

# OS - Scheduling algorithms

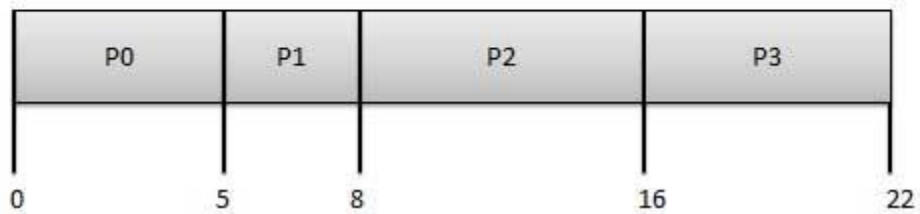
We'll discuss four major scheduling algorithms here which are following

- 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	$5 - 1 = 4$

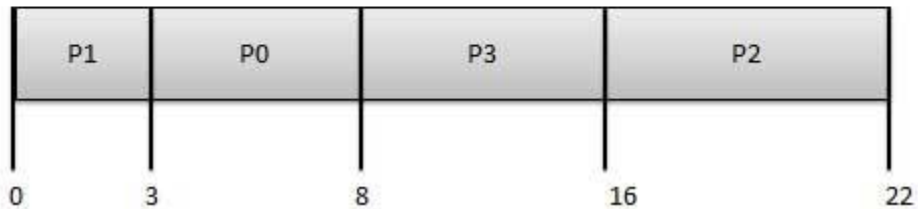
P2	$8 - 2 = 6$
P3	$16 - 3 = 13$

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

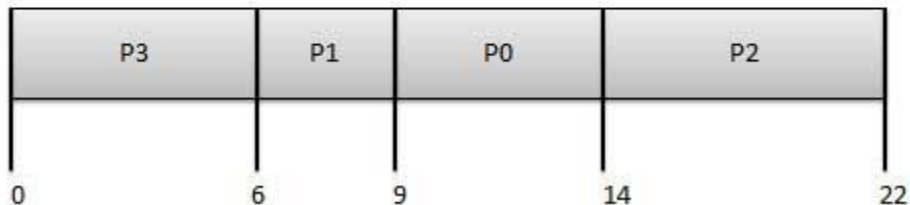
Process	Wait Time : Service Time - Arrival Time
P0	$3 - 0 = 3$
P1	$0 - 0 = 0$
P2	$16 - 2 = 14$
P3	$8 - 3 = 5$

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

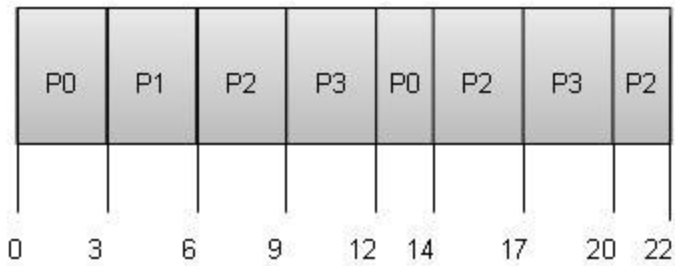
Process	Wait Time : Service Time - Arrival Time
P0	$0 - 0 = 0$
P1	$3 - 1 = 2$
P2	$8 - 2 = 6$
P3	$16 - 3 = 13$

Average Wait Time:  $(0+2+6+13) / 4 = 5.25$

# 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.

Quantum = 3



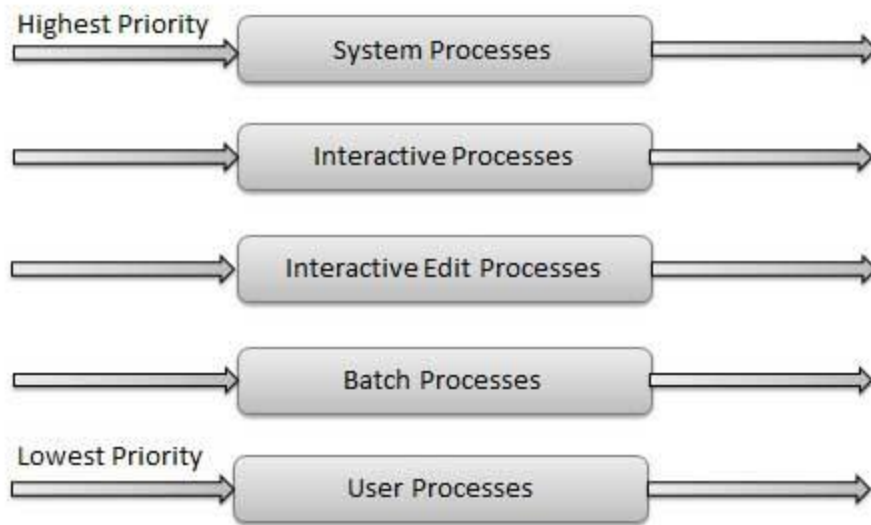
Wait time of each process is following

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.



Source:

[http://www.tutorialspoint.com/operating\\_system/os\\_process\\_scheduling\\_algorithms.htm](http://www.tutorialspoint.com/operating_system/os_process_scheduling_algorithms.htm)