**National University of Computer and Emerging Sciences**



Laboratory Manual

for

Data Structures Lab

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| Section | BCS-3H |
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**Objectives:**

In this lab, students will practice:

1. Stack with single linked list

**Question 1**

Implement a template-based stack using a singly linked list. The required member methods are:

1. **int size()**: returns the count of total element stored in the stack.
2. **bool isEmpty()**: returns true if the stack is empty else false.
3. **bool top(T&)**: returns, but does not delete, the topmost element from the stack via the parameter passed by reference. It returns false via a return statement if there is no element in the stack, else it returns true and assigns the top most element to the parameter passed by reference.
4. **void pop()**: deletes the top most element from the stack. If there is no element, return some error.
5. **push(T const& e)**: pushes the element “e” on top of the stack.

**Question 2**

# Remove all triple adjacent characters from a string using Stack.

**Input:** azxxxy

**Output:** azy

**Question 3**

Given an expression containing opening and closing braces, brackets, and parentheses.

Implement a function “**isBalanced**” to check whether the given expression is a balanced expression or not, using your stack implementation.

bool isBalanced(string exp)

For example, {[{}{}]}[()], {{}{}}, and []{}() are balanced expressions, but {()}[) and {(}) are not balanced. In your main function test your function using the given examples.

**Note:** You are required to find time complexity of every function mentioned above and mention in comments with the respective function.