

LAB 08

Miss Atika Islam

## 1. Stack using Array and Linked List

### Practice Problems

1- Write a program to implement a stack using a linked list. Include the following operations:

Push (Insert an element at the top of the stack)

Pop (Remove the top element of the stack)

Peek (Return the top element without removing it)

Check if the stack is empty

2- Use a stack (implemented using a linked list) to reverse a given string.

Input: "hello"

Output: "olleh"

3- Write a program to check if a string containing parentheses ({}, [], ()) is balanced. Use a stack implemented with a linked list.

Input: "({[()]})"

Output: Balanced

Input: "({[([)])}"

Output: Not Balanced

4- Sort a stack using recursion and only one additional stack for temporary storage. Implement the stack using a linked list.

Input Stack: [3, 1, 4, 2]

Output Stack: [1, 2, 3, 4]

5- Use a stack (implemented using a linked list) to evaluate a postfix expression.

Input: "231\*+9-"

Output: -4

6- Modify the stack implementation (using a linked list) to include a getMin() function, which returns the minimum element in the stack in O(1) time.

7- Reverse a given linked list using a stack (implemented with another linked list).

Input: 1 → 2 → 3 → 4

Output: 4 → 3 → 2 → 1

8- Given an array, find the next greater element for each element using a stack implemented with a linked list.

Input: [4, 5, 2, 10]

Output: [5, 10, 10, -1]