Map Routing[**Test Cases Description**]

- The input consists of 2 files:

1. Map file:

which contains the intersections locations and how the intersections are connected to each other.
each map file is organized as the following:
The first line contains an integer **N** which represents the **number of intersections**.
Each line of the following N lines contains 3 numbers (separated by single space):
Intersection_ID X_coordinate Y_coordinate
After that there is an integer **M** which represents the **number of roads**.
Each line of the following M lines contains 4 numbers (separated by single space):
First_Intersection_ID Second_Intersection_ID Road_Length Road_Speed
Note : the road length is given in **kilometers** and road speed is given in **kilometer/hour**.

2. Queries file:

which contains the queries to be processed.
Each query file is organized as the following:

The first line of this file contains an integer **Q** that represents the number of queries.

Each line of the following Q lines contains 5 numbers (separated by single space) represents a single query as the following:

Source_X Source_Y Destination_X Destination_Y R
Note : the maximum walking distance (**R**) is given in **meters**

- The output file should contain the result of the q queries that are in the query file.
  Each query result should be organized as the following:
  i. For milestone 1:
  - Each query output should contain 5 lines as the following:
    - **The shortest time** to move from the source location to the destination location (**in minutes**)
    - **The total distance** of the path with the shortest time **(in kilometers)**
    - **The total walking distance (in kilometers)**
    - **The total vehicle distance (in kilometers**)
    - **The total execution time (in millisecond)**
  - The shortest time and the distances should be displayed rounded to **2 digits** after the decimal point.
  - Each query should be followed by an empty line
  - After printing all the queries print the total execution time (in milliseconds)

Please refer to the input and output files to see the exact required formatting

ii. For final delivery:

- Each query output should contain 5 lines as the following:
  - **The shortest time** to move from the source location to the destination location (**in minutes**)
  - **The total distance** of the path with the shortest time **(in kilometers)**
  - **The total walking distance (in kilometers)**
  - **The total vehicle distance (in kilometers**)
  - **The ids of the intersections** of the path with the shortest time. The ids should be ordered by the visiting order.
  - **The total execution time (in millisecond)**
- The shortest time and the distances should be displayed rounded to **2 digits** after the decimal point.
- Each query should be followed by an empty line
- After printing all the queries print the total execution time (in milliseconds)

Please refer to the input and output files to see the exact required formatting

FIRST: Sample Cases

Map File Name	Queries File Name	Output File Name	Number of intersections	Number of Roads	Number of queries	Total Execution Time
map1.txt	queries1.txt	output1.txt	6	7	1	< 1 sec
map2.txt	queries2.txt	output2.txt	6	7	10	< 1 sec
map3.txt	queries3.txt	output3.txt	9	12	10	< 1 sec
map4.txt	queries4.txt	output4.txt	9	8	10	< 1 sec
map5.txt	queries5.txt	output5.txt	9	8	10	< 1 sec

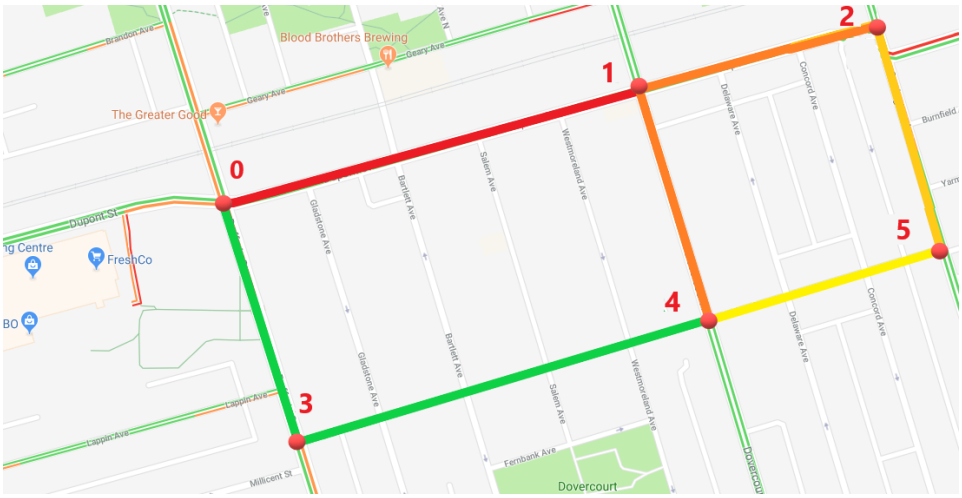

Figure 1 The road network used in the first 2 sample files

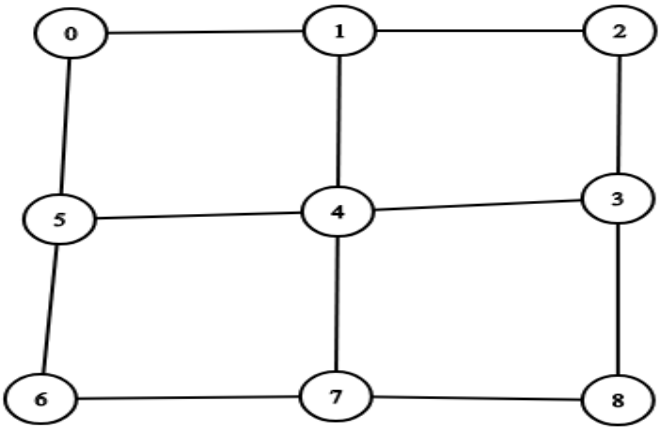

Figure 2 The road network used in sample 3

SECOND: Medium Cases

The data of the medium case is for Oldenburg road network (Oldenburg is a German city)

