

Homework 6

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Question 1.

Suppose that we have a multiprogrammed computer in which each job has identical characteristics. In one computation period T for a job, half the time is spent in I/O and the other half in processor activity. Each job runs for a total of N periods. Assume that a simple round-robin scheduling is used, and that I/O operations can overlap with processor operation. Define the following quantities:

- Turnaround time = actual time to complete a job
- Throughput = average number of jobs completed per time period T
- Processor utilization = percentage of time that the processor is active (not waiting)

Compute these quantities for one, two, and four simultaneous jobs, assuming that the period T is distributed in the following way: I/O first half, processor second half.

Question 2.

Consider the following workload:

Process	Burst Time	Arrival Time
P_1	10 ms	0 ms
P_2	20 ms	5 ms
P_3	50 ms	10 ms
P_4	30 ms	15 ms
P_5	10 ms	16 ms

Show the schedule using Shortest Remaining Time, Round Robin with time quantum of 10 ms, and Round Robin with time quantum of 20 ms. In addition, for each algorithm, state the turnaround and response times for each process.

Question 3.

Which type of process is generally favored by a multi-level feedback queueing scheduler — a process-bound process or an I/O-bound process? Briefly explain why.