BRAC UNIVERSITY

Department of Computer Science and Engineering

Lab Final Examination	CSE 221: Algorithms	**Semester**: Summer 2023
Duration: 75 Minutes	Lab Section: 3	**Full Marks**: 20
No. of Question(s): 1	Set: 3A	**No. of Page(s)**: 2

Name: (Please write in CAPITAL LETTERS)	ID:	Obtained Marks:

Answer the following question(s).

Question 1: CO3,CO5,CO6 [20 Points]

In a distant future where humanity had extended its reach beyond Earth, a group of intrepid explorers found themselves at the center of a groundbreaking endeavor - the Celestial Expedition. Their mission? To navigate the vast cosmic expanse and establish connections between distant star systems for trade, knowledge exchange, and colonization. The challenges of interstellar travel were unlike anything humans had faced before, as the distances were colossal, and gravitational anomalies could alter trajectories in unexpected ways. **The journey began from planet A** and a complex network of interconnected star systems awaited exploration, each connected by mysterious cosmic highways. These highways, analogous to the **edges in a graph**, presented potential routes that ships could take, each with a varying travel time. The **goal was to find the fastest route to reach the distant star system planet B**. Make or use the best algorithm that solves the above mentioned problem and gives the minimum number of distances it needs to travel to reach from Planet A to Planet B. The algorithm's implementation involved determining the optimal path too. Each edge in the graph, representing a cosmic highway, had a calculated weight that combined traditional travel time.

Tasks :

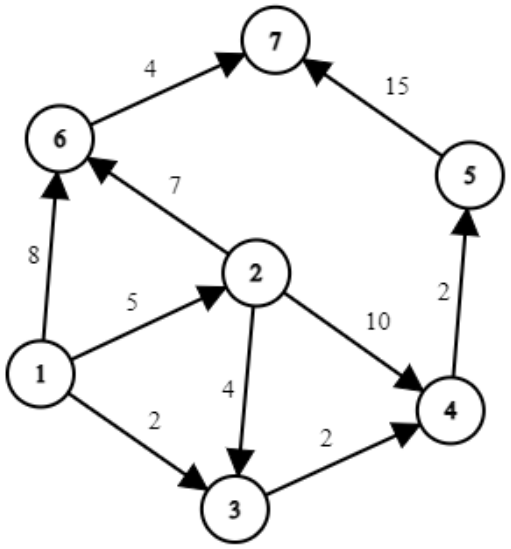
I. Read input from input_3A.txt file. [1]
II. Build the Adjacency List(s). [4]
III. Implementation of Main Algorithm. [7]
IV. Find the minimum distance it needs to travel to reach from planet A to planet B. [3]
V. Find the optimal path the spaceship chose to travel the minimum distance [3]
VI. Write output to output_3A.txt. [2]

Input

- The first line contains two integers N and M denoting the number of vertex and edges in the graph
- The next M lines each contain three integers, u, v (1 <= u, v <= N), and w (1 <= w <= 100) denoting an edge from node u to node v with weight w.
- The next line contains two integers value A and B denoting the source planet A and destination planet B.

Output

- The first part shows the minimum distance it needs to travel from planet A to planet B.
- The second part shows the path the spaceship needs to choose to obtain the minimum value.

Sample Graph	Sample Input	Sample Output
	7 10 1 2 5 2 3 4 3 4 2 1 3 2 2 4 10 4 5 2 5 7 15 2 6 7 1 6 8 6 7 4 1 5	6 Path: 1->3->4->5