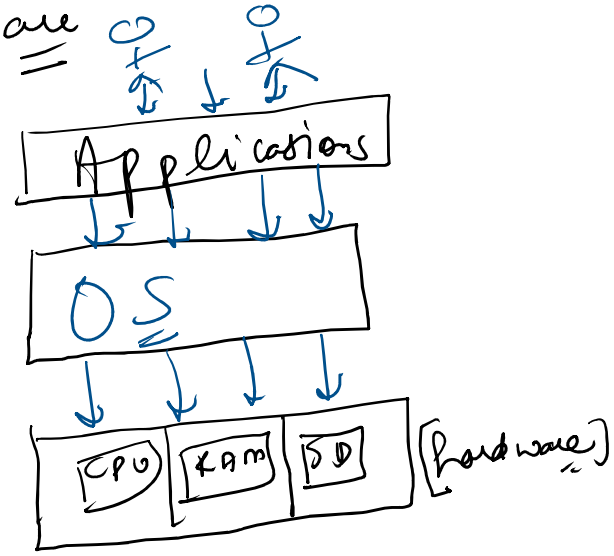
4.17 - Operating System

Saturday, October 11, 2025 10:56 AM

↳ System software



⇒ Responsibilities of OS

- Hardware and Software interaction management
- Process Mgmt.
- Storage mgmt. → (HDD, SSD)
- Memory Mgmt → [RAM]

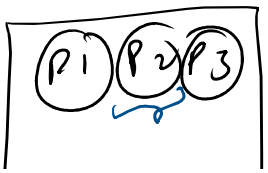
Types of OS

- Batch OS
- Real Time OS → [Hard / Soft]
- Multi-programming OS
- multitasking
- Embedded OS
- Distributed OS

⇒ Multiprogramming OS

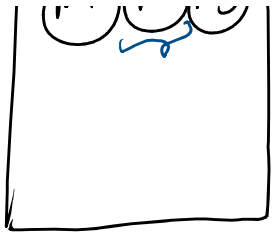
↓

[Non-preemptive]



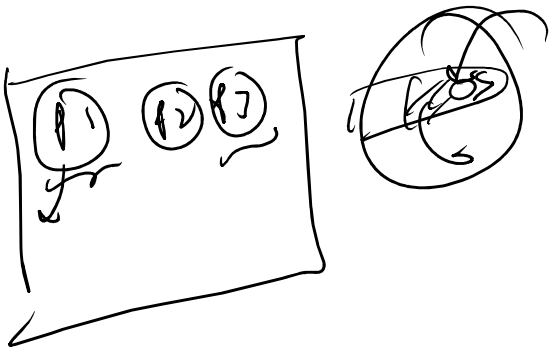
only one program runs

[Non-preemptive]



