CENG 773
Computational Geometry
Assignment #1
Programming Assignment on the Plane Sweep Algorithm

Due Date: March 20, 2016 23:55 (via ODTU-CLASS)

In this assignment your goal is to implement and compare two different solutions for the Closest Pair problem.

You will be given a set of N distinct points as a text file. The first line will contain the number of points and the following N lines will contain the tab-separated x and y coordinates of the N points, one point per line. The coordinates will be integer coordinates in the range [-1,000,000:1,000,000]. Your goal is to find the distance between the closest pair of points and report this distance between them (rounded to 4 digits after the decimal point, e.g. 0.1234)

In this assignment, you are going to implement two solutions for this problem: 1) the naïve solution which compares all pairs of points with $O(n^2)$ running time complexity and 2) a plane-sweep solution with $O(n \log n)$ running time complexity. After implementing these solutions, report the performance of both solutions on the 7 input datasets provided at the following link:

http://www.ceng.metu.edu.tr/~tcan/ceng773_s1516/hw1_datasets.zip

You should report the time required for each individual test dataset for both of the solutions.

Provide a short, one-paragraph analysis of your results along with the table showing the times.

Submit your report along with your source codes of your naïve and plane-sweep solutions via ODTU-CLASS before the deadline.

Notes: You are free to use any programming language of your choice. You are free to use any resource including source codes you find on the Internet provided that you cite them properly in your report and in your code.

Late submission policy: Late submission is allowed with 20 points penalty per day.