Al-Mustaqbal University
College of Sciences
Medical Biotechnology Department

جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم
قسم علوم التقانة الاحيائية الطبية

Lecture: (1)

Computer Fundamentals

Subject: Computer Skill I
Level: First
Lecturer: Dr. Maytham N. Meqdad

Computer Fundamentals:

What is Computer?

The computer is a super-intelligent *electronic device* that can perform tasks, process information, and store data. It takes the data as an input and processes that data to perform tasks under the control of a program and produces the output. A computer is like a personal assistant that follows instructions to get things done quickly and accurately. It has memory to store information temporarily so that the computer can quickly access it when needed.

Computing machines have been around for a long time, hundreds of years. The Chinese abacus, the calculators with gears and wheels and the first analog computers are all examples of computing machinery; in some cases quite complex, that predates the introduction of digital computing systems. The computing machines that we're interested in came about in the 1940s because World War II artillery needed a more accurate way to calculate the trajectories of the shells fired from battleships. Today، the primary reason that computers have become so pervasive is the advances made in integrated circuit manufacturing technology. The modern computer has become faster and more powerful but the basic architecture of a computing machine has essentially stayed the same for many years. Most of us use computers for a variety of tasks, from serious scientific computations to entertainment.

The computer system can be divided into:

- Computer hardware.
- Computer software.

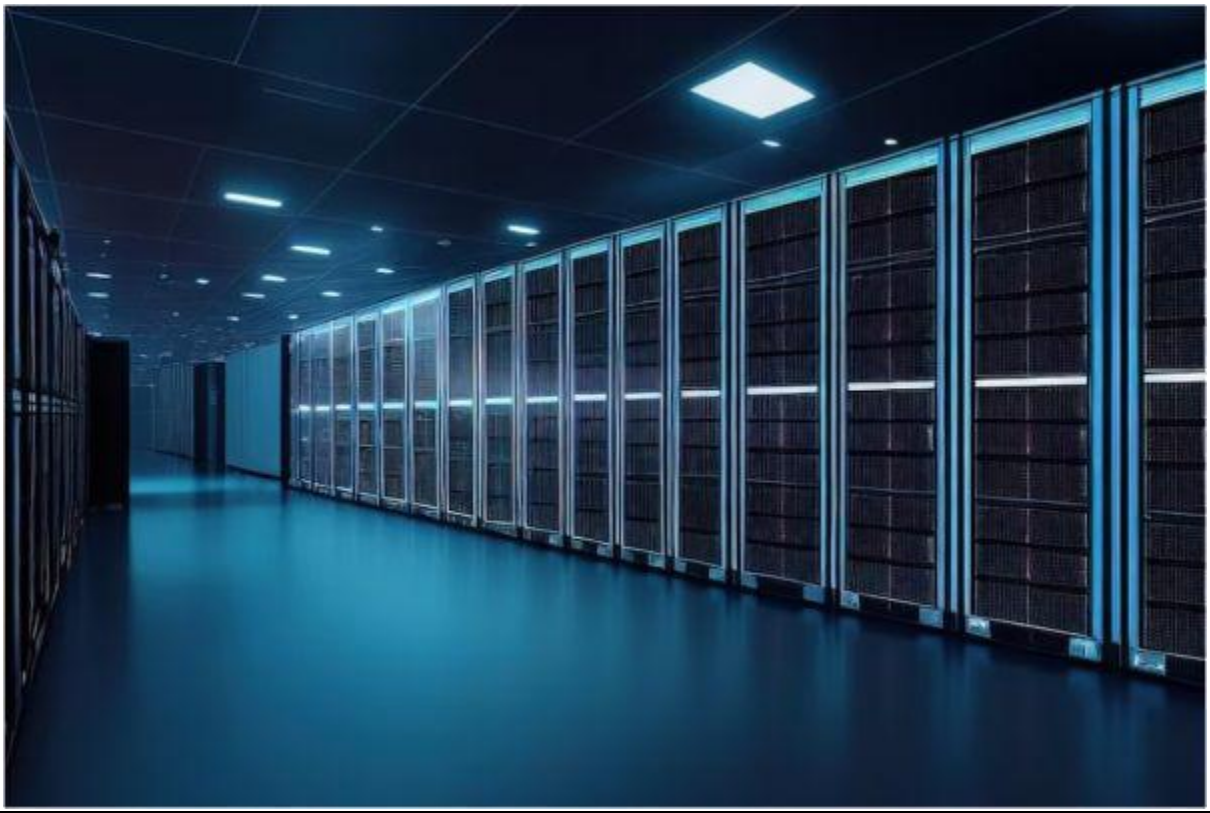
Types of Computers

- Super Computer
- Mainframe computer
- Mini Computer
- Workstation Computer
- Personal Computer (PC)
- Server Computer
- Analog Computer
- Digital Computer
- Hybrid Computer
- Tablets and Smartphone

