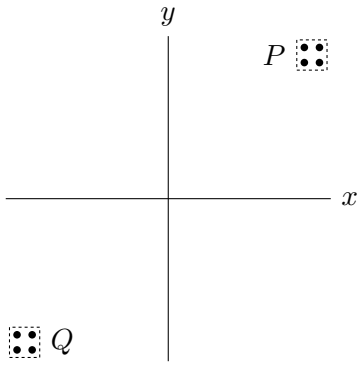
Farm

A farmer owns a large piece of land with several trees. He wants to give a part of his land to his son, and another part to his daughter, as follows: His son will partition the set of trees into two disjoint parts, say P and Q, such that the convex hull[1] of P and the convex hull of Q are disjoint and do not even touch one another. One of the farmer's children will get the convex hull of all the trees in P, and the other will get the convex hull of all the trees in Q. However, once the son chooses P and Q, the choice of who gets the convex hull of P and who gets the convex hull of Q will be left to the daughter, and she will naturally keep the larger piece of land for herself.

For instance, suppose there are 8 trees located at $(100, 100)$, $(100, 90)$, $(90, 100)$, $(90, 90)$, $(-100, -100)$, $(-100, -90)$, $(-90, -100)$ and $(-90, -90)$. In this case, the son's best option is to choose P and Q as shown: any other way of partitioning the trees will give more land to the daughter.



Given the locations of the trees, find the minimum area the daughter is guaranteed to get, regardless of how the son chooses P and Q.

Input format

The first line of input has a single integer N, the number of trees. This is followed by N lines of input, each with two integers, the x and y coordinates of a tree.

Output format

The ouput should have a single line with a single integer, the minimum area the daughter is guaranteed to get *multiplied by two*. This quantity (twice the guaranteed area) will always be an integer.

Test data

The x and y coordinates of all trees are between -1000 and 1000 inclusive.

- Subtask 1 (40 marks) : $1 \leq N \leq 18$.
- Subtask 2 (60 marks) : $1 \leq N \leq 50$.

Sample input

```
8
100 100
100 90
90 100
90 90
-100 -100
-100 -90
-90 -100
-90 -90
```

Sample output

```
200
```

Limits

Memory limit: 128 MB

Time limit: 4 s

[1]The convex hull of a set of points is the smallest convex polygon containing those points.