Question 2:

Round Robin Scheduling Algorithm

Round robin is a CPU scheduling algorithm. It is similar to FCFS but with a time quantum. There exists a ready queue. Whenever a new process arrives it is added to the ready queue at the back. A process is chosen from the front of the queue. If the remaining time of the process is less than time quantum then the process runs for the remaining time duration and moves to the complete state else it runs for the period of time quantum and is then moved back to the queue. This process is repeated till there is no process left in the ready queue.

The benefit of the Round robin scheduling algorithm is that it prevents starvation of jobs and is practically implementable. The performance of the Round robin algorithm is highly dependent on time quantum. If time quantum is less it leads to a large number of context switches and if time quantum is large then it just behaves like FCFS which can result in starvation of jobs. So in general we choose burst time so that 80 % of the process can finish in one time quantum.

Input 1
Number of Processes: 5
Arrival Time : 0 1 2 3 4
Burst Time: 6 2 1 3 5

Time quantum = 1
Average TurnAround Time: 8.6
Average Waiting Time: 5.2
Average Response Time: 1.2

Time quantum = 2
Average TurnAround Time: 8.6
Average Waiting Time: 5.2
Average Response Time: 2.4

Time quantum = 3
Average TurnAround Time: 7.8
Average Waiting Time: 4.4
Average Response Time: 3.2

Time quantum = 4
Average Turnaround Time: 9.2
Average Waiting Time: 5.8
Average Response Time: 3.4

Time quantum = 5
Average Turnaround Time: 9.8
Average Waiting Time: 6.4

Average Response Time: 4.2

Time quantum = 6
Average TurnAround Time: 8.4
Average Waiting Time: 5
Average Response Time: 5

Input 2
Number of Processes: 5
Arrival Time : 0 1 2 3 4
Burst Time: 1 2 3 4 5

Time quantum = 1
Average TurnAround Time: 6.4
Average Waiting Time: 3.4
Average Response Time: 0.6

Time quantum = 2
Average TurnAround Time: 6.2
Average Waiting Time: 3.2
Average Response Time: 1.2

Time quantum = 3
Average TurnAround Time: 5.6
Average Waiting Time: 2.6
Average Response Time: 1.8

Time quantum = 4
Average TurnAround Time: 5
Average Waiting Time: 2
Average Response Time: 2

Time quantum = 5
Average TurnAround Time: 5
Average Waiting Time: 2
Average Response Time: 2

The average response time increases with increase in time quantum. The Waiting time and the Turnaround time depend upon the burst time of the process and their arrival time. If the job with a larger burst has arrived first then it increases the average waiting time and average turnaround time of the other jobs. If jobs with smaller burst time arrive first then Average waiting time and average turnaround time decreases with increase in time quantum