1. **Suppose the the processes arrive 0, in the order P1,P2,P3,P4.** Draw a Gantt chart that shows the completion times for each process using first-come, first served CPU scheduling, and compute the average waiting time? **Note: Waiting Time=start time-arrival time**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Process** | **P1** | **P2** | **P3** | **P4** |
| **Burst Time** | **3** | **9** | **5** | **7** |

1. Draw a Gantt chart that shows the completion times for each process using first-come, first served CPU scheduling, and compute the average waiting time?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Process** | **P1** | **P2** | **P3** | **P4** |
| **Burst Time** | **20** | **12** | **4** | **9** |
| **Arrival Time** | **0** | **3** | **2** | **5** |

1. Draw a Gantt chart that shows the completion times for each process using shortest-job first (non-preemptive) CPU scheduling and compute the average waiting time?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **P2** | **P3** | **P4** | **P1** | **P5** |
| **Burst Time** | **12** | **8** | **4** | **10** | **6** |
| **Arrival Time** | **0** | **3** | **5** | **10** | **12** |

1. Draw a Gantt chart that shows the completion times for each process using shortest-job first (preemptive) CPU scheduling and compute the average waiting time?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **P2** | **P3** | **P4** | **P1** | **P5** |
| **Burst Time** | **12** | **8** | **4** | **10** | **6** |
| **Arrival Time** | **0** | **3** | **5** | **10** | **12** |

1. Draw a Gantt chart that shows the completion times for each process using priority (non-preemptive) CPU scheduling and compute the average waiting time?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **P1** | **P2** | **P3** | **P4** | **P5** |
| **Burst Time** | **10** | **1** | **2** | **1** | **5** |
| **Priority** | **3** | **1** | **4** | **5** | **2** |
| **Arrival Time** | **All processes arrived at the same time** | | | | |

1. Draw a Gantt chart that shows the completion times for each process using priority (preemptive) CPU scheduling and compute the average waiting time?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **P1** | **P2** | **P3** | **P4** | **P5** |
| **Burst Time** | **10** | **1** | **2** | **1** | **5** |
| **Priority** | **3** | **1** | **4** | **5** | **2** |
| **Arrival Time** | **0.0** | **1.0** | **2.0** | **3.0** | **4.0** |

1. Draw a Gantt chart that shows the completion times for each process using round-robin CPU scheduling with a time quantum of 5 ms

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Process** | **P1** | **P2** | **P3** | **P4** | **P5** |
| **Burst Time** | **12** | **8** | **4** | **10** | **5** |

1. Draw a Gantt chart that shows the completion times for each process using round-robin CPU scheduling with a time quantum of 2 ms

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Process** | **P1** | **P2** | **P3** | **P4** | **P5** | **P6** |
| **Arrival Time** | **0** | **1** | **2** | **3** | **4** | **6** |
| **Burst Time** | **4** | **5** | **2** | **1** | **6** | **3** |