

# J. Birthday bash

Difficulty: Demon

Time: 5 s

Memory: 1024 MB

by robertyl

Today is Alice's birthday! She invited you and her  $n - 2$  other friends to her birthday bash.

The birthday cake is a convex polygon with  $n$  sides. After they sing Happy Birthday, the cake is cut as follows: a point  $P$  is chosen uniformly at random in the interior of the cake and  $n$  cuts are made from  $P$  to the corners of the cake, creating  $n$  triangular slices. Since you and Alice are nice, you let your  $n - 2$  friends first take a slice, then you take a slice, and Alice gets the last one.

If everyone greedily takes cake slices by area, what is the expected area of your slice?

## Input

The first line contains a single integer  $n$  ( $3 \leq n \leq 200$ ), the number of sides.

The  $i$ -th of the following  $n$  lines contains two integers  $x_i$  and  $y_i$  ( $-10^3 \leq x_i, y_i \leq 10^3$ ), the coordinates of the  $i$ -th vertex of the polygon.

The vertices are given in counterclockwise order. The polygon is convex: all internal angles of the polygon are strictly smaller than  $\pi$ .

## Output

Print one real number: the expected area of your slice of cake.

Your answer will be considered correct if its absolute or relative error does not exceed  $10^{-6}$ .

## Sample 1

Input

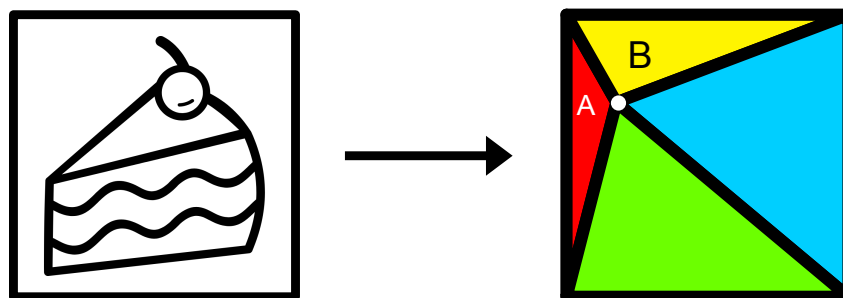
```
4
0 0
1 0
1 1
0 1
```

Output

```
0.166666637
```

Explanation

In the sample, we have a  $1 \times 1$  square. For instance, if the white dot below is chosen as the point, Alice gets the smallest slice  $A$  and you receive  $B$ . It can be shown that over all points inside the square, the average area of the second-smallest slice is  $1/6$ .



There is another sample on the next page.

**Sample 2**

Input

```
10
-43 33
-35 -39
32 -41
46 -12
50 30
50 34
49 38
42 49
37 49
-6 44
```

Output

```
95.718821997
```