Computer Science 320SC – (2019)

Programming Assignment 2

Due: Saturday, August 24 2019 (11:59pm)

Requirements

This second assignment lets you get familiar with divide-and-conquer design and development. We would like you to implement an efficient divide-and-conquer algorithm to solve the **Closest Pair** problem in plane as elaborated during the lecture. An $O(n \log n)$ solution is preferred since we have set the running time limit on the automated marker.

There are 3 test cases whose sizes increase by 10 times. The first one contains 10,000 2D points, while the last largest one comprises of 1000,000 2D points. It is worth 5% of your total course marks. The first and second test cases have 2 marks each and the last has 1 mark.

There will be a penalty if you exceed the submission limit. Therefore, please **write a bruteforce algorithm and test your divide-and-conquer version with your own generated inputs before submitting to the automated marker**.

Test case description

Your input will be a sequence of 2D points given on a line, coordinates are separated by one space. The coordinates are integers. You should output **the minimum squared Euclidean distance** so that the automated marker would not trouble with the double-precision.

Sample Input 1:

```
3 2
0 0
5 7
0 2
```

Sample Output 1:

```
4
```

Sample Input 2:

```
-3 2
-10 -100
-5 -7
0 2
```

Sample Output 2:

```
9
```

Submission Procedure

Submit your program solutions to `https://www.automarker.cs.auckland.ac.nz`. There will be a penalty of %20 (per test case) if you exceed the submission limit of 8 for each test case (applied if you eventually solve them).