Bachelor Of Technology

Department of Computer Science & IT

Data Structures Project(3rd Semester)

Title: Metro Works

Members Name:

1. Aditya Raushan	17104017	B11
2. Aman Verma	17104006	B11
3. Mayank Singh	17104029	B11
4. Siddhant N. Trivedi	17104025	B11

Objective of the Project:

The objective of project "MetroWorks" is to help the people in finding the shortest path between two desired metro stations & calculate the corresponding fare.

Data Structures Used: Graphs & STL Containers

Functions used in the Project:

1. int main( ):

Makes graph of the metro stations and inputs the source and destination Metro station name. Calls the other function of the class Graph which execute the other functionalities.

2. void dijsktraSSSP(string,string,map):

Calculates the shortest distance between the source station and destination station.

3. void DijkstraGetShortestPathTo(string,map):

Finds the stations in between the source and destination lying on the shortest path.

4. void makedotfile():

Uses the data of stations being traversed in the shortest path and creates a dot file which will be used to make the resulting png file.

5. void calcPrice(string,string):

Uses the data of the actual Metro Fares stored in a csv file and stores them into a 2d matrix then finds the fare of the input stations.

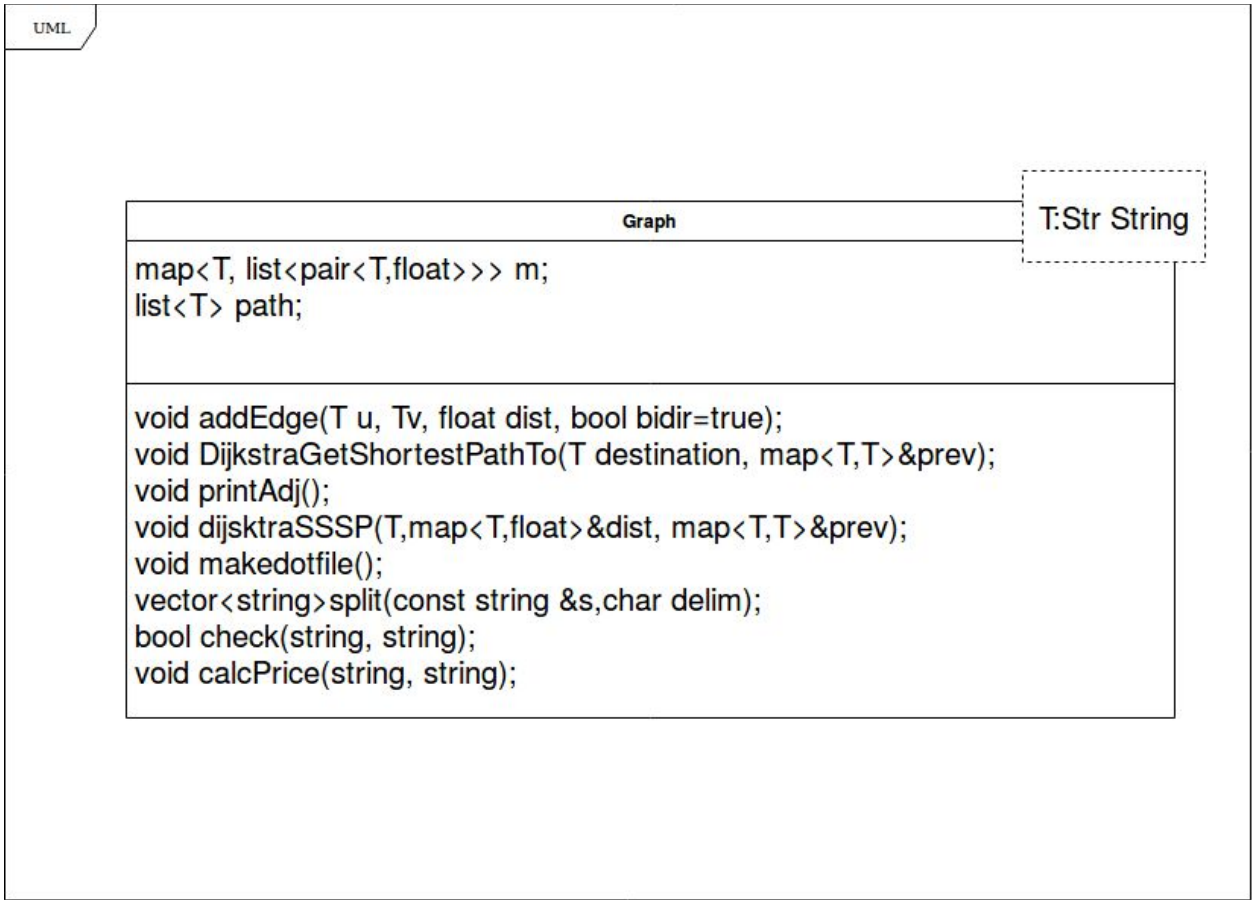
6.void split( ):

Used to split the line-by-line tuple of the extracted file into words and store these words in a vector.

7. Void check( ):

Returns true if the extracted station from the file belongs to the stations lying in the shortest path else false.

