

UNIT-II

Hardware and Software – Application and System Software- Computer Languages-Machine Language-Assembly Language –Assembler- High-Level Language –Compiler-Linker-Interpreter.

Hardware

The physical devices of a computer are called Hardware. It may be electronic, electrical, magnetic, mechanical or an optical device. Examples are microprocessor and other ICs, hard disk, printer, CD-ROM, keyboard, etc.

Hardware can be seen, touched as they are physical components of computer.

Software

A sequence of instructions given to a computer to perform certain task is called a program. A set of programs written for a computer is known as software. Software cannot be seen or touched as they are invisible but they are instruction based programs for any specific or general purpose.

In general, software are of two types

1. System Software
2. Application Software

System software may be defined as a set of one or more programs designed to control the operations of computer system.

System Software are general purpose programs designed for performing tasks such as controlling all operations required to move data into and out of the computer. It communicates with keyboard, printer, card reader, disk, tapes etc. It also monitors the use of various hardware like memory, CPU etc. System software acts as an interface between hardware and application software. System software allows application packages to be run on the computer with less time and effort. Remember that it is not possible to run application software without system software. DOS, UNIX, WINDOWS, Language Compilers and Interpreters are some of the widely used system software.

Application software is a set of programs, which are written to perform specific tasks of the users of computers such as Accounts, Stores, Payroll, etc. Application software can be classified into two types:

1. Customized Packages
2. Generalized Packages.

In **customized packages** or software, the programmes are written specially for user based on his requirements. For eg., Attendance/marks entry of a college, Employees records, pay roll of a company etc. It is highly personalized based on individual needs and cannot be used for others

Generalised software are common purpose software applicable to day to day life of the people and hence applicable to everyone. For example, word, excel (MS-Office) is a generalised package or software. Media recorder or players like VLC etc.,

Computer Languages

Language is a system of communication between two persons. Since, computers are machines, they cannot understand the common language of the people to perform the instructions or commands of the user.

Hence they developed special languages that computer can understand. Such languages are called computer or programming languages.

Programming languages are generally classified into two namely

1. Low level languages
2. High level languages

Low level languages are those which are close to computer that computer can very well understand. They are of two types

1. Machine language
2. Assembly language

High level languages: These languages are close to user, as they are developed in normal language. But they require some translators to convert into machine languages to execute the instructions. For. eg. C+, C++, Java etc.,

Machine Language:

Machine Language is the language of the computer and is the only language that is directly understood by the computer. It is called machine code and it is written as strings of 1's and 0's (binary codes). It is on this basis that the computer is designed. When this sequence of codes is fed to the computer, it recognizes the codes and converts it in to electrical signals needed to run it. For example, a program instruction may look like this:

1011000, 111101, 110111, 1100110001

It is not an easy language for the user to learn because of its complexity as it consists of 1's and 0's. It is most efficient for the computer as the instructions are directly executed. It is considered to the first generation language. It is also difficult to debug the program written in this language.

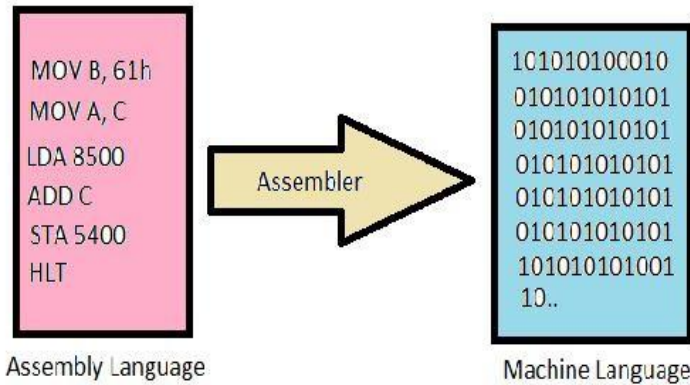
Advantage

The only advantage is that program of machine language run very fast because no translation program is required for the CPU.

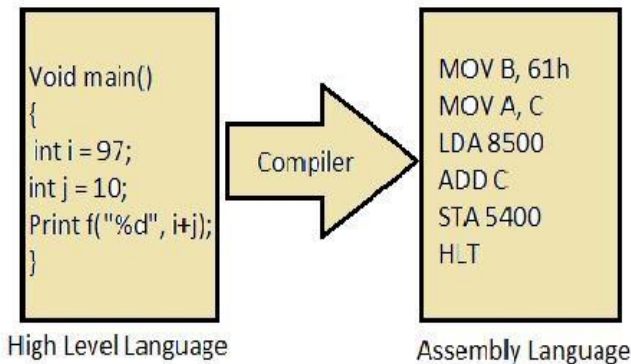
Disadvantages

1. It is very difficult to program in machine language. The programmer has to know details of hardware to write program.
2. Machine language is hardware dependent.
3. The programmer has to remember a lot of codes to write a program, which results in program errors.
4. It is difficult to debug the program.

Assembler substitutes letters and symbols to machine code. Assembly language represents a set of human readable codes. Each code represents a lowest level instruction in a computer. Assembler translates these instructions to machine codes.



Compiler is the next generation of programming software that uses an English like language to represent a computer program. The language will be highly structured and has some keywords to form the program. It is called **high level language**. The compiler converts the high level language to assembly language, and an assembler in turn this to machine code.



A linker is a software that links our software with other software and operating system. The commonly useful software components (linkers) are either available for free or on payment. This reusable block of software is called library. *Examples of programming software are C++, Visual Basic, Java, etc.*