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CMPE343 Section 2
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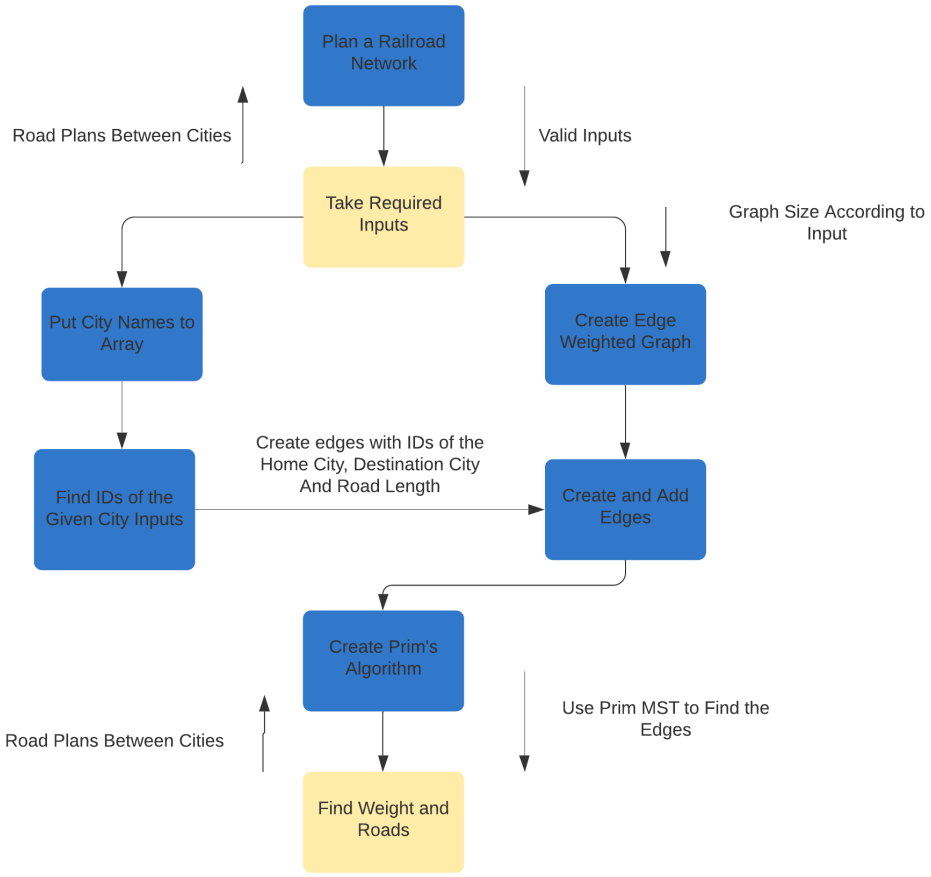
CMPE343 Programming Homework 4 REPORT

