CMSC 312 Spring 2022 Assignment #2

Due Date: Wednesday 3/23/2022

1) Implement the counting semaphores using binary semaphores. Pseudo-code for the implementation is given in the attached notes on Canvas: 10x-countingSemUsingBinarySem.pdf
   Use the bounded-buffer producer-consumer problem as uploaded on Canvas (first code at https://jlmedina123.wordpress.com/2014/04/08/255/). Show the output of this code for BOTH the incorrect and correct implementations. Also, attach your codes (two versions: for incorrect and correct solutions) on Canvas. (10+10)

2) The bounded-buffer solution in the above code uses a last-in-first-out strategy (LIFO). Change the code to implement a FIFO strategy. You may use the (in,out) pointer method discussed in Chapter-3 (using semaphores to test if the queue is full or empty should alleviate the problem of only using up N-1 locations) or implement a FIFO queue. Use the correct counting semaphore implementation from (1) for this. (20)

3) Consider the sample code for the reader-writer problem on Canvas. Change this code using **counting semaphores** to implement the scenario where the number of active readers is upper-bounded by N. Use the correct implementation of counting semaphores from (1) in this modified code. (20)

Deliverables: (i) 4 different code files (two from (1), one each from (2) and (3)), (ii) A report showing the outputs from each of the above 4 cases.

Late Policy:

5 points will be deducted for each day the assignment is late upto a maximum of 2 days (10 point deduction).