Two Convex Sets

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	1024 megabytes

A set of points U in the xy-plane is called **good** if no point in U lies in the **interior** of the convex hull of U. Note that the empty set is considered good.

You are given N distinct points $v_1, v_2, \ldots, v_N$ in the xy-plane. The coordinates of the point v_i are (x_i, y_i). No three distinct points are collinear.

Count the number of subsets S of $V = \{v_1, v_2, \ldots, v_N\}$ such that both S and $V \setminus S$ are good sets.

Input

The input is given in the following format:

N
x_1 y_1
x_2 y_2
$\vdots$
x_N y_N

- All input values are integers.
- $1 \leq N \leq 40$
- $|x_i|, |y_i| \leq 10^6$
- $(x_i, y_i) \neq (x_j, y_j)$ for $i \neq j$
- No three distinct points are collinear.

Output

Output the answer.

Examples

standard input	standard output
4 0 0 3 0 0 3 1 1	14
8 1 0 2 0 3 1 3 2 2 3 1 3 0 2 0 1	256
10 0 0 1 1 7 1 1 7 3 2 2 3 4 2 2 4 5 4 4 5	0

Note

In the first example, except for the empty set $\emptyset$ and the full set V, all other sets S satisfy the condition.