7888 Counting Self-Rotating Subsets

A set of points in the plane is *self-rotating* if there is a point P, *the center*, and an *angle* α, expressed in degrees, where $0 < \alpha < 360$, such that the rotation of the plane, with center P and angle α, maps every point in the set to some point also in the set.

You are given a set of N distinct points, all having **integer** coordinates. Find the number of distinct subsets of size $1, 2, \ldots, N$ that are self-rotating. Two subsets are considered distinct if one contains a point that the other does not contain.

Input

The input file contains several test cases, each of them as described below.

The first line of the input contains one integer N representing the number of points in the input set ($1 \leq N \leq 1000$). Each of the following N lines describes a different point of the set, and contains two integers X and Y giving its coordinates in a Cartesian coordinate system ($-10^9 \leq X, Y \leq 10^9$). All points in the input set are distinct.

Output

For each test case, output a single line containing N integers $S_1, S_2, \ldots, S_N$. For $i = 1, 2, \ldots, N$ the integer S_i must be the number of subsets of i points of the input set that are self-rotating. Since these numbers can be very big, output them *modulo* $10^9 + 7$.

Sample Input

```
3
1 1
2 2
1 0
7
-2 0
-1 1
0 2
0 0
2 0
1 -1
0 -2
1
-1000000000 1000000000
```

Sample Output

```
3 3 0
7 21 5 5 3 1 1
1
```