Internals. 01

# Operating System!

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1.a. An operating System is a System software that acts as an intermediate between a user of a Computer and Computer hardware. It is a software that manages Computer hardware.

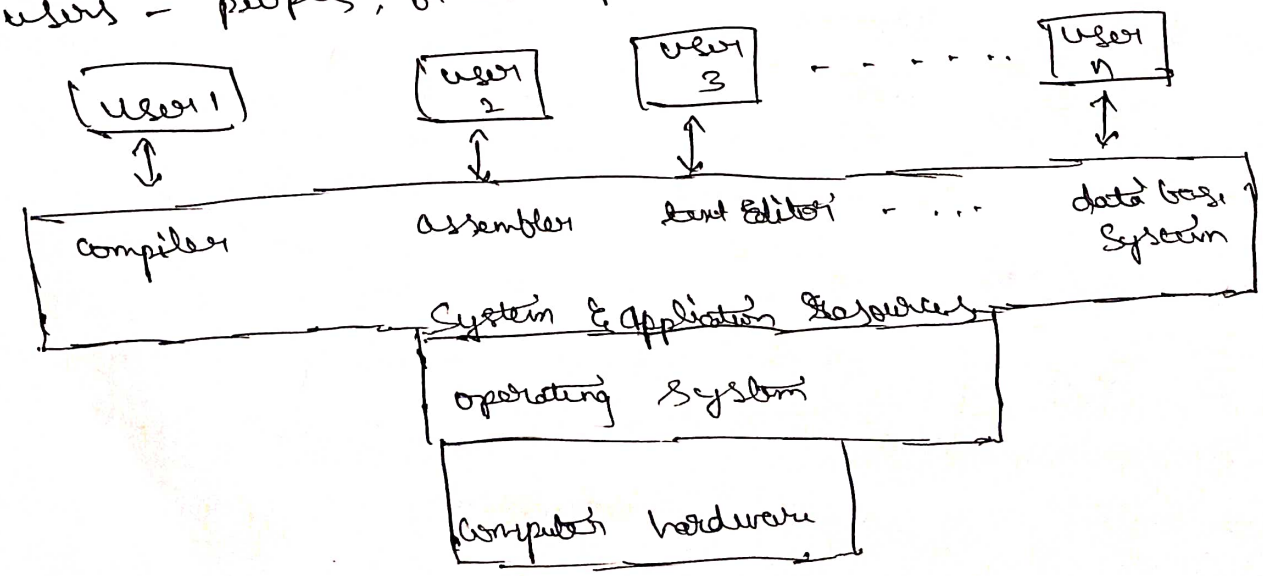
Components of Computer System:-

Hardware - provides basic computing resources, CPU, memory, I/O devices.

Operating System - Controls and coordinates the use of hardware among various applications and users.

Application program - defines the ways in which the system resources are used to solve the computing problems of the users.

users - peoples, other Computers.



