) is responsible for carrying out the processing job. The CPU is the brain of computer. It's a place where all the calculation and decision making process is carried out.
Since CPU is the brain of computer, It's guide or gives direction to computer. Let's discuss it

***COMPONENT OF CPU***

CPU has two component named as -

- Arithmetic Logic Unit
- Control Unit




- Arithmetic Logic Unit -

  The Arithmetic logic Unit (ALU) responsible to perform the arithmetic and logical task or operation. The arithmetic operation likes - addition (+), subtraction (-), multiplication (*) and division (/).

  The Logical Unit is responsible to perform logical operation like comparison operation. e.g. - greater than (>), lesser than (<), greater than and equal to (>=), lesser than and equal to (<=), equal to (=) etc.

So whenever the computer gets instruction contain arthematic and logic operator, the ALU will carry out for that job. The result of arthematic and logic expression is stored in the memory.

- Control Unit -

  You read about the Arthematic and Logic Unit which perform the task to carry out the arthematic and logic operation (calculation and comparison), while the Control Unit is that component of CPU controls the entire process.

  Or in other words, Control Unit monitored and control entire process and when user input the data into memory, control unit specify that which kind of data is given by the user and accordingly it instruct the input/output devices.

  Now let's go for an example to clearly understand how ALU and Control Unit works -

  1. Read value A
  2. Read value B.
  3. If A > B then
  4. Set C = A+B
  5. Print C
  6. Otherwise
  7. Set C = A-B
  8. Print C
  9. End

  Now, understand the given example -

  First when line 1, reaches to a memory Control Unit reads it and specify which kind of information it is. Then it gives instruction to keyboard for value of "A" and "B". As soon as user types the value of "A" and "B" (Let suppose value of "A" is 12 and value for "B" is 6). Then controls unit read third line which is a logic

expression and its gives instruction to ALU to calculate and compare the given value of "A" and "B".

Now, logical operation is carried out and gives output as True. (12 > 6 value of "A" is greater than "B"). Now again control unit call ALU for fourth line of code to print the value of "C" as C = A + B. After this it's give instruction to Output device to show the result to user.

Since value of "A" is greater than "B" so no need of OTHERWISE statement, but if the value of B is greater, then Control Unit proceed to Otherwise statement and again instruct ALU to calculate the value of "C" as per given instruction.

The CPU and ALU both need some memory to store data, unless data can't be store and you can't able to see a output. So, its store data in memory knows as **internal memory** or **Primary memory**. **External Storage** can also be used by CPU if needed.

Now, I hope functioning of Central Processing Unit is clear to you, so we are ready to proceed further.

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**OUTPUT UNIT -**

The Output Unit is responsible for showing the Output of given data or instruction to user into a readable form through various Output devices.

The main function of this is to precede data to user. Computer send the data to Output Device (Monitor) in order to make its clearly readable or under stable to users, if user need data as a hard copy then it's give a print through printer (another Output devices).

Let's discuss it one by one.

- Monitor -

  Monitor (or Screen) or also known as Visual Display Unit (VDU) is most common method to gives a output to user in the readable form. In Monitor result is shown same as in Television.

  The picture in Monitor is made up of thousands of tiny colored dot known as pixels. Most common types of Monitor are -

  - Cathode ray Tube (CRT Monitor)
  - Liquid Crystal Display (LCD Monitor).

- Printer -

  Printer is an Output device used to get the paper copy of given Output. Printer is able to produce text and images on a paper, for better clearance of result.

  The Printer is mainly of two kinds -

  - Impact Printer -

    There is a mechanical contact between print head and Paper.

  - Non-Impact Printer -

    These printers don't have a mechanical contact between print head and Paper.

- Speaker -

  Speaker is also an example of Output devices which gives you a melodious song as an output. Actually Speaker receives the sound in form of electrical current from sound card and then converted into melodious sound format.

Congratulations!!
Here we complete the first half of this course and now you know much about **Computer.** You know how its work and where we can use this invention in daily life. In this half you get an idea about computer types, its components, the way of functioning and little history of computer generation.

Updates!!

In the second half, you will learn about computer memory, difference between Hardware and Software, concept of computing and little bit fundamentals about operating system and computer language.

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