



The main components of a computer (مكوناته الرئيسية)

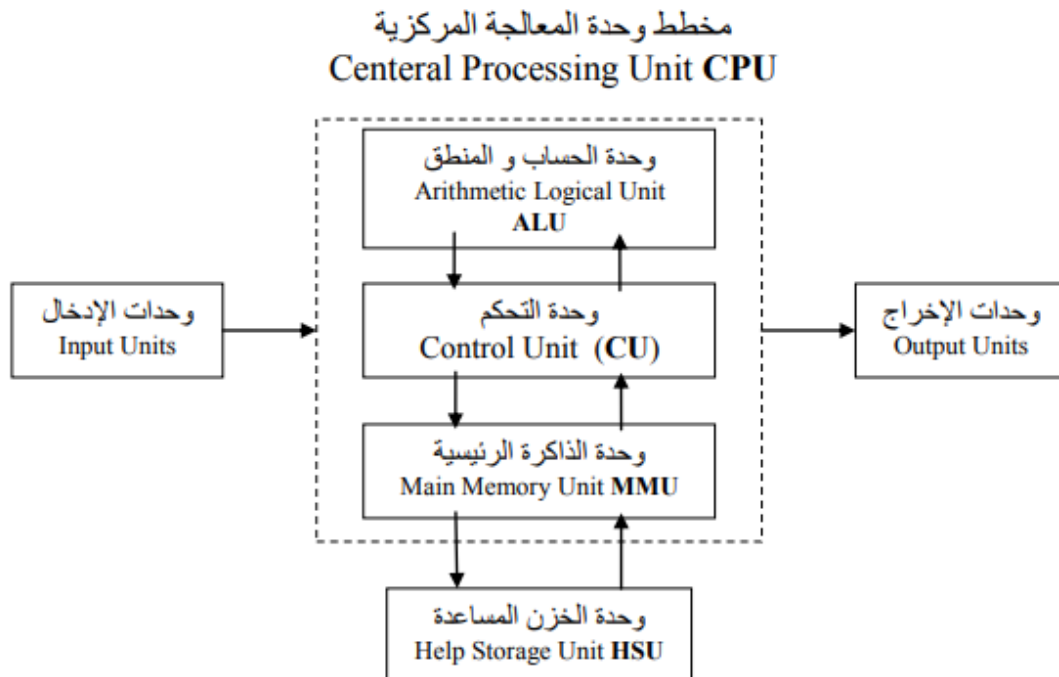
The computer consists of two main parts are the hardware and the software, and below we will discuss the most important points in each part.

- **Software:** It is a set of programs and applications that enable the computer to perform operations different.
- **Components of solids (Hardware):** they are the tangible and tangible electronic and mechanical parts.

First: Hard ware (المكونات المادية):

It is a group of tangible parts in the device. It is composed of many components, most of which are (internal), that is, they are placed inside the computer case (the system). However, we are connected externally using (ports) that are located behind the system case. These components are called peripheral devices.

CPU diagram.



1. Input units (وحدات الإدخال)

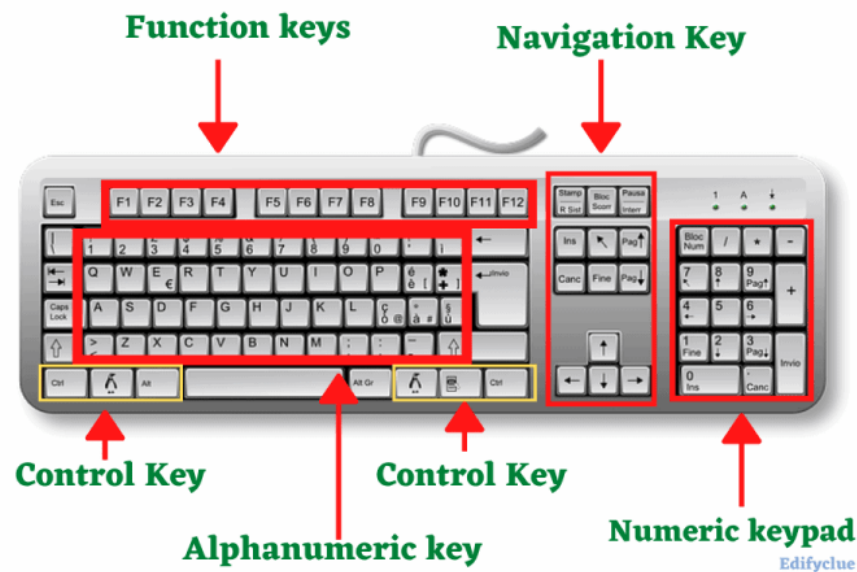
These devices are used to enter data and programs into the computer and transfer them to the central processing unit to deal with them. Many of these devices have appeared, some of which were used for a short period of time, and some are still used. These devices, like the rest of the computer components, are still in continuous development, and are among the most important input devices.

