

Operating Systems : CPU Scheduling Algorithms

1. The Ready queue of an operating system at a particular time instance is as follows: Process Next CPU burst (in milliseconds)

<u>Process</u>	<u>Next CPU burst (in milliseconds)</u>
P1	2
P2	3
P3	7
P4	18

The behavior of each process (if it were to use the CPU exclusively) is as follows: it runs for the CPU burst given, then requests an I/O operation that takes 10 milliseconds, then runs for another CPU burst of equal duration to its first CPU burst and then terminates. However, the four processes must share the CPU. Assume that the I/O operations can proceed in parallel.

- a) Draw a Gantt chart showing the execution of these processes under RR, with time quantum = 2.
 - b) Calculate the average waiting time and average turnaround time.
2. Draw the Gantt chart for SJF scheduling and calculate the average waiting time.

Process	Arrival Time	Execution Time	Service Time
P0	0	5	0
P1	1	3	5
P2	2	8	14
P3	3	6	8

3. Draw the Gantt chart for FCFS scheduling and for Round Robin (1ms Quantum). Then calculate the average waiting time and average turnaround time for both scheduling methods.

Process	Burst	Priority	Arrival Time
P ₁	8	4	0
P ₂	6	1	2
P ₃	1	2	2
P ₄	9	2	1
P ₅	3	3	3

4. Consider the following table of arrival time and burst time for three processes P0, P1 and P2.

Process	Arrival time	Burst Time
P0	0 ms	9 ms
P1	1 ms	4 ms
P2	2 ms	9 ms

If the pre-emptive shortest job first scheduling algorithm is used, what is the average waiting time for the three processes? Draw a Gantt chart.

5. Consider the following set of processes, with the arrival times and the CPU-burst times given in milliseconds.

Process	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	2	3
P4	4	1

What is the average turnaround time for these processes with the preemptive shortest remaining processing time first (SRPT) algorithm ? Draw a Gantt chart.