Class Diagram of the project:

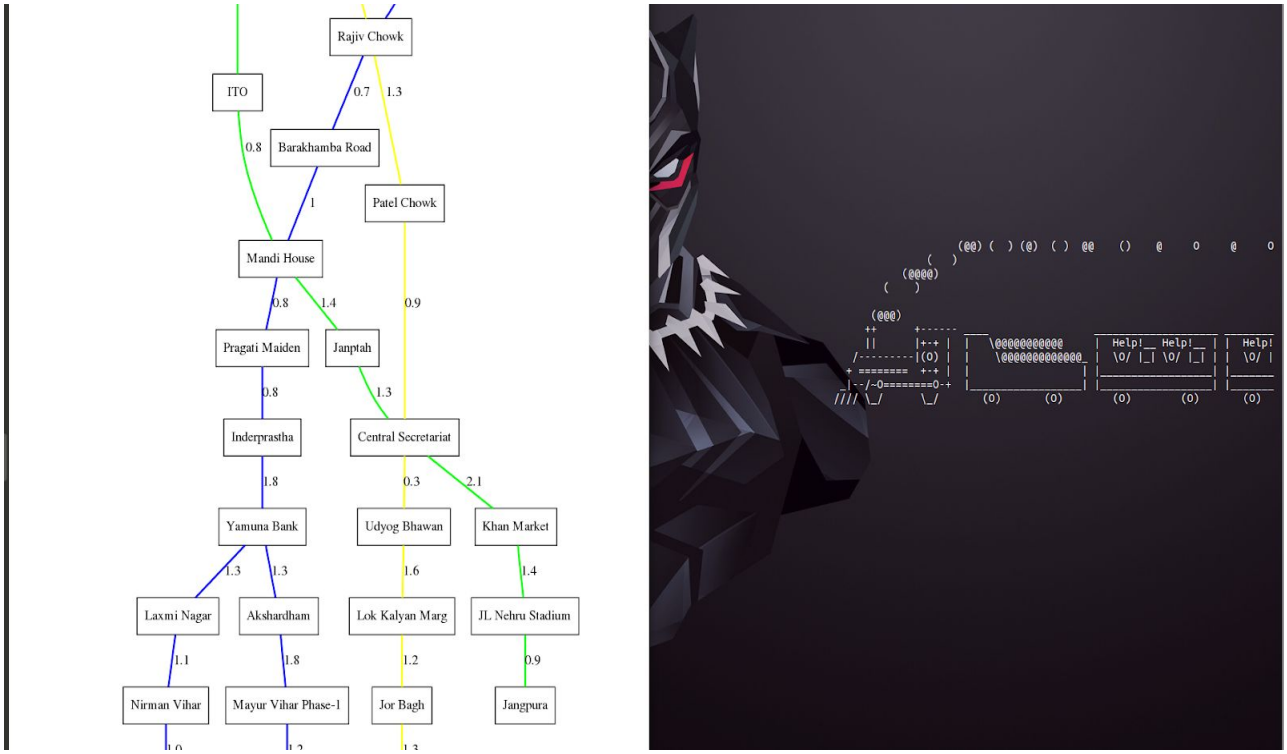


Algorithms Implemented:

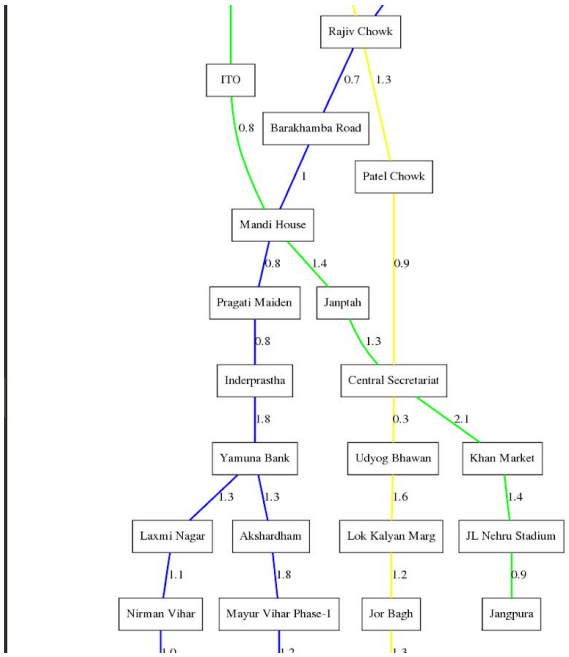
Dijkstra's Algorithm:

