Map Routing [Test Cases Description]

Contents

FIRST: Sample Cases

Map File Name	Queries File Name	Output File Name	# intersections	# Roads	# queries	Total Execution Time for all queries
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

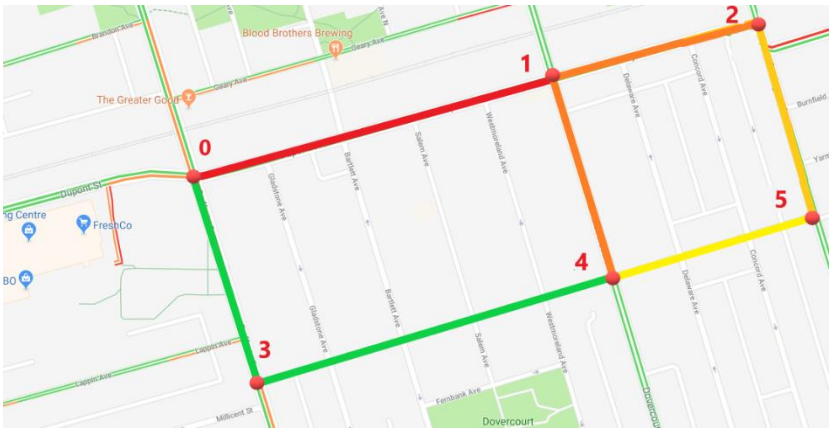


Figure 1 The road network used in the first 2 sample files

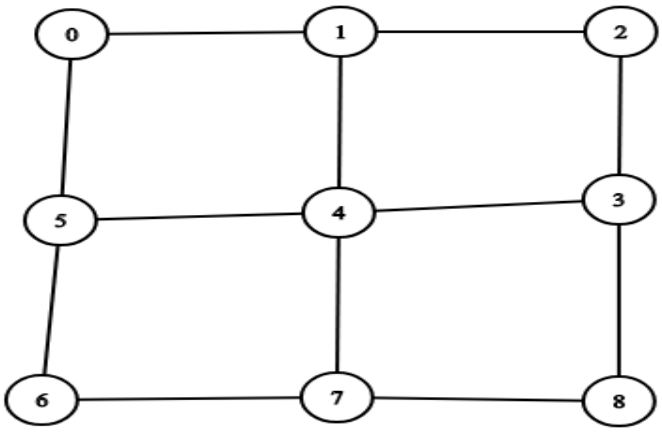


Figure 2 The road network used in sample 3

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	# intersections	# Roads	# queries	Total Execution Time for all queries
OLMap.txt	OLQueries.txt	OLOutput.txt	6105	7029	1000	< 5 sec

