**Bahria University, Lahore Campus**

Department of Computer Science

Lab Journal 03

**(Spring 2023)**

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| Course: | **Data Structures and Algorithm - Lab** | Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Course Code: | CSL-221 | Max Marks: 10 |
| Faculty’s Name: | Fatima Zulfiqar |  |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enroll No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Objective(s):

Upon completion of this lab session, learners will be able to:

* Implement stack data structure (push, pop, and display)
* Stack Application - Convert decimal to binary
* Stack Application - Convert infix expression to postfix expression
* Stack Application - Convert infix expression to prefix expression

## Lab Tasks:

**Task 1**

Implement stack data structure using arrays and perform following operations.

* Push ()
* Pop ()
* Display ()

**Note:** size of the array should be fixed. Don’t use dynamic array.

**Task 2**

Write a program to convert decimal number (taken from the user) to binary using stack data structure.

**Task 3**

Write a program that takes infix expression from the user and convert it into postfix expression using stack.

**Example:**

**Infix Expression:** A^B\*C-D+E/F/(G+H)

**Postfix Expression:**  AB^C\*D-EF/GH+/+

**Task 4**

Write a program that takes infix expression from the user and convert it into prefix expression using stack.

**Example:**

**Infix Expression:** A^B\*C-D+E/F/(G+H)

**Prefix Expression:**  -\*^ABC+D/E/F+GH

**Hint:**

Reverse given infix expression, remaining logic as it is with the difference of brackets only. Reverse expression in prefix string again before displaying. Strrev()

**Lab Grading Sheet :**

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| --- | --- | --- | --- |
| **Task** | **Max Marks** | **Obtained Marks** | **Comments(*if any*)** |
| 1. | 02 |  |  |
| 2. | 02 |  |  |
| 3. | 03 |  |  |
| 4. | 03 |  |  |
| **Total** | **10** |  | **Signature** |

**Note : Attempt all tasks and get them checked by your Lab Instructor.**