1 Fancy Fence

You want to build a fence around the trees in your garden. There are n trees, each tree is planted at integer coordinates (see Fig. 1, left). The fence consists of horizontal and vertical segments of length 1 and diagonal segments of length $\sqrt{2}$, where each segment joins two integer points (see Fig. 1, right). The objective is to build such a fence of minimum perimeter that encloses all the trees. The fence is allowed to pass through the trees.

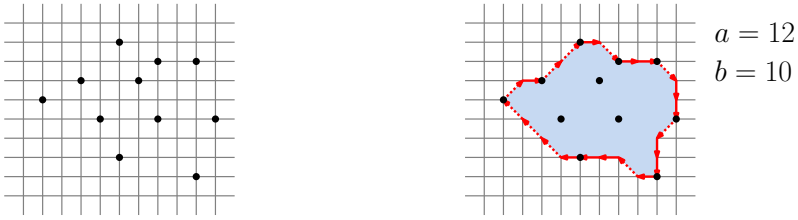

Figure 1: Fancy fence.

Letting a denote the number of horizontal and vertical fence segments, and letting b denote the number of diagonal segments, the total length of the fence is $a + b\sqrt{2}$. Write a program that inputs the tree coordinates and outputs the values a and b.

You may assume that $1 \leq n \leq 10^5$ and each point's coordinates lie in the interval $[-10^9, 10^9]$.

Input and output files can be found at: `http://challengebox.cs.umd.edu/2019/Fence`

Input:

The first line contains a single integer n, the number of trees in the garden. Each of the next n lines contains two space-separated integers x_i and y_i, indicating the coordinates of the ith tree.

Output:

The output consists of the two numbers a and b, where a indicate the total number of horizontal-vertical segments.

Example:

Given the input $p_1 = (0, 0)$, $p_2 = (3, 0)$, $p_3 = (0, 3)$ the minimum-perimeter fence consists of 3 horizontal segments from p_1 to p_2, 3 diagonal segments from p_2 and p_3, and 3 vertical segments from p_3 to p_1, for a final answer of $a = 6$ and $b = 3$.

Input:	**Output:**
`3`	`6 3`
`0 0`	
`3 0`	
`0 3`	