



The First Lecturer

Introduction of Computer

computer Hardware

Operating System,

Computer Applications

Medical device technology engineering

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Introduction of Computer

A computer: is an electronic machine, operating under the control of instructions stored in its own memory, that can accept data, manipulate the data according to specified rules, produce results, and store the results for future use.

Computers process data to create information.

Data is a collection of raw unprocessed facts, figures, and symbols. Information is data that is organized, meaningful, and useful. To process data into information, a computer uses hardware and software.

Hardware: is the electric, electronic, and mechanical equipment that makes up a computer.

Software: is the series of instructions that tells the hardware how to perform tasks.



personal computer:

small, general purpose computer that is created to be utilized by one person at a time. The size and capabilities of the computer allow it be operated by an individual for personal purposes and can be a desktop or laptop device.

The evolution of computer many generations have passed, as follows:

* **First generation 1950 - 1959:** The Computers of this generation used magnetic disks, electronic vacuum tube, which is a glass tubes controlled stop and pass electric current, but these valves were large and consume a great deal of electricity in addition to it is slow.

***The second generation 1959 - 1964:** where was replaced by electronic valves Baltranzstor and rendered the same role, but it allows the passage of electric current in a certain direction and stop off, and helped invent the transistor evolution of computer dramatically as it takes up less space and consume less energy in addition to that it's fast, and the heat emitted from it is much less than the electronic valves.

***Third Generation 1964 - 1972:** where has many developments on the electronic boards, where he helped it on the backs of small computers, also featured operating systems.

* **Fourth Generation 1972 - up to now:** Where computers have witnessed the emergence of a formidable chipset Chipsets, which later led to the invention of laptops. As we noted earlier, the computer over a number of different stages of development, and compared to other inventions, he saw a quantum leap from the



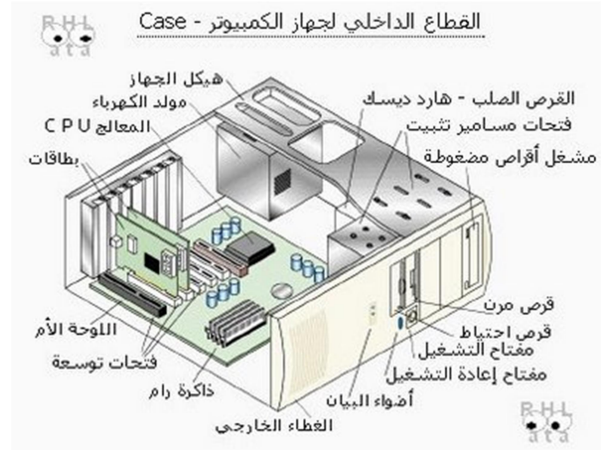
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computer that weighs 30 tons in 1946 to a laptop or Tablet PC does not exceed kilogram at the present time.

PCs usually consist the following parts:

1. Computer case
2. Power supply
3. Motherboard
4. Random access memory (RAM)
5. Hard disk(s)
6. CD/DVD drives/writers
7. Various external devices, such as a visual display, keyboard, printer and pointing device.



internal computer hardware components

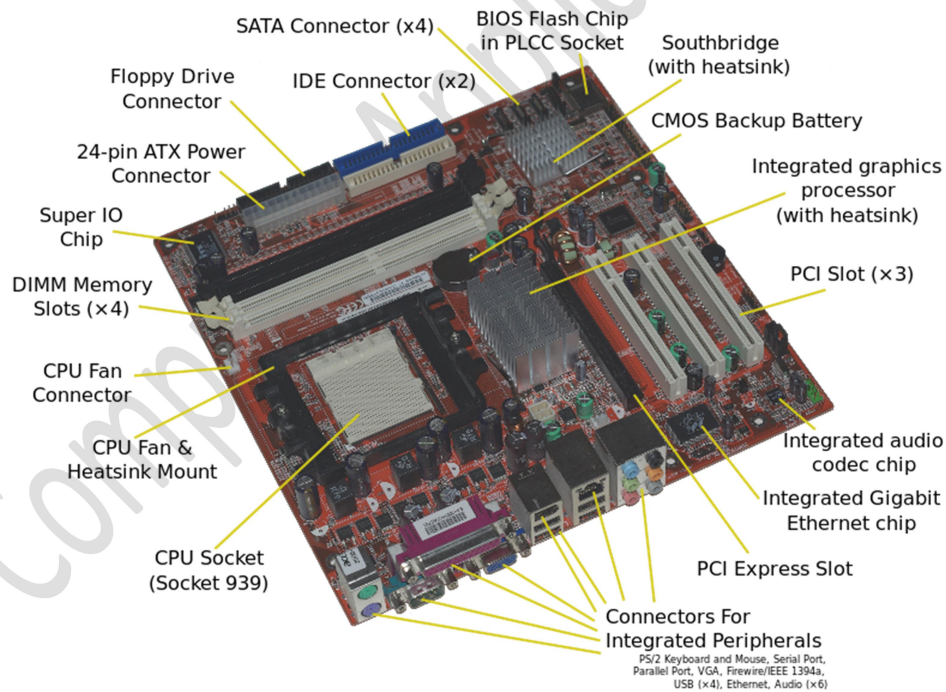
Internal components collectively process or store the instructions delivered by the program or operating system (OS). These include the following:

