

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
x1 y1 c1
⋮
xn yn cn
```

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

```
4
0 2 0
1 0 0
1 3 1
2 4 2
```

Sample Output 1

```
8
```

Sample Input 2**Sample Output 2**

```
4
0 0 0
0 1 1
0 2 2
1 2 0
```

```
4
```