CSCI 447 Homework 3

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May 11, 2024

Question 1

Having a very small quantum requires the PC to do a lot more work that isn't directly executing processes, whether that be

- Context switching between processes
- Decoding processes
- Scheduling processes

While a lower quantum may ensure more processes get a more fair distribution of time, it comes at the sacrifice of CPU efficiency.

Question 2

- If FCFS is used:

Process Order	P_1	P_2	P_3	Average
Arrival Time	0	0.4	1.0	
Execution Time	0	8	12	
Turnaround Time	8	11.6	12	10.53

- If SJF is used:

Process Order	P_1	P_3	P_2	Average
Arrival Time	0	1	0.4	
Execution Time	0	8	9	
Turnaround Time	8	8	12.6	9.53

- If SJF is used: with idle from 0 to 1

Process Order	P_1	P_3	P_2	Average
Arrival Time	0	1	0.4	
Execution Time	1	9	10	
Turnaround Time	9	9	13.6	10.53

Question 3

a. First-come, first-served could result in starvation if a process with a long execution time is placed at the front of the queue.

   Eg: P_1 has an execution time of 100, and P_2 has an execution time of 1. If P_1 is placed at the front of the queue, P_2 will never be executed.

b. Round robin most likely will not result in starvation, as each process is given a quantum of time to execute. However, if the quantum is too small, the CPU could spend more time context switching than executing processes.

c. Shortest Job First could still result in starvation depending on the order that jobs arrive to the CPU, and the length of the jobs. If a long job arrives first, and a series of short jobs arrive after, the short jobs may never be executed.

d. Priority scheduling could result in starvation if a process with a high priority is placed at the front of the queue, and never completes.

Question 4

a. $430 + 219 = 649$

b. $400 + 1327 = 1727$

c. $10 + 2300 = 2310$

d. $112 + 1952 = 2064$

e. $500 + 90 = 590$