RV UNIVERSITY
Go. change the world
an initiative of RV EDUCATIONAL INSTITUTIONS

School of Computer Science & Engineering
B.Tech (H) Program

Internal Assessment I Examination
Academic Year: 2023– 2024
Semester: II

Date: 04 March 2024 Time: 02.00 PM – 03.30PM
Course Code: CS1020
Course Name: Data Structures and Algorithms
Max Marks: 15 SET 2

USN: 1 R V U 2 3 C S E

Section: I

PART A (6 Marks)

1. Using pen & Paper, trace the following operations performed in a Circular Queue of size 3. **(2 Marks)**
   i. Enqueue(25) iii. Display() v. Enqueue(25)
   ii. Enqueue(67) iv. Dequeue() vi. Display()
2. **A + B / C * (D – F)** is an **infix** expression **(4 Marks)**

a. Convert the expression into its **postfix** form by tracing the conversion on pen & paper, using stack.
b. Write a full 'C' program to implement infix to postfix conversion.

PART B (Answer for 4 Marks)

3. A standard circular Queue q implemented using an array whose size is 12 from 0 to 11. The front & rear pointers start to point at $q[3]$. Trace the execution of adding the **tenth** element into the q. At which position will it be added? Justify your answer by giving a proper explanation. Implement ***only*** the `'isFull' and 'isEmpty' function` of this Circular Queue **(2 Marks)**
4. Assume that you are a buffet manager monitoring a **queue** of people standing to get the plate and have a buffet lunch. Five elderly people of different ages walk in towards you. You will request five younger people near the front of the queue to give up their position so that the older people can get their lunch ahead of these people. Which data structure in the computer world mimics this real-life scenario? Justify your answer. **(2 Marks)**

(OR)

5. Name the data structure that can be used to mimic the following scenarios in real life. Justify why you feel that data structure should be used. Also implement the basic operations of this data structure. **(4 Marks)**

a. Wash a pile of dirty plates kept near a sink. b. Storing the web browsing URL links visited.

PART C (5 Marks)

6. As part of a bride's wedding attire, a bride puts a big gold bangle into her right hand, followed by 'n' glass bangles matching the color of her wedding saree, and then puts another big gold bangle over these glass bangles in her right hand. Her left hand has a wrist watch given by her bridegroom as a gift. The bangles cost Rs.75000/- each, the wrist watch costs Rs.40,000/- and the glass bangles Rs.75/- each. After the wedding function, she needs to change into a lehenga-choli and have only the two gold bangles in her right hand and all unbroken glass bangles in her left hand. The wrist watch is to be removed. This means she needs to remove the glass bangles from her right hand to the left. It also means that by doing so, she will break a few bangles. She has to only wear in her left hand, the unbroken glass bangles of the original set, which was in her right hand. She cannot add new bangles to replace the broken ones. Write a C Program assuming there are 'n' glass bangles, to implement the following scenarios - the bride needs to know: **(5 Marks)**

a. How much is the total cost of her bangles in her wedding sari attire?
b. How much money did she lose by breaking the glass bangles?
c. How much is the total cost of bangles in her right and left hands in the lehenga-choli dress?

----------**ALL THE BEST**----------