- **Power buttons (أزرار الطاقة):**

It is considered one of the basic input units, and it is used to turn on the computer, and this key is not used to turn off the computer.

- **Key Board (لوحة المفاتيح)**

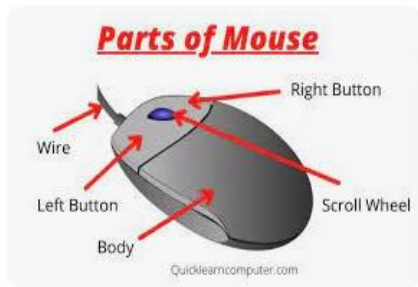
The keyboard is the most used means for entering data and programs into the computer, and it also allows the user to control the computer system. The keyboard is used to enter a letter, number, or symbol, and it is called **the data keys**. There are other keys used to perform functions or carry out specific instructions.



1. **Writing keys (alphanumeric) (مفاتيح الكتابة):** includes keys for letters, numbers, punctuation marks, and symbols.
2. **Control keys (مفاتيح التحكم):** These keys are used alone or with other keys to perform certain actions. The Ctrl, Alt, windows logo key and Esc are one of the most control keys used.
3. **Function keys (مفاتيح الوظائف):** are used to perform specific tasks, and these keys are symbolized by F1, F2, F3, F12. The function of these keys varies from one program to another.
4. **Navigation keys (مفاتيح التنقل)** They are used to move around documents or web pages, they are also used to highlight text, It's include the arrow key, Home, End, Page up, Page down, delete and insert.
5. **Numeric keypad (لوحة المفاتيح الرقمية):** It is within easy reach to enter numbers quickly, and these keys are grouped together in the form of a group, like a traditional calculator or summation machine.

- **Mouse (الفأرة)**

The mouse cursor is a small device with a ball at the bottom and when you move it in any direction on a flat surface (cursor) it will move in the same direction. Some companies, the first of which was Microsoft, produced a smart mouse (Mouse Intelligent) that uses light-tracking technology instead of the traditional mouse making the movement of pointer the ball mouse is more flexible.



- **Pointing Stick key (مفتاح التأسيس)**

Some portable computers, Notebooks, use this device, which resembles a pencil space, which is usually located in the center of the keyboard, to enable the user to move the cursor on the screen, by moving and pressing the finger.



- **Touch Pad (لوحة التأسيس)**

It is a small rectangular panel located at the bottom of the keyboard in notebook computers, where the user can perform operations by moving the cursor on the screen by moving his finger on this panel and pressing as well as.



- **Joystick (عصا التحكم)**

When using this device, the user holds the arm of the device with one hand, and then moves this the cursor moves in the same direction by pressing a stick button control at the right



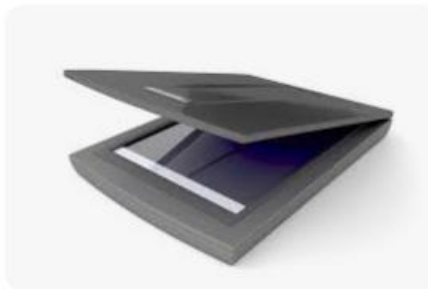
time and the right place the operation is performed and use the joystick usually with game programs that need fast and precise movements.

- **Touch Sensitive Screen (الشاشة الحساسة للمس)**

The use of this type of screen has spread in automatic teller machines (ATMs), and it is also used in kiosks called Kiosks, which are a computer unit encapsulated using multimedia. These kiosks are now used in scientific centers and in booking movie tickets.

