CO322: Data Structure and Algorithms

Lab 01 – Part 3: 3 hour Challenge

February 11, 2016

Implement the following and submit **before 5:00 pm today (February 11, 2016)** to win the 3 hour challenge (& *most probably* win some prizes).

Challenge 1: ***Implement a Queue (the Queue ADT) using two stacks***. i.e., the Queue implementation can only utilize two Stacks to provide the Queue ADT. You cannot use any other data structure such as an Array or a Linked-list. You must use your own stack implementation for this. If you haven't implemented the Stack ADT yet, then you'll have to implement it first.

Challenge 2: ***Write a function to transfer the items in a Queue to a Stack keeping the order*** (i.e., the ***front*** of the Queue should end up at the ***top*** of the stack). You can utilize any data structure you have created (e.g., stacks, queues, linked-lists) and arrays as intermediary stores of data.

Challenge 3: ***Implement a Stack using two Queues***. This is a new stack implementation, separate from the stack implementations in Lab 01 – part 1. This new Stack implementation should only use two Queues as data structures to provide the Stack functionality. If you haven't implemented a Queue ADT for lab 01 – part 2, you can use the Queue implementation developed for challenge 1 above.

Bonus Marks 1: Proper documentation/comments (explanatory, not redundant!)
Bonus marks 2: Write programs to demonstrate the functionality of your programs.

RULES

1. The winners will be decided based on the following
    a. Correct solution(s)
    b. Efficiency & elegance of the algorithms
    c. Bonus marks
    d. Time taken for submission (as a tie breaker, if necessary!)
2. Remember: Submitting partial solutions may allow you to win! Others may have not done even that much!
3. You shouldn't lookup possible solutions/answers on the Internet. Violation of this would result in disqualification.