-**Computer:** electronic device that accepts input, stores large quantities of data, execute complex instructions which direct it to perform mathematical and logical operations and outputs the answers in a human readable form. Fig (1) shows simple model of a computer:
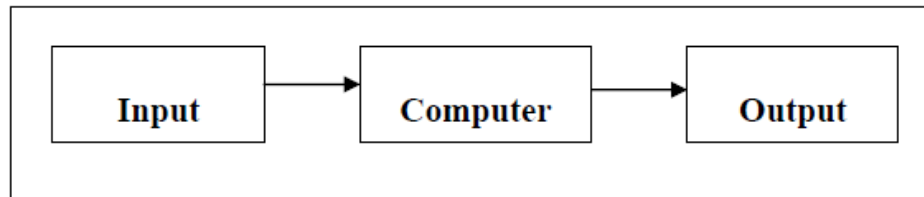

Fig (1) simple model of a computer

-**Advantages of computer system: -**

1- Store and retrieve large quantities of data.

2-The speed is faster than in any other form of data processing.

3-A single computer can perform a wide variety of activities as directed by a set of instructions (program).

4-Once data and instructions are fed into the computer, processing is continuous with a minimum of human intervention.

5-Data and programs may be stored inside the computer indefinite and be retrieved quickly.

6- Accuracy is greater than any other system.

-Computer structure: -

Computer system is made of two main parts: -

1-Hardware: refers to the physical components of the computer such as: Keyboard, memory, printer…

2-Software: refers to programs, languages, procedures and instructions that make the hardware work for us.

-Main components of hardware:

The basic components of a computer system are: (see fig. 2)

1-Input unit

2-Central processing unit: -

3- Output unit.

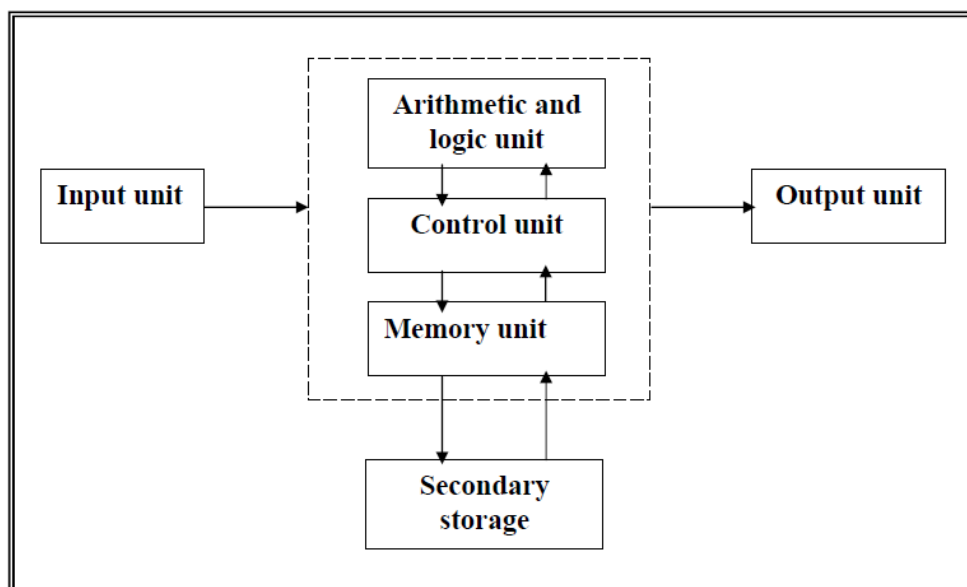4- Memory unit (internal memory).

5- External storage.

Fig (2) The logical structure of a computer

1-Input unit: -

the input unit of a computer system accepts data, convert it into electrical impulses that are sent in to internal memory or to the central processing unit (CPU) where can be processed. Such as keyboard, joysticks , touch capabilities, microphone , scanners and mouse.

2-Central processing unit (CPU): -

The brain of any computer system is the CPU, which is sometime called "Processor" or " Microprocessor" in personal computer.

The CPU supervises and controls all of the peripheral equipment; perform arithmetic operations and makes logical decisions.. It is divided into three sections: -

i. Arithmetic and Logic unit (ALU).

ii. Control unit.

iii. Register.