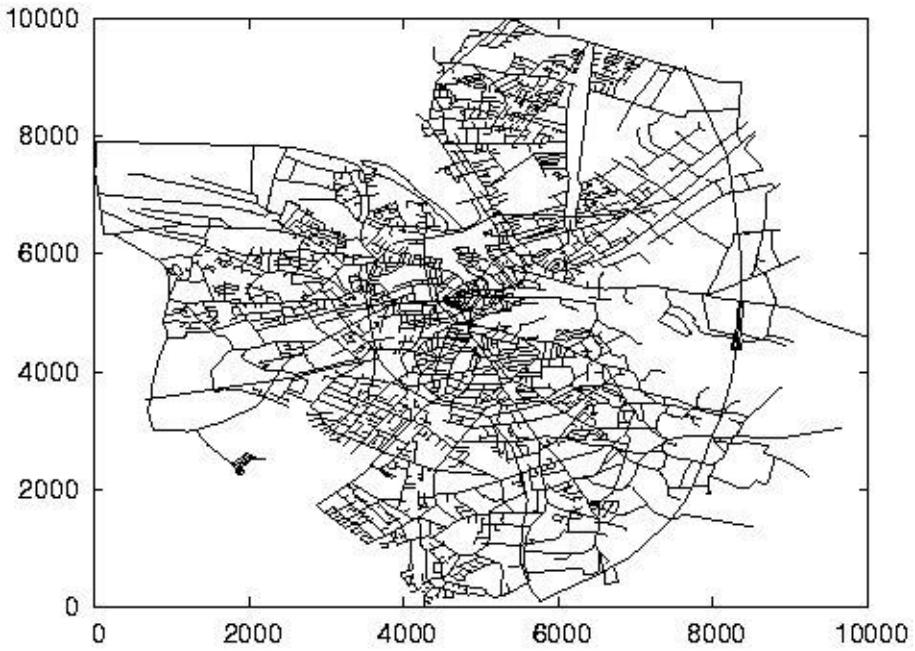


Figure 3 the city of Oldenburg road network

THIRD: Large Cases

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

Map File Name	Queries File Name	Output File Name	# intersections	# Roads	# queries	Total Execution Time for all queries
SFMap.txt	SFQueries.txt	SFOutput.txt	174956	221802	1000	< 3 min