- **Scanner (الماسح الضوئي)**

The scanner device inserts images, documents, graphics into the computer. When scanning text, it will be just an image and cannot be edited. To make the text editable, use Optical Character Recognition (OCR) software. There are different types of scanners, the most famous of which is the Scanner Flatbed, which scans one page or several pages in one operation, similar to a photocopier.



- **Reader Barcode (قارئ الخطوط المتوازية)**

It is a type of scanner used to read codes of parallel lines on commodities and products in shops and cooperative societies. It is an optoelectronic unit that reads the code by reflecting light from the lines and the spaces between these lines.



- **Digital Camera (الكاميرا الرقمية)**

A digital camera is similar to a regular camera but the captured images are stored on it In-camera storage unit called Card Memory Flash instead of traditional film. And done Entering those images from the camera's memory to the computer where they are stored and processed. A digital camera can capture moving still pictures (video), and may contain camera on microphone.

- There are small types of digital cameras, especially for the web, that can transmit an image Mobile from one site to another through the Internet and is widely used for conversation Videoconferences and distance education.



- **Voice Input Systems (وحدات ادخال الصوت)**

It is a device (such as a microphone) that is used to digitally input sounds into a computer through a sound card. This is done using special programs for audio recording such as Recorder Sound.



- **Biometric Input Devices (أجهزة التعرف على الأشخاص)**

It is an input device connected to a main computer that enables people to be identified by fingerprint, palm, face, eye, voice or signature. These devices are usually used for security purposes, such as entering halls and centers with complete confidentiality.



2. Central Processing Unit (CPU) (وحدة المعالجة المركزية)

The processor is the most important component inside a computer. The processor consists of a chip of silicon encapsulated and installed on the motherboard via an installation socket to receive and process data and then send the results for output or storage.

The CPU consists of:

❖ **Control Unit (CU) (وحدة التحكم)** :- it controls the following operations:

- A. Entering data from the input units and secondary storage units into the main memory.
- B. Data transmission between the main memory and the arithmetic and logic unit.
- C. The exit of information from the main memory to the different output units and secondary storage units.

❖ **Arithmetic and Logic Unit (ALU) (وحدة الحساب و المنطق)**

It is the unit responsible for performing arithmetic operations (addition, subtraction, multiplication, division) and logical operations (greater than, less than, equal to...) on data.

There are many companies that produce processors, the most famous of which is **Intel**, the leader in the processor industry, which produces **Pentium** processors that are

compatible with the **IBM system**, and the rest of the companies compete to imitate them, including **AMD**, which produces **Athlon** processors that are compatible with Intel. As for laptop processors, the Centrino processor, which is also produced by **Intel**, is at the top of the processors in terms of performance.

Processor speed (سرعة المعالجات)

Inside each computer, there is a special clock that is used to send electrical impulses to the central processing unit, which in turn uses these pulses to control the operations it performs. The higher the clock speed, the greater the number of instructions executed by the processor, and thus the faster the computer.

The speed of a computer in executing operations is measured in **megahertz (MHz)**, means one million operations per second. The computer speed can also be measured in **gigahertz (GHz)**, means one thousand million operations per second.

3. Memory and Storage (الذاكرة والتخزين)

- **Measuring memory capacity**: Memory is one of the basic components of a computer, and the higher the memory, the better the computer's performance.

Each binary number (0 or 1) is called **digit binary (Bit)**, and each group of eight bits is called a **byte**.

The data transfer rate to and from memory is measured in the number of **bit per second (bps)**.

Memory capacity is usually measured in **megabytes** and **byte** is used to measure data storage.

- The table shows the most important storage units used in measuring memory capacity:

وحدۃ الخزن	التفاصيل
البت Bit	اصغر وحدة لتمثيل البيانات (0 او 1)
البايت Byte	8بت او رمز واحد
الكيلوبايت Kilobyte(KB)	١٠٢٤ بايت
الميجابايت Megabyte(MB)	١٠٢٤ كيلوبايت (حوالي مليون بايت)
الجيجابايت Gigabyte (GB)	١٠٢٤ ميغابايت (حوالي بلون بايت)
الثيرابايت Terabyte(TB)	١٠٢٤ جيجابايت (حوالي تريليون بايت)

- ❖ The main memory of a computer is generally divided into several types:

Temporarily used as:

A. Random Access memory (RAM) (ذاكرة التبادل العشوائي):

RAM is used to store data and programs temporarily, where data is written and erased continuously and data can be extracted from it, modified and then re-stored in memory, this memory loses its contents when cut off the power supply to the computer, so the work must be saved constantly.

