Programming Project, Part I

General Description:

The programming project for this semester will be to implement an efficient algorithm for finding the closest pair of 2-D points. You will analyse the running time using a combination of experiments and theoretical analysis. In part I of this project, you will implement the basic $n^2$ algorithm that consists of computing the distance between every pair of points. You will perform timing experiments on your implementation.

Detailed Description:

Write a procedure or method for finding the closest pair of $n$ 2-D points. For this part, use the brute force method that consists of computing the distance between every pair of points.

Write a program that tests your procedure. You may use the programming language of your choice, but take into consideration that you will need to perform timing experiments. Do a sequence of experiments with data of various sizes. Gather the time that your program takes on all the experiments, and create a chart that plots the time against the number of points. Assume the time taken by your program on an input of size $n$ is of the form $an^2 + bn + c$. Find the values of constants $a$, $b$ and $c$ that best approximate your experiment. Provide in your analysis how you arrive at that result, and include a graph with your data and a plot of the formula with your approximation.

Turn in:

A report that includes a description of the experiment you performed, the source code you used, the data that you gathered, how you made the analysis, and the results of your analysis. Send an e-mail with your submission attached and with subject line “CS 5350 Project Part I” or “CS 6350 Project Part I”, depending on which course you are registered for.
Due date:

October 21. The penalty for a late homework is 1% per hour for up to 10% per day, for up to 4 days late. If you are not able to submit within 4 days, contact me to explain your situation. We may be able to agree on extra time for your late assignment with at most 50% grade.