# Bicycle Race

time limit per test

1 second

memory limit per test

256 megabytes

input

standard input

output

standard output

Maria participates in a bicycle race.

The speedway takes place on the shores of Lake Lucerne, just repeating its contour. As you know, the lake shore consists only of straight sections, directed to the north, south, east or west.

Let's introduce a system of coordinates, directing the *Ox* axis from west to east, and the *Oy* axis from south to north. As a starting position of the race the southernmost point of the track is selected (and if there are several such points, the most western among them). The participants start the race, moving to the north. At all straight sections of the track, the participants travel in one of the four directions (north, south, east or west) and change the direction of movement only in bends between the straight sections. The participants, of course, never turn back, that is, they do not change the direction of movement from north to south or from east to west (or vice versa).

Maria is still young, so she does not feel confident at some turns. Namely, Maria feels insecure if at a failed or untimely turn, she gets into the water. In other words, Maria considers the turn dangerous if she immediately gets into the water if it is ignored.

Help Maria get ready for the competition — determine the number of dangerous turns on the track.

**Input**

The first line of the input contains an integer *n* (4 ≤ *n* ≤ 1000) — the number of straight sections of the track.

The following (*n* + 1)-th line contains pairs of integers (*xi*, *yi*) ( - 10 000 ≤ *xi*, *yi* ≤ 10 000). The first of these points is the starting position. The *i*-th straight section of the track begins at the point (*xi*, *yi*) and ends at the point (*xi*+ 1, *yi*+ 1).

It is guaranteed that:

* the first straight section is directed to the north;
* the southernmost (and if there are several, then the most western of among them) point of the track is the first point;
* the last point coincides with the first one (i.e., the start position);
* any pair of straight sections of the track has no shared points (except for the neighboring ones, they share exactly one point);
* no pair of points (except for the first and last one) is the same;
* no two adjacent straight sections are directed in the same direction or in opposite directions.

**Output**

Print a single integer — the number of dangerous turns on the track.

**Examples**

**Input**

**Copy**

6  
0 0  
0 1  
1 1  
1 2  
2 2  
2 0  
0 0

**Output**

**Copy**

1

**Input**

**Copy**

16  
1 1  
1 5  
3 5  
3 7  
2 7  
2 9  
6 9  
6 7  
5 7  
5 3  
4 3  
4 4  
3 4  
3 2  
5 2  
5 1  
1 1

**Output**

**Copy**

6

**Note**

The first sample corresponds to the picture:

题意：一个多边形围成的湖，一个人绕着走。如果在某个位置不转弯直走的话会掉入湖里，则认为这个弯是危险的。问有多少个这样的弯。

# Maximal Area Quadrilateral

time limit per test

1 second

memory limit per test

256 megabytes

input

standard input

output

standard output

Iahub has drawn a set of *n* points in the cartesian plane which he calls "special points". A quadrilateral is a simple polygon without self-intersections with four sides (also called edges) and four vertices (also called corners). Please note that a quadrilateral doesn't have to be convex. A special quadrilateral is one which has all four vertices in the set of special points. Given the set of special points, please calculate the maximal area of a special quadrilateral.

**Input**

The first line contains integer *n* (4 ≤ *n* ≤ 300). Each of the next *n* lines contains two integers: *xi*, *yi* ( - 1000 ≤ *xi*, *yi* ≤ 1000)— the cartesian coordinates of *i*th special point. It is guaranteed that no three points are on the same line. It is guaranteed that no two points coincide.

**Output**

Output a single real number — the maximal area of a special quadrilateral. The answer will be considered correct if its absolute or relative error does't exceed 10- 9.

**Examples**

**input**

**Copy**

5  
0 0  
0 4  
4 0  
4 4  
2 3

**output**

**Copy**

16.000000

**Note**

In the test example we can choose first 4 points to be the vertices of the quadrilateral. They form a square by side 4, so the area is 4·4 = 16.

题意：给你n个点，让你从这些点里面寻找4个点，使得四边形的面积最大。