Problem L
Linear Classifers

Time limit: 1 second

Memory limit: 2048 megabytes

Problem Description

There are n points on the Cartesian plane. The i-th point has coordinate (x_i, y_i). No two points concide and no three points are collinear.

Define a **linear classifier** as a straight line with equation $\frac{q_a}{p_a}x+\frac{q_b}{p_b}y = \frac{q_c}{p_c}$, where $p_a, q_a, p_b, q_b, p_c, q_c$ are integers.

Suppose we have two linear classifiers. If the two classifiers have exactly one intersection, they divide the Cartesian plane into 4 regions. Can you find two linear classifiers so that each of the 4 regions contains an equal number of points? Of course, no points should lie on the linear classifiers, so each region should have exactly $\frac{n}{4}$ points.

Input Format

The first line contains an integer n. Each of the following n lines contains two integers x_i, y_i.

Output Format

Print two lines. In each line, print six integers $p_a, q_a, p_b, q_b, p_c, q_c$ denoting a linear classifier with equation $\frac{q_a}{p_a}x + \frac{q_b}{p_b}y = \frac{q_c}{p_c}$.

Your solution will be considered correct if it satisfies all the following conditions:

- $-10^{18} \le p_a, q_a, p_b, q_b, p_c, q_c \le 10^{18}$ for each linear classifier.
- $p_a, p_b, p_c \neq 0$ for each linear classifier.
- No points lie on the linear classifiers.
- The two linear classifiers have exactly one intersection.
- Each of the 4 regions contains exactly $\frac{n}{4}$ points.

If there are multiple possible solutions, print any. It can be proved that a solution always exists under these constraints.

Technical Specification

- $4 \leq n \leq 2024$
- $0 \leq x_i, y_i \leq 10^4$ for $i = 1, 2, \ldots, n$
- $4 \mid n$
- No two points concide and no three points are collinear.

Sample Input 1

```
8
0 0
7 2
4 0
5 7
3 9
8 10
1 6
7 10
```

Sample Output 1

```
5 52 -1 3 5 156
1 1 2 20 1 70
```

Sample Input 2

```
4
0 0
1 0
1 1
2 1
```

Sample Output 2

```
1 0 1 1 2 1
1 -1 1 1 2 -1
```

Note

Here is the figure for the first example. Note that point $D(5, 7)$ does not lie on the green line.

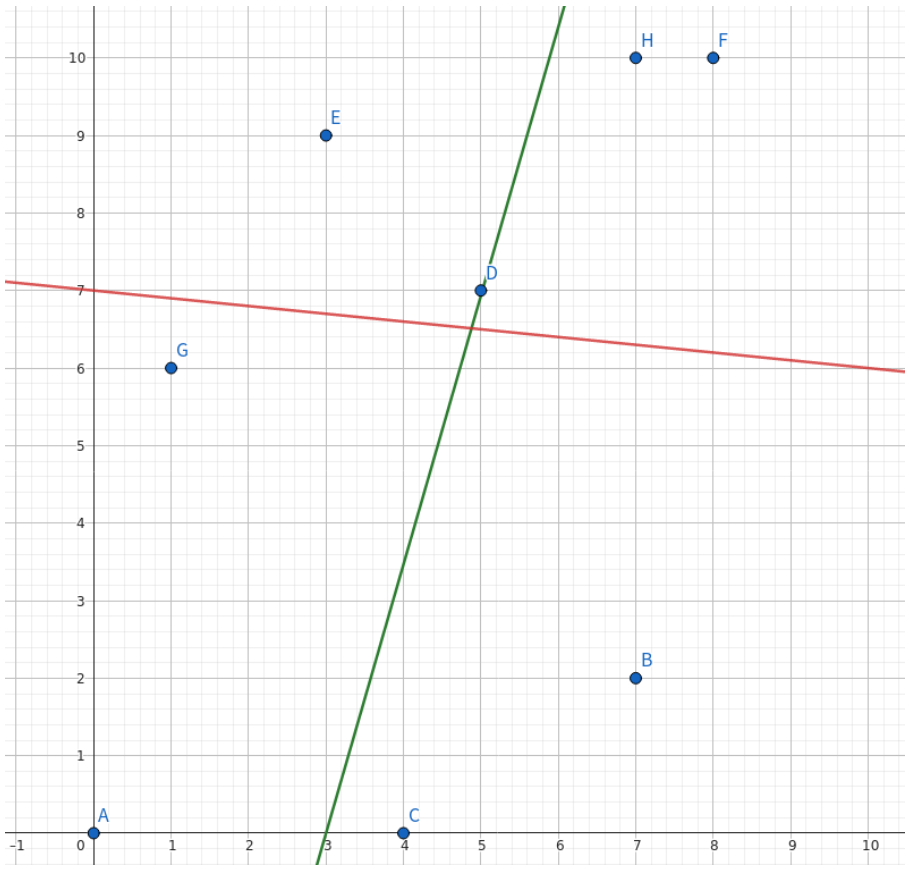

Figure 1: The figure for the first example. The two lines are the linear classifiers.