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Section: 13

Task 1

The code reads a weighted directed graph and source from "input1.txt" file applies Dijkstra's algorithm to find the shortest path from the source to all vertices. Writes the resulting distances or -1 for unreachable vertices into "output1.txt" file.

Task 2

The code applies Dijkstra's algorithm to find paths from two source cities S and T to all the other vertices in a directed weighted graph. Then determines the vertex at which the paths from S and T meet in the shortest time, considering the maximum of the distances. Finally writes the meeting vertex and the corresponding time on outputs "Impossible" if no meeting vertex exists.

Task 3

The code uses Disjoint Set Union (DSU) to track friend circles sizes in a villages of N people. It reads friendship queries from "input3.txt", updates the circles and outputs the sizes to "output3.txt" for each query, determining the size of the friend circle after 2 people become friends.

task 9

The code finds the minimum spanning tree using Prim's algorithm. It constructs an adjacency list, iteratively grows the tree by choosing minimum-weight edges, and computes the total weight of the tree.