COMPSCI 340/ SOFTENG 370

OS TUTORIAL

AGENDA

- Practice questions on CPU Scheduling in the first half
- QnA on the assignment in the second half

CPU SCHEDULING

Suppose that the following processes arrive for execution at the times indicated. Each process will run for the amount of time listed. In answering the questions, use non-preemptive scheduling

Process	Arrival Time	Burst Time
P1	0.0	8
P2	0.4	4
P3	1.0	1

a. What is the average turnaround time for these processes with the FCFS scheduling algorithm?

b. What is the average turnaround time for these processes with the SJF scheduling algorithm?

c. Compute what the average turnaround time will be if the CPU is left idle for the first 1 unit and then SJF scheduling is used.

Q1. a)

P1	P2	P3

0 8 12 13

P3

8 20

$P_1 = (8-0)$
$P_2 = (12-0.4)$
$P_3 = (13-1)$

$$T_{Avg} = \frac{8 + 11.6 + 12}{3} = 10.53$$

Q1. b)

P1	P3	P2

0 8 9 13

$P_1 = (8-0)$
$P_2 = (13-0.4)$
$P_3 = (9-1)$

$$T_{Avg} = \frac{8 + 12.6 + 8}{3} = 9.53$$

Q1. c

P3	P2	P1

0 1 5 13

$$T_{Avg} = \frac{(13-0) + (5-0.4) + (1-1)}{3} = 5.86$$

CPU SCHEDULING

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

Assume all processes arrived at t=0

a. Draw Gnatt chart for Preemptive Priority and RR (quantum = 2)

b. What is the waiting time of each process for each of the algorithms?

Q2. a)

PP

P2	P1	P4	P5	P3

0 1 3 7 12 20

RR

P1	P2	P3	P4	P5	P3	P4	P5	P3	P5	P3

0 2 3 5 7 9 11 13 15 17 18 20

Q2. b) Priority

$P_1 = (1 - 0)$ $P_2 = (0 - 0)$

$P_3 = (12 - 0)$ $P_4 = (3 - 0)$ $P_5 = (7 - 0)$

RR

$P_2 = 2$

$P_1 = 0$

$P_3 = 3 + 4 + 4 + 1 = 12$

$P_4 = 5 + 4 = 9$

$P_5 = 7 + 4 + 2 = 13$

CPU SCHEDULING

Suppose that a scheduling algorithm (at the level of short-term CPU scheduling) favors those processes that have used the least processor time in the recent past. Why will this algorithm favor I/O -bound programs and yet not permanently starve CPU -bound programs?

CPU SCHEDULING

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Ans –

It will favor the I/O -bound programs because of the relatively short CPU burst request by them; however, the CPU –bound programs will not starve because the I/O -bound programs will relinquish the CPU relatively often to do their I/O

CPU SCHEDULING

What (if any) relation holds between the following pairs of algorithm sets?

a. Priority and SJF

b. Multilevel feedback queues and FCFS

c. Priority and FCFS

d. RR and SJF

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c. Priority and FCFS

d. RR and SJF

Ans -

a. The shortest job has the highest priority.

b. The lowest level of MLFQ is FCFS .

c. FCFS gives the highest priority to the job having been in existence the longest.

d. None.

CPU SCHEDULING

Consider two processes, P1 and P2, where $p_1 = 50$, $t_1 = 25$, $p_2 = 75$, and $t_2 = 30$.

a. Can these two processes be scheduled using rate-monotonic scheduling?

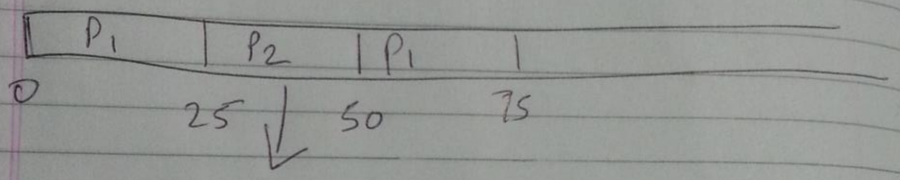
b. Illustrate the scheduling of these two processes using earliest-deadline-first (EDF) scheduling.

Q5. a)

$$\frac{t_1}{P_1} + \frac{t_2}{P_2}$$

~~20~~ $$\frac{25}{50} + \frac{30}{75}$$

$$0.5 + 0.4 = 0.9$$ (90% utilization)



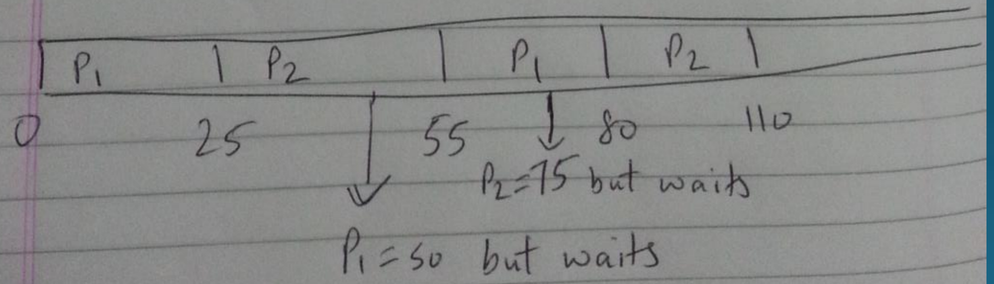
5 seconds left

Therefore, cannot be scheduled by R.M.

83% > can be scheduled using R.M.S.

Q5. b)

EDF



CPU SCHEDULING

Which of the following scheduling algorithms could result in starvation?

a. First-come, first-served
b. Shortest job first
c. Round robin
d. Priority

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Ans – b, d

REFERENCES

Operating System Concepts.

Silberschatz, A., Galvin, P. B., & Gagne, G.

9th edition.