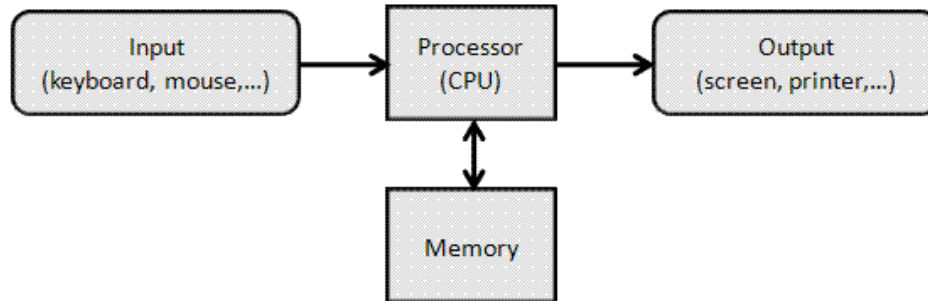


Chapter Two

Main Computer Parts

A computer is a machine that manipulates data according to a list of instructions called a program.



A computer can also be defined as an electronic machine that accepts input (data), processes it and gives out results (information).

The main parts of computer are as following:

- 1- Hardware
- 2- Software

Hardware:

Hardware is a collection of physical components that make up the computer and the devices attached to it such as input devices, output devices, secondary storage devices and others.

Hardware is composed from the following main parts:

(1) input units

Such examples are the keyboard, mouse and scanner.

(2) Central Processing Unit (CPU):

It is a metal piece with several legs installed on the motherboard and represents the electronic brains of the device where all the data is processed within this part and is called processor and depended on the CPU the type of computer is determined if P1, P2, P3,.....etc. The Central Processing Unit (CUP) consists of two parts:

(a) Arithmetic and Logic Unit (ALU):

It is the unit responsible for the execution of calculations such as (addition, subtraction, multiplication, and division) and the logical processes such as (greater than, less than, equaletc.).

(b) Control Unit

This unit controls and supervises the work of different computer units and directs its work according to the program orders in order to process the data and controls the following processes.

- 1- Data access from input units to main memory.
- 2- Transfer data between the main memory and arithmetic and logic unit.
- 3- Information exits from the main memory unit to different output units and secondary storage units.

In the arithmetic and logic unit and in the control unit there is a temporary storage area for small amounts of data called Register such as a Program Counter in the control unit is used to store the address of the next command to be executed while a register in the arithmetic and logic unit is called Accumulator and it is used for temporarily storage for data and the results of arithmetic and logical processes .

(3) Memory unit

The computer memory is a temporary storage area. It holds the data and instructions that the Central Processing Unit (CPU) needs. Before a program can run, the program is loaded from some storage medium into the memory. This allows the CPU direct access to the computer program. Memory is needed in all computers.

(a) Primary Memory:-

Primary memory also known as “main memory” or “internal memory” which is located in the mother board of system or as we say which is directly connected to the CPU. It is the place where only little bit of data are stored either by manufacturer or by user.

This is further divided into two parts:-

- 1- RAM
- 2- ROM

(1) RAM

RAM also known as “random access memory” it stores the data which the user currently uses or as we say it stores the data temporary in it. RAM needs power or electricity to work when the computer power is turned off then all the data in it will be erased automatically therefore it is called Volatile Memory . This is a circuit which has its separate space or slot in motherboard. This allows the computer to run the software faster. This memory does the following activities:

- 1- Storage of computer data in the input storage area.
- 2- Storage interim results of operation in the working storage area.
- 3- Storage the orders of program in the program storage area.
- 4- Storage final results in the output storage area.

RAM is further classified into two parts

- (a) SRAM
- (b) DRAM

(a) SRAM: - Known as Static RAM. The word “static” refers that the memory retains its contents as long as the power is supplied so that’s why we can say this is volatile in nature. SRAM does not need to be refreshed periodically. SRAM is faster but more expensive than DRAM.

(b) DRAM: - Known as Dynamic RAM. It also contains data only when electricity is available. DRAM needs to refresh periodically due to this, this RAM works slower than SRAM. Mainly general PC uses this RAM because it is much cheaper than SRAM and requires less space.

