Task: PIO
Stone

Olimpiada Informatyczna

XXV OI, Stage I. Source file `pio.*` Available memory: 128 MB. *16.10–13.11.2017*

A stone is located at the point $(0, 0)$ of an infinite grid. The stone has exactly n possible moves, not necessarily unique, each described by a vector of integer coordinates. The stone can make each move at most once, and the moves it makes may be arranged in any order.

The goal is to reach a point as far (in the Euclidean distance) from the initial position as possible. How far is that?

Input

The first line of the standard input contains a single positive integer n that specifies the number of possible moves. Each of the n lines that follow contains two integers x_i, y_i ($-10^4 \leq x_i, y_i \leq 10^4$), separated by a single space, forming the vector $[x_i, y_i]$, which describes a possible move of the stone.

Output

Your program should print a single integer to the standard output, namely the square of the distance from $(0, 0)$ to the furthest point that can be reached by the stone.

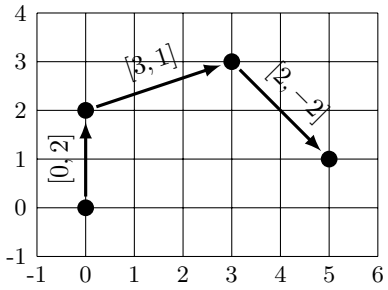
Example

For the following input data:

```
5
2 -2
-2 -2
0 2
3 1
-3 1
```

the correct answer is:

```
26
```



Explanation for the example: The figure depicts an optimal solution which employs the moves given by the vectors $[0, 2]$, $[3, 1]$, and $[2, -2]$. Another optimal solution consists of the moves $[0, 2]$, $[-3, 1]$, and $[-2, -2]$.

Sample grading tests:

`1ocen:` $n = 5$, the vectors are $[0, 0]$, $[1, 0]$, $[0, -1]$, $[-1, 0]$, and $[0, 1]$;

`2ocen:` $n = 100$, the vectors are $[i, j]$ for $i, j \in \{1, 2, \ldots, 10\}$;

`3ocen:` $n = 200\,000$, all vectors are $[-1, -1]$.

Grading

The set of tests consists of the following subsets. Within each subset, there may be several unit tests.

Subset	Property	Score
1	$n \leq 20$	15
2	$n \leq 2000$	45
3	$n \leq 200\,000$	40