CSCE 311 FALL 2017

Process Coordination

Name:_____ Due: _____

1. Consider a version of the bounded buffer problem in which there are one producer process (P_1) and two consumer processes (P_2 and P_3) all sharing the same buffer. Assume that the size of the buffer is n = 4, and that we start with a completely empty buffer. The structure of P_1, P_2, and P_3 as well as the semaphores and buffer is shown below:

```
/* structure of P1 */
do {
   ……
   produce an item in nextp
   ……
   wait(empty)
   wait(mutex)
   buffer[in]= nextp
   in = (in + 1) % n
   signal(mutex)
   signal(full)
}while(1)
```

```
/* structure of P2 & P3 */
do {
   wait(full)
   wait(mutex)
   nextp = buffer[out]
   out = (out + 1) % n
   signal(mutex)
   signal(empty)
   ……..
   consume item in nextp
   ……..
}while(1)
```

	item 0
	item 1
	item 2
	item3

0	in
0	out
4	empty
0	full
1	mutex

Assume a preemptive scheduler and that all processes start in the ready queue at the same time in the order from head to tail, P3, P2, and P1 (P3 at the head of the queue). Let the process priorities be: P3 = 1, P2 = 1, and P1 = 2.

Draw the contents of the indices “in” and “out”, as well as the state of the semaphores and the contents of the buffer ***after 2 items have been consumed***. In the case of the buffers, simply notate each item with the name of the process that accessed it last.