Map File Name	Queries File Name	Output File Name	Number of intersections	Number of Roads	Number of queries	Total Execution Time
OLMap.txt	OLQueries.txt	OLOutput.txt	6105	7029	1000	< 20 sec

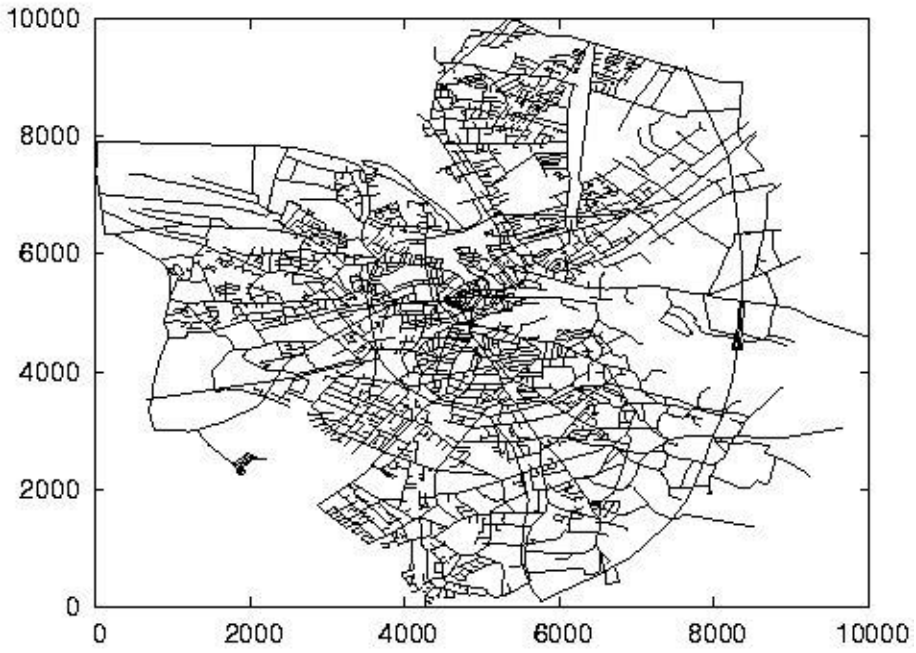

Figure 3 the city of Oldenburg road network

THIRD: Large Cases

The data of the large case is for San Francisco Road Network

Map File Name	Queries File Name	Output File Name	Number of intersections	Number of Roads	Number of queries	Total Execution Time
SFMap.txt	SFQueries.txt	SFOutput.txt	174956	221802	1000	T.B.D

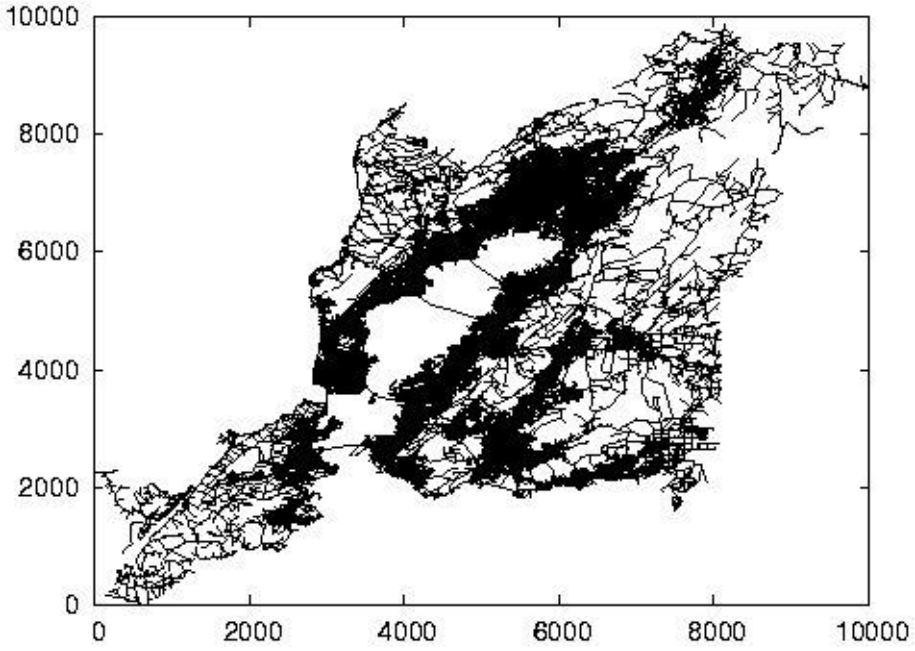

Figure 4 San Francisco road network