gradeup

Basics of Operating Systems

OPERATING SYSTEM (OS)

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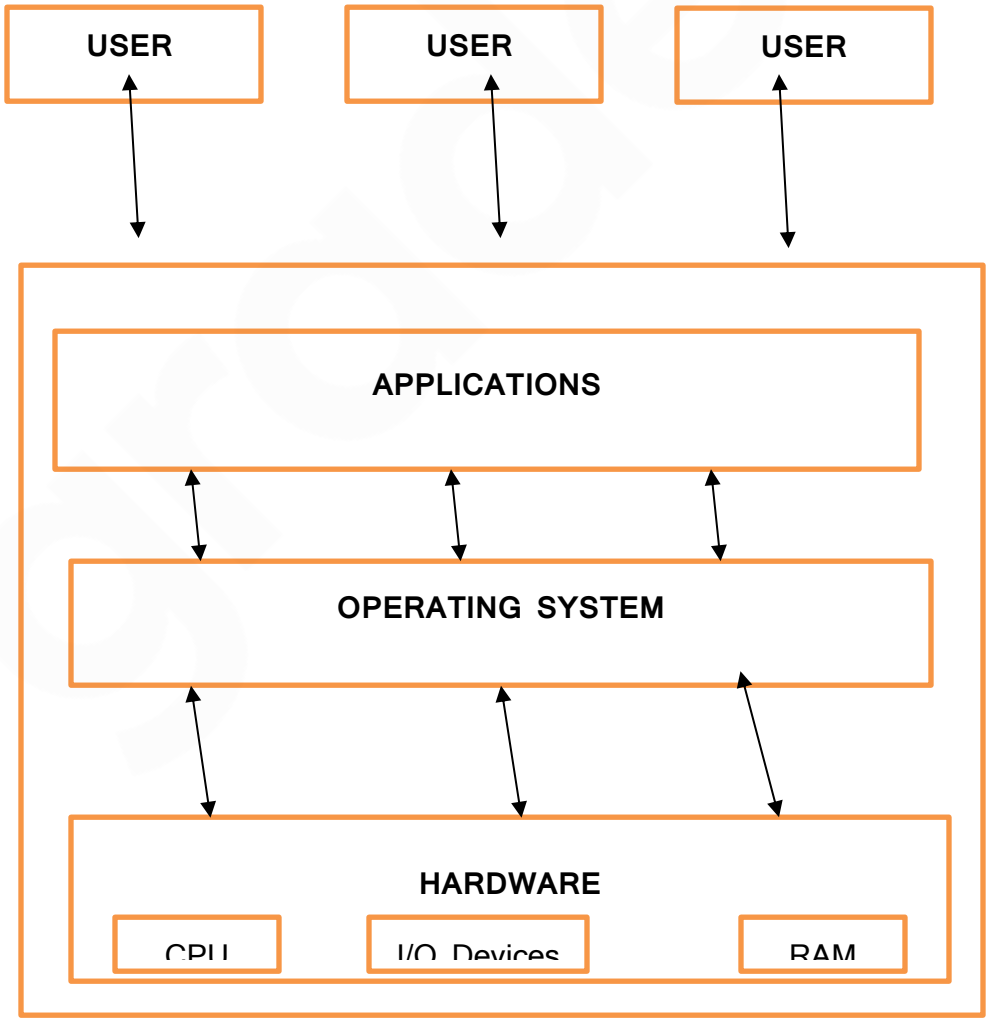
1. Definition :

Operating System is Interface between User and System Hardware .
It manages the software and hardware resources of the computer system which includes :-
i. Input Devices – Mouse and Keyboard
ii. Output Devices – Monitor , Printer and Scanner
iii. Storage Devices – External and internal storage
iv. Network Devices – Network connections , routers and modems

2. Structure of OS



Users :- Users are lay man person or IT professional who is using the computer to fulfil it's requirement.
Applications:-Applications are the software that user wants to use.
Operating System:- Act as a bridge/interface between the computer user and it's hardware
Hardware:- It is the physical part of the computer system, it include CPU input output devices, RAM etc.