Motherboard. This is a printed circuit board that holds the central processing unit (CPU) and other essential internal hardware and functions as the central hub that all other hardware components run through.

1. **CPU:** The CPU is the brain of the computer that processes and executes digital instructions from various programs; its clock speed determines the computer's performance and efficiency in processing data.
2. **RAM:** RAM -- or dynamic RAM -- is temporary memory storage that makes information immediately accessible to programs; RAM is volatile memory, so stored data is cleared when the computer powers off.



- Hard drive:** Hard disk drives are physical storage devices that store both permanent and temporary data in different formats, including programs, OSes, device files, photos, etc.
- ROM:** Read-only memory, or ROM, is a type of computer storage containing non-volatile permanent data that, normally, can only be read, not written to. ROM contains the programming that allows a computer to start up or regenerate each time it is turned on. ROM also performs large input/output (I/O) tasks and protects programs or software instructions. Once data is written on a ROM chip, it cannot be removed. Almost every computer incorporates a small amount of ROM that contains the start-up firmware. This boot firmware is called the basic input/output system (BIOS). This software consists of code that instructs the boot-up processes for the computer -- such as loading the operating system (OS) into the random access memory (RAM) or running hardware diagnostics. Consequently, ROM is most often used for firmware updates.
- Graphics processing unit:** This chip-based device processes graphical data and often functions as an extension to the main CPU.



external hardware components:

External hardware components, also called peripheral components, are those items that are often externally connected to the computer to control either input or output functions. These hardware devices are designed to either provide instructions to the software (input) or render results from its execution (output).



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Common input hardware components include the following:

1. Mouse. A mouse is a hand-held pointing device that moves a cursor around a computer screen and enables interaction with objects on the screen. It may be wired or wireless.
2. Keyboard. A keyboard is an input device featuring a standard QWERTY keyset that enables users to input text, numbers or special characters.
3. Microphone. A microphone is a device that translates sound waves into electrical signals and supports computer-based audio communications.
4. USB flash drive. A USB flash drive is an external, removable storage device that uses flash memory and interfaces with a computer through a USB port.

Other input hardware components include joysticks, styluses and scanners.

Examples of output hardware components include the following:

1. Monitor. A monitor is an output device similar to a TV screen that displays information, documents or images generated by the computing device.
2. Printer. Printers render electronic data from a computer into printed material.
3. Speaker. A speaker is an external audio output device that connects to a computer to generate a sound output.





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BIOS

BIOS (basic input/output system) is the program a computer's microprocessor uses to start the computer system after it is powered on. It also manages data flow between the computer's operating system (OS) and attached devices, such as the hard disk, video adapter, keyboard, mouse and printer.

Uses of BIOS

The main use of BIOS is to act as a middleman between OSEs and the hardware they run on. BIOS is theoretically always the intermediary between the microprocessor and I/O device control information and data flow. Although, in some cases, BIOS can arrange for data to flow directly to memory from devices, such as video cards, that require faster data flow to be effective.

How does BIOS work?

BIOS comes included with computers, as firmware on a chip on the motherboard. In contrast, an OS like Windows or iOS can either be pre-installed by the manufacturer or vendor or installed by the user. BIOS is a program that is made accessible to the microprocessor on an erasable programmable read-only memory (EPROM) chip. When users turn on their computer, the microprocessor passes control to the BIOS program, which is always located at the same place on EPROM.

When BIOS boots up a computer, it first determines whether all of the necessary attachments are in place and operational. Any piece of hardware containing files the computer needs to start is called a *boot device*. After testing and ensuring boot devices are functioning, BIOS loads the OS -- or key parts of it -- into the computer's random access memory (RAM) from a hard disk or diskette drive (the boot device)

CMOS

CMOS (short for complementary metal-oxide-semiconductor) is the term usually used to describe the small amount of memory on a computer motherboard that stores the BIOS settings. Some of these BIOS settings include the system time and date as well as hardware settings.



