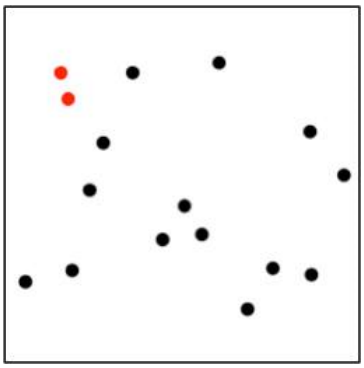
Problem Description

In BeagleTown live many happy and friendly beagles, but now we are looking for the two beagles that are the best friends. They live and walk around BeagleTown, but we define their friendship for how close are them, so the two beagles we are looking for, are them who closest.



Given n points (x,y) where each beagle are in BeagleTown, you have to display the distance of the Best Friends in BeagleTown.

The algorithm you get must have an order, O(n log2n).

Input

First comes n (beagles, 2 ≤ n ≤ 10^6), after this comes n line with 2 integers x and y (0 ≤ x,y ≤ 10^9).

Output

A line with showing the distance of the two beagles that are best friends rounded with 2 digits. See the format in the sample output

Sample Input

5
5 10
2 30
1 15
10 2
20 5

Sample Output

The distance of best friends are: 6.40