Problem C – Counting Self-Rotating Subsets

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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 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

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 1	**Sample output 1**
3 1 1 2 2 1 0	3 3 0

Sample input 2	**Sample output 2**
7 -2 0 -1 1 0 2 0 0 2 0 1 -1 0 -2	7 21 5 5 3 1 1

Sample input 3	**Sample output 3**
1 -1000000000 1000000000	1