Problem F1. FireGhost and Perfect Slice 1

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

*In this version, you need to find a cut that **minimizes** the difference in area between the two cake pieces.*

Seeing *lanhf* packing clothes to distribute to the winners of the VNOI Cup in the XX season, *tahp* and his sister *FireGhost* decided to help. Touched by their actions, *lanhf* decided to treat them to a special treat. *lanhf* took *tahp* and *FireGhost* to the most famous bakery in Ha Long city, where the chef *MofK* creates delicious and interesting-shaped cakes. *lanhf* allowed the two siblings to choose any cake they wanted!

After some consideration, the two siblings finally chose a cake in the shape of a convex polygon with n vertices. They decided to share the cake by cutting it into two parts with a single straight cut. Since they are very cooperative, the two cake pieces after the cut must have **equal perimeter**.

FireGhost is fair and equal, so *FireGhost* wants the two cake pieces after the cut to have the **smallest possible difference in area**.

After hearing *FireGhost*'s request, the chef *MofK* is at a loss on how to proceed. Given the coordinates of the n vertices of the cake, help the chef find the corresponding cut that satisfies *FireGhost*'s request.

Input

The first line contains an integer n ($3 \le n \le 20\,000$) – the number of vertices of the cake.

The i-th line among the n following lines contains two integers x_i and y_i ($|x_i|, |y_i| \le 10^6$) – the coordinates of the i-th vertex of the polygon.

The input is guaranteed to satisfy:

- the list of points is given in counter-clockwise order,
- no three consecutive points are collinear,
- the polygon is convex,
- no edge has length exceeding 49.99% the perimeter of the polygon.

Output

Print two pairs of real numbers (x_{f1}, y_{f1}) and (x_{f2}, y_{f2}) – the coordinates of two points on the edge of the cake representing the cut line that satisfies the requirements of *FireGhost* – the difference in area between the two cut pieces of cake should be **as small as possible**.

Definitions:

- x and y are the perimeters of the two cake pieces cut by the line you printed,
- S is the initial area of the cake,
- A is the difference in area between the two cake pieces created by the line you printed,
- B is the difference in area between the two cake pieces created by the corresponding line provided by the jury.

Your answer will be considered **correct** if:

- The two endpoints of the printed line should have a distance to the cake boundary of no more than 10^{-6},
- The absolute error between the perimeters of the two cake pieces should be no more than 10^{-6}, i.e., $|x - y| \leq 10^{-6}$,
- The relative error between A and B compared to the area of the cake should be no more than 10^{-12}, i.e., $\frac{|A - B|}{S} \leq 10^{-12}$.

Scoring

Subtask	Score	Constraints
1	250	$n = 3$
2	750	$3 \leq n \leq 500$
3	750	No additional constraints
Total	1750	

Example

standard input	standard output
3 3 5 0 7 0 3	3 5 0 5

Note

In the example test, since the cake is an isosceles triangle, we can easily divide the cake into 2 parts with equal perimeter and area.