**Open Ended Lab II**

**Problem Statement**

Design and implement a multi-utility system in C++ that integrates the following functionalities:

1. **Graph Pathfinding:** Implement a directed weighted graph and allow the user to find the shortest path between two vertices using Dijkstra's algorithm.
2. **Binary Search Tree (BST):** Perform the following operations on a BST:
   * Insert a node.
   * Delete a node.
   * Traverse and display the tree (Inorder, Preorder, and Postorder).
3. **Sorting Algorithms:** Allow the user to input an array of integers and sort it using:
   * Merge Sort.
   * Quick Sort.
   * Compare the number of comparisons and swaps for each algorithm.

**Requirements**

1. Provide a menu-driven program where the user can:
   * Create a graph with given vertices and edges.
   * Compute the shortest path between two nodes in the graph.
   * Perform operations on the binary search tree.
   * Sort an array using two sorting algorithms and compare their performance.
2. Use object-oriented programming (OOP) principles wherever possible.
3. Write clear and modular code with functions for each operation.

**Expected Output**

* Display the shortest path and its cost for the graph.
* Perform and display tree traversals and modifications in the BST.
* Show the sorted array along with a comparison of the performance metrics (e.g., number of comparisons and swaps) for Merge Sort and Quick Sort.

**Note:** Submission should be in PDF format either add git link or complete code. Also add output screens.

**Deadline: 2nd Jan 2025.**