**Part E**

1. Consider the following processes with arrival times and burst times:

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time | Burst Time |
| P1 | 0 | 5 |
| P2 | 1 | 3 |
| P3 | 2 | 6 |
|  |  |  |

Calculate the average waiting time using First-Come, First-Served (FCFS) scheduling.

Solution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Process | Arrival Time | Burst Time | Response Time | Waiting Time | TAT |
| P1 | 0 | 5 | 0 | 0 | 5 |
| P2 | 1 | 3 | 5 | 4 | 7 |
| P3 | 2 | 6 | 8 | 6 | 12 |
| Average | | | 4.333333333 | 3.333333333 | 8 |
|  |  |  |  |  |  |
|  |  | P1 | P2 | P3 |  |
|  | Gantt Time | 0 | 5 | 8 | 14 |

**Average Turnaround Time (TAT) =** (5 + 7 + 12) / 3 = **8**  
**Average Waiting Time (WT) =** (0 + 4 + 6) / 3 = **3.33**

1. Consider the following processes with arrival times and burst times:

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

Calculate the average turnaround time using Shortest Job First (SJF) scheduling

Solution:

SJT with preemptive

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Process | Arrival Time | Burst Time | Response Time | Waiting Time | TAT |  |  |
| P1 | 0 | 3 | 0 | 1 | 4 |  |  |
| P2 | 1 | 5 | 8 | 7 | 12 |  |  |
| P3 | 2 | 1 | 2 | 0 | 1 |  |  |
| P4 | 3 | 4 | 4 | 1 | 5 |  |  |
| Average | | | 3.5 | 2.25 | 5.5 |  |  |
|  |  |  |  |  |  |  |  |
|  |  | P1 | P3 | P1 | P4 | P2 |  |
|  | Gantt Time | 0 | 2 | 3 | 4 | 8 | 13 |

SJT with Non preemptive :

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Process | Arrival Time | Burst Time | Response Time | Waiting Time | TAT |  |
| P1 | 0 | 3 | 0 | 0 | 3 |  |
| P2 | 1 | 5 | 8 | 7 | 12 |  |
| P3 | 2 | 1 | 2 | 1 | 2 |  |
| P4 | 3 | 4 | 4 | 1 | 5 |  |
| Average | | | 3.5 | 2.25 | 5.5 |  |
|  |  |  |  |  |  |  |
|  |  | P1 | P3 | P4 | P2 |  |
|  | Gantt Time | 0 | 3 | 4 | 8 | 13 |