==========

Supercomputer

When we talk about speed, then the first name that comes to mind when thinking of computers is supercomputers. They are the biggest and fastest computers (in terms of speed of processing data). Supercomputers are designed such that they can process a huge amount of data, like processing trillions of instructions or data just in a second. This is because of the thousands of interconnected processors in supercomputers. It is basically used in scientific and engineering applications such as weather forecasting, scientific simulations, and nuclear energy research. It was first developed by Roger Cray in 1976.



Personal Computer (PC)

Personal Computers is also known as a microcomputer. It is basically a general-purpose computer designed for individual use. It consists of a microprocessor as a central processing unit(CPU), memory, input unit, and output unit. This kind of

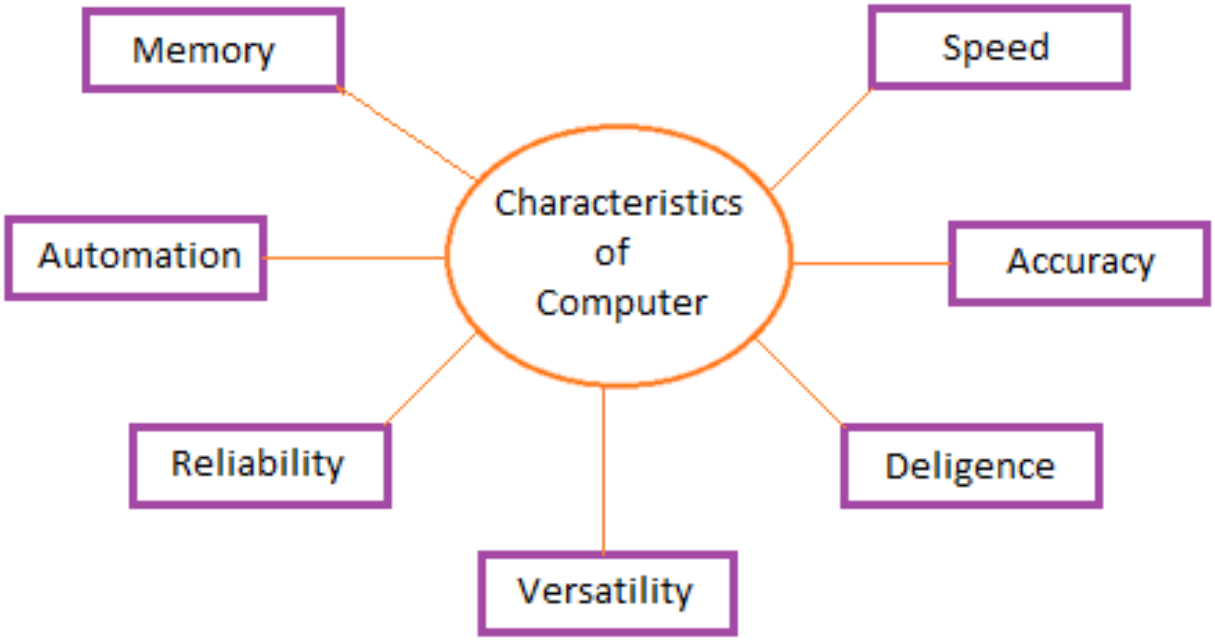
computer is suitable for personal work such as making an assignment, watching a movie, or at the office for office work, etc. For example, Laptops and desktop computers.

Tablet and Smartphones

Tablets and Smartphones are the types of computers that are pocket friendly and easy to carry is these are handy. This is one of the best use of modern technology. These devices have better hardware capabilities, extensive operating systems, and better multimedia functionality. smartphones and tablets contain a number of sensors and are also able to provide wireless communication protocols.

