Problem A. Outlier

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	256 mebibytes

Zenyk and Marichka play a game with a set of stones. In this game, Marichka arranges the set of stones on a flat surface.

She designates one of the stones as the secret *outlier* stone without telling Zenyk about it and makes the arrangement accordingly. That outlier stone has the property that when you remove it from the arrangement, the *width* of the remaining stones will be the smallest, i.e. if you leave this secret stone in the arrangement and remove any other stone the width of the stone set will be larger. Geometrically, the width of a set of stones is defined as the smallest distance between two parallel lines that enclose all the stones on or in between them. Can you help Zenyk to find the secret outlier stone?

Specifically, in this problem you will be given a set S of n distinct two-dimensional points indicating the positions of the stones in Marichka's arrangement. Your goal is to find the outlier stone in set S. You have to report the width of the stone set when this outlier is removed.

Formally, given a set $S = \{p_i\}$ of two-dimensional points, for each point p_i ($1 \le i \le n$), compute the width of the point set $S - \{p_i\}$ as w_i. The outlier is the point for which w_i is minimum. Report the minimum width w_i as a real number.

Input

The first line of the input contains a single integer n ($5 \le n \le 100\,000$) — the number of stones.

Each of the following n lines contains two integers which are the x and y coordinates of stone p_i ($1 \le i \le n$).

Line $i + 1$ contains the coordinates of point p_i with the integer identifier i ($1 \le i \le n$).

The coordinates of the stones are distinct, i.e. for any two stones p_i and p_j, ($i \ne j$), $x_i \ne x_j$ or $y_i \ne y_j$.

The coordinate values are integers between -10^7 and 10^7. All stone coordinates are distinct.

Output

A single line containing the width w of the stone set without the outlier as a real number with as high precision as possible. Your answer will be judged as correct if it has an absolute or relative error less than 10^{-9}.

Example

standard input	standard output
12 -4 -8 -9 9 -8 1 2 1 1 -3 -8 -9 -1 -3 1 9 4 4 -10 -1 -1 -9 4 2	11.50372185157