



Green University

Midterm Exam Assignment

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Ans the Question 01

Here we identify the Convoy effect from the preceding system with Gantt Chart. If found, then I will illustrate the technique with a Gantt chart to overcome it.

Processes	Arrival Time	Burst Time	Priority
P ₀	1	5	4
P ₁	3	3	1
P ₂	2	1	2
P ₃	1	7	2
P ₄	1	4	3
P ₅	2	3	5

Table-1

Table-1 shows the processes, with the length of the CPU burst, arrival time, and priority. Here the lower the order higher the priority is given in milliseconds:

Identifying the Convoy effect from the above system with Gantt Chart.

Gantt Chart :

P ₀	P ₃	P ₄	P ₂	P ₅	P ₁	
1	6	13	17	18	21	24

Processes	Arrival Time	Burst Time	Finish Time	Turnaround Time	Waiting Time
P ₀	1	5	6	5	0
P ₁	1	7	13	12	5
P ₂	1	4	17	16	12
P ₃	2	1	18	16	15
P ₄	2	3	21	19	16
P ₅	3	3	24	21	18

Average turnaround time (ATAT) = 14.83333 ms

Average waiting time (AWAT) = 11 ms

Convoy Effect is a phenomenon connected with the First Come First Serve (FCFS) algorithm, in which the whole Operating System slows down due to a few slow processes.

To bypass the Convoy Effect, preemptive scheduling algorithms like Round Robin Scheduling can be used – as the smaller processes don't have to wait much for CPU time – making their execution faster and leading to fewer resources sitting idle.

Using time quantum 2.

P ₀	P ₃	P ₄	P ₂	P ₅	P ₁	P ₀	P ₃	P ₄	P ₅	P ₁	P ₀	P ₃	P ₃	
1	3	5	7	8	10	12	14	16	18	19	20	21	23	24

In Round Robin Scheduling :

Processes	Arrival Time	Burst Time	Finish Time	Turnaround Time	Waiting Time
P ₀	1	5	21	20	15
P ₁	1	7	24	23	16
P ₂	1	4	18	17	13
P ₃	2	1	8	6	5
P ₄	2	3	19	17	14
P ₅	3	3	20	17	14
			Average	100/6=16.667	77/6=12.833

☐ Average turnaround time (ATAT) = 16.66667 ms

☐ Average waiting time (AWAT) = 12.83333 ms

Ans the Question 02

From table 1 we ascertain out the Gantt chart

P ₀	P ₃	P ₄	P ₂	P ₅	P ₁	
1	6	13	17	18	21	24

Illustrate Priority scheduling technique on the processes in Table-1 using Gantt chart and calculate the Turnaround time and Waiting time for each process.

Process	Arrival	service	priority	started	competition	Tat	WAT
P ₀	3	3	1	3	6	3	0
P ₁	2	1	2	6	7	5	4
P ₂	1	7	2	1	12	11	4
P ₃	1	4	3	12	16	15	11
P ₄	1	5	4	16	21	20	15
P ₅	2	3	5	21	24	22	19

☐ Average turnaround time (ATAT) = 12.66667 ms

☐ Average waiting time (AWAT) = 8.83333 ms

Discussing the performance of the scheduling techniques RR (preemptive) and Priority (preemptive) Scheduling is based on the average waiting time.

In Robin Round Preemptive:

- ❖ We have found the Avg Waiting time is 11 ms
- ❖ In RR AVG waiting time is more than Priority Preemptive.
- ❖ In RR AVG waiting time periods are more.
- ❖ For this problem to find the AVG Waiting time is less efficient.
- ❖ This is a hybrid model and is clock-driven in nature.

In Priority Preemptive:

- ★ We have found the AVG Waiting time is 8.833 ms
- ★ In Priority Preemptive AVG waiting time is less than Robin Round
- ★ In RR AVG waiting time periods are less.
- ★ For this problem to find the AVG Waiting time is more efficient.
- ★ This is not an actual hybrid model and is clock-driven in nature.

Priority Based Scheduling:

- Priority scheduling is a non-preemptive algorithm and one of the most common scheduling algorithms in batch systems.
- Each process is assigned a priority. The process with the highest priority is to be executed first and so on.
- Processes with the same priority are executed on a first-come-first-served basis.
- Priority can be decided based on memory requirements, time requirements, or any other resource requirement.

After All of this analysis, we ascertain the less time period waiting time which is Priority preemptive and the value is 8.833 ms.