Problem D
Colorful Rectangle

Time Limit: 10 seconds

You are given a set of points on a plane. Each point is colored either red, blue, or green. A rectangle is called *colorful* if it contains one or more points of every color inside or on its edges. Your task is to find an axis-parallel colorful rectangle with the shortest perimeter. An axis-parallel line segment is considered as a degenerated rectangle and its perimeter is twice the length of the line segment.

Input

The input consists of a single test case of the following format.

n
x_1 y_1 c_1
$\vdots$
x_n y_n c_n

The first line contains an integer n ($3 \leq n \leq 10^5$) representing the number of points on the plane. Each of the following n lines contains three integers x_i, y_i, and c_i satisfying $0 \leq x_i \leq 10^8$, $0 \leq y_i \leq 10^8$, and $0 \leq c_i \leq 2$. Each line represents that there is a point of color c_i (0: red, 1: blue, 2: green) at coordinates (x_i, y_i). It is guaranteed that there is at least one point of every color and no two points have the same coordinates.

Output

Output a single integer in a line which is the shortest perimeter of an axis-parallel colorful rectangle.

Sample Input 1	**Sample Output 1**
4 0 2 0 1 0 0 1 3 1 2 4 2	8

Sample Input 2	Sample Output 2
4 0 0 0 0 1 1 0 2 2 1 2 0	4