B. Read Only Memory (ROM) (ذاكرة القراءة فقط).

It is a permanent, read-only memory that cannot be written to, changed, or modified. And the information of this memory is usually stored by the company producing the computer, and the information remains stored in it even after turning off the computer or disconnecting the electrical current from it, so it is known as **non-volatile memory**, and this memory usually contains a set of programs that are used to operate the computer.

The speed of memory in executing the instruction from reading and writing is measured in a unit of measurement called **Nanoseconds** and is estimated at one billionth of a second, and the capacity of RAM is measured in **Megabytes**.

C. Cache Memory (الذاكرة المخبئة)

Cache memory is memory similar to **RAM** except that it is faster and has less capacity and acts as an intermediary between the processor and RAM. And the function of this memory is to save the repeated information requested by the processor more than once and reduce the gap between the speed of the processor and random circulation memory.

D. Virtual Memory (الذاكرة الافتراضية)

It is another memory connected to the **RAM**, and it is the memory that uses part of the hard disk as an extension of the **RAM**, and this type of memory is not recommended because it does not have the characteristics of the real Ram and because it reduces the size of the free space on the hard disk.

Table (1) : The difference between **RAM** and **ROM**

The difference	ROM	RAM
Definition (تعريف)	It is a memory in which data is stored in its factory, and the computer user cannot change it after that, but it is sufficient to read the contents of this memory.	It is a memory that allows reading and writing to it.
Using (استخدامات)	-----	It is used as a main memory of the processor in order to save the data and programs that it is working on now
Write in (الكتابة عليها)	No	Yes
Can be read by user (يمكن القراءة منها) (بوساطة المستخدم)	Yes	Yes
Speed (السرعة)	Slow	Fast
The comment uses (الاستخدامات) (الشائعة)	Storing the motherboard BIOS program The data stays in the chip for a very long time and can't be changed most of the time	Temporary and fast storage of data that the processor deals with or is expected to deal with soon. The data is erased once the computer is turned off.

- Storage Secondary (التخزين الثانوي)

The results of data processing are permanently stored in it for later use. These devices are slow compared to the main memory, because its capacity is large. There are three main types of secondary storage units:

- 1) **Magnetic media (الوسائط الممغنطة):** This media depends on the magnetization property in recording and reading data.

Examples of magnetic media are:-

✓ Floppy disks (الاقراص المرنة):

have been in use for a long time since the advent of personal computers (PC). The floppy disks are made of a thin flexible plastic disk covered with a magnetizable material. The disk is placed in a sealed cover to protect it using disks with a diameter of **5.3**. The cover has a hole that opens for reading or writing. The most common type of floppy disk which can accommodate **44.1 M**.

The main **advantage** of the floppy disk is its ease of transportation, but its

disadvantages are its limited storage capacity and the slow circulation of data on it.

Thus, modern storage media such as flash appeared, which led to a decline in the use of floppy disks. Some personal computer manufacturers have also tended to dispense with floppy disk drives.

✓ ZIP discs (الاقراص)

They are similar to floppy disks, except that they are slightly larger and heavier than floppy disks, and they have a large capacity ranging between **100** and **750 MB**. They are mainly used for backup and archiving work, and a Zip drive is required in order to be able to use them.

✓ Magnetic Tapes (الاشربة الممغنطة)

They are old storage units similar to the magnetic tapes used in audio recording, but with a large storage capacity of up to **100 GB**. Currently, they are used rarely and in limited areas because they store data in a sequential manner, meaning that a specific record cannot be accessed except by going through all previous records. This method of dealing with data is considered a slow method that is not compatible with the speed of the computer and is used to back up large amounts of data for archiving.

✓ **Hard Disks (الاقراص الصلبة)**

For a computer, the hard disk is the main storage medium and the only one among the various storage methods that has the size and speed sufficient to store programs and the ability to modify its contents. Hard disks have evolved a lot since they were first used in personal computers in the early eighties, as their storage capacity and speed have reduced their size.

