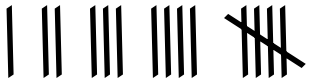


Problem D
Circuit Counting



Suppose you are given a sequence of N integer-valued vectors in the plane (x_i, y_i), $i = 1, \ldots, N$. Beginning at the origin, we can generate a path by regarding each vector as a displacement from the previous location. For instance, the vectors $(1, 2)$, $(2, 3)$, $(-3, -5)$ form the path $(0, 0), (1, 2), (3, 5), (0, 0)$. We define a path that ends at the origin as a *circuit*. The example just given is a circuit. We could form a path using any nonempty subset of the N vectors, while the result (circuit or not) doesn't depend on the ordering of the subset. How many nonempty subsets of the vectors form circuits?

For instance, consider the vectors $\{(1, 2), (-1, -2), (1, 1), (-2, -3), (-1, -1)\}$ From these vectors we can construct 4 possible subset circuits using

$$\{(1, 2),\ (-1, -2)\}$$
$$\{(1, 1),\ (-1, -1)\}$$
$$\{(1, 2),\ (1, 1),\ (-2, -3)\}$$
$$\{(1, 2),\ (-1, -2),\ (1, 1),\ (-1, -1)\}$$

Input

Input begins with an integer $N \leq 40$ on the first line. The next N lines each contain two integer values x and y forming the vector (x, y), where $|x|, |y| \leq 10$ and $(x, y) \neq (0, 0)$. Since the given vectors are a set, all vectors are unique.

Output

Output the number of nonempty subsets of the given vectors that produce circuits. It's guaranteed that the answer is less than 10^{10}.

Sample Input 1	Sample Output 1
5 1 2 1 1 -1 -2 -2 -3 -1 -1	4

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