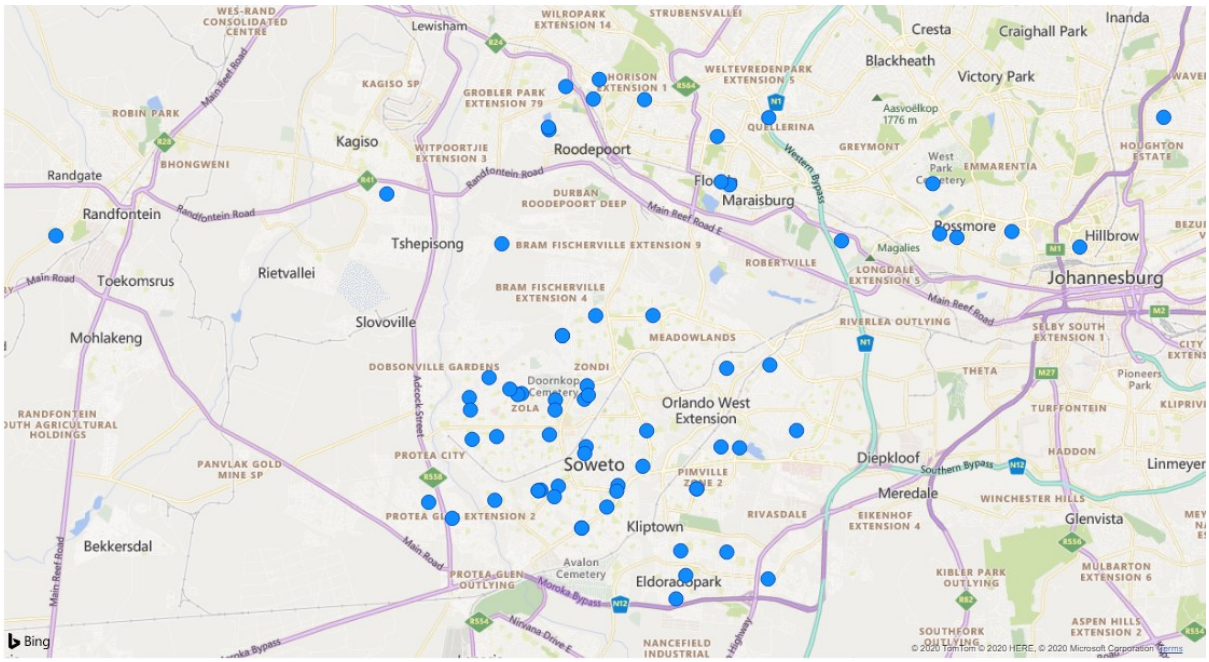
Algorithms and Complexity

This practical is the preparation for the next week's practical. Please remember to write your student number and name on the java file. This work is due on the **20th of September, 2020** (Sunday) at 11:59 PM.

Algorithm Analysis.



The figure above depicts schools or educational centres in Soweto with blue dots. Your task is to write a Java program that compares the time taken by different sorting algorithms to sort the same list of the schools in alphabetical order:

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. Write two methods to respectively do a
   a. MergeSort (Iterative);
   b. QuickSort (Iterative);

iii. Call each of the three methods in turn to sort the input array, and write the results into a second text file (Output.txt). Calculate the time taken by each method. The format of the output file should be the time taken by a method (in milliseconds) followed by the sorted list of school names on the next line/s (separated by commas).

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
Mapetla High School;-26.27364;27.84619;3
Meadowlands High School;-26.215708;27.895514;3.3
Phafogang Secondary School;-26.2673203;27.8671981;2
…
```

Then your output file will look like this if the methods took 1 and 0 milliseconds respectively:

```
time in milliseconds: 1
Result [A.B. Xuma Primary School, Adelaide Tambo School for the Physically Challenged, Adelaide
Thambo School, … , reabetswe abby plumbing academy]

time in milliseconds: 0
Result [A.B. Xuma Primary School, Adelaide Tambo School for the Physically Challenged, Adelaide
Thambo School, … , reabetswe abby plumbing academy]
```

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

Criteria	Points
Code Comments	5
Merge Sort Algorithm	10
Quick Sort Algorithm	10
Results	10