**CSCE 311 –** **Operating Systems**

Homework 1

Processes & Scheduling

10 Points

**Assigned on**: January 21st, 2021

**Due**: January 31st, 2021 @ 11:59 pm

**Deliverable:**  PDF or Doc(x) or Odt of your answers to the following.

(10 points) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

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

* 1. (1 pt each) Fill out the following four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: **FCFS, SJF, non-preemptive priority** (a smaller priority number implies a higher priority), and **RR** (quantum = 1). When needed, use the priority as the tiebreaker.

FCFS

*For this one I have filled out the first process to run for you to show you what I am looking for*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 - 1 | 1 - 2 | 2 - 3 | 3 - 4 | 4 - 5 | 5 - 6 | 6 - 7 | 7 - 8 | 8 - 9 | 9-10 | 10-11 | 11-12 | 12-13 |
| P1 | P1 | P1 | P1 | P1 |  |  |  |  |  |  |  |  |  |
| P2 |  |  |  |  |  |  |  |  |  |  |  |  | P2 |
| P3 |  |  |  |  | P3 | P3 | P3 |  |  |  |  |  |  |
| P4 |  |  |  |  |  |  |  |  |  |  | P4 | P4 |  |
| P5 |  |  |  |  |  |  |  | P5 | P5 | P5 |  |  |  |

SJF

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 - 1 | 1 - 2 | 2 - 3 | 3 - 4 | 4 - 5 | 5 - 6 | 6 - 7 | 7 - 8 | 8 - 9 | 9-10 | 10-11 | 11-12 | 12-13 |
| P1 | P1 | P1 | P1 | P1 |  |  |  |  |  |  |  |  |  |
| P2 |  |  |  |  | P2 |  |  |  |  |  |  |  |  |
| P3 |  |  |  |  |  |  |  |  |  |  | P3 | P3 | P3 |
| P4 |  |  |  |  |  | P4 | P4 |  |  |  |  |  |  |
| P5 |  |  |  |  |  |  |  | P5 | P5 | P5 |  |  |  |

Non-preemptive Priority

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 - 1 | 1 - 2 | 2 - 3 | 3 - 4 | 4 - 5 | 5 - 6 | 6 - 7 | 7 - 8 | 8 - 9 | 9-10 | 10-11 | 11-12 | 12-13 |
| P1 | P1 | P1 | P1 | P1 |  |  |  |  |  |  |  |  |  |
| P2 |  |  |  |  | P2 |  |  |  |  |  |  |  |  |
| P3 |  |  |  |  |  |  |  |  |  |  | P3 | P3 | P3 |
| P4 |  |  |  |  |  |  |  |  | P4 | P4 |  |  |  |
| P5 |  |  |  |  |  | P5 | P5 | P5 |  |  |  |  |  |

RR

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 - 1 | 1 - 2 | 2 - 3 | 3 - 4 | 4 - 5 | 5 - 6 | 6 - 7 | 7 - 8 | 8 - 9 | 9-10 | 10-11 | 11-12 | 12-13 |
| P1 | P1 |  |  | P1 |  |  |  |  | P1 |  |  |  | P1 |
| P2 |  |  |  |  | P2 |  |  |  |  |  |  |  |  |
| P3 |  | P3 |  |  |  | P3 |  |  |  | P3 |  |  |  |
| P4 |  |  |  |  |  |  | P4 |  |  |  | P4 |  |  |
| P5 |  |  | P5 |  |  |  |  | P5 |  |  |  | P5 |  |

* 1. (1 pt each) What is the turnaround time of each process for each of the scheduling algorithms in part a?
     1. FCFS
        1. P1: 4
        2. P2: 13
        3. P3: 7
        4. P4: 12
        5. P5: 10
     2. SJF
        1. P1: 4
        2. P2: 5
        3. P3: 13
        4. P4: 7
        5. P5: 10
     3. Non-preemptive Priority
        1. P1: 4
        2. P2: 5
        3. P3: 13
        4. P4: 10
        5. P5: 8
     4. RR
        1. P1: 13
        2. P2: 5
        3. P3: 10
        4. P4: 11
        5. P5: 12
  2. (2 pts) Which of the algorithms results in the minimum average turnaround time (over all processes)?
     1. The algorithm with the minimum average turnaround time is SJF with a minimum average turnaround time of 7.8 milliseconds.
        1. FCFS Average: 9.2 milliseconds
        2. SJF Average: 7.8 milliseconds
        3. Non-preemptive Priority Average: 8 milliseconds
        4. RR Average: 10.2 milliseconds