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Class: CSC343 - OPERATING SYSTEM

Assignment: Assignment 5

Q1: Difference Between Preemptive and Nonpreemptive Scheduling

Answer: (Reference: Operating System Concepts 10th- page 202)

Preemptive Scheduling: Allows the operating system to interrupt a running process to allocate CPU time to another process with higher priority or shorter burst time. Example: Round Robin (RR), Shortest Remaining Time First (SRTF).
Nonpreemptive Scheduling: Once a process starts execution, it runs until completion without interruption. Example: First-Come-First-Serve (FCFS), Shortest Job First (SJF).

Q2: Process Scheduling

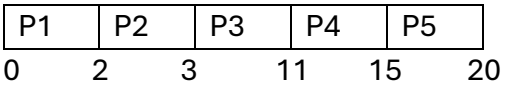
Given the processes:

Process	Burst Time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

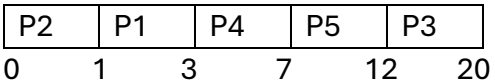
All processes arrive at time t = 0.

(a) Gantt Charts for Different Scheduling Algorithms

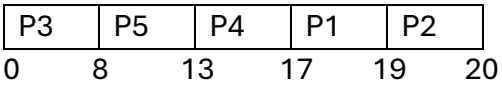
1. FCFS (First Come First Serve)



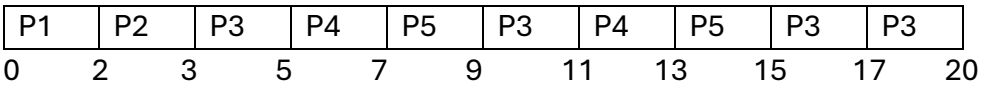
2. SJF (Shortest Job First)



3. Non-preemptive Priority Scheduling (Higher number = Higher priority)



4. Round Robin (Quantum = 2)



(b) Turnaround Time (TAT)

TAT = Completion Time - Arrival Time

Process	FCFS	SJF	Priority	RR
P1	2	3	19	3
P2	3	1	20	3
P3	11	20	8	20
P4	15	7	13	11
P5	20	12	17	13

(c) Waiting Time (WT)

WT = Turnaround Time - Burst Time

Process	FCFS	SJF	Priority	RR
P1	0	1	17	1
P2	2	0	19	2
P3	3	12	0	12
P4	7	3	9	7
P5	15	7	12	8

(d) Algorithm with Minimum Average Waiting Time is Shortest Job First (SJF)

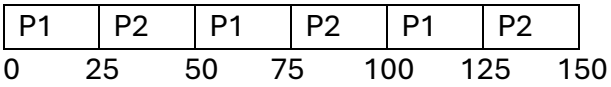
Q3: Real-Time Scheduling

Given two processes:

- P1: Period = 50, Execution time = 25
- P2: Period = 75, Execution time = 30

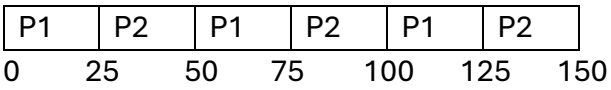
(a) Rate-Monotonic Scheduling (RMS)

- The CPU Utilization formula: $U=\sum(t_i/p_i)=(25/50)+(30/75)=0.5+0.4=0.9$
    - Since $U \leq 1$, Rate Monotonic Scheduling is feasible.



(b) Earliest-Deadline-First (EDF) Scheduling

- EDF schedules the process with the closest deadline first.
- Gantt Chart Analysis would show tasks scheduled based on remaining time before the deadline.



Note: The schedule looks the same as RMS in this case because both meet deadlines without overlapping.

Q4. https://github.com/kekef2002/CSC343_Assignment5.git