Computer Fundamentals

Computer Language and its types

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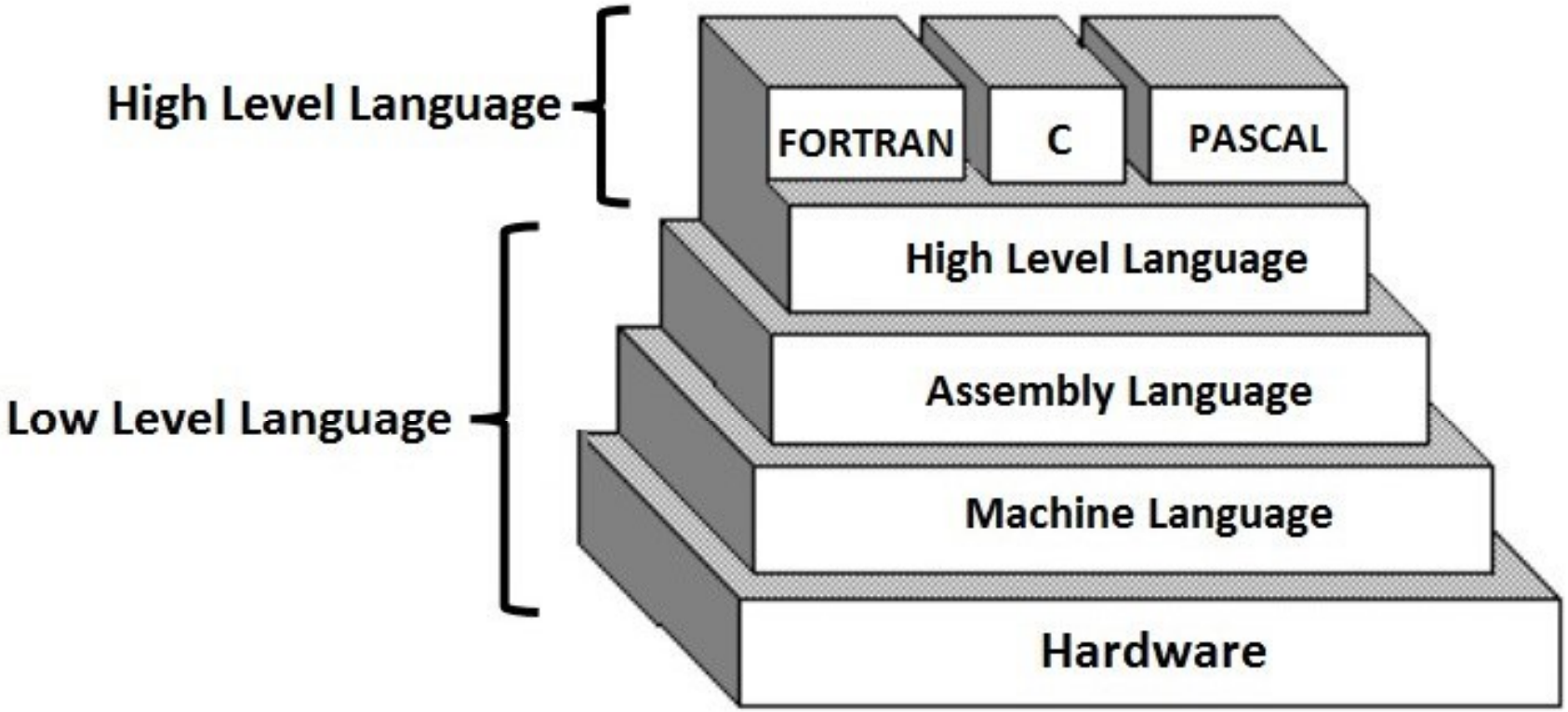
Introduction

- A language is the main medium of communicating between the Computer systems and the most common are the programming languages.
- As we know a Computer only understands binary numbers that is 0 and 1 to perform various operations but the languages are developed for different types of work on a Computer.
- A language consists of all the instructions to make a request to the system for processing a task.
- From the first generation and now fourth generation of the Computers there were several programming languages used to communicate with the Computer.
- Here we will go in the detail of the Computer language and its types.

Computer Language

- A Computer language includes various languages that are used to communicate with a Computer machine.
- Some of the languages like programming language which is a set of codes or instructions used for communicating the machine.
- Machine code is also considered as a computer language that can be used for programming.
- And also HTML which is a computer language or a markup language but not a programming language.
- Similarly there are different types of languages developed for different types of work to be performed by communicating with the machine.
- But all the languages that are now available are categorized into two basic types of languages including
    - Low-level language and
    - High level language.



Computer Language and its Types

1. Low Level Language:

- Low level languages are the machine codes in which the instructions are given in machine language in the form of 0 and 1 to a Computer system.
- It is mainly designed to operate and handle all the hardware and instructions set architecture of a Computer.
- The main function of the Low level language is to operate, manage and manipulate the hardware and system components.
- There are various programs and applications written in low level languages that are directly executable without any interpretation or translation.
- The most famous and the base of all programming languages “C” and “C++” are mostly used Low level languages till today.

- Low level language is also divided into two parts are

  1.1 Machine language and

  1.2 Assembly language.

1.1 Machine Language

- **T**he first generation language developed for communicating with a Computer.
- It is written in machine code which represents 0 and 1 binary digits inside the Computer string which makes it easy to understand and perform the operations.
- As we know a Computer system can recognize electric signals so here 0 stands for turning off electric pulse and 1 stands for turning on electric pulse.
- It is very easy to understand by the Computer and also increases the processing speed.

- **Advantage** :
  - no need of a translator or interpreter to translate the code, as the Computer can directly can understand.
- **Disadvantage** :
  - Remember the operation codes, memory address every time you write a program and also hard to find errors in a written program.

1.2 **Assembly Language**

- The second generation programming language that has almost similar structure and set of commands as Machine language.
- Here we use words or names in English forms and also symbols.
- The programs that have been written using words, names and symbols in assembly language are converted to machine language using an **Assembler**.
- Because a Computer only understands machine code languages that's why we need an Assembler that can convert the Assembly level language to Machine language so the Computer gets the instruction and responds quickly.

- **Disadvantage** :
  - it is written only for a single type of CPU and does not run on any other CPU.
- But its speed makes it the most used low level language till today which is used by many programmers.

2. High Level Languages (Third generation languages/3GLs)

- The assembly language was easier to use compared with machine language as it relieved the programmer from a burden of remembering the operation – codes and addresses of memory location.
- Even though the assembly languages proved to be great help to the programmer, a search was continued for still better languages nearer to the conventional English language.
- The languages developed which were nearer to the English language, for the use of writing the programmer in 1960 were known as High Level languages.
- The different high level languages which can be used by the common user are FORTRAN, COBOL, BASIC, PASCAL, PL-1 and many others.
- Each high level language was developed to fulfil some basic requirements for particular type of problems.
- But further developments are made in each language to widen its utility for different purposes.

Fourth Generation Languages(4GLs)

- The 3GLs are procedural in nature i.e., HOW of the problem get coded i.e., the procedures require the knowledge of how the problem will be solved.
- Contrary to them, 4GLs are non procedural.
- That is only WHAT of the problem is coded i.e., only ‘What is required’ is to be specified and rest gets done on its own.
- Thus a big program of a 3GLs may get replaced by a single statement of a 4GLs.
- The main aim of 4GLs is to be cut down on developed and maintenance time and making it easier for users.