Problem Statement and Code Design

Task1

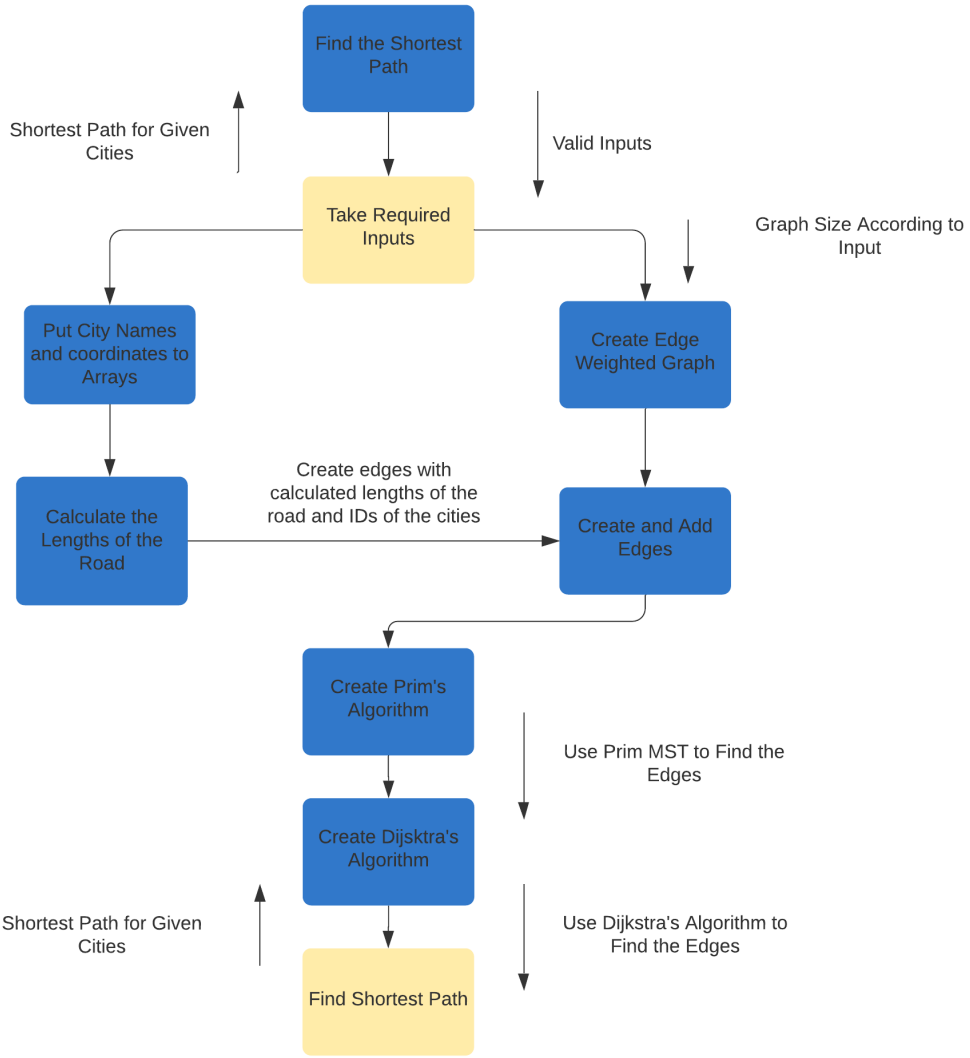
In this task, it is expected to create an algorithm that creates the graph of the roads between cities according to the given txt file. The program needs to take city names, roads between cities and its length from the input file. To create the program, I used Edge Weighted Graphs to put the roads between cities in it and used Prim MST algorithm to find the edges and print them. The Edge Weighted Graph and Prim MST have been implemented with the EdgeWeightedGraph and PrimMST classes, respectively. Then, in the main class, the input has been taken from the user, which includes city names, connections between cities and road lengths, and put to the according arrays and graphs.



