Introduction to Programming

Week 1
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Introduction to Programming

- Computer

    The word computer is derived from the **Latin** word 'computare', which means 'to calculate', 'to count', 'to think', or 'to sum up'.

    Sum : how a computer would sum 4+5

    – convert it to binary code

    – Sum operation in binary form

    – Represent result on screen in no.

Introduction to Programming (2)

A programming language is a type of written language that tells computers what to do. Examples are: **Python, Ruby, Java, JavaScript, C, C++, and C#**. Programming languages are used to write all computer programs and computer software.

Computer programming language, any of various languages for expressing a set of detailed instructions for a digital computer.

Basic type of Languages

There are three types of programming languages: **machine language, assembly language, and high-level language**.

Hierarchy

OO and Visual Language

FORTRAN | C | Pascal

High-Level Language

Assembly Language

Machine Language

Hardware
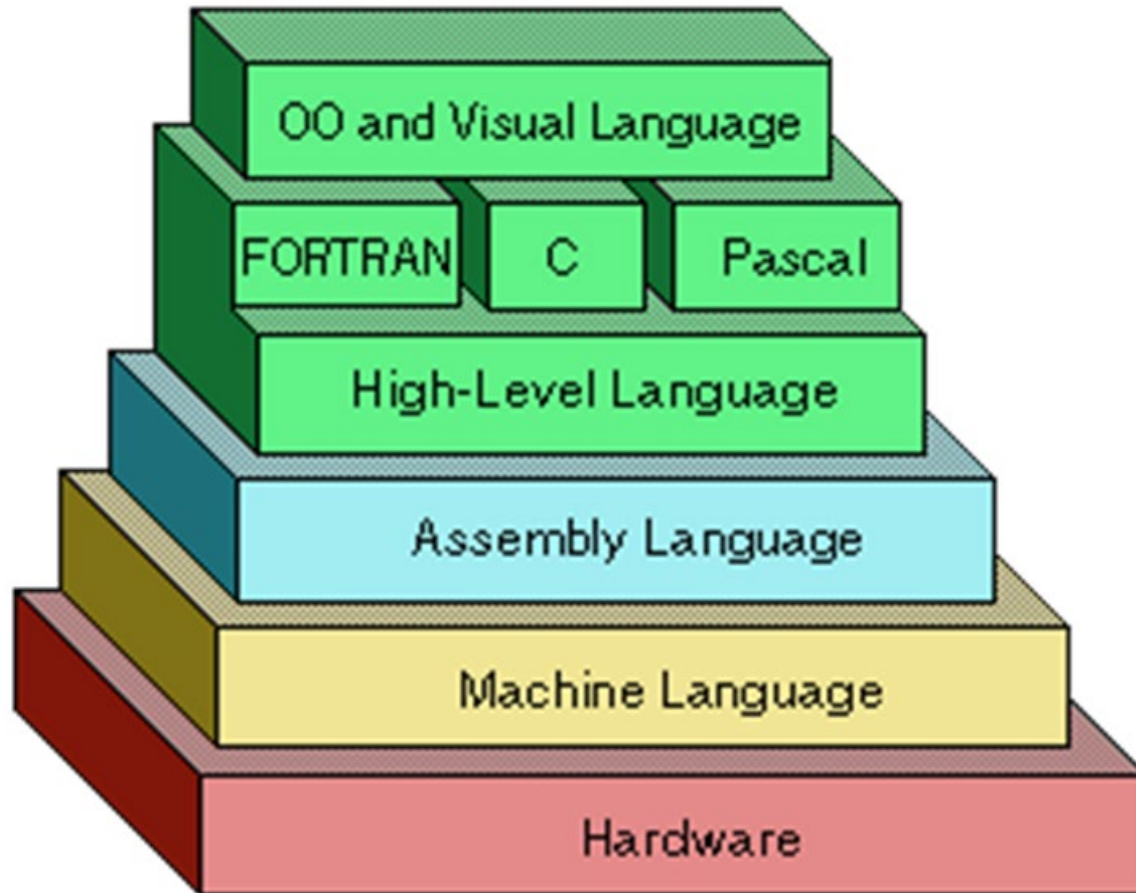
Machine Language

- Machine language is easier for the computer to understand but harder for the programmer to understand. This is because machine language is simply the language of machines—bits.

- Machine language is the binary language that is easily understood by computers. Hence it can be directly executed by CPU with absolutely no need of compilers and interpreters.

- The difference between machine language and assembly language is that machine language is incomprehensible to humans and can only be understood by computers whereas humans can understand, use, and apply assembly language.

Assembly language

- Assembly language falls between a high-level programming language and Machine language. It has syntaxes similar to English, but more difficult than high-level programming languages. To program in assembly language, one should have understood at hardware level like computer architecture, registers, etc. This kind of programming is mostly seen in the embedded systems.

Assembly language

– An assembly language statement is **a line of text that translates into a single machine instruction**. Assembly Language is expressed in a more human readable form than the binary instructions and names are allowed for memory locations, registers, operations etc.

– An assembly language is a low-level programming language that requires software called an assembler to convert it into machine code.

Assembly language----→assembler + linker---→Machine language

    programmer   processor

High Level Language

- A high-level language is easy for programmers to write as well as to understand. Programmers here use simple and easy syntax to address a specific task. Examples: Python, C, C++, etc. These syntaxes can't be understood by CPU; hence it gets converted internally to binary which CPU can understand by the medium of compiler and interpreter.

- High level language is characterized as complied language and interpreted language:

High Level Language

- High level languages are programmer friendly. …
- It provide higher level of abstraction from machine languages.
- It is machine independent language.
- Easy to learn.
- Less error prone, easy to find and debug errors.
- High level programming results in better programming productivity.

Importance

- The IT sector is rapidly experiencing fast development demanding more talent who can work in a variety of fields within the programming world. In order to meet the requirements, you will need to have special knowledge with unique skills. If you want to be in demand in this field then you need to learn on-demand programming skills.
    - Python
    - C/C++
    - Java
    - SQL
    - JavaScript

C/C++

- C/C++ is used by people who continue to work on Microsoft and Windows. It is a perfect solution for video game developers and can also be used for applications with Unity 3D too. C and C++ are well known for being the languages that get the most out of computers. It is vital to know and learn about C as it is extremely useful soon.