Department of Computer Science and Engineering
Indian Institute of Technology (ISM) Dhanbad
Mid Semester Examination, Monsoon, 2023-24

Course Name (Code): Data Structures Lab (CSC204) **Max Marks: 30**
Discipline: III BTech (CSE) **Time: 1Hr 45 Mins**

Instruction:

[i] Answer **all** the questions.

[ii] After completion of the experiment, do the following:

- Create a single folder with a name as **"<AdmissionNo>_<MidSem>"** and put all your source files inside of it.
- Zip this folder and send through the *e-mail id*: dsalab2023@gmail.com.

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1. Write a program to implement the following functions, and called them in sequence.

a) ***CreateList***( ): This function will take two separate ascending order sequences as input from the user. Then the function will create two separate doubly linked lists from these two sequences.

Sample Input:
Enter the first sequence: 1 5 7 9 11 15
Enter the second sequence: 2 4 7 10

Sample Output:
First List: 1 ↔ 5 ↔ 7 ↔ 9 ↔ 11 ↔ 15
Second List: 2 ↔ 4 ↔ 7 ↔ 10

b) ***Merge***( ): This function will merge the above two sorted lists into a single sorted list. Note that the ***Merge***( ) function **should not use any additional list**.

Sample Output:
Merged List: 1 ↔ 2 ↔ 4 ↔ 5 ↔ 7 ↔ 7 ↔ 9 ↔ 10 ↔ 11 ↔ 15

[5+10]

2. Create a $Queue$ ADT for performing $Enqueue()$ and $Dequeue()$ operation. Then solve the following problems using the created ADT.

a) Create an instance of $Queue$ and populate that queue by $enqueue$ N (where N is even) elements.

Sample Input:
Enter N: 8
Enter the elements:1 2 3 4 5 6 7 8

Sample Output:
Created instance is: 1 2 3 4 5 6 7 8

b) Rearrange the elements of the created queue by interleaving the elements of reversed first half of the queue with the elements of reversed second half of the queue. Note that you are **only allowed to use a single stack** apart from the original queue to solve this problem.

Sample Output:
4 8 3 7 2 6 1 5

[5+10]