CS130B - DATA STRUCTURES AND ALGORITHMS II

DISCUSSION SECTION WEEK 2

Agenda

Programming Assignment 1

- Submission
- Input Format
- Output Format
- Sample Run Through
- Testing

PROGRAMMING ASSIGNMENT 1

- Due Sunday, April 23 at 11:59 PM
- Electronic Turnin
 - Detailed instruction are on the website under *Turnin Instructions*
 - o /usr/bin/turnin prog1@cs130b [list of files]
 - Multiple turnins overwrite older ones
 - Must compile and run on CSIL (leave a copy on CSIL as well)
 - Don't edit files after turning them in
 - Include a README.pdf with short descriptions of your two algorithms, time complexities, and plot



IMPORTANT!!!

Include a makefile with your source code such that entering "make" creates an executable "prog1".

Closest Pair - INPUT

Input to stdin Format:

n

 $X_1 \quad Y_1$

 $x_2 \quad y_2$

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 $X_n \quad Y_n$

n is the number of input points $x_i y_i$ are the coordinates of the *i*th point



Closest Pair - INPUT

Sample input:



Closest Pair - OUTPUT

Output to stdout Format:

```
\begin{array}{cccc} x_i & y_i & x_j & y_j \\ k \\ x_i' & y_i' & x_j' & y_j' \\ k' \end{array}
```

The first line should be the closest pair of points computed from your brute-force algorithm, sorted by x-coordinate, then y-coordinate. The number k is the number of comparisons used in your brute force. The next two lines are similar, except they are returned by your divide-and-conquer algorithm. Sample output: 10 10 11 8 5000 10 10 11 8

700

Sample input and output data are provided on your course page under the **Test Data** link. Note that the number of comparisons in the sample output and your output may differ, but the number of comparisons in your divide-and-conquer algorithm should be smaller than the number of comparisons in your brute-force algorithm regardless.



Divide and Conquer!



Divide and Conquer!











Other Divide and Conquer Problems

Suppose given a trimino piece



Conside a NxN square with a corner missing. Design a divide-and-conquer algorithm to fill the NxN mutilated board with triminos. Time complexity?