(2) ROM

ROM also Known as “Read Only Memory” as the word refers mainly it can only read the data which is stored in it. The information of this memory is usually stored by the computer manufacturer as well as the information of this memory remains stored in it even after turning off the computer or disconnecting the power from it therefore known as non-volatile memory . It contains BIOS of system.

Mainly there are three types of ROM:-

- (a) PROM
- (b) EPROM
- (c) EEPROM

(a) **PROM:** Known as “programmable Read Only memory”. In this when the data is stored then we have no right to change or alter any data to it. In this the data is written by Manufacturer company, even you can also purchase blank PROM chip but it can be programmed by special tool such as PROM programmers. In general PC’s mainly PROM is used because we don’t have to alter any data to it.

(b) **EPROM:** Known as “Erasable PROM” as the word refers “erasable” means we can change or erase the data. So in EPROM we have right to change the data. In this we can change the data with the help of ultra violet rays. EPROM is much expensive than PROM.

(c) **EEPROM:** Known as “Electrically Erasable PROM” the type of ROM which can be erased by electrical charges. EEPROM can be erased one byte at any time rather than erasing the entire chip by ultra violet rays.

(4) Secondary Memory

The place where we store our personal data in computer system is known as SM. In this we store data so that when the data is needed we can easily retrieve it. This is the fundamental component of comp. system.

It is non- volatile in nature so that we cannot lose the data when power supply is off.

There are two methods for accessing the data from it:-

1. Sequential – This is the method in which we search the data sequentially or line by line until you find the desired data. E.g. Magnetic tape, etc.
2. Direct – This is the method in which computer can go directly to the information that the user wants. E.g. magnetic disk, optical disk, etc.

Now I am going to discuss some of the secondary storage devices:-

1. Magnetic Tape: - Magnetic tape appears similar to the tape used in music cassettes. It is a plastic tape with magnetic coating. Mainly it is used to store music, movie, etc. it is not used to store data in it because as we know it comes under sequential access and it reads data line by line so that we can’t find the exact location of data.

2. **Magnetic Disk:** - This is widely used popular storage medium for direct access secondary storage. This is the place where data are automatically save when we click on save button. It is non- volatile so that once data is stored in it will not lose when power goes off.

This is the storage device where we mainly store or install OS for system. Some of the magnetic disk are as follows:-
Hard Disk, Floppy Disk, etc.

(a) Hard Disk

Hard Disk also known as “Hard Drive” or “Fixed Drive” and it is a piece of metal the size of a palm hand installed inside the motherboard and it contains all the files and data stored in the computer. Hard disk comes fix in our system and if you require more hard disk then it comes in removable also. The average computer today comes with a 250 to 500 GB hard drive.

Usually divides the hard disk into several parts to protect it from the risk of infection with the virus and the parts of this disk are called in English letters in sequence C:\, D:\, E:\,.....etc.

(b) Floppy Disk

This is removable, round, f lat piece of Mylar plastic, coated with a ferric oxide. This kind of disk is read and written by Floppy Disk Drive (FDD), which is a device which performs basic operations on disk including reading and writing of data to it. This was used to transfer data from one computer to another. Earlier 5 ¼” floppy disks were used but these disks have less storage capacity so new format of 3 1/2” floppy disk came in market. Now a days floppy disk are not used because off less storage and high rate.

(c) Optical Disk

This is the secondary storage medium in which you can store much more data in it. This is flat, circular, plastic disk coated with material. Optical disk is very popular because of its small size and huge storage capacity. You must have optical disk reader in your computer so that you can read or write data on it. There are two types of optical disk:

1. CD
2. DVD

CD: Known as “Compact Disk”, mainly used to store data, music, movie, software, etc. it can store 80 minutes of continuous video recording. The space of CD is up to 700 MB. Due to its high storage capacity it is widely used. The data are stored in it in the form of “Pits”. To avail the services of CD your computer should have CD drive.

There are two types of CD:

- i- CD ROM.
- ii- CD R/W.

DVD: Known as “Digital Versatile Disk”. It is high capacity storage medium. Mainly used to store movie, music, software, etc. the storage capacity of DVD is up to 4.7 GB. It looks similar to CD but due to its high storage capacity it is not cheaper as CD. To avail the facility of DVD you must have DVD drive in your computer. DVD drive also gives you facility to run CD disks too. Types of DVD:

- i- DVD ROM.
- ii- DVD R/W.