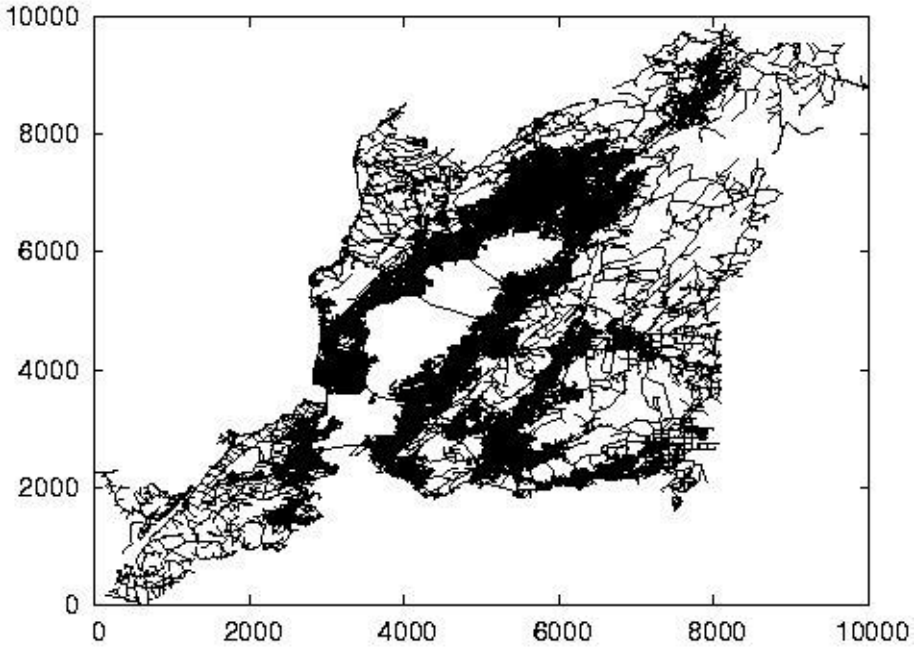


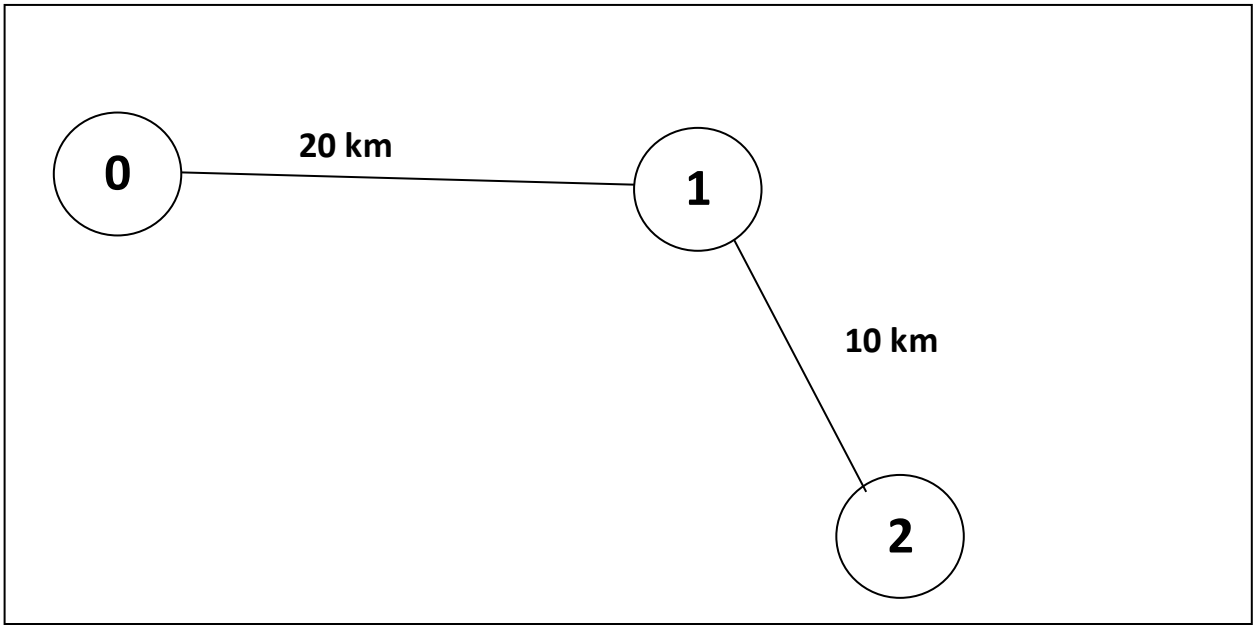
Figure 4 San Francisco road network

(BONUS) Maps with changing speed

In this scenario, road speed is not constant anymore. The speed changes depending on the time interval. You should consider the speed changing when finding the path with the shortest time.

For the following example:

- The speed interval is **10** minutes, each road has 2 speeds (speed count = 2).
- The **road length** from intersection **0** to intersection **1** is **20 km**. This road (from 0 to 1) has speeds **[80 km/h, 60 km/h]**.
- The road length from intersection **1** to intersection **2** is **10 km**. This road (from 1 to 2) has speeds **[30 km/h, 50 km/h].**
- The vehicle speed doesn't change in the middle of the road (even if the time interval changes).
- At the start of time (time = 0), the vehicle moves from intersection 0 to intersection 1. It will move with speed 80 km/h for the whole road (even if it exceeds the speed interval, speed doesn't change in the middle of the road).
- When the vehicle reaches intersection 1 (at time = 15 minutes), It would move from intersection 1 to intersection 2 with the speed of the second interval for that road (50 km/h).
- The time to move from intersection 0 to intersection 2 = 15 + 12 = 27 minutes.



Input & Output Description

- The map file for this scenario will consist of the following:
  a. The first line contains an integer **N** which represents the **number of intersections**.
  b. Each line of the following N lines contains 3 numbers (separated by single space):

     Intersection_ID X_coordinate Y_coordinate
  c. After that there is three integers (separated by single space):

     M Speed_Count Speed_Interval

     Where **M** represents the **number of roads**.
     Speed_Count represents the number of speeds of each road, and
     Speed_Interval represents the interval of speed changing **(in minutes)**.
  d. Each line of the following M lines contains (**3 + Speed_Count)** numbers (separated by single space):

     First_Intersection_ID Second_Intersection_ID Road_Length $Road\_Speed_1$
     $Road\_Speed_2$, ….., $Road\_Speed_{Speed\_Count}$.

     This means that this road speed is **$Road\_Speed_1$** in the interval **[0, Speed_Interval)**,
     It will be **$Road\_Speed_2$** in the interval **[Speed_Interval, 2 x Speed_Interval)**
     and so on..

  Note : the road length is given in **kilometers** and road speeds are given in **kilometer/hour**.

- The query file is in the same format as the normal case (constant speed).

- The output file should be in the same format as the normal case.

Note:

- The speeds repeat if the time exceeds the speed count. For example:
  - The road from intersection 0 to intersection 1 in the previous figure will have the speeds 80 km/h in the interval [0, 10), then the speed becomes 60 km/h in the interval [10, 20), then it becomes 80 km/h in the interval [20, 30), and so on…