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Assignment-4
CS-314:Operating Systems Laboratory

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1. Explanation of scheduling scheme:

a. *Shortest Job First (SJF)*

SJF is a *non-preemptive* scheduling method that is used in operating systems to manage CPU time allocation to various processes. SJF is based on the premise that the operating system should allocate the CPU to the process with the lowest projected execution duration.

The operating system in SJF keeps a queue of processes that are ready to launch. When a process is ready to run, it is added to the queue's end. The process at the front of the queue is chosen by the operating system to run on the CPU. If the presently running process completes before a shorter process is ready to run, the shorter process is appended to the queue's end.

b. *Round Robin (RR)*

Round Robin (RR) is a *time-sharing* scheduling algorithm used in operating systems to manage the allocation of CPU time to multiple processes. The basic idea behind RR is to allocate the CPU to each process in a cyclic manner for a specified time interval called a "*time slice*" or "*quantum*".

RR ensures that each process gets a fair share of the CPU time, as each process gets to run for a specified time slice before being moved to the end of the queue. This helps to prevent one process from monopolizing the CPU.

2. The expected job characteristics for the scheme:

a. *Shortest Job First (SJF)*
- Short Run Time
- Predictable Run Time
- High CPU utilization
- Low Average Waiting time
- Fairness

b. *Round Robin (RR)*
- Low response time

- High Throughput
- No Starvation
- Equal Time-Sharing

3. Provide a test process data to bring out the suitability of your scheme

Ans: a) Shortest Job First (SJF)

The scheme is suitable for the prioritizing jobs having short execution time, jobs having short execution time won't have to undergo starvation. Also, the time sharing will be according to the execution time. The algorithm is non-preemptive.

E.g.:

Process	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	2	8
P4	3	1

As the SJF schedules the job with shortest job first the execution order will be:

Process	Start Time	Finish Time	Turnaround Time
P4	3	4	1
P2	4	7	3
P1	7	12	5
P3	12	20	8

b) Round Robin (RR)

The scheme is based on principle of equal time-sharing among process. The Scheduling algorithm schedules the process for a constant time slice after which it preempts the current running process and takes another process from the ready queue into the run queue.

E.g.: Time Quantum-*2*

Process	Arrival Time	Burst Time
P1	0	4
P2	1	3
P3	2	5
P4	3	2

The execution order is as follows

Process	Start Time	End Time	Remaining Time
P1	0	2	2
P2	2	4	1
P3	4	6	3
P4	6	8	0
P1	8	10	0
P2	10	11	0
P3	11	13	1
P3	13	14	0

4. Provide a test process data to bring out the shortcomings of your scheme

Ans: *Shortest Job First (SJF):*

The scheduling algorithm doesn't perform well when the processes have long burst time, Processes with varying burst time, Processes with I/O bound tasks, high variance in burst time.

Round Robin (RR):

The limitations of RR are visible when we have processes with varying times and priorities.