Purpose of OS:
1. Help the users to use the system in efficient and convenient manner.
2. Hide the complexity of the system hardware from the user
3. Helps to provide the suitable interface to use the system
4. Helps to manage the different resources of the system
5. Keeps the track on different activities of resources which include granting the resource requests, which resource is used by whom and resolve the conflicts between different resources .
6. Provide the fair, effective and efficient sharing of resources between programs and users .
Goal Of OS :
1. The primary most goal of the OS is to optimize the use of system resources so as the result the throughput of the system should be maximize
2. It also create the user-friendly environment in computer system for the accessing of the system resources

Characteristics of OS
1. **Memory Management :-** Tracks the primary memory , i.e. which part of it is used by whom and which is not , and also allocate the memory when the job or program request for the memory.
2. **Process Management :**- Allocate and de-allocate the resources to the CPU according to the requirement.
3. **Device Management :**- It is also known as input-output controller as it decides which job gets which device ,for how long and when.
4. **File Management :-** Decides who get the resources and allocate and de-allocate the resources.
5. **Control over the System Performance :**- Keeps the track records between the delays requests for service and from the system
6. **Security :**- Prevent the unauthorized access to the data and program with the help of passwords and other related techniques
7. **Error Detecting Aids –** Production of traces, dumps , error messages and error detecting methods.
8. **Job Accounting –** Keeps track of resources and time used by various users and/or jobs.
Most Important Function of Operating System (OS)
Resource Management :- OS is just like the resource manager .For example – in our daily routine you have to divide which work is more urgent or in between you can do some other work with high priority.

What are the resources in the computer system that are managed by OS?
i. **CPU:-** It performs execution of job.
User program ---------> Compile ----------> Execute program --------> Execute on CPU

Execute Program ----------> Program ---------> CPU
(Hard Disk) (Main Memory)

If we have multiple users working on one CPU, then how to allocate these one CPU resource among various users is the duty of OS.

ii. **Main Memory :-** Whenever any program has to be executed on the cpu ,then it should be present on to the main memory. In multi user system, there can be more than one program so there corresponding data unit and code should be present on the main memory in order to be executed. Memory consists of one single block (not a chip), there can be multiple chips to make one block & it has to be shared by more than one user. This sharing of one memory block by multiple users is done by OS.

iii. **Secondary Storage :-** Consist of hard disk, magnetic tape, Floppy disk, CD-ROM. Through main memory & secondary storage are of same kind but we put them in separate category : the way main memory is accessed is different from the way the secondary storage is accessed. Also, Secondary memory is of different types ex: hard disk ,magnetic tape ,all have different characteristics.

Main memory is accessed by CPU. But if the disk is not present in the main memory , then device driver is instructed to access that data from the secondary storage. Device driver instruct the secondary storage & pass it to main memory.

iv. **Input / Output devices:-** Device through which the data is entered into the system is known as input device. Example – keyboard
Device through which information is fetched from the system is known as output device . Example Monitor, Printer
Secondary memory is a special type of I/O device.

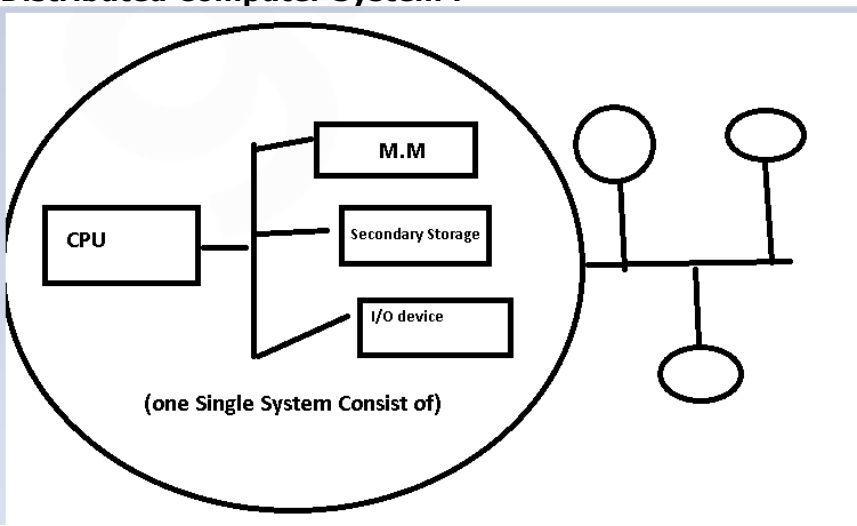
Hard disk -------> Main Memory --------> CPU
(SM)

CPU --------------------> Secondary Storage
(Processed
Data file or output)

So, duty of OS is to manage these resources so that more than one user can use it simultaneously

So, major responsibility of OS is to manage CPU , Main Memory , secondary memory & I/O devices .

Distributed Computer System :-



We have multiple Isolated system which are connected through network. The aim of having such distributed structure is that

1. All information is not required to be present on one system. Database can be partitioned into multiple pieces & stored on different system but still sitting on a particular computer/ terminal one can access all the information from any database of any system in that network.
2. It avoid duplication which means that different information can be stored on different systems & can be accessed through network . So we have data at different places & can share them.