Problem D: Defense Walls

Advanced Algorithms for Programming Contests

Restrictions

Time: 2 seconds
Memory: 512 MB

Problem description

At long last, the Titans are approaching even your secluded country. There is only one way to keep everyone safe: Defense walls! Of course you want to build as many walls as possible (and the supply of raw material won't be an issue), but there are some restrictions to how they can be built: Every defense wall should have polygonal shape and a guard tower at each of its corners – however, guard towers can't be built everywhere, only in a few select spots (these have already been determined). Furthermore, different defense walls shouldn't touch one another (in particular they may not have common guard towers), and, most importantly, there should be an area that is enclosed by all walls (the most vulnerable people will be moved there).

Given the coordinates where guard towers could be built, find how many walls can be constructed such that the above restrictions are satisfied.

Input

The input consists of

- one line containing n ($3 \leq n \leq 10^4$) – the number of spots where guard towers can be built

- n lines describing these spots, with the i-th line containing integers x_i and y_i ($-1000 \leq x_i, y_i \leq 1000$) – the coordinates of the i-th spot. It is guaranteed that the given points are pairwise distinct.

Output

Output the maximum number of nested defense walls behind which the villagers can hide.

Sample input and output

Input	Output
8	1
2 0	
1 1	
0 2	
1 3	
2 4	
3 3	
4 2	
3 1	
8	2
3 0	
2 2	
0 3	
2 4	
3 6	
4 4	
6 3	
4 2	