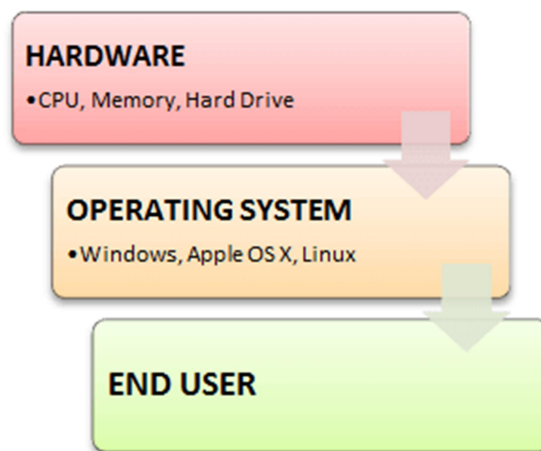
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Operating System

An **Operating System (OS)** is a software that acts as an interface between computer hardware components and the user. Every computer system must have at least one operating system to run other programs., need some environment to run and perform its tasks.

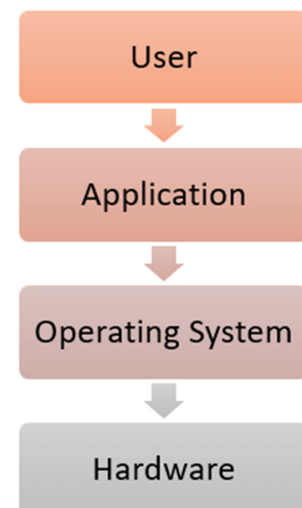
The OS helps you to communicate with the computer without knowing how to speak the computer's language. It is not possible for the user to use any computer or mobile device without having an operating system.



Computer System Structure

Computer system can be divided into four components:

- Hardware – provides basic resources
CPU, memory, I/O devices
- Operating system
Controls and coordinates use of hardware among various applications and users
- Application programs – define the ways in which the system resources are used to solve computing problems
Word processors, compilers, web browsers, database systems, video games
- Users – people , other computers

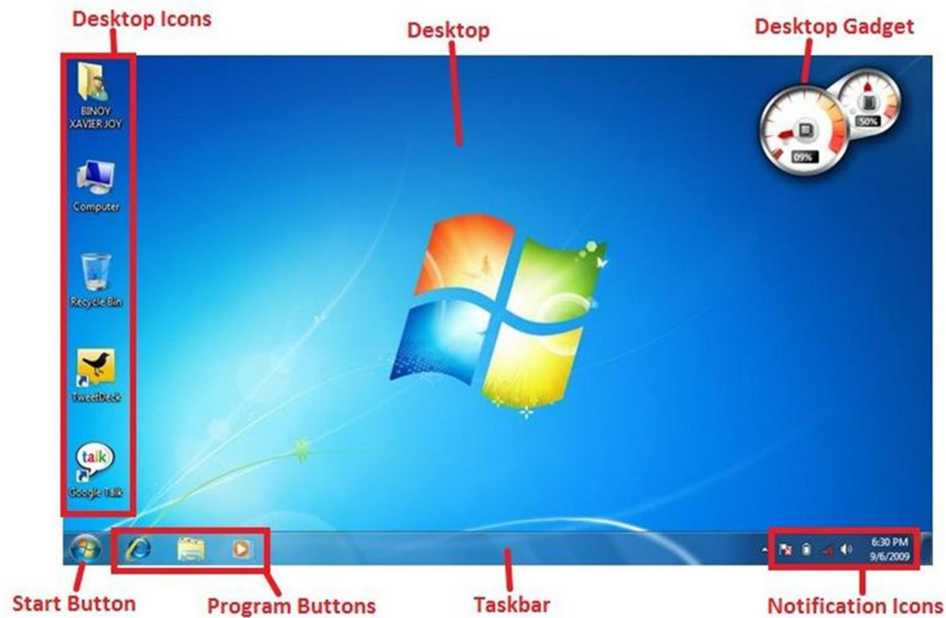




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Components of The Windows 7 user interface



Operating system goals:

- Execute user programs and make solving user problems easier
- Make the computer system convenient to use
- Use the computer hardware in an efficient and secure manner

History Of OS

- Operating systems were first developed in the late 1950s to manage tape storage
- The General Motors Research Lab implemented the first OS in the early 1950s for their IBM 701
- In the mid-1960s, operating systems started to use disks
- In the late 1960s, the first version of the Unix OS was developed
- The first OS built by Microsoft was DOS. It was built in 1981 by purchasing the 86-DOS software from a Seattle company



