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Operating System  
By-Balaji sir

- Theory
- Explanation
- Derivation
- Example
- Shortcuts
- Previous Years Question With Solution

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# Operating Systems

Trapti Singh..

## Teaching Schedule

I. Introduction and Background.

II. Process Management

- process concept
- CPU scheduling ✓
- Synchronization ✓
- Concurrent Programming .
- Deadlocks
- Threads.

III. Memory Management.

- RAM Chip Implementation
- Loading, Linking & Address Binding
- Techniques
  - paging
  - Multilevel paging .
  - Inverted paging
  - Segmentation
  - Segmented Paging .
- Virtual Memory .

IV. File Systems.

## Textbooks

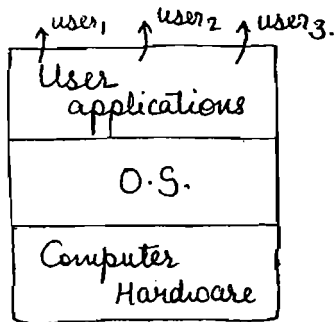
1. OS by Galvin.
2. Modern OS by A.S. Tenenbaum.
3. OS by William Stallings.

# Chapter 1

## Introduction and Background

Q. What is an OS?

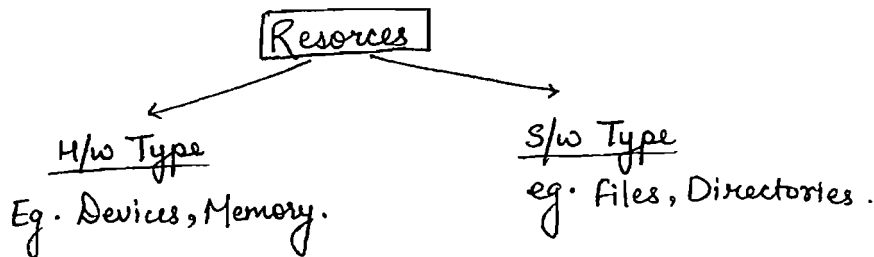
OS is an interface between user and computer hardware.



```
main()
{
  int x;
  printf("Hello");
}
```

internally calls write() System Call in order to communicate with the monitor.

- System Call: System call is the request made by the user program to the OS in order to get any kind of service.
- Operating System is also called as Resource Allocator because it is responsible for allocating resources of a computer.



### Goals of O.S.

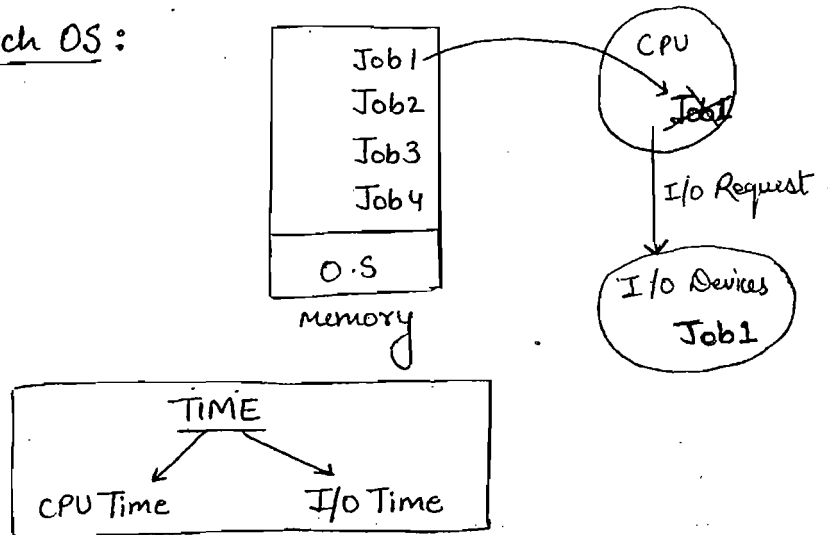
1. The primary goal is convenience. (easy to use)
2. The secondary goal is efficiency. (Stability).

### Types of OS

1).

## Types of OS

### (1). The Batch OS:

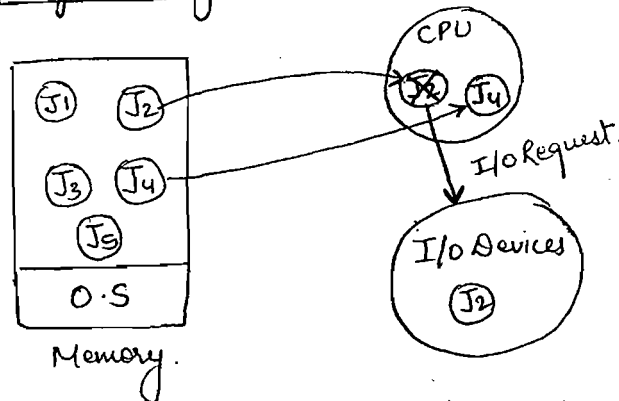


- If the Job is completed completely then only another Job will be scheduled onto CPU.
- increased CPU idleness.
- Decreased throughput of the system.

