

HW6 solution

Q1:

Consider the following scenario for $n=2$.

Both p_0 and p_1 initiate entry at the same time, and they both read $\text{Number}[0] = \text{Number}[1] = 0$.

p_1 completes the write $\text{Number}[1] = 1$ first, and then p_1 enters the critical section before $\text{Number}[0]$ is written as 1 by p_0 .

Then, p_0 completes writes $\text{Number}[0] = 1$. Now, $\text{Number}[1] = \text{Number}[0]$ and the process ids are used to break tie: $(\text{Number}[1], 1) > (\text{Number}[0], 0)$.

Then, p_0 enters the critical section. The mutual exclusion property is violated, because p_1 is also in the critical section.

Q2:

Following table shows an execution that results in a deadlock.

P0 starts	P1 starts
	Line2
Line3	
	Line3
Stuck at line6	Line5, go back to line2
	Stuck at line2

Q3:

- (a) Eventual Consistency:
7 possible values: [0, 1, 2, 3, 4, 5, 6]
- (b) Read-my-write
1 possible value: [6]

Q4:

- (a) It is not possible. p will conclude q has crashed in bounded amount of time.
- (b) It is possible. Say all messages have a delay that is 10 seconds. p would have concluded that q has crashed after $t = 1$ second