

Task 3

The Oldest Ruin

Task

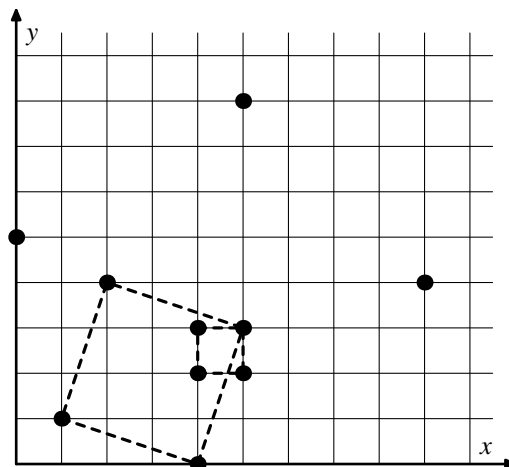
A long time ago lived many people in a settlement here. The people built structures of various shapes and various sizes. However, those structures have long been lost, and the only clues to deduce the position of the structures are some literature and the columns found in the ruin.

The literature describes a temple. The temple were precisely square-shaped when viewed from the above, and columns were located at the four corners of the temple. We do not know in which direction the temple was built or whether any columns were on the edges of or inside the temple. Archaeologists deduced that the temple must be the square made of columns found in the ruin with the maximum area.

Write a program which, given the coordinates of positions of columns, finds the square made of four columns with the maximum area and reports its area. Note that the edges of the square are not necessarily parallel to the coordinate axes.

Example

In the example depicted in the figure below, there are ten columns among which four columns at $(4, 2)$, $(5, 2)$, $(5, 3)$, $(4, 3)$ and four columns at $(1, 1)$, $(4, 0)$, $(5, 3)$, $(2, 4)$ compose squares. The latter is larger and its area is 10.



Input

The input file is named `input.txt`.

The first line contains n , the number of the columns found in the ruin.

Each of the following n lines contains two space-separated integers that are the x - and y -coordinates of a column.

No columns appear more than once.

n is an integer in the range $1 \leq n \leq 3000$, and the x - and y -coordinates of columns are integers between 0 and 5000, inclusive.

30% of the mark is given for test cases with $1 \leq n \leq 100$ and 60% of the mark is given for test cases with $1 \leq n \leq 500$.

Output

The output file is named `output.txt`.

The output file should contain a single integer, which is the maximum area of a square made of four columns if one exists, or 0 otherwise.

Sample input and output

The following are the input and the output corresponding to the example above.

`input.txt`

```
10
9 4
4 3
1 1
4 2
2 4
5 8
4 0
5 3
0 5
5 2
```

`output.txt`

```
10
```