What is a computer?

A computer is an electronic device that will take input from the user (data), process it, and give results (information) or respond as per the user. The computer is a programmable computational device.

Types of Computers

There are various types of computers that are used today based on the need of user. Some of the types are:

- **Desktop:** Desktops are mainly used for regular use and they have separate components mounted together like the monitor, keyboard, mouse, CPU etc. Since the system is primarily kept on a desk for better usability it is called as desktops. They have powerful processors in them which accounts for a wide variety of tasks that they are capable of doing.

- **Laptop:** Laptops are a portable version of the desktops, with all the components integrated in a single unit thus providing mobility to the system. They are great for on the go work and come with built-in eb cams, Bluetooth and Wi-Fi.
- **Servers:** Servers are special types of computers that are used to manage network resources. They provide services to other systems and computers. Some of the primary tasks of servers include creating databases, hosting and proving support to other applications. They are backed up by multiple processors and high-capacity storage.

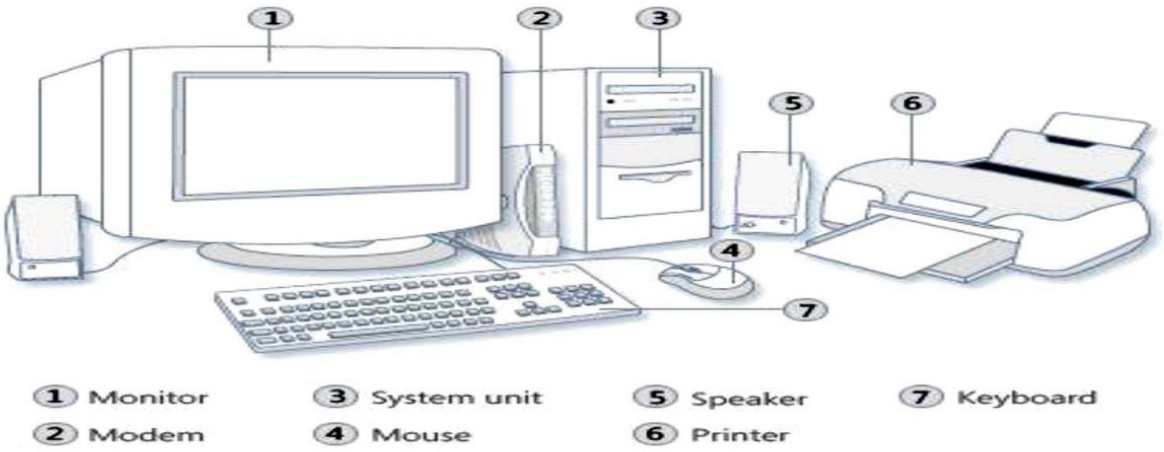
- **Tablets:** Tablets are even portal than laptops. They are smaller than laptops but are larger in size than smartphones. They come with touchscreens with makes it perfect for browsing the web, consuming content and personal communications.
- **Other devices:** Other devices include smartphones, game console, Smart TV's etc.

Computer Components

Any kind of computers consists of **Hardware** and **Software**.

Hardware: Computer hardware is the collection of physical elements that constitutes a computer system. Computer hardware refers to the physical parts or components of a computer such as the

- Input units: Mouse, keyboard, scanner …, etc.
- Output units: Monitor printer…, etc.
- Storage units: computer data storage, hard drive disk (HDD), flash… etc.
- System unit: graphic cards, sound cards, motherboard and chips. …, etc.
- Processing unit: processor CPU.



Software: is a generic term for organized collections of computer data and instructions, often broken into two major categories:

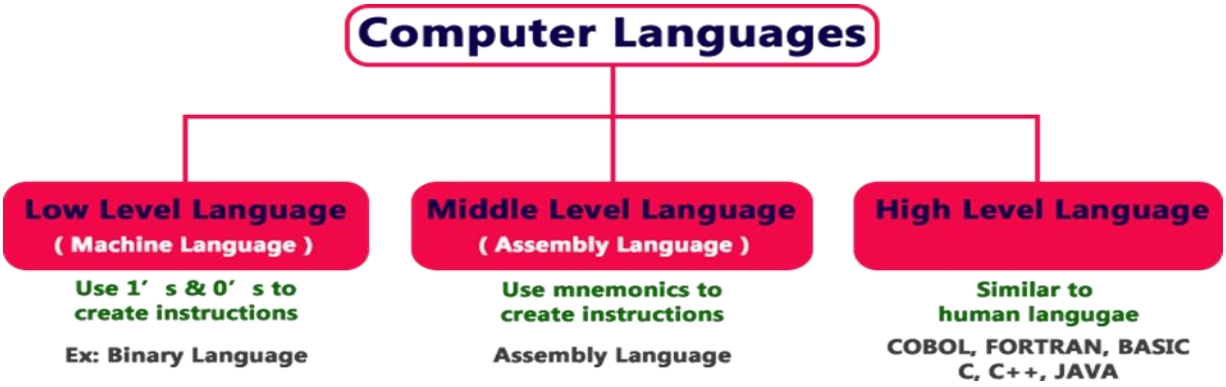
- **System Software** that provides task specific functions of the computer. System software consists of an operating system and some fundamental utilities such as disk formatters, file managers, display managers, text editors, user authentication (login) and management tools, and networking and device control software.

