Problem G. Geometry Enjoyer

Input file:	*standard input*
Output file:	*standard output*
Time limit:	7 seconds
Memory limit:	512 mebibytes

Altair was playing with the points on the plane (as usual). At some point, he discovered a new game that he will play with you.

He made a convex polygon with k sides on the two-dimensional plane. The polygon had a really nice property: no pair of sides are parallel. Then he extended every side of the polygon to a line, and found the intersection point for every pair of lines.

Now he gives you the points he got. You should find the initial polygon.

Input

The first line contains one integer n ($1 \le n \le 200$): the number of points.

Each of the next n lines contains four integers, p_x, q_x, p_y, and q_y ($-10^6 \le p_x, p_y \le 10^6$, $1 \le q_x, q_y \le 10^6$): the coordinates of the i-th point. The X coordinate equals p_x/q_x, and the Y coordinate equals p_y/q_y. It is guaranteed that the values p_x and q_x are coprime, and the values p_y and q_y are coprime.

It is guaranteed that the polygon can be uniquely determined by the given points.

Output

The first line of the output should contain one integer k: the size of the polygon.

You can output the vertices of the polygon in any order.

Each of the next k lines should contain four integers, p_x, q_x, p_y, and q_y ($-10^6 \le p_x, p_y \le 10^6$, $1 \le q_x, q_y \le 10^6$): the coordinates of the polygon vertices. The X coordinate equals p_x/q_x, and the Y coordinate equals p_y/q_y. The values p_x and q_x should be coprime, and the values p_y and q_y should be coprime.

Example

standard input	*standard output*
6 1 1 2 1 12 5 24 5 0 1 0 1 3 1 3 1 -3 1 0 1 4 1 0 1	4 0 1 0 1 1 1 2 1 3 1 3 1 4 1 0 1