TRobots Inc. fabricates and maintains *touring robots*. Every touring robot visits places in a Cartesian plane scene to accomplish its tasks. A task of a robot is a sequence of at least two points the robot must visit in a tour according to the following rules:

1. the robot starts at the first point of the task, facing the second one;
2. the robot moves in the direction it faces;
3. upon arrival to a point in the sequence, the robot turns counterclockwise an angle α, satisfying $0 \leq \alpha < 2\pi$, until it faces the next point in the sequence (convention: the first point in a sequence is considered the following one for the last point in the sequence);
4. the robot ends at the first point of the sequence, facing the second one.

As a net result of a tour, a robot completes an integer number of turns. TRobots Inc. finds the number of turns important as this number determines when a robot needs maintenance. Your job is to help TRobots Inc. calculating the number of turns a robot completes for a given tour.

Input

The input consists of several cases, each one comprising a set of lines with data that defines a task for a robot. A task for the robot is described by several input lines:

- the first line defines the *size* N of the task, an integer satisfying $1 < N < 1000$ and representing the number of places the robot must visit in the tour;
- each of the following N lines has a pair of integer values, representing the Cartesian coordinates (x, y) of a point to visit in the tour ($-10^6 \leq x, y \leq 10^6$). It is guaranteed that each pair of consecutive points (considering the sequence as a circular list) are different.

The end of the input is given by $N = 0$.

Output

For each given case, output one line with the number of turns a robot completes for the given tour.

Sample Input

```
3
0 0
3 0
1 0
7
3 4
5 1
-2 -2
-2 2
-1 1
4 -1
1 -2
0
```

Sample Output

```
1
4
```