Nearest Pair

The nearest pair problem is to find two points that are nearest to each other in a given set of points. This problem is prevalent in numerous applications, one of which is in air-traffic control where you may want to monitor planes that come too close together, since this may indicate a possible collision. In the figure below, for example, among all the points, the closest pair is (1, 1) and (2, 0.5)

Your task is to write a program that calculates the shortest distance among any pair of points.

Input Format

The first line contains a positive integer, N which represents the number of points.This line is followed by N lines which contains two integers, X and Y. X represents the x-coordinate of the point and Y represents the y-coordinate of the point.

Refer the sample input for illustration.

Constraints

- **The number of points, N:** A positive integer where (0 < N < 10000).
- **The x-coordinate, X:** A real number where (-10000.0 <= X <= 10000.0).
- **The y-coordinate, Y:** A real number where (-10000.0 <= Y <= 10000.0).

Output Format

Output the shortest distance formed by any pair of points.

Refer the sample output for illustration.

Sample Input 0

```
8
-1 3
-1 -1
1 1
 2 0.5
 2 -1
 3 3
 4 2
 4 -0.5
```

Sample Output 0

```
1.118034
```