

Computer Fundamentals

Introduction

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What is a Computer?

 Computer is an advanced electronic device that takes raw data as an input from the user and processes it under the control of a set of instructions (called program), produces a result (output), and saves it for future use.



- The main components of a digital computer are :
 - Input devices (keyboard, mouse, etc)
 - Output devices(monitor,printer,etc)
 - Central Processing Unit (processor)
 - Mass storage device and memory



The term ' Computer'

- The term ' computer' is derived from a Latin word "computare" which means "to calculate", "to count", "to sum up" or "to think together".
- So, more precisely the word computer means a "device that performs computation".

- Computer cannot do anything without a program. Programs are a set of instructions or ordered operations for a computer to perform a task.
- Charles Babbage is considered as the father of the computer.
- The first mechanical computer designed by Charles Babbage was called Analytical Engine.
- It uses read-only memory in the form of punch cards.



Functionalities of a Computer

- If we look at it in a very broad sense, any digital computer carries out the following five functions
 - Step 1 Takes data as input.
 - Step 2 Stores the data/instructions in its memory and uses them as required.
 - Step 3 Processes the data and converts it into useful information.
 - **Step 4** Generates the output.
 - Step 5 Controls all the above four steps.



Advantages of Computers

1. High Speed

- Computer is a very fast device.
- It is capable of performing calculation of very large amount of data.
- The computer has units of speed in microsecond, nanosecond, and even the picoseconds.
- It can perform millions of calculations in a few seconds as compared to man who will spend many months to perform the same task.

2. <u>Accuracy</u>

- In addition to being very fast, computers are very accurate.
- The calculations are 100% error free.
- Computers perform all jobs with 100% accuracy provided that the input is correct.

3. <u>Storage Capability</u>

- Memory is a very important characteristic of computers.
- A computer has much more storage capacity than human beings.
- It can store large amount of data.
- It can store any type of data such as images, videos, text, audio, etc.

4. Diligence

- Unlike human beings, a computer is free from monotony, tiredness, and lack of concentration.
- It can work continuously without any error and boredom.
- It can perform repeated tasks with the same speed and accuracy.

5. Versatility

- A computer is a very versatile machine.
- A computer is very flexible in performing the jobs to be done.
- This machine can be used to solve the problems related to various fields.
- At one instance, it may be solving a complex scientific problem and the very next moment it may be playing a card game.

6. <u>Reliability</u>

- A computer is a reliable machine.
- Modern electronic components have long lives.
- Computers are designed to make maintenance easy.

7. Automation

- Computer is an automatic machine.
- Automation is the ability to perform a given task automatically.
 Once the computer receives a program i.e., the program is stored in the computer memory, then the program and instruction can control the program execution without human interaction.

8. Reduction in Paper Work and Cost

- The use of computers for data processing in an organization leads to reduction in paper work and results in speeding up the process.
- As data in electronic files can be retrieved as and when required, the problem of maintenance of large number of paper files gets reduced.
- Though the initial investment for installing a computer is high, it substantially reduces the cost of each of its transaction.

Disadvantages of Computers

1. <u>No I.Q.</u>

- A computer is a machine that has no intelligence to perform any task.
- Each instruction has to be given to the computer.
- A computer cannot take any decision on its own.

2. Dependency

 It functions as per the user's instruction, thus it is fully dependent on humans.

3. Environment

 The operating environment of the computer should be dust free and suitable.

4. No Feeling

- Computers have no feelings or emotions.
- It cannot make judgment based on feeling, taste, experience, and knowledge unlike humans.

Hardware vs. Software

<u>Hardware</u>

- Hardware refers to the physical elements of a computer.
- Hardware is best described as a device, such as a <u>hard drive</u>, that is physically connected to the computer or something that can be physically touched.
- A CD-ROM, computer display monitor, printer, and video card are all examples of computer hardware.
- Without any hardware, a computer would not function, and software would have nothing to run on.
- Hardware and software interact with one another: software tells hardware which tasks it needs to perform.



Inside a personal computer:

- 1. Monitor
- 2. Motherboard
- 3. CPU(Microprocessor
- 4. Main memory(RAM)
- 5. Expansion cards.

- 6. Power supply unit.
- 7. Optical disc drive.
- 8. Hard disk drive (HDD)
- 9. Keyboard.
- 10. Mouse.

Types of Hardware

- Some of the different types of hardware are –
- Input devices With the help of these devices, data is provided to the computer. E.g: Mouse, Keyboard, Touchpad, Scanners, Joystick, Webcam, etc.
- **Output devices** This is a device that converts information to a humanreadable format.Eg:Monitor, Printer, Headphones, Speakers, etc.
- **Removable Data Storage-** These are the devices that help to store the data.Eg:Optical Disk drive(CD-RW,DVD+RW),floppy disk,memory card,USB flash drive, etc.
- **Computer case-** Central Processing unit(CPU), hard disk, motherboard, network interface controller, power supply, random-access memory(RAM), sound card, video card.
- Data ports Ethernet firewire, parallel ports, serial port, universal serial bus(USB)

<u>Software</u>

- Software is a general term used to describe a collection of <u>computer</u> programs, procedures, and documentation that perform some <u>task</u> on a computer system.
- Software is an ordered sequence of instructions for changing the state of the computer hardware in a particular sequence.
- Software is typically programmed with a user-friendly interface that allows humans to interact more more efficiently with a computer system.
- Practical computer systems divide software systems into three major classes system software,

programming software, and <u>application software</u>, although the distinction is arbitrary and often blurred.



Types of Software

<u>System software –</u>

- System software acts as a middle layer between the user and a computer. They communicate with all the hardware components in the computer and also control the CPU, memory and other devices.
- Eg: device drivers, operating systems(Microsoft Windows XP, Windows 7, Windows Vista), servers, utilities.

Programming software –

- This software is usually used by computer programmers. Most of the internet applications use Java or PHP as a programming language. Using programming language all the software programs and applications are developed and tested.
- Eg: Android, Linux, C++, Java, Unix, compilers, debuggers, interpreters, linkers, text editors etc.

<u>Application software –</u>

- Application software is generally used by the end-users to perform any task. MS Word or Powerpoint applications are designed for the user to write a document or prepare presentations. The apps that we find out mobiles or tablets are all application software.
- Eg: Word processors, Database software, Multimedia software, Graphics software, web browser, accounting software, media players etc.