Unit = 6

Computer Software / Interaction of user and Computer

A computer system consist of hardware and software. The computer hardware can not perform any task on its own. It needs to be instructed. Software instructs the computer about tasks to be performed. Software is the set of programs that instructs the computer about tasks to be performed. Softwares are mainly classified into following two categories.

A) System software.
B) Application software.

A) System software:-

It ~~is~~ provides basic functionality to the computer. System software is required for the working of computer itself. It controls computer hardware and it acts as an interface between user, application software and computer hardware. On the basis of their functionality, system software is mainly divided into two types as follows:-

a) For system management and functionality
b) For ~~developing software~~ the development of application software.

a) For system management and functionality:-

It relates to the functioning of different components of the computer like processor, input and output devices etc. It provides support for various services, as requested by the application software. It includes Operating system, Device Drivers and System Utilities.

1) Operating System (OS) :-

It is most important part of computer. It intermediates between the user of a computer and the computer hardware. It controls and coordinates the use of hardware among the different application ~~softa~~ software and the users.

Functions of OS:

i) It create environment between user and application software to work.

ii) It manages different resources of the computer like the CPU time, memory space, I/O devices etc.

iii) It controls the execution of different programs to prevent occurance of error.

iv) It provides a convenient interface to the user in the form of commands and graphical interface.

Example:- Microsoft Disk Operating System (MS-DOS), Windows 7, Windows XP, Linux, UNIX etc.

2) Device Driver:-

It acts as translator between hardware and software. Keyboard, mouse, hard disk, printer, speaker, webcam, scanner etc are some devices that are commonly connected to computers. For proper working of these types of devices, its

corrosponding driver must be installed on the computer. Nowdays, the operating system comes preloaded with some commonly used device drivers like the device drivers for mouse, webcam and keyboard.

i) Each device has it's own device driver.

ii) Whenever a new device is connected to a computer, it's device driver has to be loaded in the computer's memory to enable use of that device.

iii) Device drivers can be character or block device drivers. Character device drivers are for character based devices like keyboard, which transfer data character and block device driver are for devices like hard disk, that transfer data as block.

Example:- CD of a printer, Sony audio recorder.

3) System Utilities:-

System utility software is required for the maintenance of computer. They are used for supporting and enhancing programs and data in computer. Some examples of System utilities are:-

i) Anti-virus utility to scan computer for viruses.

ii) Data compression utility to compress the files.

iii) Cryptographic utility to encrypt and decrypt files.

iv) Disk cleaners to find files that have not been used for long time etc.

b) System software for the development of application software:-

It is required for the development and execution of application software. It provides software tools required for the development of application software. It includes programming languages, translator software, linker and loader.

1) Programming Languages:-

A programming language is a set of commands, instructions and other syntaxes to create a software program. They are used to write a program, which controls the behaviour of the computer. The programming language should be understood both by programmer and the computer. Programming languages are of three types, high-level languages, Assembly languages and Machinge languages.

High-level language is easier to understand and use for the programmer but difficult for computer. C, C++, Java etc are high-level programming languages. Assembly language falls in between machine language and high level language. These languages use symbolic representation of machine codes like ADD for addition and SUB for subtraction. Machine language is what the computer understand but difficult for programmer. It is the collection of binary digits or bits which are in the form of 0's and 1's.

2) Translator software:-

Translator software is used to convert a program written in high-level language and assembly language on to a machine-level language program that is understandable by computer. The translated program is called object code. There are three kinds of translator software.

i) Assembles → It is a software that converts a program written in assembly language into machine code.

ii) Compiler → It is a software that translates the program written in high-level language to machine language.

iii) Interpreter → It is a software that converts the high-level language program into computer understandable form.

Differences between a Compiler and an Interpreter:

i) Interpreter looks at a source code line-by-line. Compiler looks at the entire source code.

ii) Interpreter converts a line into machine executable form but compiler converts the entire source code into object-code.

iii) In interpreter source code is first interpreted and then executed but in compiler source code is first compiled then executed.

iv) During execution of ~~an interpreter~~ interpretation, both interpreter and source code are required but during execution of an object code, the compiler is not required.

v) The interpreted code runs slower than the compiled code.

3) Linker :-

Linker is a program that links several object modules and libraries to a single executable program. A source code of a program is often very large consisting of several hundred or more lines. The source code may also include reference to libraries. The code is broken down into many independent modules for easy debugging and maintenance. Before execution of the program, these modules and the required libraries are linked together using the linker software. The compiled and the linked program are called the executable code.

4) Loader :-

The loader software is used to load and re-locate the executable program in the main memory. Software has to be loaded into the main memory for execution. Loader assigns storage space to the program in the main memory for execution.

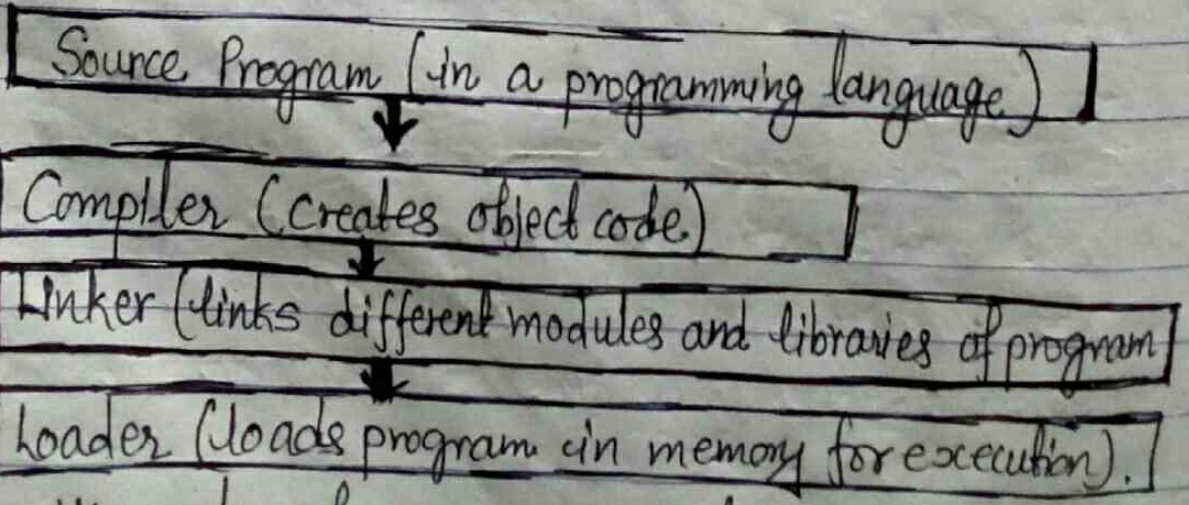

fig. Hierarchy of program execution.

B. Application Software:-

The software that a user uses for accomplishing (i.e. finishing or completing) a specific task is the application software. Application software may be a single program or a set of programs. A set of programs that are written for a specific purpose and provide the required functionality is called software package. Application software is written for applications like graphics, media players, database applications, telecommunication etc. Some examples of application software packages are as follows:-

i) Word Processing software → For writing letter, reports, documents etc. (e.g. MS-WORD).

ii) Image Processing software → For drawing, editing photos or images, manipulating graphics etc. (eg Adobe photoshop).

iii) Spreadsheet software → Used for creating budget, tables etc. (e.g. MS-Excel).

iv) Presentation software → To make presentations, slide shows. (e.g. MS-Power point).

v) Web Browser software → To access the World Wide Web to search documents, sounds, images etc. (e.g. Internet Explorer, Chrome).

Software Acquisition :-

The act or process of acquiring software in different ways like purchase, download free from internet or get it bundled along with hardware is called software acquisition. It is the way in which the software are made available to users. Some of the ways are as follows:-

i) Retail software → It is the software sold in retail stores. It comes with printed manuals and installation instructions. For example: Microsoft Windows OS.

ii) Original Equipment Manufacturer (OEM) software :- It refers to software which is sold, and bundeled with hardware. For example :- Dell computers are sold with "Windows 7" OS pre-loaded on them.

iii) Shareware → It is a program that the user is allowed to try for free, for specified period of time, as defined in license. It is downloadable from internet.

iv) Freeware → It is a software that is free for personal use. It is downloadable from internet.

v) Open-Source Sofware → It is software whose source code is available and can be customized and altered within the specified guidelines laid down by the creator. Examples : Linux, Apache, FireFox, OpenOffice etc.