E. Drawing Circles is Fun

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

There are a set of points S on the plane. This set doesn't contain the origin $O(0, 0)$, and for each two distinct points in the set A and B, the triangle OAB has strictly positive area.

Consider a set of pairs of points $(P_1, P_2), (P_3, P_4), ..., (P_{2k-1}, P_{2k})$. We'll call the set*good* if and only if:

- $k \geq 2$.
- All P_i are distinct, and each P_i is an element of S.
- For any two pairs (P_{2i-1}, P_{2i}) and (P_{2j-1}, P_{2j}), the circumcircles of triangles $OP_{2i-1}P_{2j-1}$ and $OP_{2i}P_{2j}$ have a single common point, and the circumcircle of triangles $OP_{2i-1}P_{2j}$ and $OP_{2i}P_{2j-1}$ have a single common point.

Calculate the number of good sets of pairs modulo 1000000007 $(10^9 + 7)$.

Input

The first line contains a single integer n $(1 \leq n \leq 1000)$ — the number of points in S. Each of the next n lines contains four integers a_i, b_i, c_i, d_i $(0 \leq |a_i|, |c_i| \leq 50;\ 1 \leq b_i, d_i \leq 50;\ (a_i, c_i) \neq (0, 0))$. These integers represent a point .

No two points coincide.

Output

Print a single integer — the answer to the problem modulo 1000000007 $(10^9 + 7)$.

Examples

input

```
10
-46 46 0 36
0 20 -24 48
-50 50 -49 49
-20 50 8 40
-15 30 14 28
4 10 -4 5
6 15 8 10
-20 50 -3 15
4 34 -16 34
16 34 2 17
```

output

```
2
```

input

```
10
30 30 -26 26
0 15 -36 36
-28 28 -34 34
10 10 0 4
-8 20 40 50
9 45 12 30
6 15 7 35
36 45 -8 20
-16 34 -4 34
4 34 8 17
```

output

```
4
```

input

```
10
0 20 38 38
-30 30 -13 13
-11 11 16 16
30 30 0 37
6 30 -4 10
6 15 12 15
-4 5 -10 25
-16 20 4 10
8 17 -2 17
16 34 2 17
```

output

```
10
```