COSC 3346 Operating Systems

Practice Questions: Chapter 6

1. Consider the following set of processes, with the length of the CPU burst given in milliseconds:

|  |  |  |
| --- | --- | --- |
| Process | Burst Time | Priority |
| P1 | 2 | 2 |
| P2 | 1 | 1 |
| P3 | 6 | 4 |
| P4 | 4 | 3 |

The processes are assumed to have arrived in the order P1, P2, P3, and P4.

1. Draw three Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: **FCFS (First Come First Served),** **SJF (Shortest Job First), and non-preemptive priority.**

**FCFS:**

|  |  |  |  |
| --- | --- | --- | --- |
| P1 | P2 | P3 | P4 |

0 2 3 9 13

SJF:

|  |  |  |  |
| --- | --- | --- | --- |
| P2 | P1 | P4 | P3 |

0 1 3 7 13

**Priority – non-preemptive**

|  |  |  |  |
| --- | --- | --- | --- |
| P3 | P4 | P1 | P2 |

0 6 10 12 13

1. What is the waiting time of each process of these scheduling algorithms?

|  |  |  |  |
| --- | --- | --- | --- |
| Process | FCFS | SJF | Priority (non-preemptive) |
| P1 | 0 | 1 | 10 |
| P2 | 2 | 0 | 12 |
| P3 | 3 | 7 | 0 |
| P4 | 9 | 3 | 6 |
| Average: | 14/4 | 11/4 | 28/4 |

1. Which of the algorithms results in the minimum average waiting time (over all processes)?

SJF

1. From the textbook

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time | Burst Time |
| P1 | 0.0 | 8 |
| P2 | 0.4 | 4 |
| P3 | 1.0 | 1 |

a. What are the average waiting time and the average turnaround time for these processes with FCFS scheduling algorithm?

b. What are the average waiting time and the average turnaround time for these processes with the SJF scheduling algorithm?

Answer:

1. FCFS:

|  |  |  |
| --- | --- | --- |
| P1 | P2 | P3 |

0 8 12 13

Note: turn-around-time = finish-time – arrival-time

Average waiting time = ((0 – 0) + (8 – 0.4) + (12 – 1))/3

Average turn-around-time = ((8-0) + (12-0.4) +(13-1))/3

1. SJF:

|  |  |  |
| --- | --- | --- |
| P1 | P3 | P2 |

0 8 9 13

Average waiting time = ((0 – 0) + (9 – 0.4) + (8 – 1))/3

Average turn-around time = ((8 - 0) + (13 – 0.4) + (9 - 1))/3