Note On Computer Hardware And Operating System

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Computer Hardware

A Computer is an electronic device that has two essential parts including hardware and software to perform various operations. That means without hardware parts in a computer, software is of no work and vice versa. So, we need both hardware and software to run a Computer and can perform multiple operations. Software is nothing but a piece of code or set of instructions written in a chip to run a hardware device on the Computer. Now the question is what is hardware? Yes, like other machines physical parts are known as hardware. Hardware is a physical component that is attached to the PC that can neither be modified nor be changed as it is fixed into that place. There are different types and models of hardware components being manufactured by big companies available in the market.

Hardware is the collection of physical parts of a Computer system that has shape and size and can be feel. The most essential hardware components are Motherboard, CPU, RAM memory, IO system, power supply, video display controller, Bus and hard disk drive. Some of the normal hardware parts you see like a mouse, keyboard, monitor and CPU are the basic components of a computer. But inside the CPU box there is hard disk, motherboard, and RAM, video card, CPU Fan, sound card, server components, CD/DVD drive and many more. The hardware components does change in shape and size as in a desktop computer the CPU integrates all the components that are connected by wires but in laptop computers the components are integrated into a single portable unit. Basically the hardware components in a Computer system are connected through wires

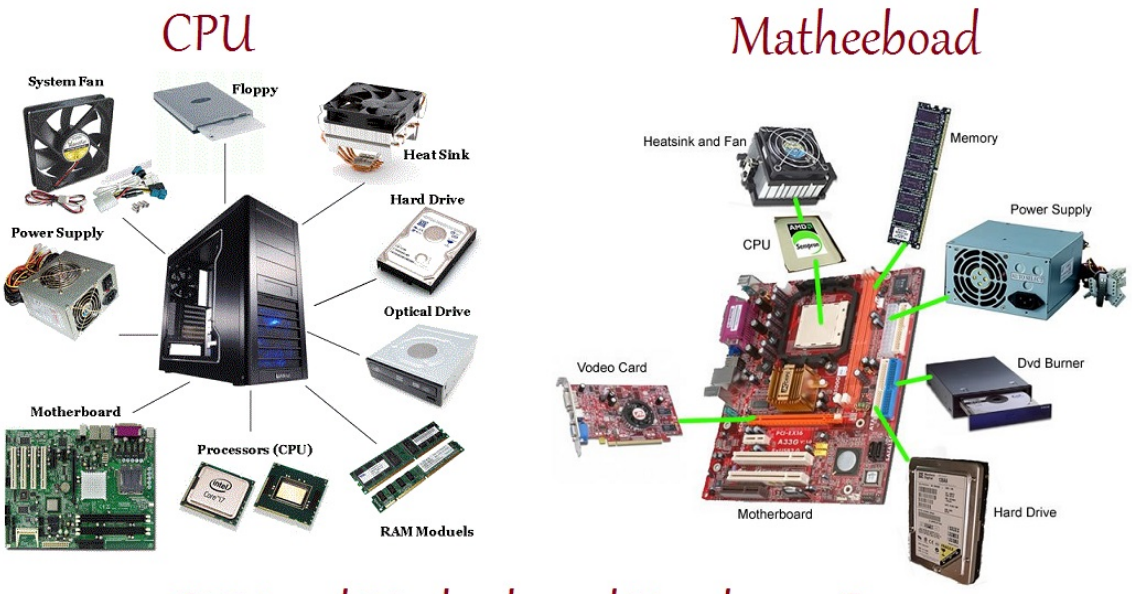
in order to function properly. From power supply to network connection all are connected through wires.

Hardware Components

The most important hardware component is Mother Board that holds all the important components of a Computer including CPU, memory and various connectors for input/output device. Some of the input devices like keyboard, mouse, microphone, modem, joystick, USB devices, joystick and many more are connected for better functioning. Similarly the output devices like the computer monitor, modem, projectors, printers etc are connected to the available connectors of motherboard. It is the main mother board that includes graphic processors for better display screen on your monitor. There is CPU socket, CPU fan memory connector, super IO chip, DIMM memory slots, IDE connector, SATA connector, BIOS flash chip that are the most essential components to run a Computer system. It also integrates audio codec chip for sound and gigabit Ethernet chip for network connection on a computer.

