

# Process Management Part-2

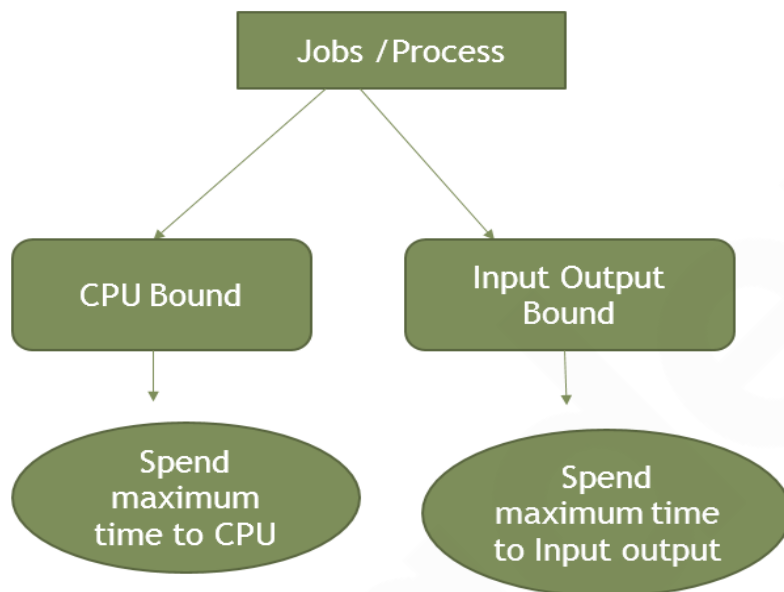


**Content:-**

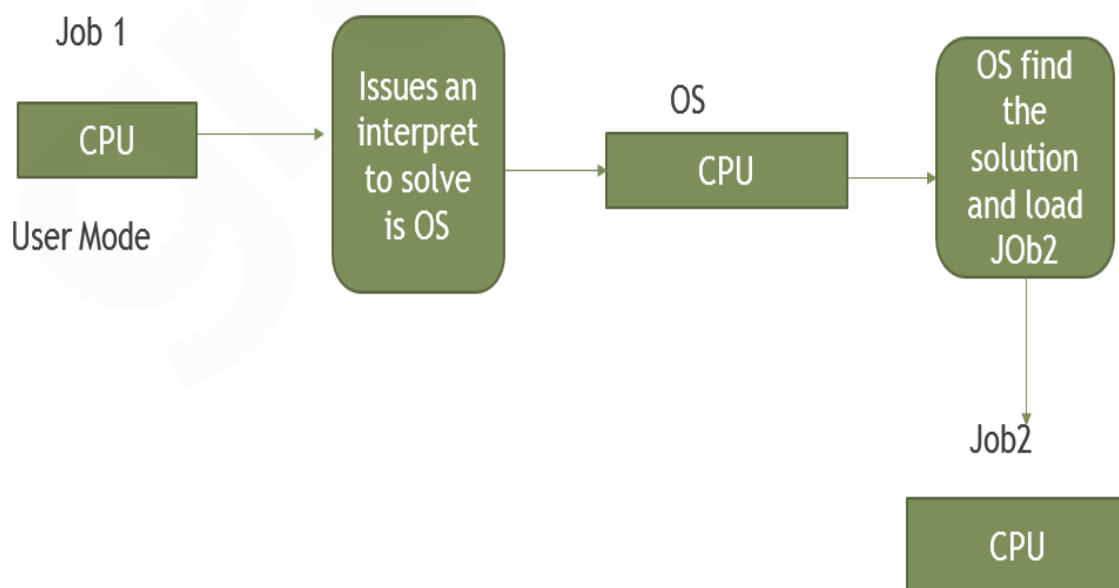
1. Types of jobs
2. Switching
3. Types of Switching
4. Performance Parameter
5. Scheduling Algorithm

**Types of Jobs :-**

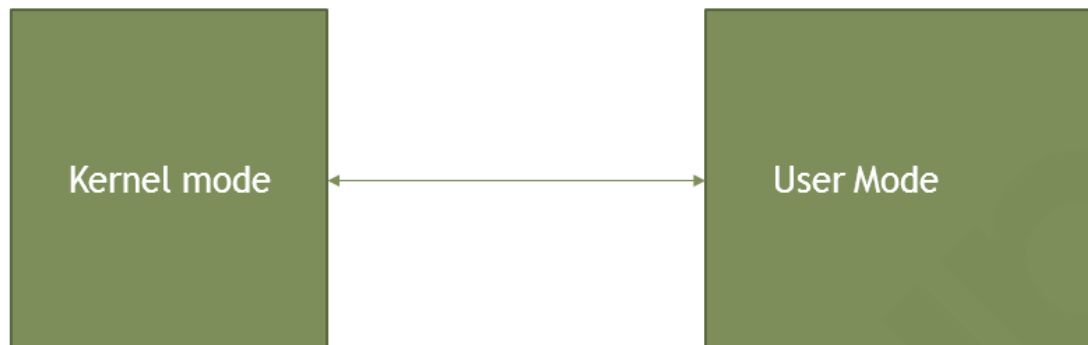
Basically the jobs are divided into two parts :-