Characteristics of Computer System

A computer is a fast electronic device that processes raw data, performs arithmetic and logical operations, and produces output. Nowadays, the computer has become a part of our life and can be used in most fields. In a computer, there are various characteristics of computer systems depending on their size, capacity, and specifications. But, the major characteristics of the computer can be classified into Speed, Accuracy, Diligence, Versatility, Reliability, Consistency, Memory, Storage Capacity, Remembrance Power, and Automation.



1. Speed

Executing mathematical calculation, a computer works faster and more accurately than human. Computers have the ability to process so many millions (1,000,000) of instructions per second. Computer operations are performed in micro and nano seconds. A computer is a time saving device. It performs several calculations and tasks in few seconds that we take hours to solve. The speed of a computer is measure in terms of GigaHertz and MegaHertz.

2. Diligence

A human cannot work for several hours without resting, yet a computer never tires. A computer can conduct millions of calculations per second with complete precision without stopping. A computer can consistently and accurately do millions of jobs or calculations. There is no weariness or lack of concentration. Its memory ability also places it ahead of humans.

3. Reliability

A computer is reliable. The output results never differ unless the input varies. the output is totally depend on the input. when an input is the same the output will also be the same. A computer produces consistent results for similar sets of data, if we provide the same set of input at any time we will get the same result.

4. Automation

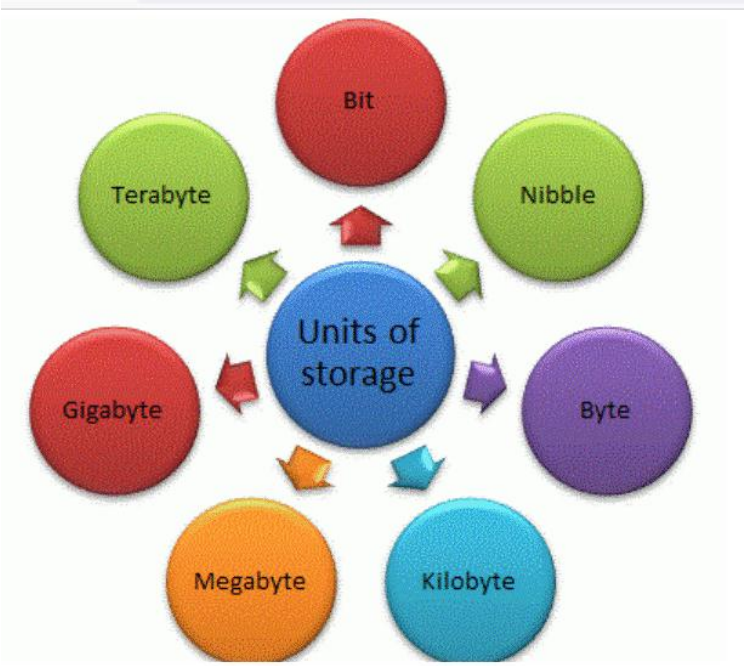
The world is quickly moving toward AI (Artificial Intelligence)-based technology. A computer may conduct tasks automatically after instructions are programmed. By executing jobs automatically, this computer feature replaces thousands of workers. Automation in computing is often achieved by the use of a program, a script, or batch processing.

5. Versatility

The capacity of the computer of performing more than one task at the same time is called the versatility of a computer. Versatility means the capacity to perform different types of work completely.

6. Memory

A computer can store millions of records. these records may be accessed with complete precision. Computer memory storage capacity is measured in Bytes, Kilobytes(KB), Megabytes(MB), Gigabytes(GB), and Terabytes(TB). A computer has built-in memory known as primary memory.

