Yet Another Minimax Problem

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

You are given n points on the plane. You have to choose such a straight line, that there will be points on both sides of the line and the minimum distance from one of the points to the line should be the maximum possible. Find this distance.

Input

The first line contains a single integer n — the number of the points ($2 \le n \le 2\,000$).

Each of the following n lines contains two integers x_i and y_i — coordinates of i-th point ($|x_i|, |y_i| \le 10^9$).

It's guaranteed that no two points coincide.

Output

Print single real number — an answer. Your answer will be considered correct if its absolute or relative error doesn't exceed 10^{-9}.

Scoring

Subtask	Score	Constraints
1	11	$n \le 10$
2	19	Points form strictly convex non-degenerate polygon, given in the counter clockwise order, $3 \le n$
3	23	$n \le 100$
4	31	$n \le 1\,000$
5	16	No additional constraints

Examples

standard input	standard output
4 0 0 0 1 1 0 1 1	0.50000000000
2 -12 34 56 -78	65.51335741664
8 0 0 2 0 5 1 5 3 4 5 3 4 1 4 0 2	1.10000000000

Note

A picture for the third example:

