CS & IT ENGINEERING

Operating Systems

1500 Series

Lecture No.- 02

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Recap of Previous Lecture

Topic Questions Practice

Topics to be Covered

- Topic
- Topic
- Topic
- Topic
- Topic

Priority Scheduling w/Round-Robin

Priority Scheduling w/Round-Robin

Hybrid

11:30

- Run the process with the highest priority. Processes with the same Priority run Round-Robin
- Example:

Process	Burst Time	Priority
P_1	4	3 (L)
P_2	5	2
P_3	8	2
P_4	7	1 (H)
P_5	3	3

R.Q: P_1 -- P_5

TAT = 20.8

WT = 15.4

R.T = 4

$= \frac{58}{5} = 11.6$

- Time quantum is 2. Draw the Gantt Chart and Compare Avg. TAT and RT with Pure Round Robin.

CPU

Av. WT = 13.8

Av. TAT = 19.2

Av. RT = $\frac{(20+7+9+0+22)}{5}$

[NAT]

TQ = 10 TAT

#Q. The following processes are being scheduled using a preemptive, priority-based, Round-Robin scheduling algorithm. <Hybrid>

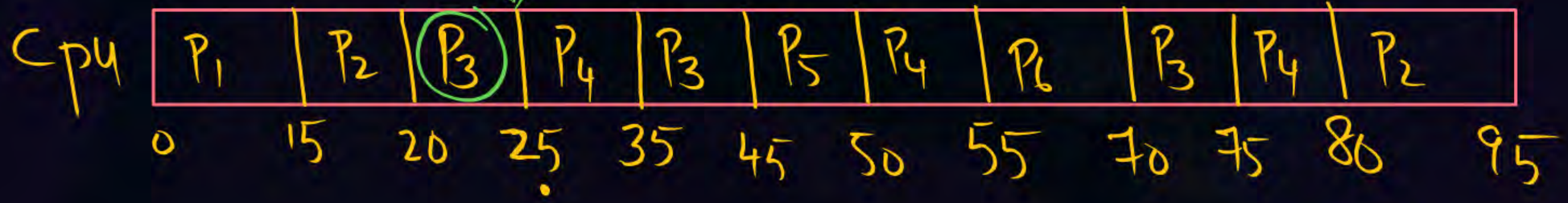
a) 39.17 b) 41.6
c) 34.16 d) 40
e) 38.33 f) 45

Process	Priority	Burst	Arrival
P_1	8	15	0
P_2	3	20	0
P_3	4	20	20
P_4	4	20	25
P_5	5	5	45
P_6	5	15	55

Av. TAT
Av. R.T

P1, P2, P3, P2, P4 P3 P3, P4, P5, P3, P4, P6

Pre



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Each process is assigned a numerical priority, with a higher number indicating a higher relative priority. The scheduler will execute the highest-priority process. For processes with the same priority, a Round-Robin scheduler will be used with a time quantum of 10 units. If a process is preempted by a higher-priority process, the preempted process is placed at the end of the queue.

a. Show the scheduling order of the processes using a Gantt chart.

b. What is the turnaround time for each process?

c. What is the waiting time for each process?

[NAT]

TQ = 10

#Q. The following processes are being scheduled using a preemptive, Round-Robin scheduling algorithm.

Process	Priority	Burst	Arrival
P_1	H 40	20	0
P_2	30	25	25
P_3	30	25	30
P_4	35	15	60
P_5	L 5	10	100
P_6	10	10	105

R.Q

P_1 ; P_2 ; P_3 ; P_2 ; P_3 ; P_4 ; P_3 ; P_2

CPU

P_1	P_{idle}	P_2	P_3	P_2	P_3	P_4	P_2	P_3	P_{idle}	P_5	P_6	P_5

0 20 (5) 25 30 40 50 60 75 85 90 (10) 100 105 115 120

Continues

Each process is assigned a numerical priority, with a higher number indicating a higher relative priority. In addition to the processes listed below, the system also has an idle task (which consumes no CPU resources and is identified as P_{idle}). This task has priority 0 and is scheduled whenever the system has no other available processes to run. The length of a time quantum is 10 units. If a process is preempted by a higher-priority process, the preempted process is placed at the end of the queue.

a. Show the scheduling order of the processes using a Gantt chart.

b. What is the turnaround time for each process?

c. What is the waiting time for each process?

d. What is the CPU utilization rate?

→ 100 - 12.5 %

∴ cpu Idleness = $\frac{15}{120} = \frac{3}{24} = \frac{1}{8} = 0.125 = 12.5\%$

[NAT]

M.L.

