National University of Computer and Emerging Sciences

Lab Manual

for

Data Structures

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Section	BCS-3A
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Lab Manual 06

Objectives:

After performing this lab, students shall be able to revise:

✔ Implementation of a Queue ADT using Linked List, Array and stack

NOTE: Create a separate file for each task.

Q1. Implement the Link list question of the Exam.

Your task is to write a C++ function "**deleteSubSequence**" that removes the desired subsequence from a singly linked list of integers that store binary digits such that each node either stores zero or one. This function must delete all the sublists/sequences containing binary representations that are positive powers of 2 (2^0=1 is not included). For Example, 2^1 = 10, 2^2 = 100 and so on.

Below is a table that contains sample inputs and outputs.

Input:	1->1->0->0->1->0->1	1->0->0->0->1->1->0	0->1->1->1	1->0
Output:	1->1	1	0->1->1->1	null

Assume that the singly linked list has dummy/sentinel head and tail nodes. *Traverse the list using an iterator and remove the required subsequences*.

If you need any helper function, write down its definition as well.

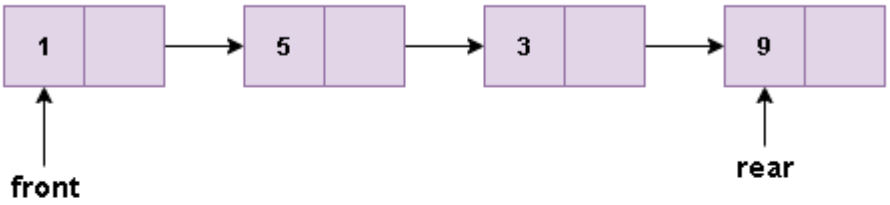
Note that this function is a non-member function.

Q2. Implement a class Queue Using Link List

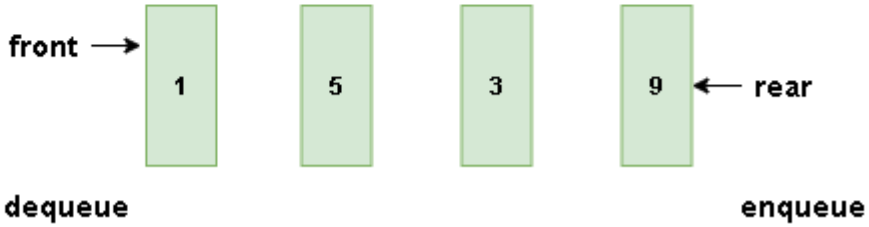
Implement the following functions

A. **IsFull:**
B. **IsEmpty:**
C. **Enqueue:** Add an element to the queue.
D. **Dequeue:** Removes front element from the queue.
E. **Print:** It will print all elements of the queue in FIFO order

Linked List Representing Queue



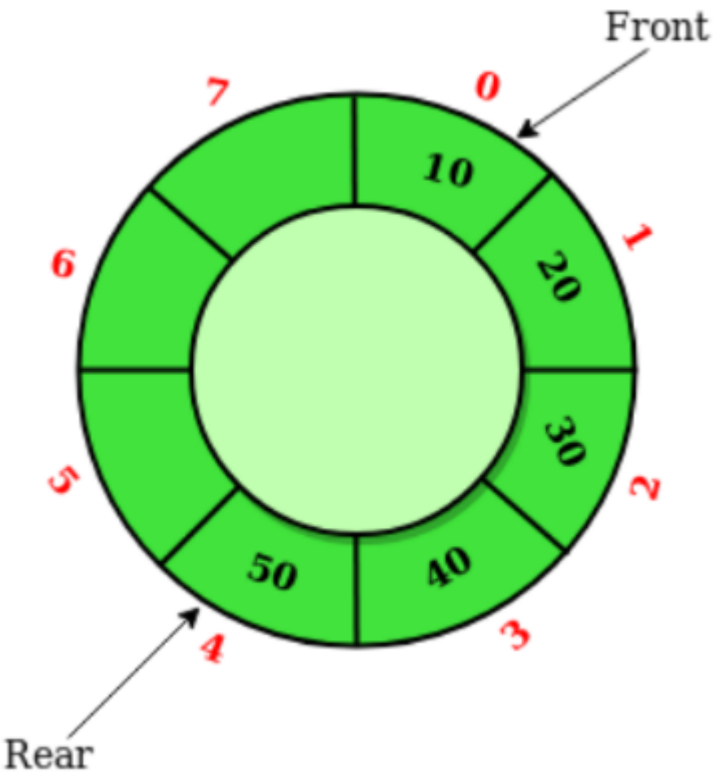
Queue



Q3. Implement a class Queue Using Array as a circular list

Implement the following functions

F. **IsFull:**
G. **IsEmpty:**
H. **Enqueue:** Add an element to the queue.
I. **Dequeue:** Removes the front element from the queue.
J. **Print:** It will print all elements of the queue in FIFO order

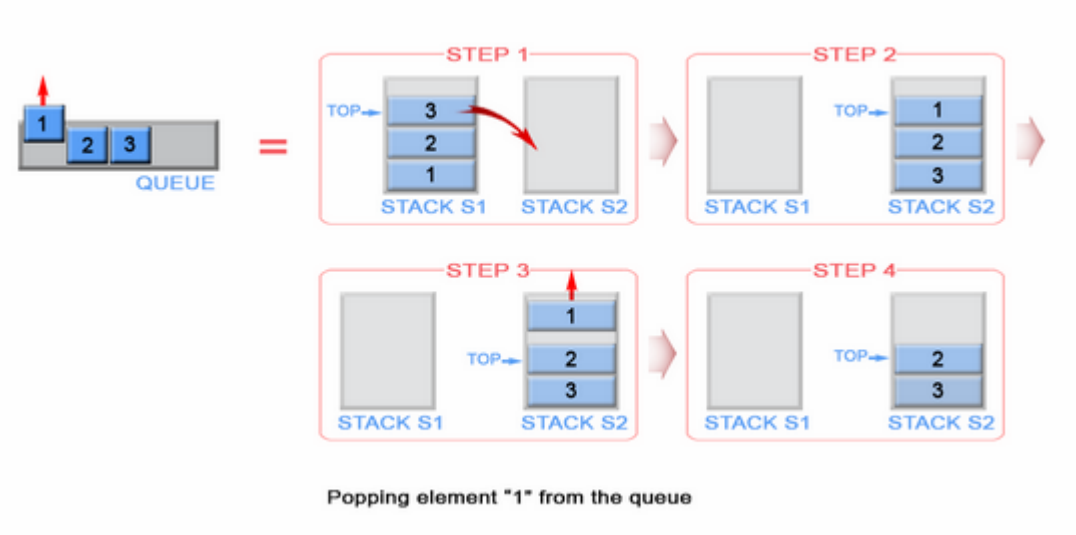


Q4. You have to implement a template class queue using stack objects. The private members of the Queue class are just stack objects and you can only use operations of stacks.

Implement the following functions:

A. **IsFull:**
B. **IsEmpty:**
C. **Enqueue:** Add an element in the queue.
D. **Dequeue:** Removes a front element from the queue.
E. **Print:** It will print all elements of the queue in FIFO order

NOTE: you are not allowed to use any array or link list in the queue class.



Popping element "1" from the queue

Good Luck!