

## Problem B. Lines

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            5 seconds  
Memory limit:         512 megabytes

You are given  $n$  distinct points  $a_1, \dots, a_n$  on plane. For each pair  $i, j$  ( $i < j$ ) consider line passing through the points  $a_i$  and  $a_j$  (denote it as  $L_{i,j}$ ).  $A_{i,j}$  is the angle in radians from horizontal line to  $L_{i,j}$  in counterclockwise direction.  $0 \leq A_{i,j} < \pi$ .

$p_1, \dots, p_{\frac{n \cdot (n-1)}{2}}$  is array of the values  $A_{i,j}$  in the increasing order. Your task is to find the median of  $p$ .

Median of the array of length  $x$  is element with number  $\lfloor \frac{x}{2} \rfloor + 1$  if  $x$  is odd and average of the elements with numbers  $\lfloor \frac{x}{2} \rfloor$  and  $\lfloor \frac{x}{2} \rfloor + 1$  in otherwise.

### Input

The first line of input contains a single integer  $n$  ( $2 \leq n \leq 10^5$ ) — number of the points.

Next  $n$  lines contain the coordinates of the points.

The  $i$ -th of these lines contain two integers  $x_i$  and  $y_i$  ( $-10^9 \leq x_i, y_i \leq 10^9$ ) — the coordinates of the  $a_i$ .

It's guaranteed that the points are distinct.

### Output

Print the median of the angles with absolute or relative error at most  $10^{-9}$ .

### Examples

standard input	standard output
3 0 0 0 1 1 0	1.5707963268949
4 0 0 0 1 1 0 1 1	1.17809724517117
3 0 0 0 1000000000 1 0	1.5707963267949
3 0 0 1 0 2 0	0