- **Application Software** which is used by users to accomplish specific tasks. Application software may consist of a single program, such as an image viewer; such as Microsoft Office, a software system such as a database management system.

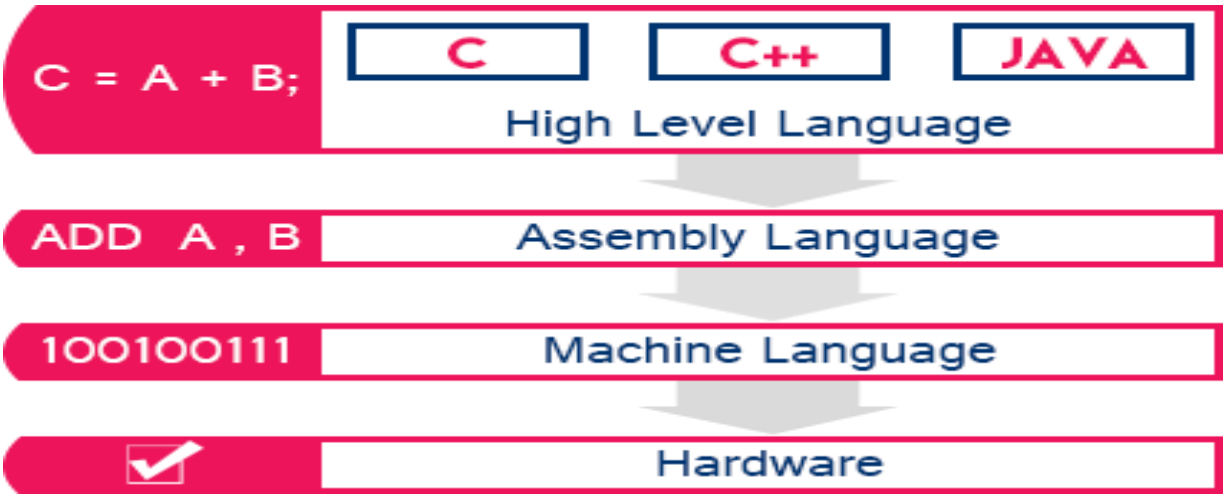
Computer programming language

It is the process of designing and building an executable computer program for accomplishing a specific computing task. Programming involves tasks such as analysis, generating algorithms, profiling algorithms accuracy and resource consumption, and the implementation of algorithms in a chosen programming language (commonly referred to as coding). The source code of a program is written in one or more programming languages. The purpose of programming is to find a sequence of instructions that will automate the performance of a task for solving a given problem. The process of programming thus often requires expertise in several different subjects, including knowledge of the application domain, specialized algorithms, and formal logic. Programs are written either in one of high-level programming languages (such as BASIC, C, Java, pascal, matlab, python) which are easier but execute relatively slowly, or in one of low-level languages (assembly language or machine language) which are very complex but execute very fast.

Generally, we use languages like English, Hindi, and French etc., to make communication between two persons. That means, when we want to make communication between two persons we need a language through which persons can express their feelings. Similarly, when we want to make communication between user and computer or between two or more computers we need a language through which user can give information to computer and vice versa. When user wants to give any instruction to the computer the user needs a specific language and that language is known as computer language. User interacts with the computer using programs and that programs are created using computer programming languages like C, C++, Java, etc. Computer Languages are classified into three languages:



