

CSCI 3453: Operating System Concepts

HW Assignment # 4

Due Date: March 7, 2021 @ 11:55 PM

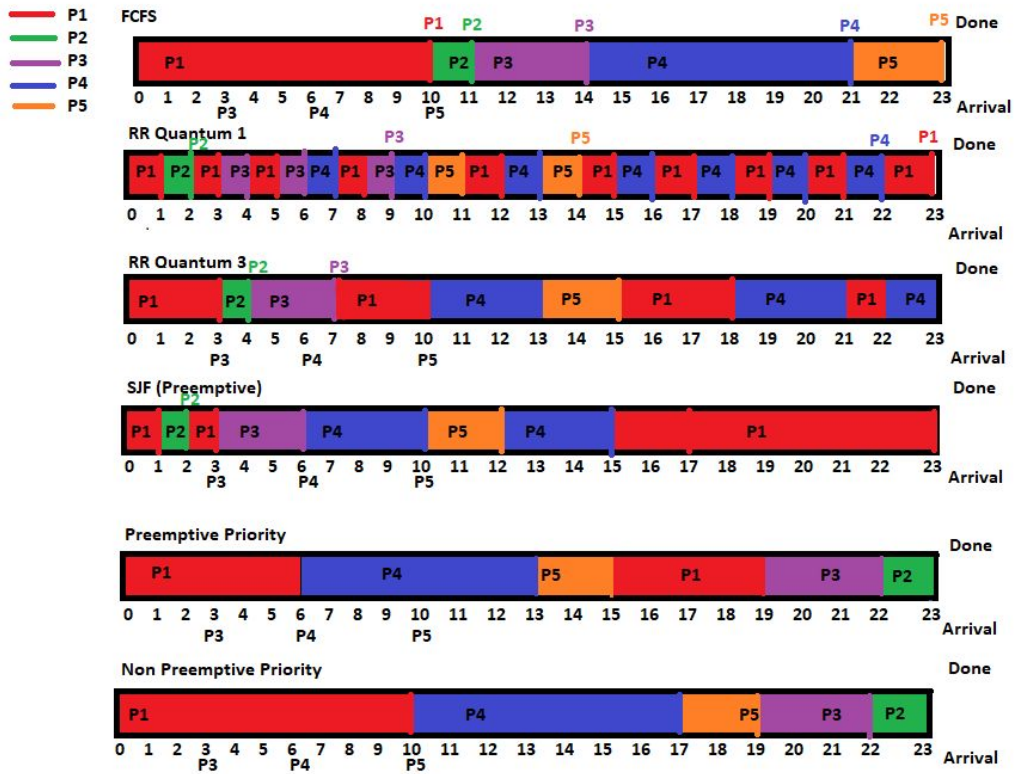
- 1) A CPU-scheduling algorithm determines an order for the execution of its scheduled processes. Given n processes to be scheduled on one processor, how many different schedules are possible? Give a formula in terms of n .
 $n!$
- 2) Many CPU-scheduling algorithms are parameterized. For example, the RR algorithm requires a parameter to indicate the quantum time. Multilevel queues require parameters to define the number of queues, the scheduling algorithm for each queue, the criteria used to move processes between queues, and so on.

These algorithms are thus really sets of algorithms (for example, the set of RR algorithms for all time slices, and so on). One set of algorithms may include another (for example, the FCFS algorithm is the RR algorithm with an infinite time quantum). What (if any) relation holds between the following pairs of algorithm sets?

- 1) Priority and SJF
 - Shortest job has highest priority
 - 2) Multilevel feedback queues and FCFS
 - Lowest level of feedback queue is FCFS
 - 3) Priority and FCFS
 - FCFS assigns priority in terms of longest existence in ready queue
 - 4) RR and SJF
 - None
- 3) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Arrival Time	CPU Burst Time	Priority
P1	0	10	2
P2	1	1	4
P3	3	3	2
P4	6	7	0
P5	10	2	1

- 1) Draw six Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, preemptive SJF, RR (quantum 1), RR (quantum=3), preemptive priority (a smaller priority number implies a higher priority), and non-preemptive priority (a smaller priority number implies a higher priority).



- 2) What is the turnaround time of each process for each of the scheduling algorithm in part (a)?
 $\text{completion} - \text{arrival} = \text{turnaround}$

	FCFS	RR(Q1)	RR(Q3)	SJF	p-Priority	non-Priority
P1	10	23	22	23	19	10
P2	10	1	1	1	1	1
P3	11	6	4	3	3	3
P4	15	16	13	9	7	7
P5	13	4	2	2	2	2

- 3) What is the waiting time of each process for each of the scheduling algorithms in part (a)?
 $\text{turnaround} - \text{burst} = \text{waiting time}$

	FCFS	RR(Q1)	RR(Q3)	SJF	p-Priority	non-Priority
P1	0	13	9	13	9	0
P2	9	0	0	0	0	0
P3	8	3	1	0	0	0
P4	8	8	6	2	0	0
P5	11	2	0	0	0	0

Create the text file using Microsoft Word, Open Office Writer, or a text editor. Name the document as follows:

FirstName_LastName_HW4

Rubric for Grading:

	Description	Points
Question 1		10
Question 2		20
Question 3		90
Total Points		120