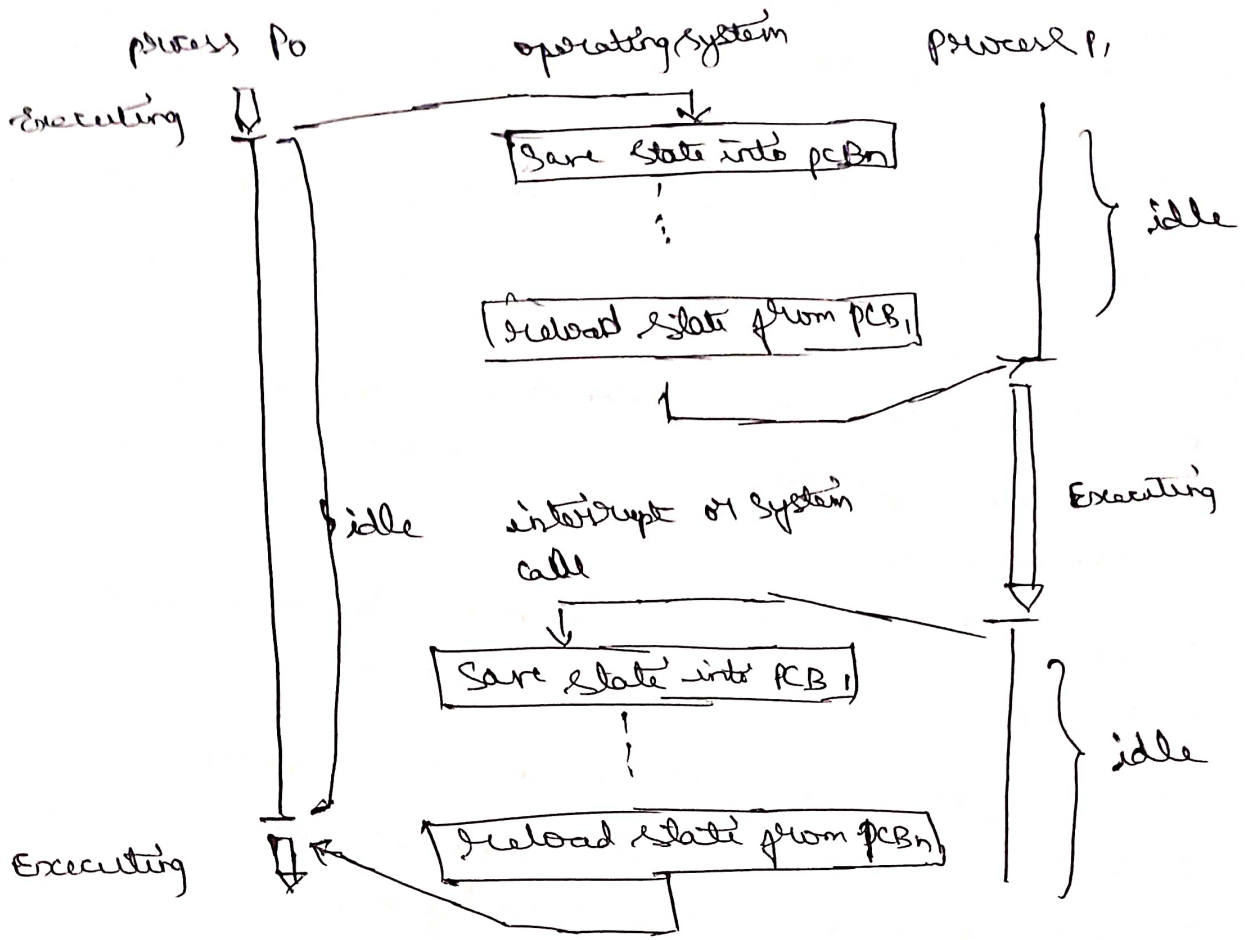
The basic hardware components consists of CPU, memory, I/O devices. The application program uses these components. The OS controls and coordinates the use of hardware, among various application programs for various users.

1b.

| Time Sharing OS | Microprogramming OS |
|---|---|
| 1. It enables execution of multiple tasks and processes at the same process to increases CPU performance. | 1. Multiple programs reside in the main memory simultaneously to improve CPU utilization. |
| 2. It is based on the concept of time Sharing. | 2. It used in the concept of context switching. |
| 3. The idea is to allow multiple processes to run simultaneously via time sharing. | 3. The idea is to reduce the CPU idea time for as long as possible. |
| 4. It takes less time to execute the task allocation | 4. It takes more time to execute the process. |
| 5. principle objective is minimize response time. | 5. principle objective is maximize processor use. |

3a. Context Switch:

The task of switching a CPU from one process to another process is called context switching. Context switch times are highly dependent on hardware support.




whenever an interrupt occurs, the state of the currently running process is saved into the PCB. and the state of another process is restored from PCB to the CPU.

PCB :- Process Control Block

| Process Identification |
|---|
| priority no |
| program counter |
| Memory allocation |
| I/O status Info |
| List of open files |
| Accounting Info |
| Number of registers |
| process state. |

→ control block will change according to the OS.

→ PCB is identified by an PID (Integer process ID). when a process is running, its hardware state is inside the CPU.

→ whe the OS stops running a process, it saves the register's value in PCB.

→ when a process is created by OS, it allocates a PCB for it.

Following Information is stored in process control block.

1. process Identification :- Each process is uniquely identified by the user's identification and a pointer connecting it to its descriptor.
2. priority number :- OS allocates priority number to each process. According to priority number it allocates the resources.
3. program counter :- the PC indicates the address of the next instruction to be executed for this current process.
4. Memory allocation :- It contains the value of the base register, limit registers and the page tables depending on the memory system used by the OS.
5. I/O status information :- It maintains information about the open files, list of I/O devices allocated to process.
6. list of open files :- process uses number of files for operation. OS keeps track of all opened file by this process.
7. process state :- process may be in any one of the state : new, ready, running and waiting, terminate.

3b.

| Symmetric multiprocessor | Asymmetric multiprocessor |
|---|---|
| (1) It treats all processors are equal ; an I/O can be processed on any CPU. | (1) It has one master CPU & the remainder CPU's are slaves. |

| | |
|---|---|
| (2) Symmetric multiprocessor is easier to implement in OS | (2) Asymmetric multiprocessor is difficult to implement. |
| (3) Single OS manages all processor cores simultaneously | (3) Separate OS, or separate copy of same OS manage each one. |
| (4) Master-slave concept is used | (4) master slave concept is not used. |
| (5) The processor communicates with each other through shared memory. | (5) Shared memory is not used for communication. |