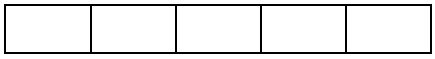
CS 201 – Data Structures II (L2), Spring 2024
Quiz # 1

Name: _____ ID: _____

Q1 - Given an initially empty circular queue, implemented using the backing array of initial size 5. Perform the following operations on the queue and show the status of queue after each step. The result should show elements in the queue and the positions of front(f) and rear(R) pointers. The backing array will be resized to double if it gets full. No shrinking is happening.

- enqueue(c)
- dequeue()
- enqueue(d)
- enqueue(e)
- dequeue()
- enqueue(f)
- enqueue(g)
- enqueue(h)
- enqueue(i)
- dequeue()

F=R=0



Q2 - ADyck word is a sequence of +1's and -1's with the property that the sum of any prefix of the sequence is never negative. For example, +1; -1; +1; 1 is a Dyck word, but +1; -1; -1; +1 is not a Dyck word since the prefix +1-1-1 < 0. Provide pseudocode for a function that uses stack to check if a given sequence (seq) forms ADyck word or not.

Q3 - Suppose you have a deque *D* containing the numbers (1, 2, 3, 4, 5, 6, 7, 8), in this order. Suppose further that you have an initially empty queue *Q*. Give a sequence of instructions that uses only *D* and *Q* (and no other variables) and results in *D* storing the elements in the order (1, 2, 3, 5, 4, 6, 7, 8).

Q4 - We discussed that the complexity of add(i,x) and remove(i) operations of List implemented using a fast circular DEQUE is O(min(i, n-i-1). Why is this so? Clarify.