

# Why There Are So Many Programming Languages?

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**Abstract-** From this paper, we learnt about the basics of programming languages. Programming languages are the most essential part of the technology revolving around us. We briefly went through the types of languages and their features. From time, the aspect of languages have evolved much, and modified languages with better speed, flexibility and less complexity have taken place. The best part we learnt from this paper is that each language has its own specific features to meet with the user's ease and need.

**Keywords-** Programming language

## I. INTRODUCTION

The most common use of programming languages is to run an electronic machine like computer. A programming language is defined as a set of instructions which commands a computer to execute a particular operation for a particular task. Out of all available programming languages, the most popular and globally recognized ones were invented back in 90s. It started with the first one invented in 1950s followed by thousands of languages have been discovered now. In simpler tone, one can say a programming language acts as a medium of communication between humans and computer through different computer codes. In addition, it has added a very significant role in internet development, which in turn has made human life much simpler and comfortable. A programming language is used in our daily life and it has great impact on our future advancements too. Not only a language benefits a programmer but it also helps them to try innovate new things according to the demand and future betterment for masses. It will not be wrong to say that a programming language is the most basic and essential part in the field of technology.

### Characteristics

- A programming language should be simple, easy to learn and use, easy to read, and understandable by humans.
- Programming languages should be well designed and documented.

- A programming language must be memory efficient and should use computer resources to an optimum level.
- Types of languages
- Basically three types of programming languages are there,
- Machine language
- High level language
- Assembly language

### Machine language

Machine language is a collection of binary numbers or objects that a computer can read and interpret.. Computers only understands machine language. For users the machine language is inconvenient to read and write. The process of conversion of a program from high level language depends on CPU. There is an another name another name of this is machine code.

### High level language

An advanced language is a programming language that allows programs to be developed in a more practical context.. They are referred to as "closer to humans." The programs written in high level language can run on various platforms and architectures. It is easier to debug the language. Before execution, every program written in high level language is interpreted into machine language.

### Assembly language

An assembly language is a lowlevel programming language that is meant to communicate directly with a computer's hardware. Assembly language includes human-readable commands, such as mov, add, sub and many more. It is works as bridge between software programs and their prime hardware platforms. It requires vast knowledge of computer design and architecture.

### Object-oriented language

C++

C++ was developed by Bjarne Stroustrup at bell labs in 1979 as it is considered to be an extension of C. The difference between C and C++ is that C is procedural language and C++ is an object oriented language. Some of features of C++ to be more advanced than C are given below:

- All the OOps features such as Abstraction, Encapsulation, and inheritance make it more useful for programmers to perform better.
- Exception handling is also present in C++.
- Concept of virtual functions and constructors and destructors.
- It also provides reusability of every function which saves memory and time.
- It has a lot of inbuilt function which enhance its library.

## Java

The developer of java is James Gosling and in 1995, Sun Microsystem released it. Java is one of the world's most popular programming language in use for web - applications. It is simple and easy to learn. Its syntax is quite simple. Some of confusing concepts of C++ have been reimplemented in cleaner way in java. Some of features of java are given below: Java is portable as first java program is converted into bytecode. This bytecode is platform independent and can run on any platform.

- Java supports dynamic compilation and automatic memory management (garbage Collections).
- Java provides multithreading feature, it deals with multiple tasks at a time. The advantage is that it doesn't occupy memory for each thread.
- Java gives secure virus free, temper free system because of :
  - a. No explicit pointer
  - b. Java program runs inside the virtual machine sandbox

## Python

Python is for high-level and general-purpose. It is a Object Oriented Programming language. Guido Van Rossum who found this language. For beginners, Python is easy to learn comparatively than other programming language like Java, C, C++. Python contains elegant syntax structure that makes it most popular language. Here are some of the facts about this Language:

- Python allows programming in Object-Oriented and Procedural paradigms.
- We have generally type relatively less code in python programs than other programming languages like Java, C++.
- Python has huge collection of standard library which can be used for the following:
  - a. Machine Learning
  - b. Web frameworks
  - c. Image processing
  - d. Multimedia
  - e. Scientific computing

