**Bahria University, Lahore Campus**

Department of Computer Science

Lab Journal 12

**(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 Adelson Velsky Landis (AVL) Tree
* Insert given node in an AVL tree and apply balancing factor
* Implement AVL rotations
* Delete nodes from AVL tree

## Lab Tasks:

**Task 1**

Write a program to implement AVL tree using following given data elements. Also display elements in the tree using inorder traversal.

**45 15 79 90 10 55 12 20 50 90 79 6**

AVL tree should be implemented according to the given guidelines.

* Define a class for AVL tree and declare relevant attributes.
* Define a function to calculate height of a node.
* Implement a function to check if a tree is balanced or not.
* Implement function to perform left rotation.
* Implement function to perform right rotation.
* Implement function to perform left-right rotation
* Implement function to perform right-left rotation
* Implement a function to insert new node.

**Task 2**

Using a tree obtained in **TASK 1**, Implement a function to insert new node in the given AVL tree. Lets suppose, new elements to be inserted is **73, 4,** and **100.** Also display resultant tree.

**Task 3**

Implement a function to delete nodes from the given AVL tree. You are required to delete node with value **20** from the AVL tree obtained in **TASK** **2**. Also display the resultant tree.

**Task 4**

Write an algorithm to search for a specific element from AVL tree.

**Note : Attempt all tasks and get them checked by your Lab Instructor. Also for each task, attach a screenshot of the output. You are free to use any other helping functions in your code.**

**Lab Grading Sheet :**

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| **Task** | **Max Marks** | **Obtained Marks** | **Comments(*if any*)** |
| 1. | 6 |  |  |
| 2. | 0 |  |  |
| 3. | 2 |  |  |
| 4. | 2 |  |  |
| **Total** | **10** |  | **Signature** |