There are several hardware components attached to the CPU or Central Processing Unit which is also called as the brain of Computer. The CPU includes all the processors that interprets and execute program instructions. It includes control unit that instructs, maintains and also control the flow of information, arithmetic logic unit for simple logic operations and a controller. Inside the CPU, memory is an important component that stores all the information or data on your computer. It includes the main

memory slot called RAM (Random Access Memory), ROM (Read only Memory), CMOS battery, internal hard disk that is connected to Computer system to store abundant data and applications, and an optical disk drive known as CD/DVD drive that can read and write from CD or DVD's. There are also points for external storage devices like USB, flash drive, external hard disk to be connected for memory storage.



Computer CPU and Motherboard Hardware Components

The hardware components are connected to the bus through a controller that coordinates the activities of a device with the bus. Bus is a term given to a group of wires on the main circuit board of Computer that connects all the components including network, hard disk, USB drive, keyboard through a controller, main memory and processor directly to bus and display monitor via video card. It allows the flow of data between the components and also within the computer to another computer. There are also other types of hardware components like a CD ROM drive,

Floppy disk and Zip drive. Floppy drive is a data storage device which was used to run a floppy disk and is not used now anymore due to very slow and virus infected. CD ROM drive is known as compact disk read only memory which used to store data, software, games, songs etc. Zip drive is a removable medium capacity storage device which was used earlier.

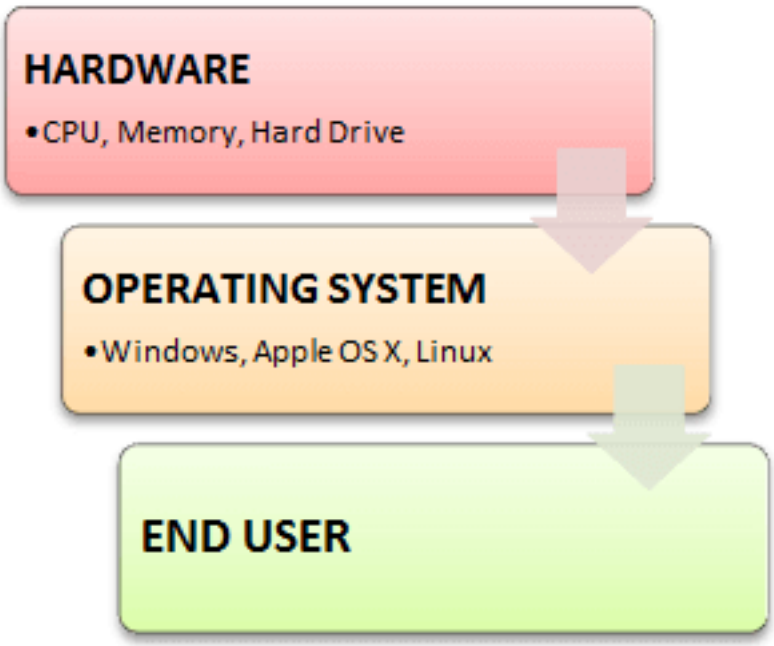
With the changing world and new technology there are lots of powerful hardware components designed for better performance of PC. There are several manufacturing companies making tons and tons of hardware components and one of the most popular is Intel that mainly designs processors, motherboard, graphic chips, flash memory, network interface controllers and many more. These hardwares are available in different models and types that are designed mainly for a particular computer PC. One thing you must remember that any hardware is useless if there is no software, so a Computer must have software to run a hardware component.

Operating System

What is an 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. Applications like Browsers, MS Office, Notepad Games, etc., need some environment to run and perform its tasks.