**Switching :-**

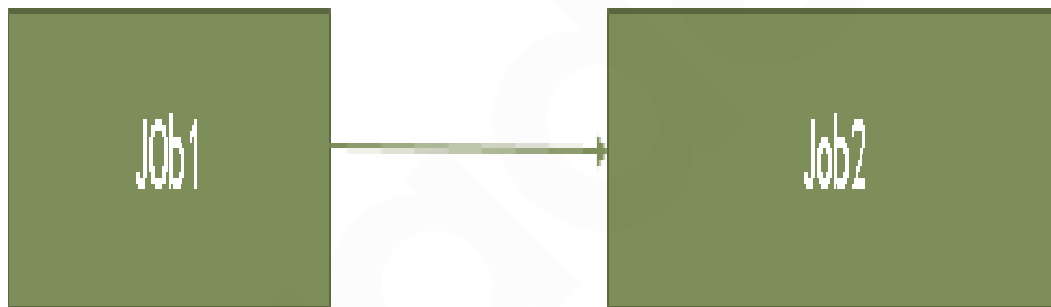


## Mode Switching



## Context Switching

- ▶ When CPU switches to another process/job, the system must save the state of the old process/job and load the saved state for the new process/job.
- ▶ As system is not doing useful work while switching so context switching is over-head.
- ▶ Time dependent on hardware support.



### Note:

1. Module Switching is the part of context switching.
2. Between every context switching there is mode switching

### Performance Parameters :-

1. CPU Utilization
2. Throughput of the system
3. Average Turnaround
4. Average waiting Time of a process
5. Response Time

1. CPU Utilization :- It is the average fraction of time, during which CPU is busy, executing either user programs or system modules. Higher the CPU utilization , better it is.
2. System Throughput :-It is the average amount of work completed per unit time.
3. Turn around time :- It is the total time elapsed from the time job is submitted(or process is created) to the time the job is completed.

Turnaround Time = Process/job finish time – process/job Arrival Time

4. Waiting Time :- It is defined as the total time spend by job while waiting in suspended state or ready state , in a multiprogramming environment.

Waiting time of job/process = Turnaround time – actual execution time  
Lower the average waiting time, better it is.

5. Response Time :- This parameter has relevance for interactive-time sharing systems and for the real-time systems. In interactive system, response time is defined as the time elapsed from the moment last character of a command line is typed by the interactive user, to the time when the first response to that command appears on the terminal. For real-time systems, it is defined as the time elapsed from the time an event is reported in the system, to the time when the first instruction is interrupted servicing routine (ISR) is executed to the service the interrupt caused by the event.

**Pre-emption** :- Forcefully stoppage of job

**Non-Pre-emption** :- Job will leave the CPU on its own

**Various Scheduling Algorithms:-**

1. First Come First Served (FCFS)
2. Shortest Job First (SJF)
3. Shortest Remaining Time Next (SRTN)
4. Priority Based Non-pre-emptive Scheduling
5. Priority Based Pre-emptive Scheduling
6. Round Robin Scheduling
7. Multi Level Queues (MLQ) Scheduling

**1. First Come First Served (FCFS) :-** The process are dispatched (Scheduled to run) strictly in the same order, as those have arrived in the system.

Process	Arrival Time ms	Next Burst ms
P <sub>0</sub>	0	10
P <sub>1</sub>	1	6
P <sub>2</sub>	3	2
P <sub>3</sub>	5	4

**Ex -1 :-**

**Average Turnover Time = 14.25ms**

**Average Waiting Time = 8.75**

**Shortest Job First (SJF) :-** The next job to be dispatched will be the one, which happens to be the shortest amongst the pending lot of jobs.

Process	Arrival Time ms	Next Burst ms
P <sub>0</sub>	0	10
P <sub>1</sub>	1	6
P <sub>2</sub>	3	2
P <sub>3</sub>	5	4

**Ex-2**

**Average Turnover Time = 12.75 ms**

**Average Waiting Time = 7.25 ms**