



Indian Institute of Information Technology Sri City, Chittoor
(An Institute of National Importance under An Act of Parliament)

Name: **DSA Lab - 6**
Date: **20th May, 2021**

Duration: **3 Hrs**
Maximum Marks: **10**

INSTRUCTIONS:

1. Please carefully read all assignment problems and answer in the same .c file.
2. Submit **single .c file** for the first **THREE PROBLEMS only**. At a time only one code can be used for execution. Rest should be commented.
3. Name the file as follows: S2020xxxxx_A6.c
4. **DO NOT** zip. Just attach single .c file directly to your submission in the common Google classroom.
5. For the first three problems, **print the Time Complexity** and provide the description as **COMMENTS in the code**.

****If you do not follow the above-mentioned instructions, a suitable penalty would be imposed.***

ASSIGNMENT PROBLEMS

1. It is required to split a queue into **TWO** queues so that all the elements in odd positions are in one queue and all the elements in even positions are in another queue. Write a program SPLITQ to accomplish this. **[2 Marks]**
2. Implement an algorithm REVERSEQ that will reverse all the elements in a circular queue maintained using linked list.
NOTE: You need to reverse the circular linked list by changing the links between the nodes. **[3 Marks]**
3. You need to implement a Circular Queue using Linked List. The following information is given below.
You are given two numbers **N** and **Q** denoting the maximum size of the queue and number of queries respectively. Assume that the queue is empty initially. **[5 Marks]**

There are four types of queries:

- Type 1: **E n**, denotes enqueue the number **n** into queue if queue is not full otherwise print "Overflow" without quotes.
- Type 2: **D**, perform dequeue operation and print nothing if queue is not empty otherwise print "Underflow" without quotes.
- Type 3: **F**, print the front element if queue is not empty otherwise print "Empty" without quotes.
- Type 4: **R**, print the rear element if queue is not empty otherwise print "Empty" without quotes.

Consider $N = 2$ and $Q = 4$, print the output for the below input.

E 1
E 2
E 3
F
D
D
E 5
F
R
D
R

-----PRACTICE PROBLEM-----

You are given a binary string, (string which contains 0's and 1's), You have to perform several operations on this string, in one operation choose a non-empty **even length substring** containing only 0's or only 1's and remove it from the string.

Your goal is to minimize the final length of the string after performing several operations. It is possible that the final string may become empty, in that case print **"EMPTY"** without quotes.

***** GOOD LUCK *****