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Tutorial 1

1. Programming languages are necessary in order for humans to communicate with computers. They are needed to bridge the gap between humans and computers. Programming is essential for humans and their organizations in order to fulfill human needs and wants.

2.

a) Source Code

Source code is written by programmers in high level programming languages. It is a human readable language which is easy to understand and work with. Has to be compiled and interpreted. Debugging and maintenance is easier.

Machine Code

Machine code is a lower level language. It consists of binary code represented by zeros and ones. It is not human readable and can be challenging for programmers. Machine code varies from system to system. It is typically generated by compilers or assemblers from the source code.

b) High Level Language

High level languages are easily understood and written by human. Uses English syntax, including variables and functions. Can be executed in different platforms. Generally slower in execution.

Low Level Languages

Closer to hardware and provides direct control to the computer. Typically written using machine code and assembly language. Less portable than high level languages. Due to being directly connected to the computer, execution is faster.

c) Compiler

Converts source code into machine code. It is considered a one time process which the outcome being an executable file. The generated code is independent and can be executed directly by the hardware.

Interpreter

Executes code line by line. Analyzes during runtime, executing it directly. Provides instant feedback on errors and issues. Doesn't produce intermediate machine code.

d) Structured Language

Breaks down programs into smaller units. Uses loops and conditionals to control the flow. Uses functions and procedures making it well suited for smaller programs and tasks that need sequence execution methods.

Object Oriented Language

Code is organized around objects that contain data. Objects can be defined as classes. These languages are used for complex systems and large scaled applications that requires real word interactions.

e) C

C is a procedural language developed in the 1970s. It is a simple a effective language although it lacks built in support for OOP features. Memory management is done manually. C programs are faster and use a smaller memory and is being widely used in the system.

C++

C++ is an extension of C language that was developed in 1980s. It introduces additional OOP concepts like classes. It contains larger code base and high level of abstraction. It is widely used in application development and game development.

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Java

Object oriented programming language. Can be executed on any platform. Uses manual memory management. Contains a vast standard library. Commonly used for enterprise applications and web development

g) Syntax Error

Occurs when the code violates rules of programming. It is a mistake in the structure of the code Typically detected by the compiler or interpreter. When a syntax error occurred, a code cannot be executed.

Logical Error

This occurs when the code does not produce the expected result. It Is a mistake in the algorithm. This does not cause the code to not generate since it doesn’t violate syntax errors. Identifying errors is more challenging.