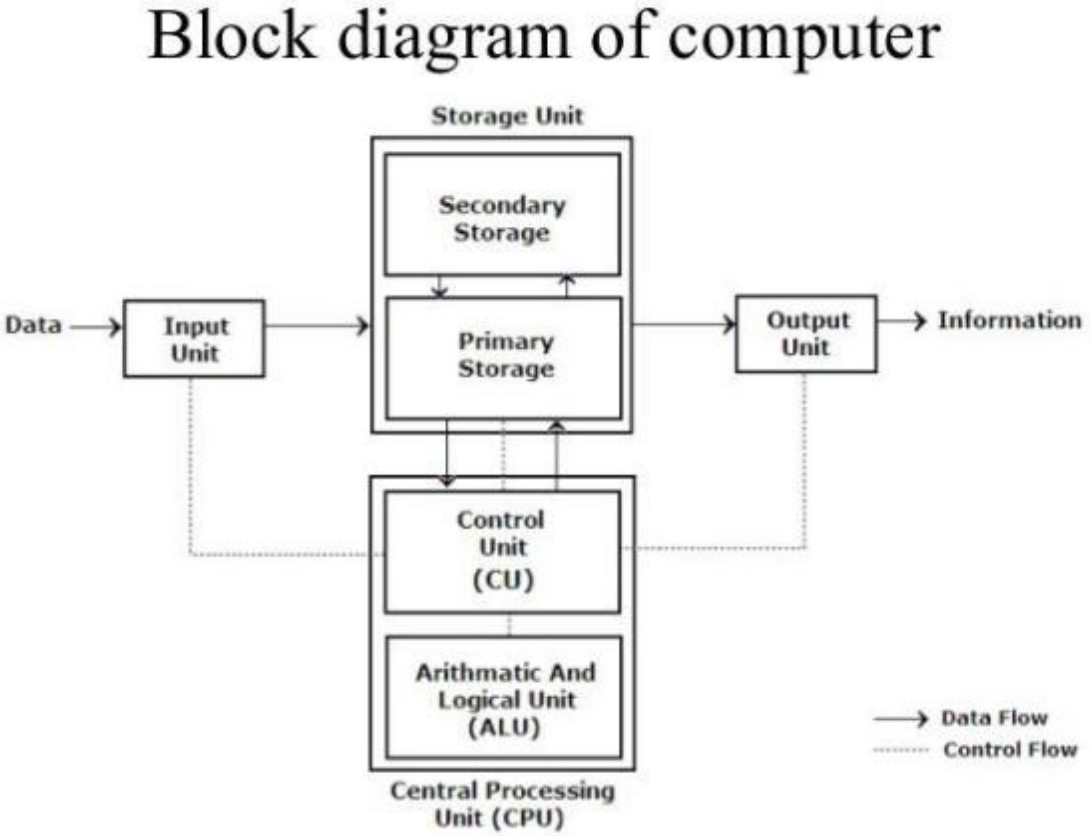


7. Accuracy

When a computer performs a computation or operation, the chances of errors occurring are low. Errors in a computer are caused by human's submitting incorrect data. A computer can do a variety of operations and calculations fast and accurately.

Block Diagram of Computer

A digital computer is considered to be a calculating device that can perform arithmetic operations at enormous speed. It is defined as a device that operates upon information/data. To be able to process data the computer is made of various functional units to perform its specified task.

