Pan African Olympiad in Informatics Team Selection Test 2025

Carnival Game

Time limit: 2 seconds **Memory limit: 512 MB**

Elyas, Idris and Chakib are playing a carnival game: on a large corkboard are placed N pins ($3 \leq N < 100$), where each one sits on a lattice point and no three points are collinear (no three points lie on the same line). To play, the trio have to pick out a pin each to designate three pins that the dealer will wrap an elastic band around, thus forming a triangle; the number of pins that lie inside of said triangle (excluding the ones chosen to form it) will be added to their score.

Elyas would like to count the amount of points he can get from each possible triple of pins that he and his friends could choose. More specifically, he would like to know how many of the triangles gain him i points, for all possible values of i ($0 \leq i < N - 2$).

Problem Description

You are given an array P of N points (x, y) ($0 \leq x, y \leq 10^6$), where all points have integer coordinates and no three points lie on the same line. Output an array O where $O[i]$ ($0 \leq i < N - 2$) denotes the amount of distinct triples that form a triangle containing i points (excluding its vertices).

Input

Input is formatted as follows:

```
N
X[0] Y[0]
X[1] Y[1]
...
X[N-1] Y[N-1]
```

Output

Output is expected as follows:

```
O[0] O[1] O[2] ...  O[N-3]
```

Constraints

- $3 \leq N \leq 100$
- $1 \leq X[i], Y[i] \leq 10^6$ $(0 \leq i < N)$

Subtasks

For this task, the amount of points you are awarded is the maximum of the percentages of testcases correctly answered across all of your submissions. This means that if this task has t testcases and you have answered at most s $(s \leq t)$ testcases correctly across all of your submissions, the amount of points you are awarded will be $100 * \frac{s}{t}$.

Example

```
7
3 6
17 15
13 15
6 12
9 1
2 7
10 19
```

Output:

```
28 6 1 0 0
```

Explanation

For the sake of simplicity, let's look at $O[2] = 1$: there exists only one triangle that contains 2 pins, formed by choosing the pins on $(2, 7)$, $(10, 19)$ and $(17, 15)$. The pins it contains are at $(6, 12)$ and $(13, 15)$. See illustration below: