
CSS.201.1 ALGORITHMS

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Finding Closest Pair of Points

Problem: Given a set of points find the closest pair of points in \mathbb{R}^2 .

Input: Set $S = \{(x_i, y_i) \mid x_i, y_i \in \mathbb{R}, \forall i \in [n]\}$. We denote $P_i = (x_i, y_i)$.

Output: P_i, P_j that are at minimum l_2 distance i.e. minimize $\sqrt{(x_i - x_j)^2 + (y_i - y_j)^2}$.

Now the naive algorithm for this will be checking all pairs of points and take their distance and output the minimum one. There are total $\binom{n}{2}$ possible choices of pairs of points. And calculating the distance of each pair takes $O(1)$ time. So it will take $O(n^2)$ times to find the closest pair of points.

Idea: $\forall P_i, P_j \in S$ find distance $d(P_i, P_j)$ and return the minimum. Time taken is $O(n^2)$.

CHAPTER 2

Median Finding

CHAPTER 3

Bibliography