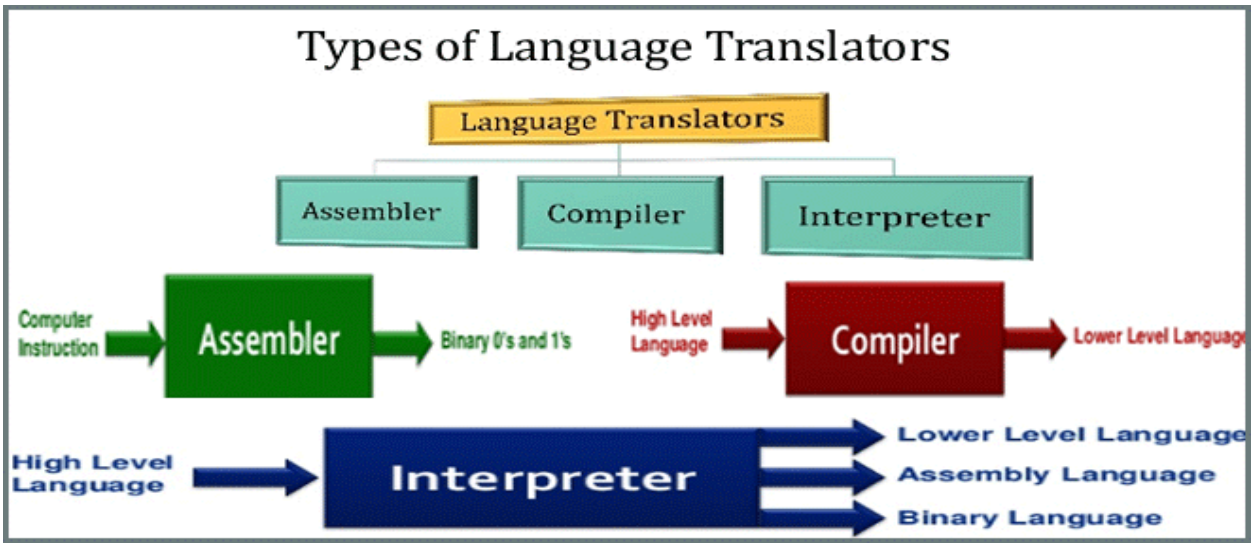
The following figure provides few key points related to the computer languages.



Language translators

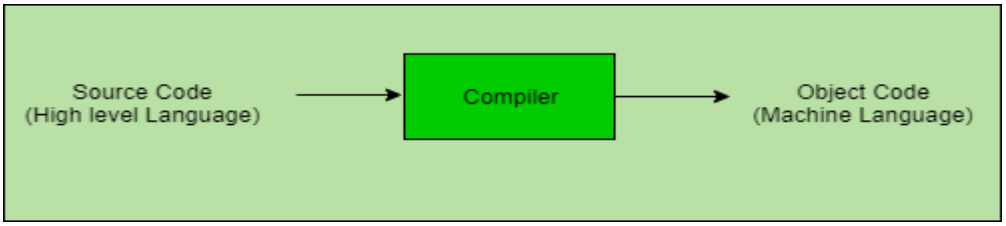
We generally write a computer program using a high-level language. A high-level language is one which is understandable by us humans. It contains words and phrases from the English (or other) language. But a computer does not understand high-level language. It only understands program written in 0's and 1's in binary, called the machine code. A program written in high-level language is called a source code. We need to convert the source code into machine code and this is accomplished by **Compilers**, **Assembler** and **Interpreters**. Hence, a compiler or

an interpreter is a program that converts program written in high-level language into machine code understood by the computer.



1. Compiler

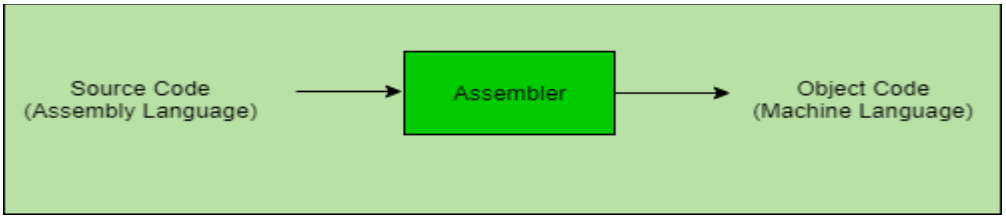
The language processor that reads the complete source program written in high-level language as a whole in one go and translates it into an equivalent program in machine language is called a Compiler. Example: C, C++ C#. In a compiler, the source code is translated to object code successfully if it is free of errors. The compiler specifies the errors at the end of the compilation with line numbers when there are any errors in the source code. The errors must be removed before the compiler can successfully recompile the source code again the object program can be executed number of times without translating it again.



2. Assembler

The Assembler is used to translate the program written in Assembly language into machine code. The source program is an input of an assembler that contains

assembly language instructions. The output generated by the assembler is the object code or machine code understandable by the computer. Assembler is basically the 1st interface that is able to communicate humans with the machine. We need an assembler to fill the gap between human and machine so that they can communicate with each other. code written in assembly language is some sort of mnemonics(instructions) like ADD, MUL, MUX, SUB, DIV, MOV and so on. and the assembler is basically able to convert these mnemonics in binary code. Here, these mnemonics also depend upon the architecture of the machine.



3. Interpreter

The translation of a single statement of the source program into machine code is done by a language processor and executes immediately before moving on to the next line is called an interpreter. If there is an error in the statement, the interpreter terminates its translating process at that statement and displays an error message. The interpreter moves on to the next line for execution only after the removal of the error. An Interpreter directly executes instructions written in a programming or scripting language without previously converting them to an object code or machine code. An interpreter translates one line at a time and then executes it.