(d) ZIP Disk

It is similar to floppy disk but it is larger in thickness and greater in the capacity of storage than a floppy disk.

(e) Flash

It is a mobile memory used to transfer data from one computer to another and is called commercially Flash Ram and has a storage capacity from 64MB to 32GB.

(5) Output Units

One of the most important output units is the monitor where the software is produced in the form of images or symbols or data and other output units printer, speaker,etc.

Tabl1 (1): Shows the system units, output units and input units

SYSTEM UNITS	OUTPUT UNITS	INPUT UNITS
Mother Board Central Processing Unit (CPU) Main memory (RAM / ROM) Hard Disk Floppy Disk Drive Laser Disk Drive Data Buses Power Supply Hardware Cards Case	Screen Printer Plotter Speakers Headphone	Mouse Keyboard Scanner Light Pen Joystick Microphone Camera Barcode reader Finger print Graphics tablet

Software

Software is a set of programs, which is designed to perform a well-defined function. A program is a sequence of instructions written to solve a particular problem. There are two types of software.

- 1- System Software
- 2- Application Software

(1) System Software

The system software is a collection of programs designed to operate, control, and extend the processing capabilities of the computer itself. System software is generally prepared by the computer manufacturers. These software products comprise of programs written in low-level languages, which interact with the hardware at a very basic level. System software serves as the interface between the hardware and the end users.

Some examples of system software are Operating System, Utility, Compilers, Interpreter, Assemblers, etc.

(a) Operating System

i- DOS (Disk Operating System)

ii- Windows (Windows 3.11, Windows 95, Windows NT, Windows 98, Windows me, Windows 2000, Windows XP, Windows 2003.....etc.)

iii- UNIX

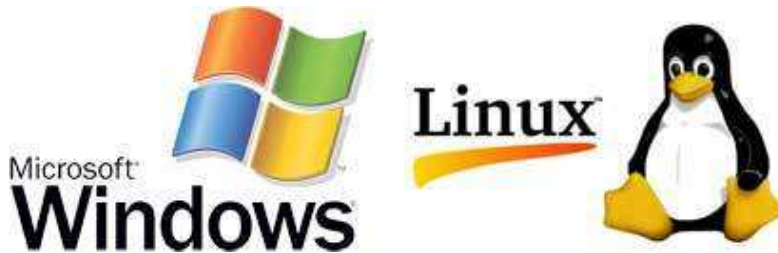
iiii- LINUX

(b) Utility Programs

Utility programs are small systems programs that can do specific and simple task such as copying a file from tape to cylinder or arranging a set of data alphabetically or digitally. One of the type of utility programs is the editor program that allows the user to open a file and write programs or data in it.

(c) Compilers Programs

Compilers programs are the programs that programmers use to translate programs they write in a computer language such as Basic, Bascal, Fortran,etc., in order to solve a problem where these translators convert the main program that the programmer writes (Source Program) into a program written in a machine language and called (object program).



Here is a list of some of the most prominent features of a system:

- Close to the system
- Fast in speed
- Difficult to design
- Difficult to understand
- Less interactive
- Smaller in size
- Difficult to manipulate
- Generally written in low-level language

(2) Application Software

Application software products are designed to satisfy a particular need of a particular environment. computer lab can come under the category of Application software. Application software may consist of a single program, such as Microsoft's notepad for writing and editing a simple text. It may also consist of a collection of programs, often called a software package, which work together to accomplish a task, such as a spreadsheet package.

Examples of Application software are the following:

- Word Processing (MS Word, Lotus Word(Pro.), Word Perfect)
- Spreadsheet (MS Excel, Lotus123)
- Data Base (MS Access, MS SQL, Oracle)
- Presentation (MS power Point, Flash)
- Graphics (AutoCAD, Photoshop)
- Web Authoring (MS Front Page)
- Data Protection (Anti Virus)

Features of application software are as follows:

- Close to the user
- Easy to design
- More interactive
- Slow in speed
- Generally written in high-level language
- Easy to understand
- Easy to manipulate and use
- Bigger in size and requires large storage space

Computer programming language

Computer programming languages any of various languages for expressing a set of detailed instructions for a digital computer. Such instructions can be executed directly when they are in the computer manufacturer-specific numerical form known as machine language, after a simple substitution process when expressed in a corresponding assembly language, or after translation from some “higher-level” language. Although there are many computer languages, relatively few are widely used.

