5119 - Zombie Containment

North America - Pacific Northwest - 2010/2011

Associated with the zombie apocalypse is the notion of a critical mass of zombies: once the number of zombies exceeds a certain threshold T, all is lost. Your city is in a precarious state: its current population is $3T$. Even worse, you suspect someone in the city may be infected, although you have no idea who it may be. Once the symptoms manifest, it will be too late for that person, as well as for everyone else in the city that person can reach.



To prevent the possibility of reaching critical mass, you are going to divide the city into 3 regions via a set of walls. The city is triangular, and so you are going to divide the city into 3 smaller triangles by choosing a single splitting point and erecting straight walls between that point and the three vertices of the outer wall. This must be done immediately, i.e., there is no time to relocate people. Can you find a splitting point such that the three resulting regions each have exactly T people?

Input

The input consists of multiple test cases. Each test case is formatted as follows:

- Line 1: An integer n, $3 \leq n \leq 30000$, denoting the number of people. n is always a multiple of 3.
- Lines 2 to 4: Two numbers x_i and y_i denoting the coordinates of the i-th corner of the city, with $-10 \leq x_i, y_i \leq 10$. The three corners are specified in counterclockwise order.
- Lines 5 to $n + 4$: Two numbers x_i and y_i denoting the coordinates of the i-th person, with $-10 \leq x_i, y_i \leq 10$. All people lie in the interior of the city triangle.

Input is followed by a single line with a `0', which should not be processed. It is guaranteed that no two people will be collinear with any of the corners of the city. In particular, it is guaranteed that for any two people *I* and *J* and any corner *A*, the angle *IAJ* will be at least 10^{-7} rad.

Output

For each test case, print out a single line with two numbers *x* and *y* denoting the splitting point of the city. Each person must lie in the interior of one of the three generated triangles. Assume a person is a single point with zero radius, and that a wall is a line with zero thickness. It is guaranteed that there exists a splitting point; in fact, it is guaranteed that there exists a splitting point such that if the point were moved by 10^{-7} in any direction, it would still be a splitting point. Any splitting point that partitions the people into 3 sets of equal size will be judged correct.

Sample Input

```
3
0.0 0.0
10.0 0.0
0.0 10.0
4.0 4.0
1.0 4.0
4.0 1.0
0
```

Sample Output

```
3.0 3.0
```

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