Throughput: No. of jobs completed per unit time. is called throughput of the system.

Exp: IBM OS/2

### (2). Multiprogramming O.S.:



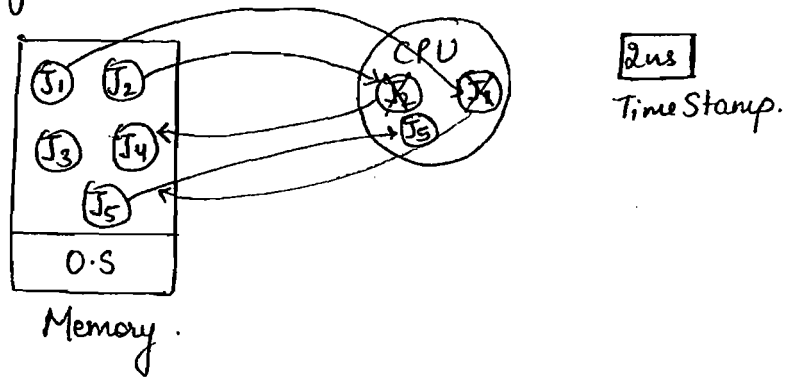
- If the job is leaving the CPU to perform IO operation, then another job which is ready for execution will be scheduled onto CPU.

#### • Advantage

- Increased CPU Utilization.
- Increased throughput of the system.

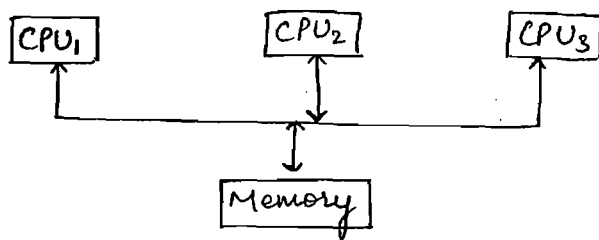
Exp: Windows, UNIX.

### (3). Multitasking OS :



- Multitasking is an extension of multiprogramming OS.
  - The jobs will be executed in the time sharing mode.
- Exp: Windows, Unix

### (4). Multiprocessor Systems :

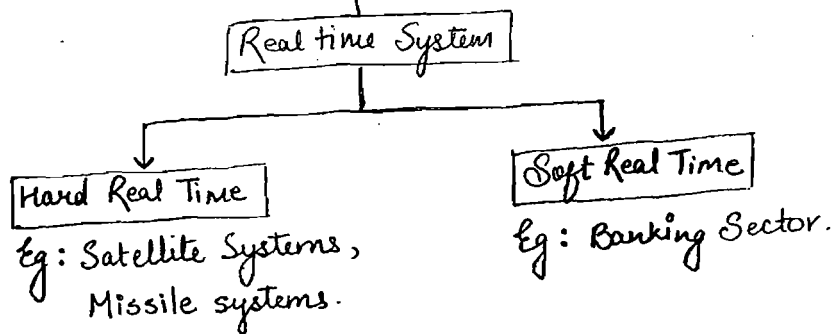


- Advantage
  - Increase the throughput of the system
  - Reliability
    - ↳ Fault Tolerant Systems.
  - Economical.

Exp: UNIX.

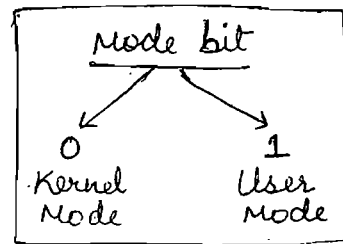
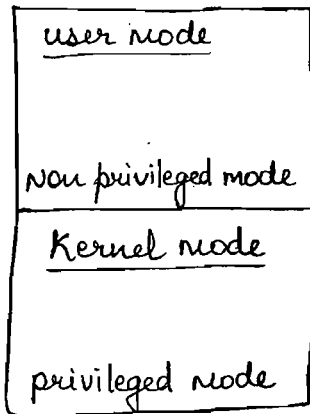
### (5). Real Time Systems :

- The systems which are strict deadly time bound are called as real time systems.



Exp: Sx works, Vx works, RTO's.

# Dual Mode Operation:



- In the hardware level, the instructions are executed by using dual mode operation like
  1. user mode / non privileged mode
  2. kernel mode / privileged mode / system mode / monitor mode.
- The dual mode operation is used in order to provide protection & security to the user programs. and also to the operating system from "errant users" (unauthorized users).
- It is purely the decision of the operating system in which particular mode, the instruction has to be executed.
- The mode bit is used to identify in which particular mode, the current instruction is executing.
- The privileged instructions are executed in the kernel mode & non privileged instructions are executed in the user mode.
- In the Boot time, the system always starts only in the Kernel mode.
- The operating system always runs only in the kernel mode

Note: The mode switching takes very less time compared to process switching.