Language Types

(1) Machine language

Sometimes referred to as machine code or object code, machine language is a collection of binary digits or bits that the computer reads and interprets. Machine language is the only language a computer is capable of understanding.

The exact machine language for a program or action can differ by operating system on the computer. The specific operating system will dictate how a compiler writes a program or action into machine language. And one of the disadvantages of machine language is that it requires a great effort and accuracy from the programmer in addition to the difficulty of detecting mistakes.

Computer programs are written in one or more programming languages, like C++, Java, or Visual Basic. A computer cannot directly understand the programming languages used to create computer programs, so the program code must be compiled. Once a program's code is compiled, the computer can understand it because the program's code is turned into machine language.

Machine language example

Below is an example of machine language (binary) for the text "Hello World".

```
01001000 01100101 01101100 01101100 01101111 00100000  
01010111 01101111 01110010 01101100 01100100
```

Below is another example of machine language (non-binary), which will print the letter "A" 1000 times to the computer screen.

```
169 1 160 0 153 0 128 153 0 129 153 130 153 0 131 200 208 241 96
```

(2) Assembly Language

This language uses certain symbols written in English to express a particular order such as add and mean collect and code mult means multiply. This language varies from computer to another and the programs written in this language are called source programs and need a translated program called Assembler in order to convert it into machine language. The source program after its translation is called Object Program.

(3) High Level Languages

A high-level language is a programming language designed to simplify computer programming. It is "high-level" since it is several steps removed from the actual code run on a computer's processor. High-level source code contains easy-to-read syntax that is later converted into a low-level language, which can be recognized and run by a specific CPU.

Most common programming languages are considered high-level languages. Examples include:

- | | |
|---------------|----------------|
| 1. C++ | 7. Objective C |
| 2. C# | 8. Pascal |
| 3. Cobol | 9. Perl |
| 4. Fortran | 10. PHP |
| 5. Java | 11. Python |
| 6. JavaScript | 12. Swift |

Each of these languages uses different syntax. Some are designed for writing desktop software programs, while others are best-suited for web development. But they all are considered high-level since they must be processed by a compiler or interpreter before the code is executed.

code written in languages like C++ and C# must be compiled into machine code in order to run. The compilation process converts the human-readable syntax of the high-level language into low-level code for a specific processor. Source code written in scripting languages like Perl and PHP can be run through an interpreter, which converts the high-level code into a low-level language on-the-fly.

Important Tasks in Windows

Starting computer

Most basic computer users only need to know a few things about their operating system. In these tutorials we will cover the basics of Windows 7. We will start with the Start menu, desktop and screen saver then move through the control panel and explore the topics of user accounts, Appearance and Themes, printers, mouse, folder options and sound. We will then move onto file structure and windows updates.

Lets' get started with learning about the start menu and desktop. The Windows start menu is where you will find and access all of your programs and settings. Click on the Windows icon in the lower left corner of your working screen. The Windows 7 Start Menu will look like this. The left hand column is a list of recently used programs and will change as you use your computer. The right hand column is where you will see

the standard menu including the control panel, device and printer manager and help.



Below the left hand column is a search box. In this box you can type a file name, folder name, program, or extension and search for the location on the computer. If you do not press enter after your search your list of matching items will appear above the search box in the start menu. By clicking the magnifying glass or pressing enter a window will open with a list of the matching items.

Below the right hand column start menu options is the shutdown button. Clicking the button will shut down the computer properly.



If you would like more options click the arrow on the button to get a list of options. The first option is to switch users. This will keep the current user logged into the computer and bring you back to the sign in window to log into another account. Log off will log the user off closing all programs and return you to the sign in menu. Lock will lock the computer so a password will have to be entered before being able to log back on. Any open programs will remain open until the closed by the user or the computer is shutdown. Restart will log off all users shut down the computer and reboot it to the log in menu. Sleep will keep all programs running but shut down the monitor and non-essential components of the computer. It will keep any programs open but will only use minimum resources to keep the computer running. Hibernate is used primarily for laptops. It uses even less power than sleep mode by placing your open work on your hard drive and turning your computer off with the ability to recover any open work when the computer is turned back on.