Operating Systems: Homework #4

Due on March 1, 2016 at 11:59pm

Professor Qu
Monday & Wednesday 3:30pm — 5:17pm

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Problem 1

Consider the following process arrival list:

Name	Arrival time	Service time
A	0	4
B	3	9
C	5	2
D	7	5
E	11	3
F	13	1
G	21	4

Consider the following scheduling methods:

(a) First-come first-served (FCFS)

(b) Shortest-job first (SJF)

(c) Shortest remaining time first (SRTF)

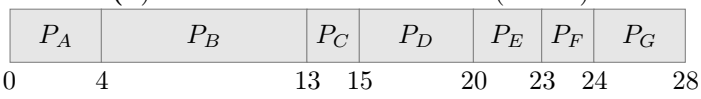
(d) Round-robin (RR), Quantum = 5

Draw a Gantt chart (time line) showing which process is executing over time and calculate the average waiting time and average completion time.

Notes : (1) In SRTF, if a process arrives with service time equal to the remaining service time of the process currently being served, the current process is not interrupted. (2) In RR, if a process arrives at the same time a quantum finishes, the running process is preempted and the new arrival executes. The preempted process goes to the end of the ready queue. (3) Waiting time and completion time is defined as in the slides.

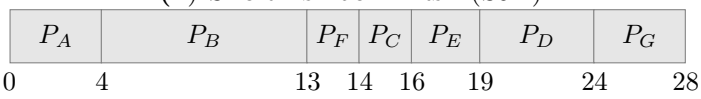
Solution

(a) First-come first-served (FCFS)



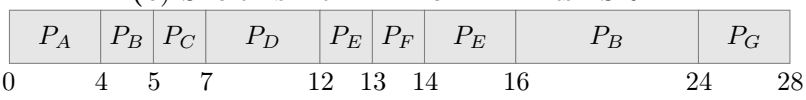
Average waiting time: $(0 + 1 + 8 + 8 + 9 + 10 + 3) \div 7 = 5.6$
Average completion time: $(4 + 8 + 10 + 13 + 12 + 11 + 7) \div 7 = 9.3$

(b) Shortest-job first (SJF)



Average waiting time: $(0 + 1 + 9 + 9 + 9 + 0 + 3) \div 7 = 4.4$
Average completion time: $(4 + 10 + 11 + 14 + 12 + 1 + 7) \div 7 = 8.4$

(c) Shortest remaining time first SRTF



Average waiting time: $(0 + 12 + 0 + 0 + 2 + 0 + 3) \div 7 = 5$
Average completion time: $(4 + 32 + 2 + 5 + 3 + 1 + 7) \div 7 = 14.1$

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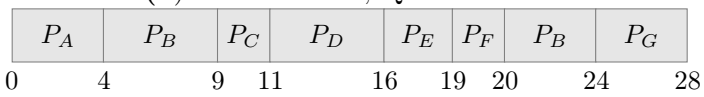
(d) Round-robin, Quantum = 5



Average waiting time: $(0 + 16 + 4 + 4 + 5 + 6 + 3) \div 7 = 5.4$
Average completion time: $(4 + 36 + 6 + 9 + 7 + 6 + 7) \div 7 = 10.7$