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Tutorial 01

1. A programming language is a formalized system of syntax and semantics that enables humans to communicate instruction to computers. Programming language are essential for communication between humans and computers.
   They provide higher-level abstractions, productivity tools, platform independence, collaboration support and promote innovation, ultimately empowering developers to build complex software systems.

2.

   a)

Source Code	Machine Code
It is easy to read and understanding by human.	It is not easy to read and understating by human.
Source code needs to be translated before executed (By using compiler and interpreter)	Machine code is executed directly by computer's hardware without any translation.

It is easy to write complex program.	It is difficult to write complex program.

b)

High-Level Language	Low-Level Language
It is easy to read and write for humans. They have keyword, logical constructs and meaningful variable name.	It is not easy to read and write for humans. They have symbols, binary code and mnemonic instructions.
High level language provides many libraries, frameworks and tools for developers.	Low level language is typically specific to a particular hardware architecture.
A program written using high-level language will run on any device. It is not based on one device.	A program written using low-level language will not run on any device. It is based on one device.

c)

Compiler	Interpreter
First analyzes the entire source code. Then it converts into machine code.	It is executing the source code line by line.
Generally, faster and more efficient.	Generally, slower and less efficient.

Errors and issues are often detected during runtime.	Errors and issues are often detected during interpretation process.

d)

Structured Language	Object Orientated Language
It is using control structure like sequences, selection and iteration to execute program.	It is providing mechanisms like classes and objects to structure programs.
It is using simple data types like integers, floats, and characters.	It is using complex data structure like properties and functions.
It is promoting code reusability through procedural abstraction.	It is promoting code reusability through class inheritance and object composition.

e)

C	C++
C is primarily a procedural programming language. It is focuses on structured programming.	C++ supports multiple programming paradigms. It is focuses on Object Oriented Programming (OOP), procedural programming and generic programming.

C has a small standard library that provides essential functions.	C++ has an extensive standard library that includes the functionally of C's standard library.
C is widely used in system programming, embedded systems…	C++ widely used in applications, game developments, GUI applications…

f)

C++	Java
C++ supports multiple programming paradigms. It is focuses on Object Oriented Programming (OOP), procedural programming.	Java is primarily an Object-Oriented Programming language.
C++ allows manual memory management with features like pointers.	Java has automatic memory management trough garbage collection.
C++ code is compiled into machine-specific binaries, making it less platform-independent.	Java code is compiled into bytecode that runs on the Java Virtual Machine (JVM).

g)

Syntax Error	Logical Error

Syntax errors are detected by the compiler or interpreter during the compilation or interpretation process.	Logical errors are do not trigger any error messages during compilation or runtime.
Syntax errors result from mistakes in the code's structure such as missing semicolon, brackets.	Logical error result from incorrect logic. For that case results will be incorrect.
It is providing information about the specific line and location.	It is not providing information about the specific line and location.