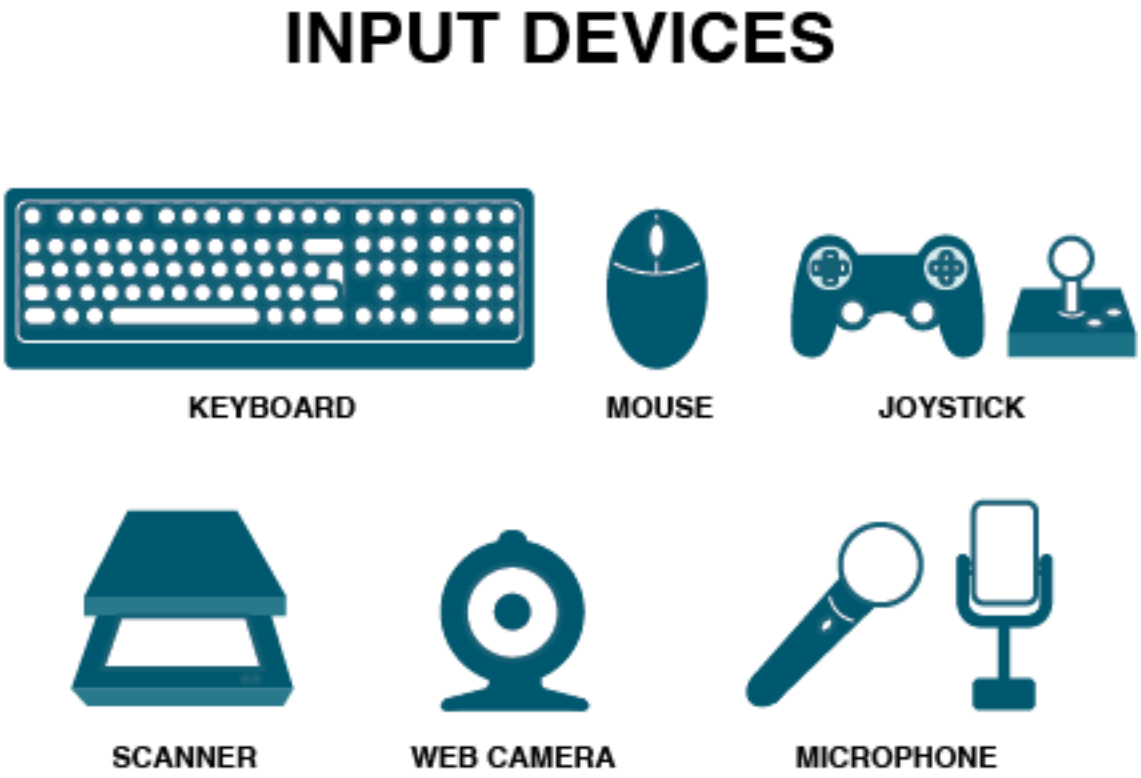


Input Unit: Computers need to receive data and instruction in order to solve any problem. Therefore, we need to input the data and instructions into the computers. The input unit consists of one or more input devices. Keyboard is the one of the most commonly used input device. Other commonly used input devices are the Mouse, Scanner, Microphone etc. All the input devices

perform the following functions.

- Accept the data and instructions from the outside world.
- Convert it to a form that the computer can understand.

• Supply the converted data to the computer system for further processing.



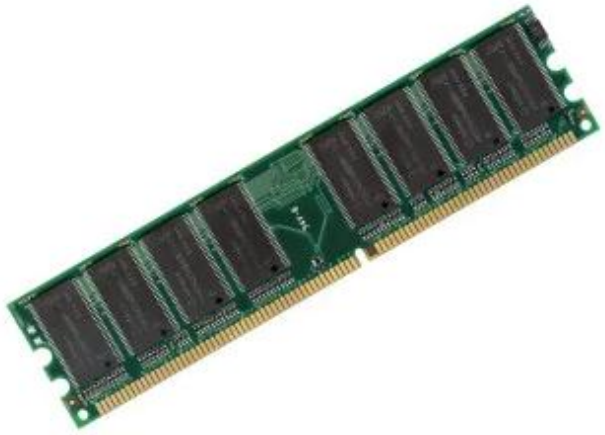
Storage Unit:

