Task 4

Python Tasks and Expected Outputs

Upload .py or Ipynb extension file on GitHub public repo “100DaysofBytewise" and share the link in the submission form by 14 June 2024.

1. **QuickSort Algorithm**
    a. Write a program to implement the QuickSort algorithm.
    b. **Expected Output:** If the input array is [3, 6, 8, 10, 1, 2, 1], the output should be [1, 1, 2, 3, 6, 8, 10].
2. **Knapsack Problem**
    a. Write a program to solve the 0/1 Knapsack Problem using dynamic programming.
    b. **Expected Output:** If the input weights are [1, 3, 4, 5], values are [1, 4, 5, 7], and the maximum capacity is 7, the output should be 9.
3. **Graph Traversal (BFS and DFS)**
    a. Implement Breadth-First Search (BFS) and Depth-First Search (DFS) for graph traversal.
    b. **Expected Output:** If the input graph is {0: [1, 2], 1: [2], 2: [0, 3], 3: [3]}, the BFS starting from node 2 should return [2, 0, 3, 1], and the DFS starting from node 2 should return [2, 0, 1, 3].
4. **Dijkstra's Algorithm**
    a. Write a program to implement Dijkstra's algorithm for finding the shortest path in a graph.
    b. **Expected Output:** If the input graph is {'A': {'B': 1, 'C': 4}, 'B': {'C': 2, 'D': 5}, 'C': {'D': 1}, 'D': {}} and the starting node is A, the output should be {'A': 0, 'B': 1, 'C': 3, 'D': 4}.
5. **Longest Common Subsequence (LCS)**
    a. Write a program to find the longest common subsequence between two strings.
    b. **Expected Output:** If the input strings are AGGTAB and GXTXAYB, the output should be GTAB.