

CS23302 DATA STRUCTURES LAB

Week 2

Date: 17.07.2025

Lab 2: Linear Data Structures

OBSERVATION - Reasoning based Questions (Come prepared with answers written in notebook)

1. Can a queue implemented using an array ever show "overflow" even when elements have been dequeued? Explain how and why. How can this be resolved?
2. You are to implement a queue using two stacks. Which operations become more expensive (enqueue or dequeue), and why? Provide the logic.
3. Can you use a single stack to reverse a string and check if it's a palindrome? Provide the logic.

EXECUTION QUESTIONS

PART A: Array Implementation of Stack and Queue

1. Simulate a parking garage where cars are parked in a stack (LIFO) structure using arrays. When a car exits, cars on top must be moved temporarily. Implement this and print the number of moves required to retrieve a specific car.
2. A banking kiosk maintains a queue for customers. Implement a queue using arrays that supports customer arrival (enqueue) and service (dequeue). Add a feature to print the average waiting time assuming each service takes 5 minutes.

PART B: Linked List Implementation of Stack and Queue

3. Implement a queue using a linked list to manage print jobs in a college lab. Each print job has job ID, pages, and user name. Include options to: enqueue a job, dequeue a job, and view current job in front of the queue.
4. Design a browser backtracking system using a stack implemented as a linked list. Each node should store the URL of a visited page. Include operations to: visit a new page, go back, and display history.