G: Board game

Memory limit **256 MB**

Today, Sophie received a new board game, whose key element is establishing trade links between cities. There are n cities with coordinates $(x_1, y_1), (x_2, y_2), \ldots, (x_n, y_n)$ on the board, no two of them sharing both coordinates. Each city produces a good of one type. Trade links can be established only between cities producing goods of different kinds. For establishing such a link between a pair of cities with coordinates (x_i, y_i) and (x_j, y_j), the player receives

$$(x_i - x_j)^2 + (y_i - y_j)^2$$

points.

Sophie would like to know which trade link would grant her the most points. Write a program that: reads the board description, determines the trade link that maximizes the number of points, and prints this number to the standard output.

Input

In the first line of input, there is an integer n ($2 \leq n \leq 250\,000$) that specifies the number of cities on the board. Each of the n lines that follow describes a single city. A city's description consists of a triple of integers x_i, y_i, t_i ($-1\,000\,000\,000 \leq x_i, y_i \leq 1\,000\,000\,000$, $1 \leq t_i \leq n$) separated by single spaces; the numbers x_i, y_i are the i-th city's coordinates, whereas t_i is the type of good that it produces.

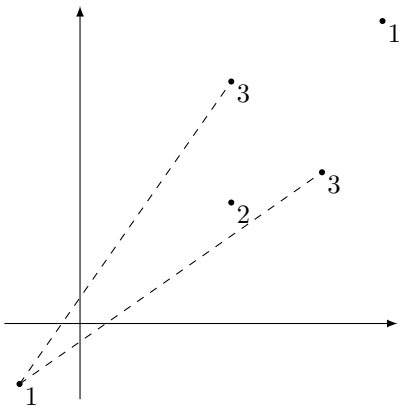
More than one type of good is produced overall, and no two cities share both coordinates.

Output

The first and only line of output should contain the maximum number of points that Sophie can receive for a single trade link.

Example

Input	Output
5 5 4 2 -2 -2 1 10 10 1 8 5 3 5 8 3	149



The trade link that maximize the number of points links the cities with coordinates $(-2, -2)$ and $(8, 5)$. This link yields $149 = 10^2 + 7^2$ points. There is also another link that yields the same amount of points: between the cities with coordinates $(-2, -2)$ and $(5, 8)$.