Data Structures & Algorithms

BIT F21 | Lab # 02

Lab Instructor : Dr. Madiha Khalid

June 21 , 2023

Instructions :

- You are not allowed to use stack class from C++ STL .
- To get the full credit , you have to keep in mind all the corner cases and implement the counter-checks as well as throw an exception where required .
- **YOU ARE NOT ALLOWED TO :**
  - **Use internet or mobile phone**
  - **Have discussion with your classmates**

YOUR MARKS WILL GET DEDUCTED IF YOU ARE FOUND GUILTY OF DOING SO ! Good Luck :)

Challenge 1

(Reverse Array)

Implement a template function which receives an array and reverses its elements **using stack.**

```
void reverseArray(T* arr, int size);
```

Challenge 2

(Palindrome)

A string is called palindrome if it remains the same even if it is reveresed. For example, the string "racecar" is a palindrome because its reversed string is also "racecar". Your task is to implement a function that receives a string and tells whether it is palindrome or not using stack.

```
bool isPalindrome(const string& str);
```

Challenge 3

(Balanced Parentheses)

Your task is to implement a function that receives a string and returns true if the parentheses in the expression are balanced otherwise returns false.

You should only consider round brackets “ (   ) ” as parentheses. Parentheses are considered balanced if each opening parenthesis has its corresponding closing parenthesis and they are properly nested.

For example:

“(a + b) * (c - d)” -> balanced

“(((a + b) * (c - d)))” -> balanced

“((a + b) * (c - d)” -> not balanced (missing closing parenthesis)

“(a + b) * (c - d))” -> not balanced (extra closing parenthesis)

```
bool isBalanced(const string& str);
```

Think for while : Does this task really need to be done with stack ?

Challenge 4

(Reverse Words)

Your task is to implement a function that receives a string and reverses each word in it using stack.

You can assume that the string only consists of alphabets and spaces. The order of the words should remain same but characters within each word should get reversed.

For example:

String : “Welcome to DSA”

Modified string : “emocleW ot ASD”

```
void reverseWords(string& str);
```