OPERATING SYSTEM SCHEDULING ALGORITHMS

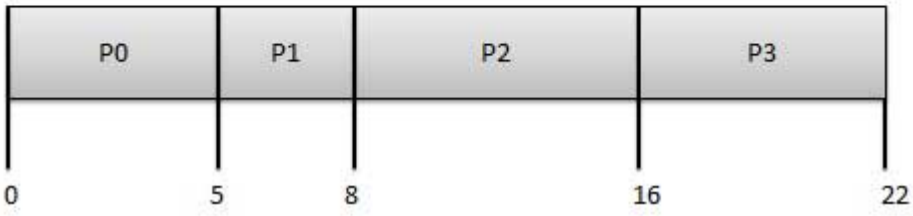
We'll discuss four major scheduling algorithms here which are following

- First Come First Serve *FCFS* Scheduling
- Shortest-Job-First *SJF* Scheduling
- Priority Scheduling
- Round Robin*RR* Scheduling
- Multilevel Queue Scheduling

First Come First Serve *FCFS*

- Jobs are executed on first come, first serve basis.
- Easy to understand and implement.
- Poor in performance as average wait time is high.

Process	Arrival Time	Execute Time	Service Time
P0	0	5	0
P1	1	3	5
P2	2	8	8
P3	3	6	16



Wait time of each process is following

Process	Wait Time : Service Time - Arrival Time
P0	0 - 0 = 0
P1	5 - 1 = 4
P2	8 - 2 = 6
P3	16 - 3 = 13

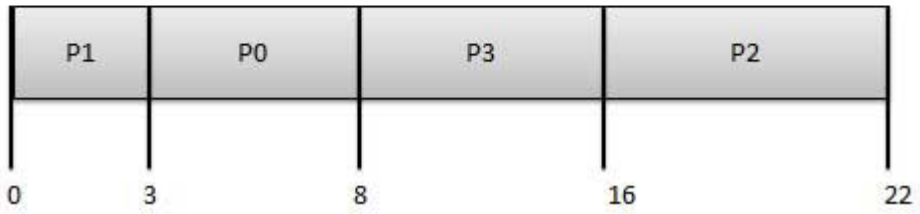
Average Wait Time: $0 + 4 + 6 + 13$ / 4 = 5.55

Shortest Job First *SJF*

- Best approach to minimize waiting time.
- Impossible to implement

- Processer should know in advance how much time process will take.

Process	Arrival Time	Execute Time	Service Time
P0	0	5	0
P1	1	3	3
P2	2	8	8
P3	3	6	16



Wait time of each process is following

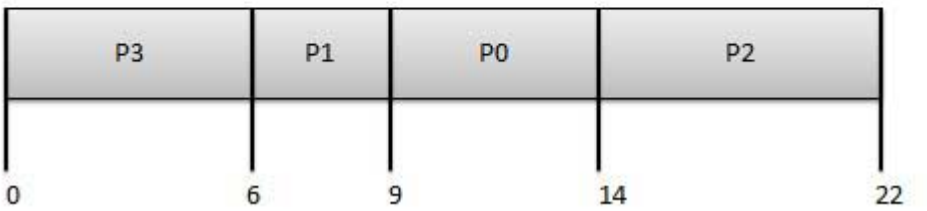
Process	Wait Time : Service Time - Arrival Time
P0	3 - 0 = 3
P1	0 - 0 = 0
P2	16 - 2 = 14
P3	8 - 3 = 5

Average Wait Time: $3 + 0 + 14 + 5$ / 4 = 5.50

Priority Based Scheduling

- Each process is assigned a priority. Process with highest priority is to be executed first and so on.
- Processes with same priority are executed on first come first serve basis.
- Priority can be decided based on memory requirements, time requirements or any other resource requirement.

Process	Arrival Time	Execute Time	Priority	Service Time
P0	0	5	1	0
P1	1	3	2	3
P2	2	8	1	8
P3	3	6	3	16



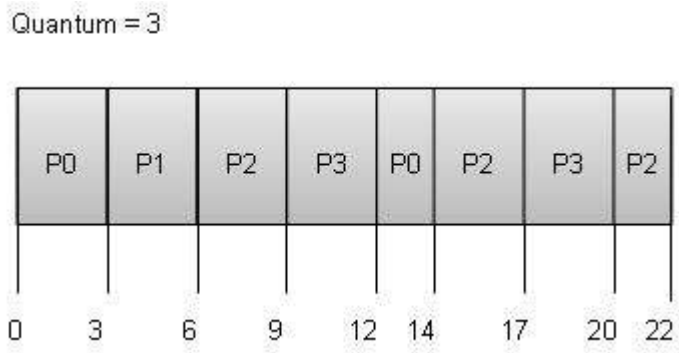
Wait time of each process is following

Process	Wait Time : Service Time - Arrival Time
P0	9 - 0 = 9
P1	6 - 1 = 5
P2	14 - 2 = 12
P3	0 - 0 = 0

Average Wait Time: $9 + 5 + 12 + 0$ / 4 = 6.5

Round Robin Scheduling

- Each process is provided a fix time to execute called quantum.
- Once a process is executed for given time period. Process is preempted and other process executes for given time period.
- Context switching is used to save states of preempted processes.



Wait time of each process is following

Process	Wait Time : Service Time - Arrival Time
P0	$0 - 0 + 12 - 3 = 9$
P1	$3 - 1 = 2$
P2	$6 - 2 + 14 - 9 + 20 - 17 = 12$
P3	$9 - 3 + 17 - 12 = 11$

Average Wait Time: $9 + 2 + 12 + 11$ / 4 = 8.5

Multi Queue Scheduling

- Multiple queues are maintained for processes.
- Each queue can have its own scheduling algorithms.
- Priorities are assigned to each queue.