Design and Analysis of Algorithms Practice
LAB 10
Date: 5^{th} November 2024

General instructions:

1. Students have to write the pseudo code first in their notebooks and implement it after that. Students can use either C / C++.

2. The point of contact (Member 1 as submitted in Gform) from the group has to submit all the programs. You may ask the TA, if you forgot the point of contact (Member 1).

3. Submit all the programs as a single Zip file in Google Class Room (GCR).

4. Pseudo code, Demonstration and Viva will be evaluated by the TA for 10 marks each and a total of 30. Pseudo code and Viva will be evaluated in the lab itself.

5. If the students wish to submit the programs later, then they can do it with in 2 days (i.e., if the lab is on Tuesday, then programs need to be submitted by Thursday 11:59 PM by point of contact (Member 1).). This evaluation will be considered for Demonstration 10 marks.

Algorithms

Q1) **Shortest Path Algorithms:** Implement following 2 functions with respect to finding shortest paths.

1. SPATH_DIJKSTRA(Graph G, Vertex S) – find shortest paths to all the vertices from S using Dijkstra algorithm (Only for positive weight graphs)
2. SPATH_BELLMANFORD(Graph G, Vertex S) – find shortest paths to all the vertices from S using Bellman-Ford algorithm(For graphs including negative weights)

Q2) **Huffman Coding Algorithm:** Implement Huffman coding algorithm by taking a sample input text file and display the complete text file using binary codes given by Huffman algorithm.

Note: Students who have finished the above programs in less time can explore implementing finding the longest path using any algorithms.