

CS162, Spring 2004  
 Section 6 Quiz 1  
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Directions: Complete the following questions as best you can. You're encouraged to discuss these questions with the people around you. This quiz IS NOT GRADED. Its only intended to help you understand the material.

1. Consider the following processes and their associated arrival times and processing time requirements.

Process Arrival	Arrival Time	Processing Requirements
A	0	1
B	2	5
C	3	1
D	6	3

Complete the following table to indicate which process will be scheduled on the CPU using different scheduling algorithms. Assume that the time slice is 1 unit. For RR, assume that new processes are scheduled immediately.

Time	FIFO	RR	SJF	SRTF
0	<i>A</i>	<i>A</i>	<i>A</i>	<i>A</i>
1				
2	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>
3	<i>B</i>	<i>C</i>	<i>B</i>	<i>C</i>
4	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>
5	<i>B</i>	<i>B</i>	<i>B</i>	<i>B</i>
6	<i>B</i>	<i>D</i>	<i>B</i>	<i>B</i>
7	<i>C</i>	<i>B</i>	<i>C</i>	<i>B</i>
8	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>
9	<i>D</i>	<i>B</i>	<i>D</i>	<i>D</i>
10	<i>D</i>	<i>D</i>	<i>D</i>	<i>D</i>
11				
12				
13				
14				
15				

*A few more details about the solution:*

- *FIFO and SJF do not produce the same schedule in general--that just happens to be the case in this example.*
- *In SJF, at time slice 7 when job B finishes, jobs C and D are both in the ready queue. Job C is selected to run because it is shorter.*

- *In SRTF, at time slice 6 when job D arrives, job B requires only 2 more time slices to complete. Because that is less than the time remaining to complete job D, job B is chosen to run (and finish).*

2. Compute the average response time for each algorithm. Which algorithm provides the fastest average response time in this example? Does that algorithm always provide the fastest response time?

*The average response times are:.*

- *FIFO:  $1 + 5 + 5 + 5 / 4 = 16 / 4 = 4$*
- *RR:  $1 + 8 + 1 + 5 / 4 = 15 / 4 = 3.75$*
- *SJF:  $1 + 5 + 5 + 5 / 4 = 16 / 4 = 4$*
- *SRTF:  $1 + 6 + 1 + 5 / 4 = 13 / 4 = 3.25$*

*The SRTF algorithm results in the fastest response time in this example.*

*In fact, the SRTF algorithm always provides the fastest response time-- provably so. SJF provides the fastest response time among non-preemptive policies. The disadvantage of SRTF and SJF is that they may lead to starvation.*