## Educational programming languages

A programming language that helps in enhanced education in any ways. Following are some examples of educational programming languages:

### Pascal

Pascal is the most well-known, high level language that was designed by Niklaus Wirth. In US and Europe, Pascal is primary choice in computer science for teaching programming in the earlies of 1970s and 1980s. Some of the features of Pascal are:

- It is a strongly typed language.
- Easy to learn
- Structured language.
- It has extensive error checking.
- It is supporting object oriented programming language

### Scala-based

Kojo is an interactive desktop environment for applications designed primarily for education. It is an open source IDE for the this programming language. It is a multidisciplinary learning environment that helps discover, learn and teach content in areas such as computer programming and psychology, mathematics and science, art, music and philosophy, computer and internet skills.

### Basic-256

Basic-256 is a simplest version to use of BASIC designed to teach anyone the basics of computer programming. It consist of statements separated by newlines, which are executed in order. It has a built-in graphics mode

that allows to draw pictures on screen in minutes. It taught the basic introduction of program and their concepts through fun exercises.

### **Business programming languages**

#### **Data bus**

The data bus language was invented by data point in year 1972. It was standardized as a ANSI language in year 1994. It was basically invented as an alternative to language Cobol. It is a high level language used in designing of applications which are business oriented. The use of data bus is mainly in highly user interactive applications.

#### **COBOL**

Cobol is high level programming language which is user friendly and all the instructions can be easily written in English words as it is an English-type language. It was basically used for business-oriented applications related to financial and defence domain and many more. It has advanced file handling capabilities for holding huge data. Cobol has effective error messages which make it easy to debug.

#### **Libraries**

In practice, "library" usually refers to ready-made objects, classes, and objects that can be used in a program. The format of the library depends on all languages in which the library is used and the operating system in which it is distributed. It can be anything from multiple files in different formats - for example:

.py or .pyc or .zip files for Python libraries  
 .jar file for a Java library  
 .dll filed (compiled into machine code in an object format) for code in C/C++ on Windows.

#### **Security**

Cyber attackers have two main goals: denial of service to make some changes to access and web tampering to gain unauthorized access. Research shows that security breaches are rooted in programming languages. A possible reason for these cyber-attacks may be due to the lack of knowledge of the application developers about language-specific vulnerabilities such as widespread use of C/C++ languages even with a long history of memory attacks. Programming languages such as Python, Ruby, C#, and Java are strongly typed languages. Strong typing is an important part of security that needs to know the type of the identifier, so

keys should be granted access based on their type. However, only some security vulnerabilities are mentioned in this message. Developers should be aware of vulnerabilities in these programming languages, such as authentication and XSS violations in Ruby and native Java and Python.

#### **Change of requirements with time**

As we are in the developing technological era, the modernity is the need of the hour. Every single thing has the touch of the modernity. And same thing is with the Coding as it has become the more impeccable option to use coding because of its flexibility and speed. Earlier we used to have C language and assembly language which were slightly complex. But now we have Python which is a comparatively easier language. It is globally popular now and has taken the race in its control because of its better readability key. Although programming language has impacted a lot over time but still it has chances of more modifications for example the feature of compiler has to be modified. The other changes include addition of keywords, changes in syntax, introduction of functions in library and many others. Making changes in old programming languages is much more difficult, time consuming and less fruitful than creating a new programming language.

## **II. CONCLUSION**

The developers formulate the idea of a new computer language by considering various existing and old ones. While deriving this process, various new features are made available, some are changed, some are removed and some are modified with better. This can be understood by considering an illustration of smart phones. Smart phones are basic mode of communication and other entertainment purposes. But every new year hundred's of smart phones are launched with some added modified as well as repeated features. The choice of a smart phone depends on preference and ease of users. Same is the case of programming languages, the choice of using any particular programming language is dependent of user's choice, comfort and ease. To better understand this, consider the example of human languages, we have tons of different languages used by tons of different people from different regions. Therefore, the use of any programming language is highly user specific. A programmer should use one that works the way he or she thinks. Some people like to use java, some prefer python while others have different liking.

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