Solve the following problems and upload within 24.4.2025, time- 11:59 pm.

1. Single Source Shortest Path

Problem Idea:

Emergency Response System:

Imagine a city map where each location is a node and roads have travel times (weights). Given an accident location, find the fastest route to all hospitals.

a) Represent the city as a graph with adjacency matrix or adjacency list.
b) Implement Dijkstra's algorithm to find the minimum travel time from accident spot to every hospital.

2. All Pair Shortest Path

Problem Idea:

Network Latency Optimization:

In a company's internal computer network, find the minimum data transfer time between all pairs of computers.

a) Represent computers and network links as a graph with weights = latency.
b) se Floyd-Warshall algorithm to precompute shortest times between all computers.

3. Maximum Flow

Problem Idea:

Water Distribution System

Given a network of water pipes (nodes = junctions, edges = pipes with capacities), find the maximum amount of water that can be sent from the main water source to the city reservoir.

a) epresent the water distribution as a graph with capacity on edges.
b) Apply Ford-Fulkerson method (using BFS/DFS) to calculate the maximum flow.