

Ram And His Farm

Farmer Ram has **N** trees in his farm, which is in the form of a 2D plane. Each tree is denoted by a **(X, Y)** coordinate. Ram doesn't really like the fact that his trees are not guarded, and he is also obsessed with symmetry. He wants to build a triangular fence around the trees, such that:

- All his **N** trees lie on or within the fence that he constructs.
- The fence is triangular in shape, and since he loves symmetry, all three sides of the triangle should be equal.
- One of the sides of the triangular fence should always be parallel to the 'X' or 'Y' axis.

Ram also wants to save money, and hence he wants the fence to be of minimum length, while satisfying the above constraints. Help Ram find the minimum length of each side of the triangular fence (since all the 3 sides are equal, he is only interested in knowing the length of one of the sides) that can enclose all his trees.

Input

The first line of input consists of a single integer **N**, denoting the number of trees that are present in Ram's farm. Each of the following **N** lines consists of 2 space separated integers **X_i**, **Y_i**, denoting the coordinates of the **ith** tree.

Note: No two trees are located at the same point.

Output

Output a single value, denoting the minimum length of one side of the fence (which is an equilateral triangle with all its sides equal) that can satisfy the above constraints.

Note: The answer can have a relative error of utmost **10^{-7}** .

Constraints

$2 \leq N \leq 100000$

$-10000 \leq X_i, Y_i \leq 10000$

Sample Input

```
6
0 0
0 5
5 0
```

5 5
2 2
3 3

Sample Output

10.773502692

Explanation

The following diagram shows one of the optimal ways to build the fence (trees are marked in red).