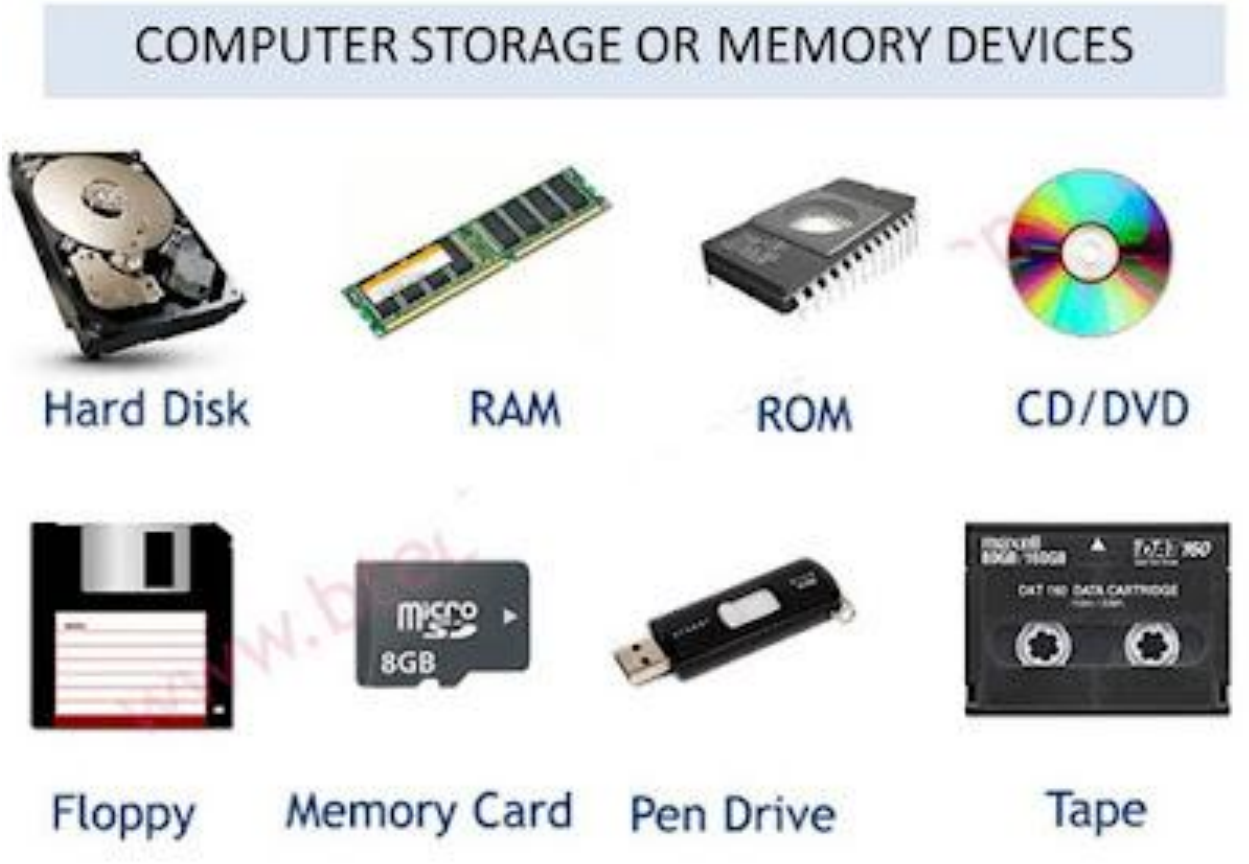
The storage unit of the computer holds data and instructions that are entered through the input unit, before they are processed. It preserves the intermediate and final results before these are sent to the output devices. It also saves the data for the later use. The various storage devices of a computer system are divided into two categories.

a) Primary Storage: Stores and provides very fast. This memory is generally used to hold the program being currently executed in the computer, the data being received from the input unit, the intermediate and final results of the program. The primary memory is temporary in

nature. The data is lost, when the computer is switched off. In order to store the data permanently, the data has to be transferred to the secondary memory. The cost of the primary storage is more compared to the secondary storage. Therefore, most computers have limited primary storage capacity.

b) Secondary Storage: Secondary storage is used like an archive. It stores several programs، documents, data bases etc. The programs that you run on the computer are first transferred to the primary memory before it is actually run. Whenever the results are saved, again they get stored in the secondary memory. The secondary memory is slower and cheaper than the primary memory. Some of the commonly used secondary memory devices are Hard disk، CD, etc.





Output Unit:

The output unit of a computer provides the information and results of a computation to outside world. Printers, Visual Display Unit (VDU) are the commonly used output devices. Other commonly used output devices are Speaker, Headphone, Projector etc.

Common Output Devices of Computer

Arithmetic Logical Unit:

All calculations are performed in the Arithmetic Logic Unit (ALU) of the computer. It also does comparison and takes decision. The ALU can perform basic operations such as addition، subtraction, multiplication, division, etc and does logic operations viz, >, <, =, 'etc. Whenever calculations are required, the control unit transfers the data from storage unit to ALU once the computations are done, the results are transferred to the storage unit by the control unit and then it is send to the output unit for displaying results.

Control Unit:

It controls all other units in the computer. The control unit instructs the input unit, where to store the data after receiving it from the user. It controls the flow of data and instructions from the storage unit to ALU. It also controls the flow of results from the ALU to the storage unit. The

control unit is generally referred as the central nervous system of the computer that control and synchronizes its working.

Central Processing Unit:

The Control Unit (CU) and Arithmetic Logic Unit (ALU) of the computer are together known as the Central Processing Unit (CPU). The CPU is like brain performs the following functions:

- It performs all calculations.
- It takes all decisions.
- It controls all units of the computer.