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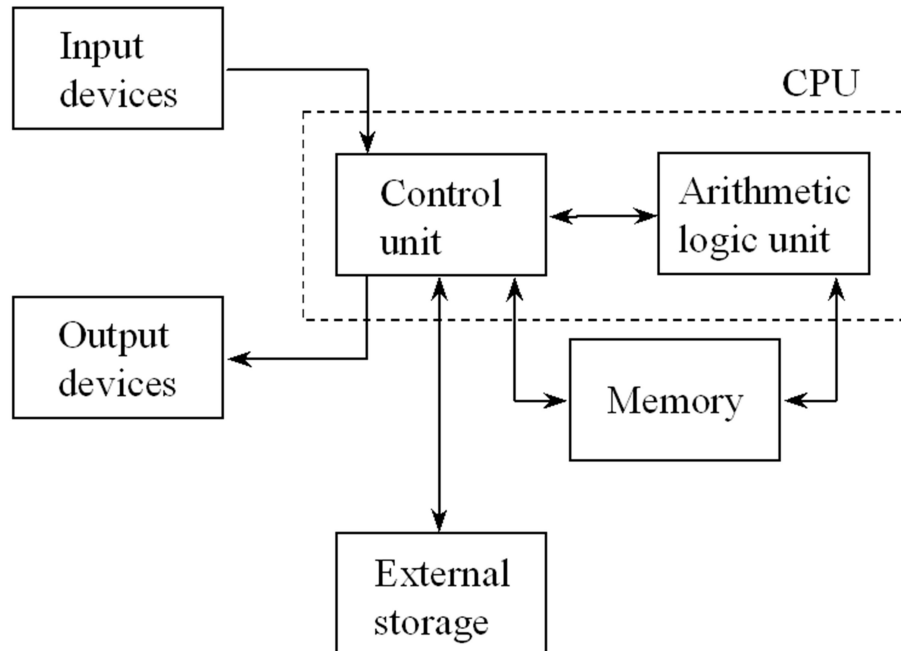
- The present-day popular OS Windows first came to existence in 1985 when a GUI was created and paired with MS-DOS.

In an operating system software performs each of the function:

1. **Process management:-** Process management helps OS to create and delete processes. It also provides mechanisms for synchronization and communication among processes.
2. **Memory management:-** Memory management module performs the task of allocation and de-allocation of memory space to programs in need of this resources.
3. **File management:-** It manages all the file-related activities such as organization storage, retrieval, naming, sharing, and protection of files.
4. **Device Management:** Device management keeps tracks of all devices. This module also responsible for this task is known as the I/O controller. It also performs the task of allocation and de-allocation of the devices.
5. **I/O System Management:** One of the main objects of any OS is to hide the peculiarities of that hardware devices from the user.
6. **Secondary-Storage Management:** Systems have several levels of storage which includes primary storage, secondary storage, and cache storage. Instructions and data must be stored in primary storage or cache so that a running program can reference it.
7. **Security:-** Security module protects the data and information of a computer system against malware threat and authorized access.
8. **Command interpretation:** This module is interpreting commands given by the and acting system resources to process that commands.
9. **Networking:** A distributed system is a group of processors which do not share memory, hardware devices, or a clock. The processors communicate with one another through the network.



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Advantage of using Operating System

- Allows you to hide details of hardware by creating an abstraction
- Easy to use with a GUI
- Offers an environment in which a user may execute programs/applications
- The operating system must make sure that the computer system convenient to use
- Operating System acts as an intermediary among applications and the hardware components
- It provides the computer system resources with easy to use format
- Acts as an intermediate between all hardware's and software's of the system

Disadvantages of using Operating System

If any issue occurs in OS, you may lose all the contents which have been stored in your system

Operating system's software is quite expensive for small size organization which adds burden on them. Example Windows

It is never entirely secure as a threat can occur at any time



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What is a Kernel?

The kernel is the central component of a computer operating systems. The only job performed by the kernel is to the manage the communication between the software and the hardware. A Kernel is at the nucleus of a computer. It makes the communication between the hardware and software possible. While the Kernel is the innermost part of an operating system.

Difference between 32-Bit vs. 64 Bit Operating System

Parameters	32. Bit	64. Bit
Architecture and Software	Allow 32 bit of data processing simultaneously	Allow 64 bit of data processing simultaneously
Compatibility	32-bit applications require 32-bit OS and CPUs.	64-bit applications require a 64-bit OS and CPU.
Systems Available	All versions of Windows 8, Windows 7, Windows Vista, and Windows XP, Linux, etc.	Windows XP Professional, Vista, 7, Mac OS X and Linux.
Memory Limits	32-bit systems are limited to 3.2 GB of RAM.	64-bit systems allow a maximum 17 Billion GB of RAM.



Q: Explain in detail the types of computers?

Q:What is the first processor in the back of personal devices?

Q:The difference between a computer and personal calculators?

Q: what a difference between storage & memory?