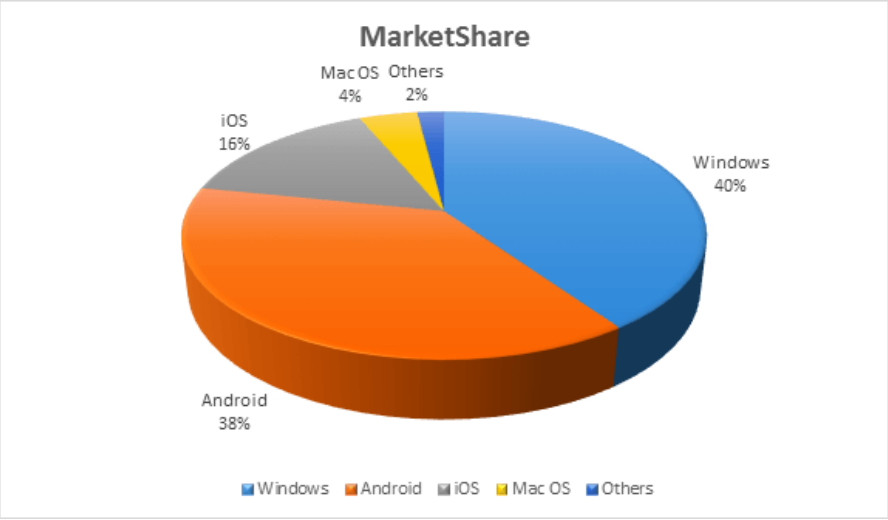
The OS helps you to communicate with the computer without knowing how to speak the computer's language. It is not possible for the user to use any computer or mobile device without having an operating system.



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

Examples of Operating System with Market Share



Market Share of Operating Systems

Following are the examples of Operating System with the latest Market Share

OS Name	Share
Windows	40.34
Android	37.95
iOS	15.44
Mac OS	4.34
Linux	0.95
Chrome OS	0.14
Windows Phone OS	0.06

Types of Operating System (OS)

Following are the popular types of Operating System:

- Batch Operating System
- Multitasking/Time Sharing OS
- Multiprocessing OS
- Real Time OS
- Distributed OS
- Network OS
- Mobile OS

Batch Operating System

Some computer processes are very lengthy and time-consuming. To speed the same process, a job with a similar type of needs are batched together and run as a group.

The user of a batch operating system never directly interacts with the computer. In this type of OS, every user prepares his or her job on an offline device like a punch card and submit it to the computer operator.

Multi-Tasking/Time-sharing Operating systems

Time-sharing operating system enables people located at a different terminal(shell) to use a single computer system at the same time. The processor time (CPU) which is shared among multiple users is termed as time sharing.

Real time OS

A real time operating system time interval to process and respond to inputs is very small. Examples: Military Software Systems, Space Software Systems are the Real time OS example.

Distributed Operating System

Distributed systems use many processors located in different machines to provide very fast computation to its users.

Network Operating System

Network Operating System runs on a server. It provides the capability to serve to manage data, user, groups, security, application, and other networking functions.