All hard disks operate on the same principle and differ from each other in the quality of their components and the speed of their work, which is measured by the rotations per minute, the amount of Data transfer rate (DTR) transferred, and the amount of cache memory that's contained.

2) **Media Optical (الوسائط الضوئية):-** This technology relies on laser beams to write and read data, as it works on the appearance of small blisters on reflective surfaces and uses laser beams to read data from the disc by examining the amount of light reflected from the blisters, which is in the form of intermittent pulses. These discs are called compact discs CD (Disks Compact) with a diameter of **12 cm** and a thickness of **2.1 mm**.

❖ CDs can be classified according to their use into:

- i. **DVD-ROM, CD-ROM:** These are discs that can be read only and cannot be overwritten or modified.
- ii. **Recording discs DVD-R, CD-R:** These are discs that can be read and written to and whose contents cannot be erased.
- iii. **DVD-RW, CD - RW reading and writing discs:** discs that can be read and written to an unlimited number of times, and thus similar to other storage units such as **flash memory** and **hard disks**.

❖ Versatile Digital **DVDs** are discs that use optical disc technology, but they have a huge capacity of up to **17 GB** of data. They are used to store movies in very high quality and now replace videotapes where the disc can store a two-hour movie and has three main types. Such as CDs (only digital readable, recordable and rewritable disks).

- 3) **Flash memory** (الذاكرة الوميضية) :- It is similar to random access memory (**RAM**), but it is slower and does not lose its contents when the power is cut off, and it is small in size and can be easily transferred and its contents modified and used for preservation purposes such as transferring data from a digital camera to a personal computer.

Types of flash memory

a) **Card Memory-MC** (بطاقة الذاكرة):

The memory card is widely used in mobile communications devices, digital cameras and personal digital assistants. **PDA**

b) **flash memory drive unit** (وحدة التخزين اللحظي)

This type of flash storage unit has been widely used due to its ability to be used with many computers equipped with a USB port, and this unit contains a data reader and writer in addition to the temporary memory.

4. **OutPut Unit** (وحدات الإخراج)

The output devices receive the results (**information**) from the main storage unit (**memory**) and record them on output media that are appropriate to the requirements of the beneficiary. Examples of output devices are :-

- **Screens** (الشاشات)

As it displays the output, the visual display device is one of the most important and most widely used output units monitor, which is also known visually on the screen as a monitor.

The screen may be **monochromatic**, meaning it can show only two colors, white black or green black, and it may be multicolored, meaning capable of showing a large number of colors.

The screen consists of a large number of dots arranged in Matrix format called **Pixels**, and the higher the number of points, the clearer the image Resolution, and controls the colors of the screen and the degree of clarity of the image is installed inside the screen called "**Adapter Graphics display**" images.

- **Laser printer (طابعة الليزر)**

Laser printers are among the best types of printers, as they print a full page at once, and are similar in their work to a photocopy machine.



- **Inkjet Printer (طابعة ضخ الحبر)**

These printers rely on creating the letter by pumping tiny droplets of ink onto the paper to form the letter or shape to be printed.



- **Plotter (طابعة الرسومات)**

It is an output device that prints 3D maps, drawings and designs. The Printer Inkjet Wide is also used to print large color billboards, photos and advertisements.



- **Photo printers (طابعة الصور)**

Photo printers are color printers that are usually small and rely on jet ink technology. These printers have started to become very popular with the increasing use of digital cameras. These printers use thick, glossy Photo Papers.



- **Multi Function Printers (الطابعات متعددة الوظائف)**

This type of printer combines several functions in one device such as printing, photocopying, scanning and faxing.



- **Voice Output (المخرجات الصوتية)**

Computers today are provided with a unit for audio outputs (speakers), which are used with many applications that rely on multimedia such as educational programs such as spelling programs, language teaching programs, scientific encyclopedia programs, games, playing sounds and music through the Internet, listening to audio CDs and playing DVD movies.



- **Projector Data (جهاز عرض البيانات)**

It is a device that connects to a computer to display the computer's visual output of texts, images and videos on a display screen or the wall with the ability to enlarge it. The data projector is commonly used in teaching, training and meeting rooms.

