

D. Symmetric Projections

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a set of n points on the plane. A line containing the origin is called good, if projection of the given set to this line forms a symmetric multiset of points. Find the total number of good lines.

Multiset is a set where equal elements are allowed.

Multiset is called symmetric, if there is a point P on the plane such that the multiset is [centrally symmetric](#) in respect of point P .

Input

The first line contains a single integer n ($1 \leq n \leq 2000$) — the number of points in the set.

Each of the next n lines contains two integers x_i and y_i ($-10^6 \leq x_i, y_i \leq 10^6$) — the coordinates of the points. It is guaranteed that no two points coincide.

Output

If there are infinitely many good lines, print -1 .

Otherwise, print single integer — the number of good lines.

Examples

input
3 1 2 2 1 3 3
output
3

input
2 4 3 1 2
output
-1

Note

Picture to the first sample test:

In the second sample, any line containing the origin is good.