



ACADEMY OF TECHNOLOGY

Lab Assignment (Day 1)

Paper name: Design and Analysis of Algorithms Lab
Code: PCC-CS494
Discipline: CSE

Semester: 4th
Time: 2 Hours

Date: February 21, 2023

1. Write a menu driven program in C or C++ to implement the following functions of a stack using array.
 - a. *void push(int)* to add an item in the stack.
 - b. *int pop()* to removes an item from the stack.
 - c. *int peek()* to return top element of stack.
 - d. *int isFull()* returns **1** if stack is full, else **0**.
 - e. *int isEmpty()* returns **1** if stack is empty, else **0**.
 - f. *void print()* to display the items in the stack.
2. Write a menu driven program in C or C++ to implement the following functions of a queue using array.
 - a. *void insert(int)* to add an item in the queue.
 - b. *int del()* to removes an item from the queue.
 - d. *int isFull()* returns **1** if queue is full, else **0**.
 - e. *int isEmpty()* returns **1** if queue is empty, else **0**.
 - f. *void print()* to display the items in the queue.

3. Write a menu driven program in C or C++ to implement a queue using stack using array.

A queue can be implemented using two stacks. Let queue to be implemented be **Q** and stacks used to implement be **S1** and **S2**. Queue **Q** can be implemented in two ways: 1: by making delete operation costly and 2: by making insert operation costly.

An implementation of a queue **Q**, using two stacks **S1** and **S2**, is given below (by making delete operation costly):

```
1 void insert(Q, x) {  
2     push (S1, x);  
3 }
```

```

1 void delete(Q){
2     if(isEmpty(S2)) then
3         if(isEmpty(S1)) then {
4             print("Queue is empty");
5             return;
6         }
7         else while (!(isEmpty(S1))){
8             x=pop(S1);
9             push(S2,x);
10        }
11    x=pop(S2);
12 }

```

Example:

