



LAB 07 – RR and Priority Scheduling

OBJECTIVE(S)

- Understanding RR and Priority scheduling Algorithms

Round Robin Scheduling Algorithm:

This is a preemptive version of the FCFS algorithm based on time quantum. Very large time quantum makes Round Robin as FCFS algorithm. It minimizes average response time. Each process is provided a fixed time to execute, which is called a quantum. Once a process is executed for a given time period, it is preempted and another process executes for a given time period. Context switching is used to save states of preempted processes.

Aim:

Write a C/C++ program to implement the process scheduling mechanism of Round Robin Scheduling.

Algorithm:

Step 1: Start the process

Step 2: Accept the number of processes in the ready Queue and time quantum (or) time slice.

Step 3: For each process in the ready Q, assign the process id and accept the CPU burst time.

Step 4: Calculate the no. of time slices for each process where No. of time slice for process (n) = burst time process (n)/time slice.

Step 5: If the burst time is less than the time slice than the no. of time slice = 1.

Step 6: Calculate



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Turn-around time (TaT) of Process(n) = Completion Time – Arrival Time

Waiting Time (WT) for process(n) = Turn-around time – Burst Time

Step 7: Calculate

Average waiting time = Total waiting Time / Number of processes

Average Turnaround time = Total Turnaround Time / Number of processes

Step 8: Stop the process

Round Robin Scheduling Example:

Example: Consider the following table:

Process no.	Arrival Time	Burst Time
P1	0	6
P2	2	1
P3	5	4
P4	6	3

Find the average waiting time and average turnaround time using RR (Round Robin) algorithm with Time Quantum size 2?

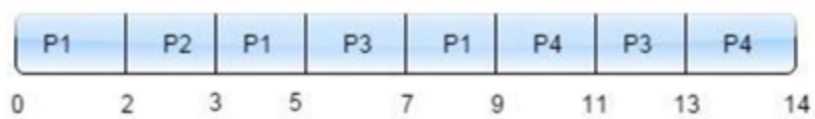
Solution: Using round robin algorithm with time quantum size = 2, ready queue and Gantt chart are:



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Ready Queue: P1, P2, P1, P3, P1, P4, P3, P4

Gantt chart is:



Therefore,

Process No.	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time
P1	0	6	9	$9 - 0 = 9$	$9 - 6 = 3$
P2	2	1	3	$3 - 2 = 1$	$1 - 1 = 0$
P3	5	4	13	$13 - 5 = 8$	$8 - 4 = 4$
P4	6	3	14	$14 - 6 = 8$	$8 - 3 = 5$

So,

Average Turnaround time = $(9 + 1 + 8 + 8) / (4) = 6.5$

Average Waiting time = $(3 + 0 + 4 + 5) / (4) = 3$



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Priority Scheduling Algorithm:

Priority can be internal or external and static or dynamic. This algorithm selects processes with highest priority to execute.

Aim:

Write a C/C++ program to implement the process scheduling mechanism of Priority Scheduling.

Algorithm:

Step 1: Start the process.

Step 2: Accept the number of processes in the ready Queue.

Step 3: For each process in the ready Q, assign the process id and accept the CPU burst time.

Step 4: Start the Ready Q according to the priority, higher priority process will get the CPU first than lower priority process.

Step 5: If the two processes have similar priority then FCFS is used to break the tie and repeat steps 4 and 5 until the ready queue is empty.

Step 6: Consider the ready queue is a circular Q calculate

Turn-around time (TaT) of Process(n) = Completion Time – Arrival Time

Waiting Time (WT) for process(n) = Turn-around time – Burst Time

Step 7: Calculate



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Average waiting time = Total waiting Time / Number of processes

Average Turnaround time = Total Turnaround Time / Number of processes

Step 8: Stop the process.

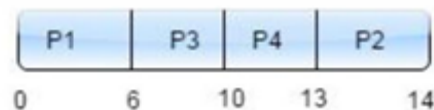
Priority Scheduling Example:

Example: Consider the following table:

Process no.	Arrival Time	Burst Time	Priority
P1	0	6	2
P2	2	1	4 (Lowest)
P3	5	4	1 (Highest)
P4	6	3	3

Find the average waiting time and average turnaround time using Priority (Non-preemptive) algorithm?

Solution: Using Priority (non-preemptive) algorithm, Gantt chart is:



Therefore,



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Process No.	Arrival Time	Burst Time	Completion Time	Turnaround Time	Waiting Time	Priority
P1	0	6	6	$6 - 0 = 6$	$6 - 6 = 0$	2
P2	2	1	14	$14 - 2 = 12$	$12 - 1 = 11$	4 (Lowest)
P3	5	4	10	$10 - 5 = 5$	$5 - 4 = 1$	1 (Highest)
P4	6	3	13	$13 - 6 = 7$	$7 - 3 = 4$	3

So,

Average Turnaround time = $(6 + 12 + 5 + 7) / (4) = 7.5$

Average Waiting time = $(0 + 11 + 1 + 4) / (4) = 4$



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ASSIGNMENT # 07

1. Write a shell script/ C++/Java program to implement the following scheduling algorithms.
 - RR(Round robin algorithm)
 - Priority Scheduling algorithm(non preemptive)