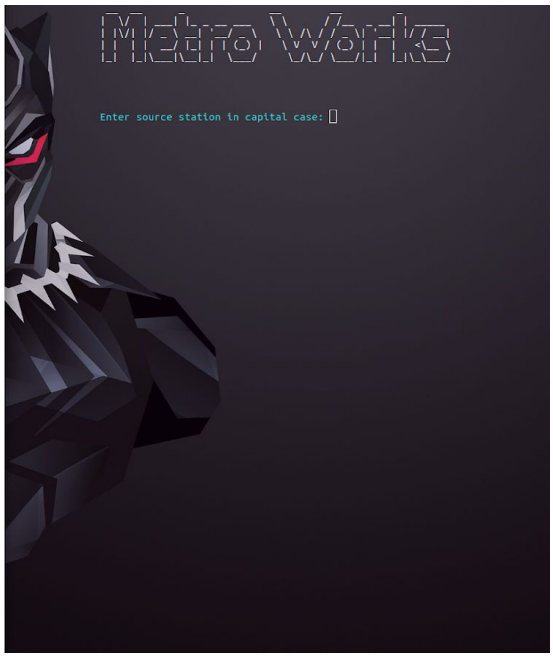
Dijkstra's algorithm to find the shortest path between a and b. It picks the unvisited vertex with the lowest distance, calculates the distance through it to each unvisited neighbor, and updates the neighbor's distance if smaller. Mark visited (set to red) when done with neighbors.
Dijkstra's algorithm is an algorithm for finding the shortest paths between nodes in a graph, which may represent, for example, road networks. It was conceived by computer scientist Edsger W. Dijkstra in 1956 and published three years later. For a given source node in the graph, the algorithm finds the shortest path between that node and every other. It can also be used for finding the shortest paths from a single node to a single destination node by stopping the algorithm once the shortest path to the destination node has been determined.

Results Screenshots:

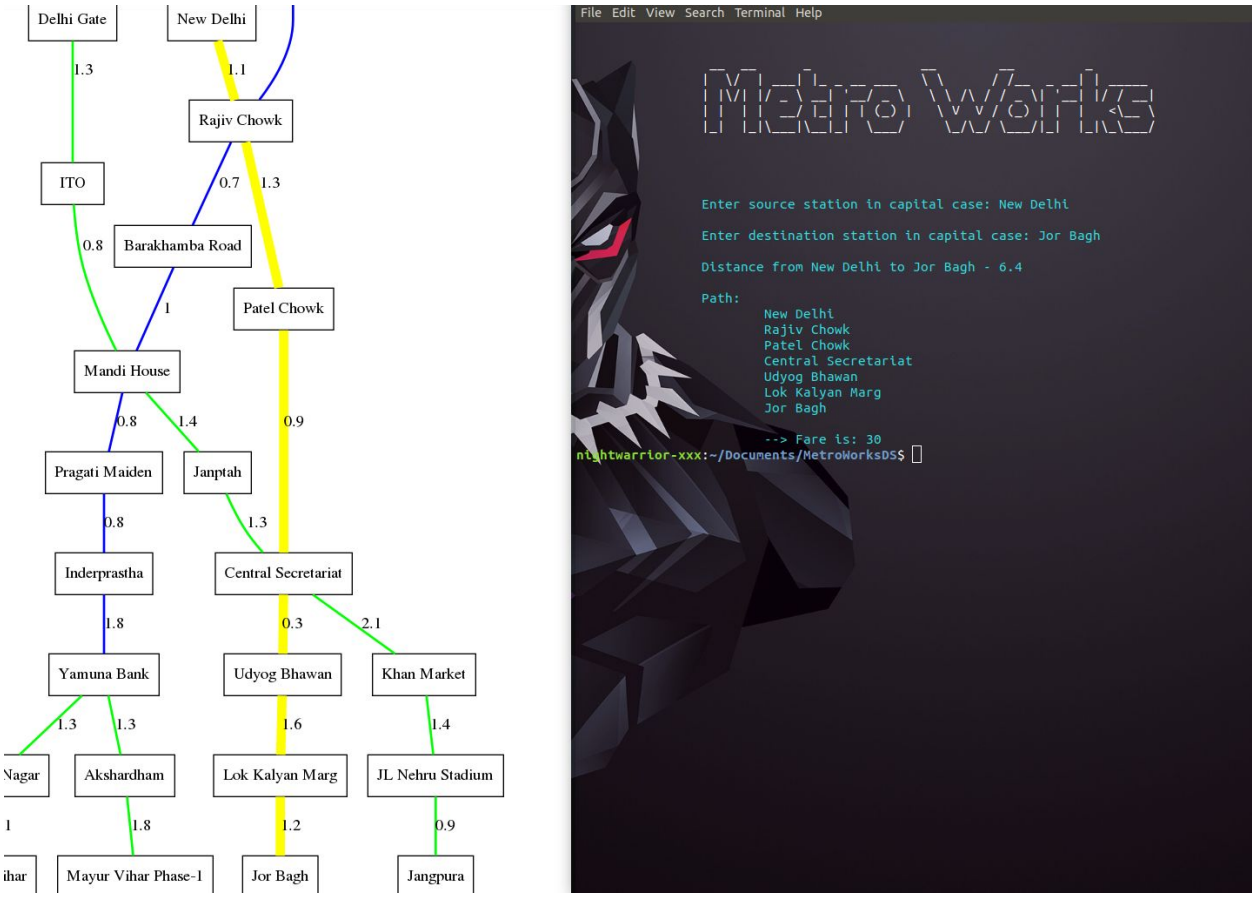


1.Opening Window to show the map as well as moving train transition.





2.Window to enter the source and destination stations by referring the map.



3. Window to show the Shortest path on map (broadened edge) and console alongwith the fare.