3- Output unit: -

Output units are instruments of interpretation and communication between human and computer, that let you see (or here) the result of the commands you enter, the most common output device are a display screen (monitor), printer or other device that let you see what he computer has accomplished.

4- Main Memory units: -

The memory is the part of the computer that holds information (data and Instruction) for processing. Main memory also known as primary or internal memory or primary storage, There are two types of main memory which are ROM (Read Only Memory) and RAM (Random Access Memory).

-**Type of main memory: -**

There is basically two type of memory:

4-1 Random access memory (RAM):

Also called read/write memory, it is used for storing data and instruction, in this type the stored information will be lost when computers power is turned off so that it is called the volatile memory, its used only for temporary storage.

4-2 Read only memory (ROM):

Is read only memory which can be read from but not written on so that it is called a non-volatile memory, when the user turn the computer off the content of ROM are not changed.

** **The Difference between RAM and ROM: -**

RAM	ROM
• Stand for Random- Access Memory	Stand for Read Only Memory
• Read /Write memory	Read Only memory
• Sending data (writing) to RAM Memory address is called destructive Write because the new data erases Whatever was there before.	Sending data to ROM memory address is in effective because the contents of ROM can not be Changed (write not allowed) because this memory for read only.
• Form of primary storage for holding temporary data and instruction.	Form of primary storage for Holding permanent data and instruction.

RAM	ROM
• Volatile: program and data are Erased when the power is off	Permanent: program and data remain intact even power is off.

5-Secondary storage (External storage):-

-**Comparison between human and computer**

Computer	Human
Computer input devices have huge variety such as, keyboard, joysticks, touch capabilities, microphone and scanners. They help human to communicate with computers.	Sense of sight, hearing, touch, taste, and smell are human input devices.
Flash memory and hard disk drive form bulk of computer storage. Absence of these devices means computer cannot store information.	Human brain is the sole storage feature. Unlimited in capacity for information storage.
Computer can access information stored in memory at faster rate than human.	Human tend to forget a balk of the information and may take time for recollect.
Computer processing is faster than human.	Human processing takes time for collection.
Computer requires input for processing, so, it is incapable, or limited in, monitoring and changing processing as humans do.	Human brain capable of self processing can therefore monitor and change itself in addition to initiating the thought of processing itself.
Computer processing centralized to CPU.	Human have multiple neurons

-**Generation of computers**

As the time passed, the device of more suitable and reliable machine was need which could perform our work more quickly. During this time, in the year 1946, the first successful electronic computer called ENIAC was developed and it was the starting point of the current generation of computer

1.First generation

ENIAC was the world first successful electronic computer which was develops by the two scientists namely J. P. Eckert and J. W. Mauchy. It was the beginning of first generation computer. The full form of ENIAC is "Electronic Numeric Integrated And Calculator" ENIAC was a very huge and big computer and its weight was 30 tones. It could store only limited or small amount of information. Initially in the first generation computer the concept of **vacuum tubes** was used. A vacuum tube was such an electronic component which had very less work efficiency and so it could not work properly and it required a large cooling system.

2.Second generation

As the development moved further, the second generation computers knocked the door. In this generation, **transistors** were used as the electronic component instead of vacuum tubes .A transistors is much smaller in the size than that of a vacuum tube. As the size of electrons components decreased from vacuum tube of transistor, the size of computer also decreased and it became much smaller than that of earlier computer.

3.Third generation

The third generation computers were invented in the year 1964. In this generation of computer, **IC (Integrated circuits**) was used as the electronic component for computers. The development of IC gave birth to a new field of microelectronics. The main advantage of IC is not only its small size but its superior performance and reliability than the

previous circuits. It was first developed by T.S Kilby. <u>This generation of computer has huge storage capacity and higher calculating speed.</u>

4.Forth generation

'**Micro processor'** is the main concept behind this generation of computer.A microprocessor is a single chip (L.S.I circuit), <u>which is used in a computer for any arithmetical or logical functions to be performed in any program. The speed of computer becomes very fast and efficient.</u>

4.Fifth generation

In this generation, computer possess **artificial intelligence (A.I)**and it is able to take self decisions like a human being.