

Problem C. Colorful Squares

Input file: *standard input*
Output file: *standard output*
Time limit: 5 seconds
Memory limit: 1024 mebibytes

There are N points on a plane: $P_1(x_1, y_1)$, $P_2(x_2, y_2)$, $\dots$, $P_N(x_N, y_N)$. Each point has a color denoted by an integer from 1 to K .

Consider a square with edges parallel to coordinate axes. The square is *colorful* if it contains points of all K colors inside or on its border. It is allowed for the square to have edge length 0, thus covering just a single point.

Find a colorful square with the minimum side length, and print that length.

Input

The first line contains two integers N and K ($2 \leq N \leq 10^5$, $2 \leq K \leq N$).

Then N lines follow. The i -th of these lines contains three integers, x_i , y_i , and c_i : the coordinates of the i -th point and its color, respectively ($1 \leq x_i, y_i \leq 2.5 \cdot 10^5$, $1 \leq c_i \leq K$). You may assume that there is at least one point for each of k colors.

Output

Print one integer: the answer to the problem.

Examples

standard input	standard output
5 2 4 2 1 5 3 1 5 4 2 4 5 2 3 8 2	1
5 3 4 2 1 5 3 1 5 4 2 4 5 2 3 8 3	5
4 2 1 1 1 1 1 1 1 1 2 1 1 2	0