Algorithms and Complexity

Please remember to write your student number and name on the java file. This work is due on the **4th of October, 2020 (Sunday)** at 11:59 PM. Please submit your source code uncompiled.

Greedy Algorithms.

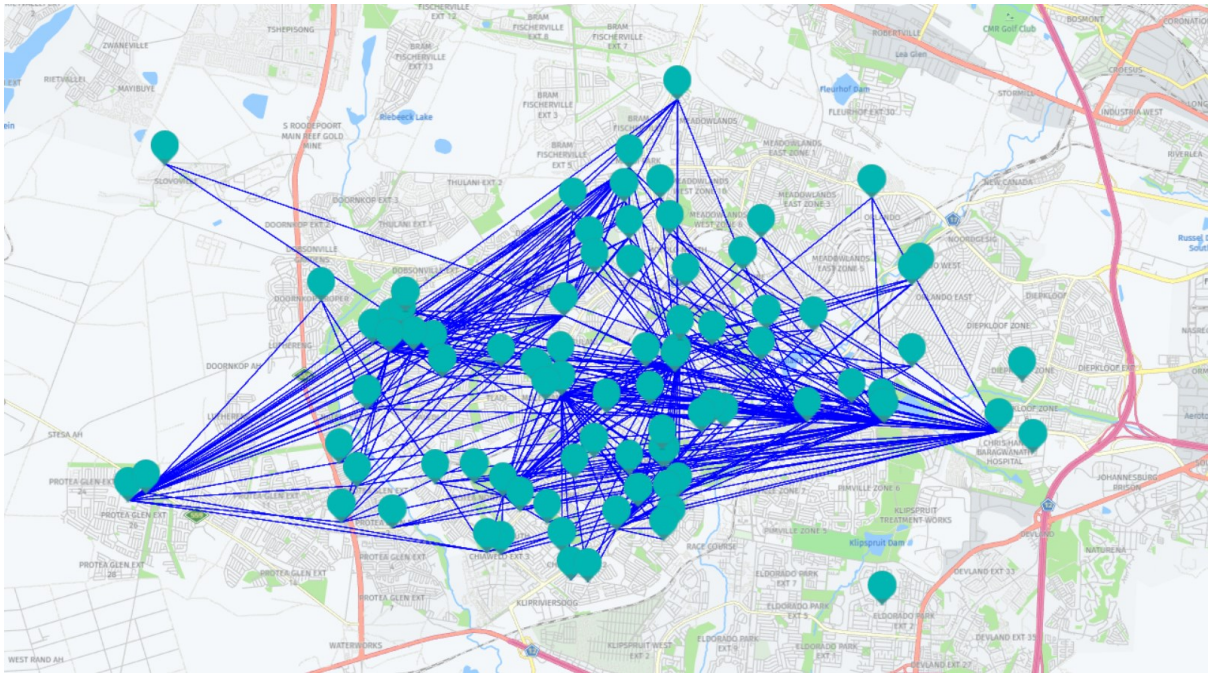

Figure 1 - Soweto educational centres disconnected graph.

The figure above depicts Soweto educational centres connect with links based on the suggested formula. Your task is to write a Java program that computes the shortest path using the Dijkstra algorithm:

same as prac2

i. Write a Java program that opens the CSV and reads the values into an array. The CSV file (*Soweto.csv*) contains the names, geographical coordinates, and ratings for schools separated by semicolons.

ii. Implement Dijkstra's algorithms:

iii. Use the imported CSV data to create a graph that has links among nodes (educational centres) such that:

$$\left\lfloor \sqrt{(source.latitude)^2 * (source.longitude)^2} \%6 \right\rfloor = \lfloor destination.name.length \%6 \rfloor = \lfloor destination.rating \rfloor$$

iv. Use the geographical coordinates to weigh all the edges in the graph. You can look at links below for computing the relative distance between nodes:

https://en.wikipedia.org/wiki/Haversine_formula
https://www.movable-type.co.uk/scripts/latlong.html

v. Find the path cost in kilometres:

a. From '**Moletsane Secondary School**' to '**Freedom Primary School**'
b. From '**Moletsane Secondary School**' to '**Lancea Vale Secondary School**'
c. From '**Tshilidzi Primary School**' to '**Winnie Madikizela-Mandela School**'
d. From '**Tshilidzi Primary School**' to '**Siyabonga Secondary School**'
e. From '**Kliptown Primary School**' to '**Saint Barnabas College**'
f. From '**Kliptown Primary School**' to '**Enkolweni Primary School**'

Write the results into a text file (Output.txt).

For example, if your input file contains:

```
Name;lat;lng;rating
Moletsane Secondary School;-26.2545499;27.85119;5
BHUKULANI HIGH SCHOOL;-26.233524;27.867531;4.7
St Matthews School;-26.259996;27.881219;3.8
Adelaide Thambo School;-26.2488437;27.8764192;3
Naledi High School;-26.2506089;27.831194;3.6
```

Then your output file will look like this:

```
From 'Moletsane Secondary School' to 'Freedom Primary School' is 60 Km
…
```

A starting point.
https://www.geeksforgeeks.org/dijkstras-shortest-path-algorithm-greedy-algo-7/

The table below discusses the grading rubric for this practical implementation.

Criteria	Points
Code Comments	5
Dijkstra	10
Correct Graph	8
Results	12