

## 2circles

100 points

Source code: `2circles.c`, `2circles.cpp`, `2circles.pas`

Input file: `2circles.in`

Output file: `2circles.out`

Time limit: **4 seconds**

Memory limit: **64MB**

### Task

We will consider a convex polygon with  $N$  vertices. We wish to find the maximum radius  $R$  such that two circles of radius  $R$  can be placed entirely inside the polygon without overlapping.

### Description of input

The first line of input contains the number  $N$ . Each of the next  $N$  lines contains a pair of integers  $x_i, y_i$  – representing the coordinates of the  $i^{\text{th}}$  point, separated by space.

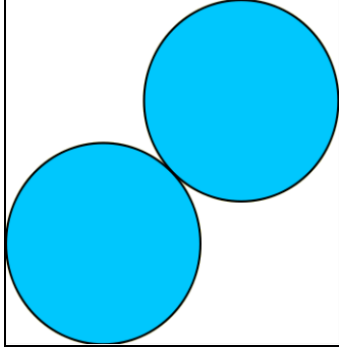
### Description of output

You should output a single number  $R$  – the desired radius. Output  $R$  with a precision of *3 decimals*. You will pass a test if the output differs from the true answer by at most 0.001.

### Constraints

- $3 \leq N \leq 50000$
- $-10^7 \leq x_i \leq 10^7$
- $-10^7 \leq y_i \leq 10^7$
- The points are given in trigonometric (anti-clockwise) order.
- For 10% of tests  $N = 3$
- For 40% of tests  $N \leq 250$

### Example

2circles.in	2circles.out	Explanation:	
4 0 0 1 0 1 1 0 1	0.293	<p>The maximum radius is obtained when the centers of the two circles are placed on one of the square's diagonals. The radius can be calculated exactly and it is:</p> $\frac{\sqrt{2}}{2 * (1 + \sqrt{2})} \approx 0.293$	



# 19<sup>th</sup> Balkan Olympiad in Informatics

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Day 1

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2circles.in	2circles.out	2circles.in	2circles.out
4 0 0 3 0 3 1 0 1	0.500	6 0 0 8 0 8 6 4 8 2 8 0 4	2.189