Lec:- 01

Principles of Computing :-

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Python :-

* Computers and programming :-

→ A Computer is just a machine (the hardware) for executing programs (the software).
Hence, the software rules the hardware !

→ The process of creating software is called programming.

→ Programming develops valuable problem - solving skills, especially ones that pertain to analysis, design and implementation.

* Programming language :-

→ A program is just a sequence of instructions telling the computer what to do.
We need to provide these instructions in a language that Computers can understand.
This language is called "programming language"

Ex:- python, Java, C, C++ etc.

→ Every structure in a programming language has an exact form (i.e. Syntax) and a precise meaning (i.e. Semantic) / logic

if Syntax is correct, → not mean that program will run.
↓
means, "you have written a program such that Computers understand."

Semantic → output
↓
how to write such that output will correct, that you need.

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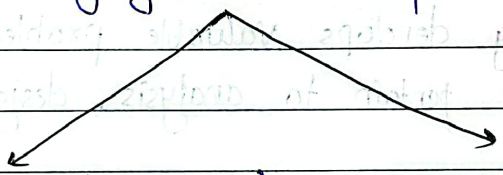
→ Python, Java, C & C++ are high level languages.

→ Computer hardware can only understand very low-level-language known as machine language.

→ In a high-level language like Python, the addition of two numbers can be expressed more naturally.

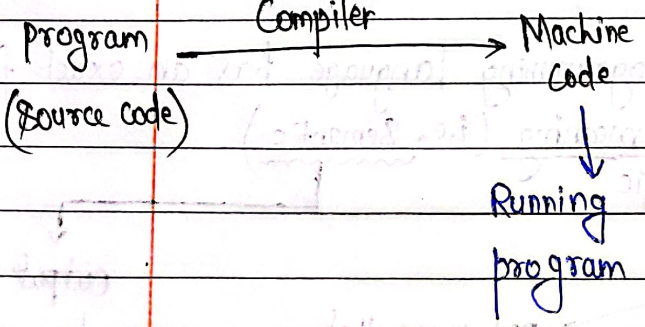
C = a+b (Much easier)

But, we need a way to translate the high-level language in to a machine language that a computer can execute.



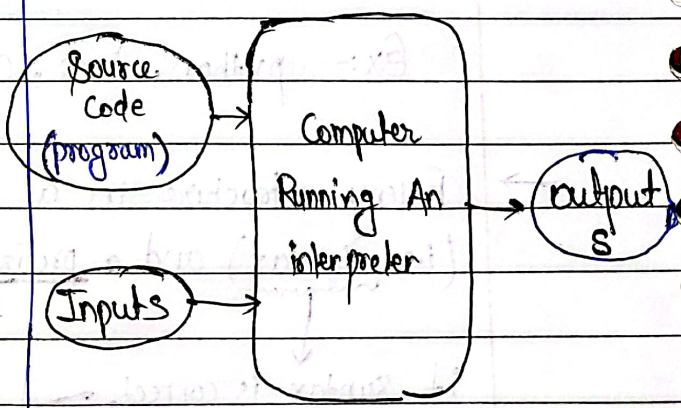
Compiled

→ A compiler is a complex software that takes a program written in a HLL and translates it in to a equivalent program in the machine language at once (complete code)



Interpreted

→ An interpreter is a software that analyzes and executes the source code instruction by instruction line by line (on-the-fly) as necessary.



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* python is an interpreted language.
* C, C++ Compiled language.

* Benifits of Interpreted language :—

→ Compling is a static (pre execution), one-shot translation
  * once a program is compiled, it may be run over and over again without further need for the compiler or the source code.

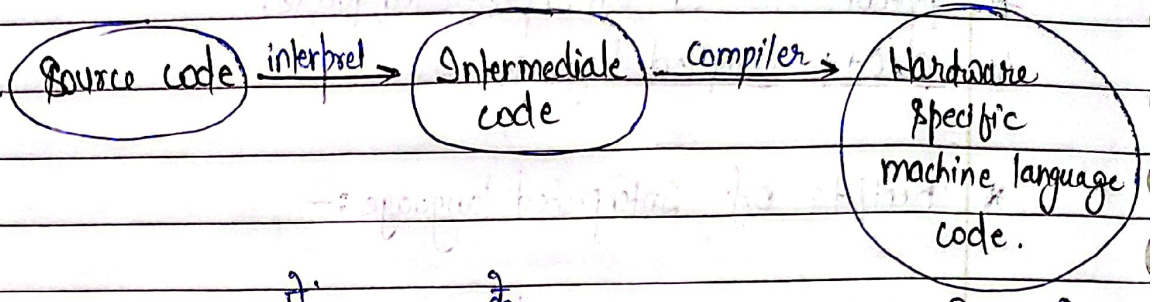
→ Interpreting is dynamic (happens during execution).
  * The interpreter and the source code are needed every time the program runs.

→ Compiled programs tend to be faster, while *interpreted ones lend themselves to a more flexible programming Enviroments
  ↓
  * developed and run interactively.

* Note on Portability :—
  ↓
  You can run program in different types of machince provided by interpreter.

→ The translation process highlights another advantages that high level languages have over machine languages, namely portability

→ A program for an intel-based machine will not run on an IBM based machine since each Computer type has its own machine language.

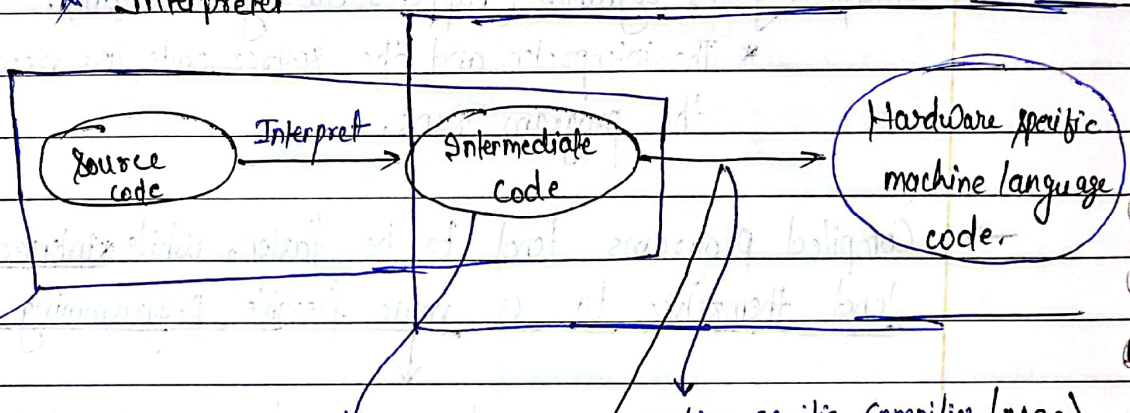


* Compilation में machine के according source code लिखना होगा।

intel IBM

Ex:- C program of intel & IBM are different

* Interpreter



By user

understand by all type of machine

machine specific compilier (MSC)

handed by MSC

user don't worry

→ A program written in HLL (python) can be run on many different kinds of computers as long as there is a suitable compiler or interpreter

* python programs are portable.

Python → Python virtual machine

Java → Java virtual machine ← Compiler