Introduction to Computer Programming

A computer program consists of code written by programmers or developers that is executed on a computer to perform particular tasks. This overall process is called as Computer Programming.

The definition presented above can be generalized as;

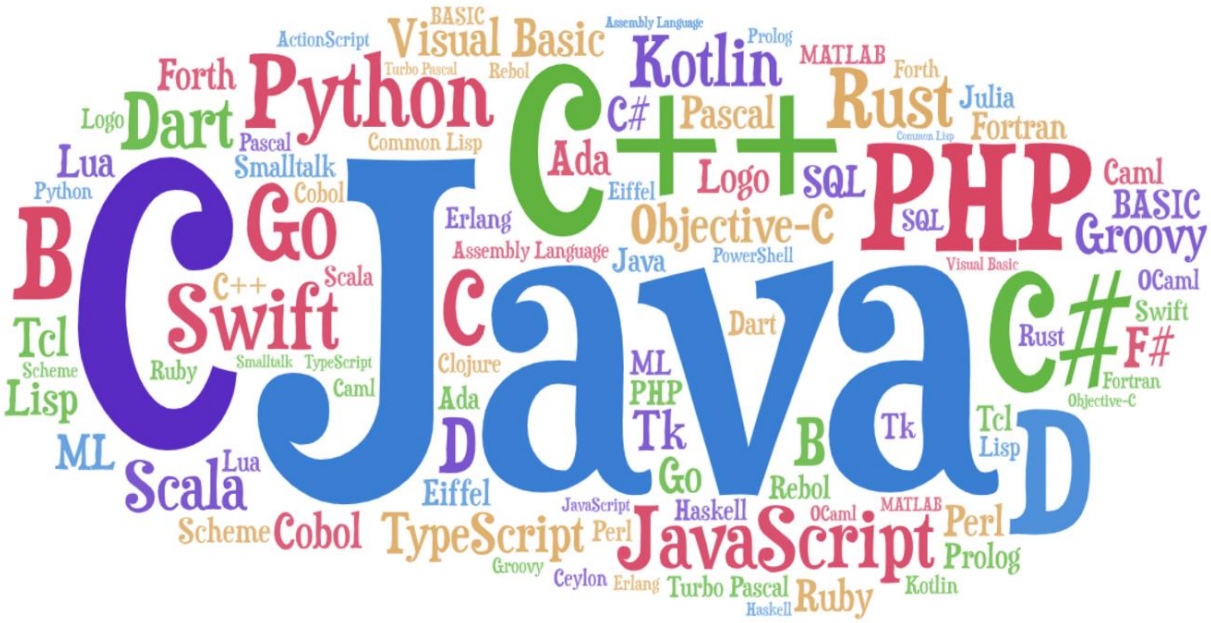
Programming is the process of giving machines a set of instructions that describe how a program should be carried out. At first, Programmers will start by using a code editor or IDE to write what is called source code. This is a collection of code written in a programming language that other programmers can read. The source code differs from language to language.

After this, Source code needs to be converted into machine language so machines can understand the instructions and execute the program. This process of converting source code into machine language is known as compiling.

Examples of compiled programming languages are C , C++ and JAVA.

There are other languages that do not use compilers. Instead, these languages will use an interpreter that will read and execute the code line by line.

Examples of interpreted programming languages would be JavaScript and PHP.



Once the code is executed, then the computer program can run. The different types of computer programs include Word processors, Database systems, video games, and websites.

These computer programs allow us to interactive with different software devices and services like phones, websites, and the computers themselves.

Now let us learn about the history of the computer programming in brief as;

History of Programming

Many historians believe **Ada Lovelace** was the first to create a published computer program in the mid-19th century. She was a mathematician who translated ***Luigi Federico Menabrea's writings on the Analytical Engine***. In this translation, Ada had added her own extensive notes and created a method for calculating ***Bernoulli numbers*** for the Analytical Engine.

Similarly, the work of mathematician Alonzo Church as well as the Turing machine were the first introductions of computer codes.

In the 1920's, computers were created which was followed by the earliest programming languages. For the next century, as machines and technology continued to evolve, so did the number of programming languages.

Types of Programming Languages

There are hundreds of programming languages in existence. Developers will first consider the needs of the application so they can decide which languages would be appropriate to use.

Some of the popular programming languages are as;

- Python
- JavaScript
- C/C++
- Java
- C#
- Ruby
- PHP

Some of these languages are primarily used in one field of development while others are more general-purpose programming languages.

JavaScript is primarily used in web development and is usually the first programming language learned by beginner web developers. JavaScript can also be used for mobile and game development. Python can be used in a variety of areas like data analysis, machine learning, and web development. Likewise other programming languages can also be used for various purposes.

Based upon the purposes, Programming languages are grouped in a variety of categories. Here are some of the categories as;

1. Machine language – a low level language that consist of 0's and 1's (binary). High level languages are compiled into machine code so the code can be executed by the computer.
2. Assembly language – a low level language that is compiled by an assembler. Assemblers translate human code to machine code.
3. Procedural languages – this approach goes through a series of procedures before a program is executed on the computer. (For example, Go and Julia)
4. Scripting languages – these languages often times don't need to be compiled but rather interpreted. Interpreted means an interpreter will read and execute the code instead of being compiled into machine code. (For example, JavaScript and PHP)
5. Functional languages – this works with the idea of building complex programs through a collection of smaller functions. (For example, Haskell and Scala)
6. Object-oriented languages – this works with the idea of building programs around collections of objects. (For example, Java and Python)

Here, machine language and assembly language can be commonly called as Low-Level Language whereas rest of the others are known as High-Level Languages.

Note: Research on your own for knowing about the advantages and disadvantages of the Low-Level and High-Level languages.

Here, in this module we will be focusing on the **Object-oriented** over other categories. For this we will use JAVA as the programming language and learn about the concept of the Object-oriented programming paradigm along with the features of the JAVA.

Task to do:

Research about the concept of Object-oriented programming language.