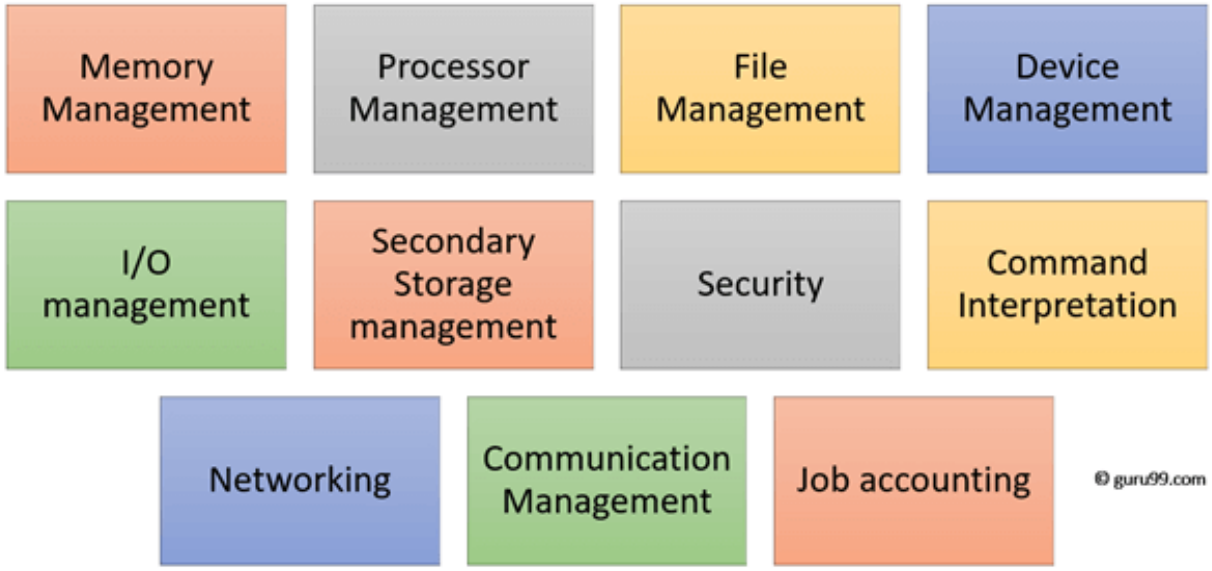
Mobile OS

Mobile operating systems are those OS which is especially that are designed to power smartphones, tablets, and wearables devices.

Some most famous mobile operating systems are Android and iOS, but others include BlackBerry, Web, and watchOS.

Functions of Operating System

Below are the main functions of Operating System:



Functions of Operating System

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.

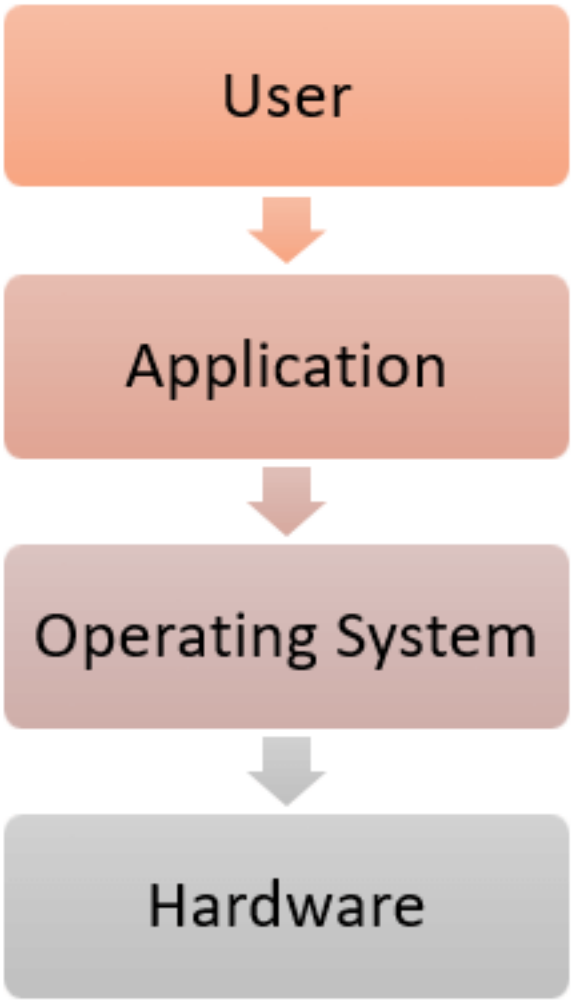
7. **Security**:- Security module protects the data and information of a computer system against malware threat and authorized access.
8. **Command interpretation**: This module is interpreting commands given by the and acting system resources to process that commands.
9. **Networking:** A distributed 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.
10. **Job accounting**: Keeping track of time & resource used by various job and users.
11. **Communication management**: Coordination and assignment of compilers, interpreters, and another software resource of the various users of the computer systems.

Features of Operating System (OS)

Here is a list important features of OS:

- Protected and supervisor mode
- Allows disk access and file systems Device drivers Networking Security
- Program Execution
- Memory management Virtual Memory Multitasking
- Handling I/O operations

- Manipulation of the file system
- Error Detection and handling
- Resource allocation
- Information and Resource Protection



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 intermediator 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