Process Scheduling

Week 4 Exercise

Instructions:

1. Create Gantt charts of the process scheduling.
2. Compute average waiting time and turnaround time, *assuming that context switching time is insignificant*.
3. Discuss and answer questions.

Group Members:

1. Waris DAMKHAM ID: 6388014 \_\_\_
2. Chalumphu Atjarit ID: 6388020\_\_\_\_\_\_\_\_\_

Part 1: The Basics

|  |  |  |  |
| --- | --- | --- | --- |
| Process | Arrival Time | CPU Time | Priority |
| A | 0 | 20 | 2 |
| B | 2 | 5 | 1 |
| C | 7 | 3 | 4 |
| D | 8 | 7 | 3 |
| E | 9 | 4 | 1 |

Chart

Description automatically generated with medium confidenceGantt Chart:

Result:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P |  | Turnaround Time | | |  |  |  | Wait Time | |  |
| FCFS | SJF | STCF | Priority | RR(2) | FCFS | SJF | STCF | Priority | RR(2) |
| A | 20 | 20 | 39 | 29 | 39 | 0 | 0 | 21 | 9 | 20 |
| B | 23 | 30 | 5 | 5 | 15 | 18 | 25 | 0 | 0 | 2 |
| C | 21 | 16 | 3 | 32 | 11 | 18 | 13 | 0 | 29 | 8 |
| D | 27 | 31 | 13 | 28 | 21 | 20 | 24 | 6 | 21 | 13 |
| E | 30 | 18 | 5 | 4 | 13 | 26 | 14 | 1 | 0 | 9 |
| AVG | 24.2 | 23 | 13 | 19.6 | 19.8 | 16.4 | 15.2 | 5.6 | 11.8 | 10.4 |

Questions:

1. In this situation, what algorithm does achieve the best average waiting time? Do you think this is always the case? What is the disadvantage of this algorithm?  
     
   **Answer:**
2. For the situations below, if your goal is to optimize responsiveness for a user, which algorithm will you choose? Give a reason why it is better than other algorithms.
   1. Assume that all processes interact with the user.  
      **Answer:**
   2. Assume that only processes C and D interact with the user (You may change the priority.).  
      **Answer:**
3. [Optional] If you choose different algorithms on (a) and (b), propose a new one that gets the best of both of them.
4. Select a suitable algorithm for each situation.
   1. FCFS: Fair shopping cart checkout (the processes are shopping carts).
   2. RR: Context switching takes very long time.
   3. STCF: Best waiting time when the process remaining time is not available.

Part 2: Multilevel Feedback Queue

|  |  |  |  |
| --- | --- | --- | --- |
| Process | Arrival Time | CPU Time | I/O Time |
| A | 0 | 10 | None |
| B | 0 | 8 | None |
| C | 0 | 8 | After this process runs (CPU) for 3s, it has to run the I/O task for 1s. Then, for every 1 CPU time, it has 1s of I/O time. |

* RR has a quantum time of 2
* MLFQ have 2 queues with quantum time of 2 and 4
* The first queue MLFQ has a time limit of 2 for each process
* MLFQ priority boost every 6 seconds

Gantt Chart:

Result:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Process | Turnaround Time | | Wait Time | |
| RR(2) | MLFQ | RR(2) | MLFQ |
| A |  |  |  |  |
| B |  |  |  |  |
| C |  |  |  |  |
| Average |  |  |  |  |

Questions:

4. Compared to RR, what kind of processes that MLFQ prefers? Do you think it is fair?