CL-2001
Data Structures
Lab # 5

Objectives:

- Stack ADT
- Stack Linked list

Note: Carefully read the following instructions (*Each instruction contains a weightage*)

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function and about its functionality.
3. Mention comments where necessary such as comments with variables, loop, classes etc to increase code understandability.
4. Use understandable name of variables.
5. Proper indentation of code is essential.
6. Write a code in C++ language.
7. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of every task **outputs in Microsoft Word and submit word file. Do not submit .cpp file.**
8. First think about statement problems and then write/draw your logic on copy.
9. After copy pencil work, code the problem statement on MS Studio C++ compiler.
10. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Google Classroom. (Make sure your submission is completed).
11. Please submit your file in this format **19F1234_L4**.
12. **Do not submit your assignment after deadline. Late and email submission is not accepted.**
13. **Do not copy code from any source otherwise you will be penalized with negative marks.**

Problem: 1 | Stack ADT | 60 Mins

Implement the stackADT with size 10. It should have the following functions:

1. initializeStack: Initializes the stack to an empty state.
2. isEmptyStack: Determines whether the stack is empty.
3. isFullStack: Determines whether the stack is full.
4. push: Adds a new element to the top of the stack.
5. top: Returns the top element of the stack.
6. pop: Removes the top element of the stack.
7. Display: Display all the content of current stack

Implement main() in such a way that working of all the functions mention above will be satisfied.

Driver Code:

```
class IntStack {
    int *stackArray;
    int stackSize;
    int top;
public:
    IntStack(int);
    void Push(int);
    int Pop();
    bool isEmpty();
    bool isFull();
}
```

Problem: 2 | Stack Linked List | 60 Mins

Write a C++ program to implement stack using Linked List.

The program should use the following functions.

```
struct node {
    int data;
    node* next;
};
class StackLL {
    node* top;
public:
    void Push(int elem);
    int Pop();
    bool IsEmpty();
}
```

Problem: 3 | Stack Linked List | 60 Mins

Using one or more stacks, write a code to read a string of characters and determine whether it forms a palindrome. For example ABLE WAS I ERE I SAW ELBA.

Best of luck