Closest Pair Problem

Given n points on the plane, each represented by (x, y) coordinates, find a pair of points with the smallest distance between them.

Input

The first line of input will contain the number of points, **n (2 <= n <= 30,000)**. Each of the next **n** lines will contain two integers **x** and **y (-1,000,000 <= x, y <= 1,000,000)**. The ith line contains the coordinates for the ith point.

Output

Print to the ouput a single floating point number **d**, denoting the distance between the closest pair of points. **d** should contain exactly 6 digits after the decimal.

Example

Input:
5
0 0
-4 1
-7 -2
4 5
1 1

Output:
1.414214