#Q. A variation of the Round-Robin scheduler is the Regressive Round-Robin scheduler. This scheduler assigns each process a time quantum and a priority. The initial value of a time quantum is 50 milliseconds. However, every time a process has been allocated the CPU and uses its entire time quantum (does not block for I/O), 10 milliseconds is added to its time quantum, and its priority level is boosted. (The time quantum for a process can be increased to a maximum of 100 milliseconds.) When a process blocks before using its entire time quantum, its time quantum is reduced by 5 milliseconds, but its priority remains the same. What type of process (CPU-bound or I/O-bound) does the Regressive Round-Robin scheduler favor?

<CPU-Bound>

[MSQ]

#Q. Which of the following scheduling algorithms could result in starvation?

<B, D>

A First-come, First-served

B Shortest Job First

C Round Robin

D Priority

[NAT]

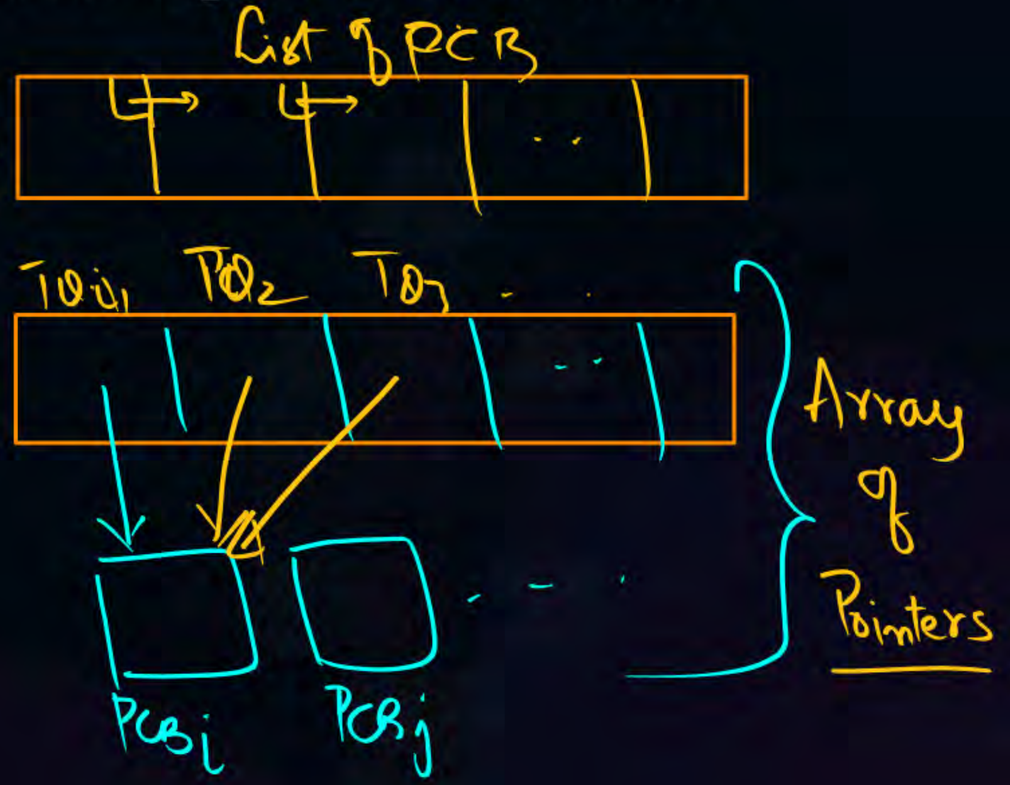
#Q. Consider a variant of the RR scheduling algorithm in which the entries in the ready queue are pointers to the PCBs.

(a) What would be the effect of putting two pointers to the same process in the ready queue? (Prioritising the Process)

(b) What would be major advantages and disadvantages of this scheme?

a) Improve Priority of desired Process

Starv. Lock of Resp.



[MCQ]

Definition

#Q. A process may be defined as:

A. A set of instructions to be executed by a computer.

B. A program in execution.

C. A piece of hardware that executes a set of instructions.

D. The main procedure of a program.

[MCQ]

#Q. A processor in the context of computing is:

GPU

A. A set of instructions to be executed on a computer.

B. A program in execution.

C. A piece of hardware that executes a set of instructions.

D. The main procedure of a program.

2 mins Summary

- Topic One
- Topic Two
- Topic Three
- Topic Four
- Topic Five

THANK - YOU