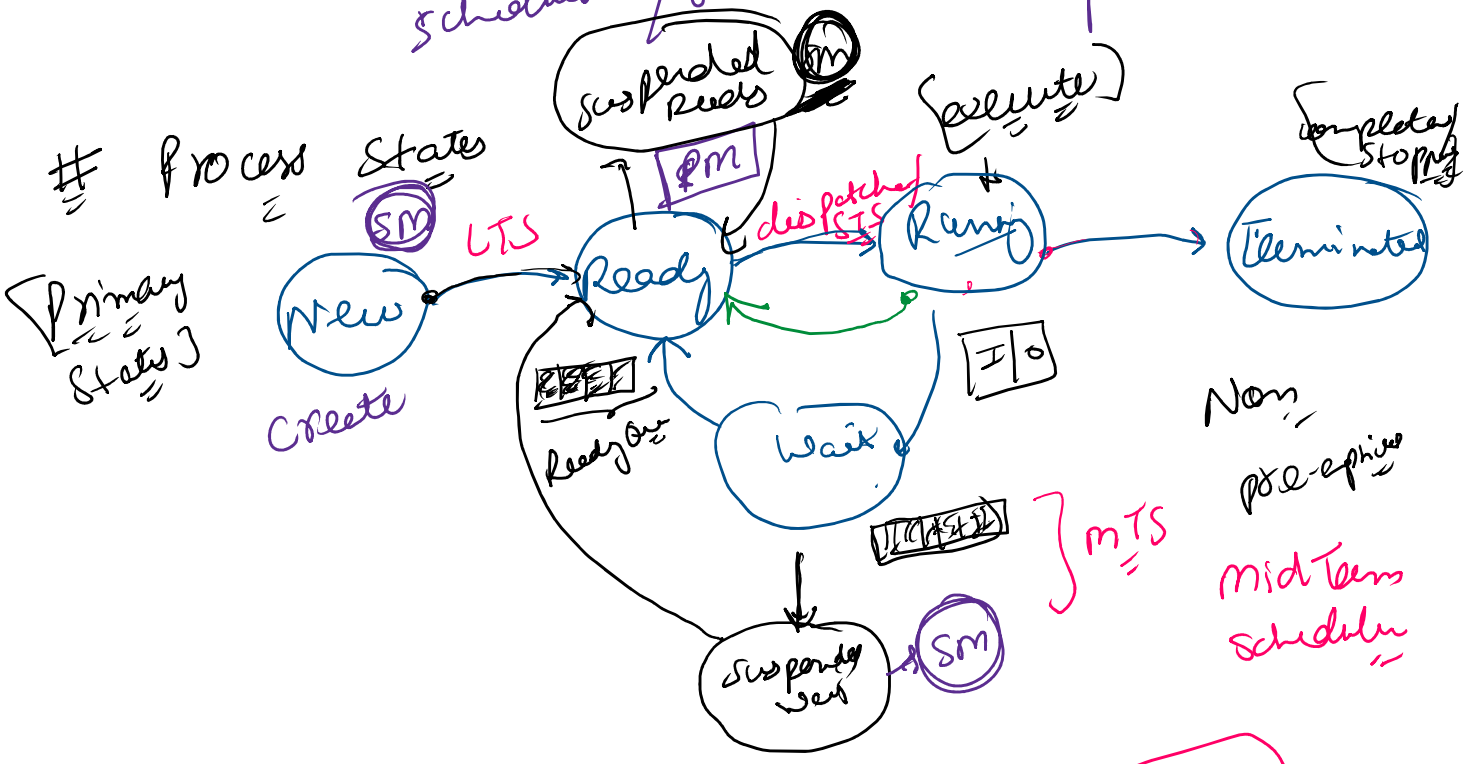
Program runs at admin

Multitasking
↓
[pre-emptive]

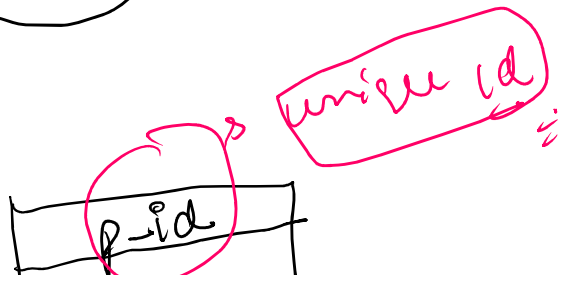


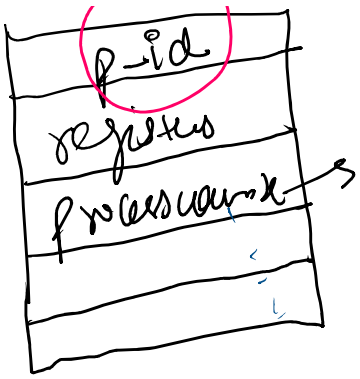
Process Scheduling
↳ algorithms that OS uses to schedule / run the processes.

Process States



[PCB]
↳ Process Control Block





Algorithms for Scheduling

- Preemptive
  - Round Robin
  - [SRTF]
  - LRTF
- Non-preemptive
  - FCFS
  - SJF
  - LJF

Some terminologies to remember

1) Arrival Time: the time when process enters the ready queue (point of time)
2) Burst time: actual time needed for process to complete the work. (duration)
3) Completion time: when process gets terminated/completed execution (point of time)

3) Completion ... — points of time

completion of execution

4) Turn around time: [Completion − arrival] — durations

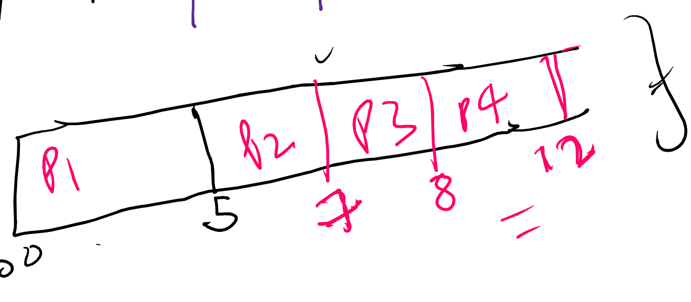
5) Response time: time the process gets CPU for the first time − arrival time — duration

Scheduling Algo

FCFS

P-id	A.T	B.T	C.T	T.A.T	R.T
P1	0	5	5	5	0
P2	3	2	7	4	5
P3	4	1	8	4	~~7~~
P4	6	4	12	6	8

time line view → Gantt Chart



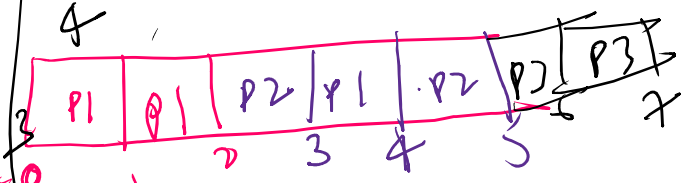
Time slice / time quantum terms

max amount of time that OS decides to run a particular process

Round Robin

Round Robin

P_id	A.T	B.T	C.T	T.A.T
P1	0	~~3~~ 1 0	4	4
P2	2	~~2~~ 1 0	5	3
P3	4	2	7	3



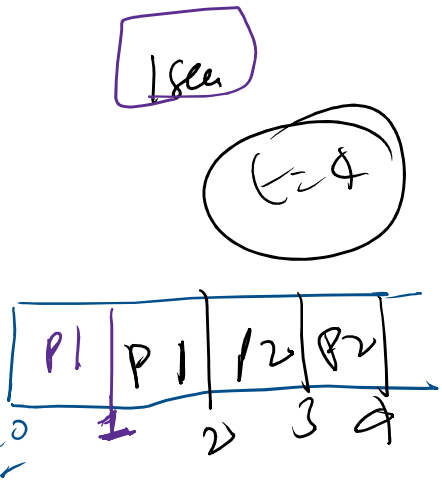
Shortest Job First (Non-preemptive)

Priority Based

Priority	P_id
10	P1
20	P2
30	P3

SRJF
(Shortest Remaining time first)

P_id	A.T	B.T
P1	0	~~5~~ 4 3
P2	2	~~2~~ 1 0
P3	4	3



P2	2	[illegible]
P3	4	3

t=0 1 2 3 4

\# Diff b/w OS and kernel

kernel → component that actually manages the hardware

OS → includes every functionality of managing hardware, software

Kerberos