

## 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**

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

**Sample Output 2**

```
4
```