

## Assignment II

Submit any two programs by 24<sup>th</sup> October 2024

Submit remaining two programs by 6<sup>th</sup> November 2024

### Instructions:

1. **Submit individually or in groups with a maximum of two members. Group members should be in the same section.**
2. There will be a viva after the submission. Dates will be announced later
3. **One submission per group**
4. **One file per question** with the format **rollnumber1\_rollnumber2\_qno.c** if a **group submission** is made. If done **individually** **rollnumber1\_qno.c**

Q1. Consider a parking lane with 10 slot number numbered 0...9. Cars enter the lane from one end and park their cars. Cars exit the parking lane from the other end. If a car, e.g. in slot 4, has to exit, then all the cars in slots 0 to 3 are put into a temporary queue. Once a car in slot 4 exits, cars are put back in the same order.

Assume that each car is an integer number. Write a program to simulate the parking lane. You can use any data structure/combination of data structures from stacks/queues-circular/priority/simple of your choice.

Input: [0,1,2,3,4,5,6,7,8,9] Want to remove car 4 Output: [0,1,2,3, , 5,6,7,8,9]

Input: [0,1,2,3, , 5,6,7,8,9] Want to add car 44 Output: [0,1,2,3, 44, 5,6,7,8,9]

Q2. Consider a petrol filling station with a single filling booth. Cars line up to fill fuel as they come into the filling station and are serviced on a first come first serve basis. However, if an ambulance arrives then it jumps the line and becomes the first in the waiting queue. Write a program to simulate the petrol filling station. Assume the ambulance is represented by a special integer number.

Q3. Consider an organization has many departments like sale, HR, accounts etc. Each department has a number of employees. An employee has an employee id and employee name.

- a) You have to maintain a separate list of employees for every department. Use linked lists for this. The employees may be connected to each other in any order. Create an array of departments such that each department points to the correct list of employees.
- b) Write a menu driven program to
  - a. retrieve all the employees of a user given department.

b. Retrieve a specific employee detail

Q4. The daily price of stock of a company ABC is given. You have to determine, it's span. For this, look at the maximum number of consecutive days (starting from today and going backwards) for which the price of the ABC's stock was less than or equal to today's price. Write a program to determine the span of ABC's stock. Find out the complexity of your program.

Input: [50] Output: [1]

Input: [50, 40] Output: [1, 1]

Input: [50, 40, 30] Output: [1, 1, 1]

Input: [50, 40, 30, 35, 37, 20, 35] Output: [1, 1, 1, 2, 3, 1, 2]