

Class Test 02 - Stack and Queue

Data Structure and Algorithm Lab 1

(Open Book - You may use any resources)

June 19, 2025

Question 1:

Implement a Queue Using Two Stacks: Use only the STL `stack` container to implement a custom Queue class with:

- `enqueue()`
- `dequeue()`
- `front()`

Implement both:

- a. Costly `enqueue()`
- b. Costly `dequeue()`

Question 2:

Check Palindrome Using Stack and Queue: Write a C++ program to check whether a given string is a palindrome, using:

- A stack (for reverse order)
- A queue (for original order)

Ignore case and non-alphabetic characters.

Question 3:

Celebrity Problem Using Stack: In a party of n people, a celebrity is defined as someone who is known by everyone but knows no one. Given a `matrix[n][n]`, where `matrix[i][j] = 1` if person i knows person j , write a C++ function using stack to find the celebrity (if any).

Question 4:

Sliding Window Maximum Using Deque: Write a function to find the maximum of all subarrays of size k in an array using a **deque** for optimal performance. Example:

Input: `arr = [1, 3, -1, -3, 5, 3, 6, 7]`, `k = 3`

Output: `[3, 3, 5, 5, 6, 7]`

Hint: Use Deque to keep track of useful elements for each window.

— End of Questions —