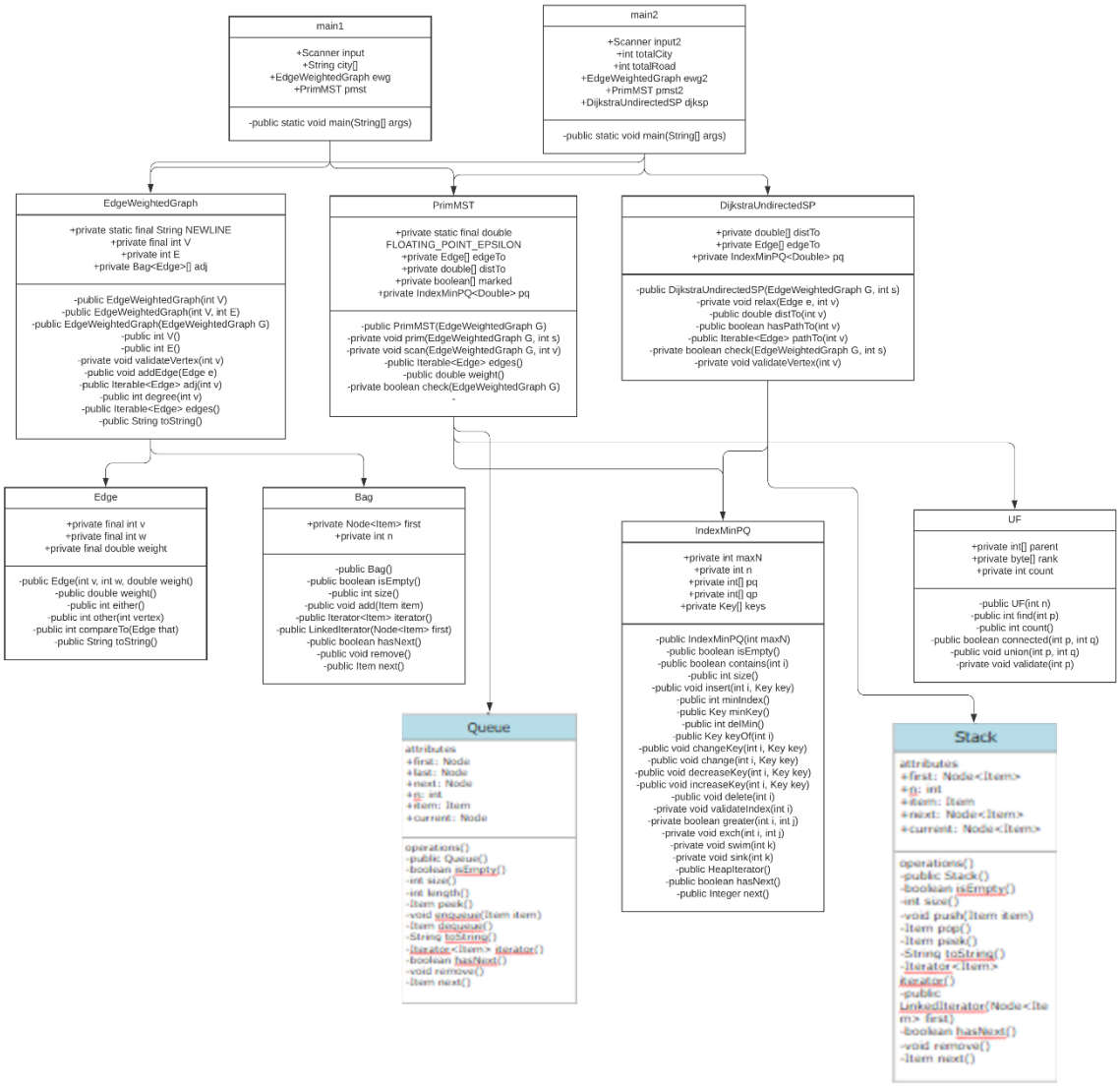
Structure Chart of Task1

Task2

In this task, it is expected to create an algorithm that creates the graph of the roads between cities according to the given txt file. The program needs to take city coordinate, city names, roads between cities from the input file. The program needs to calculate the length of the roads according to the coordinates of the cities. To create the program, I used Edge Weighted Graphs to put the roads between cities in it and used Dijkstra's algorithm to find the shortest paths. The Edge Weighted Graph and Dijkstra's algorithm have been implemented with the EdgeWeightedGraph and DijkstraUndirectedSP classes, respectively. Then, in the main class, the inputs has been taken from the user, which includes city coordinates, city names and connections between cities, and put to the according graph with required calculations.



Structure Chart of Task2



UML Diagram of Task1 and Task2

Final Assessments

- The trouble points that I experienced in this assignment was creating the Edge Weighted Graphs and implementing the Prim's Algorithm and Dijkstra's Algorithm.
- The implementation and modifying the algorithms parts were the most challenging parts for me because it was hard to think a road plan as an edge weighted directed graph and apply algorithms on it to find shortest paths in this graph. Also combining the algorithms is harder than normal implementations.
- I learned how to create an edge weighted directed graph, Prim's Algorithm, Dijkstra's Algorithm and how it can be helpful for our daily lives just like the modern navigation systems.