

Fence

SEASON 7 – SECOND ROUND



Lora recently got tired of interacting with humans and decided to start a new life with her dogs far away from society. She now wants to surround her newly-built house with a fence, to be sure that no intruders will bother her.

We can represent Lora's house as a single point with coordinates (0, 0). Near Lora's house are several poles, which we can also represent by integer coordinates. Lora can connect two poles with a fence along a straight line. She now wants to connect some pairs of poles in such a way that the poles and their connections form **a convex polygon with minimal area**, such that Lora's house is strictly inside it.

Your task is to write a program, that computes the minimal possible area of such convex polygon. To make things easier, you should print an integer – the area of the polygon multiplied by 2 (it is guaranteed that the area multiplied by 2 will be an integer).

Note: The connection of two poles cannot go straight through Lora's house!

Input

The first line of the file `fence.in` contains a single integer N – the amount of poles near Lora's house. The following N lines describe the poles. The i -th of those lines contains a pair of space-separated integers X_i and Y_i – the coordinates of the i -th pole.

Output

In the output file `fence.out` print a single integer – the minimum area of such convex polygon, multiplied by 2.

Constraints

$$3 \leq N \leq 400$$

$$-10^6 \leq X_i, Y_i \leq 10^6$$

Time limit: 1.0 sec

Memory limit: 256 MB

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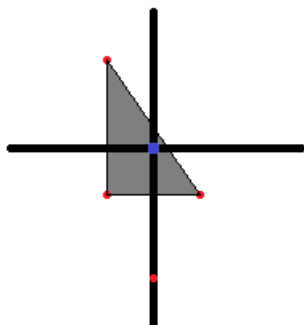
Example test

Input (fence.in)	Output (fence.out)
4 -1 2 -1 -1 1 -1 0 -3	6
4 -1 2 1 2 0 1 0 -1	6
5 -1 2 1 2 -1 -2 1 -2 4 0	16

Clarifications

The solutions of the sample tests are as follows (the poles are marked with red dots and Lora's house with a blue square):

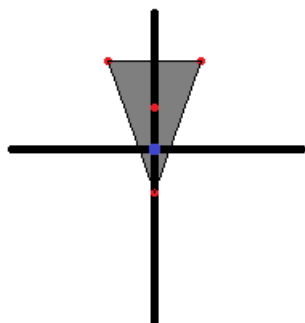
Sample case 1 (area=3):



Sample case 2 (area=3):

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Sample case 3 (area=8):

