

C. Star sky

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

The Cartesian coordinate system is set in the sky. There you can see n stars, the i -th has coordinates (x_i, y_i) , a maximum brightness c , equal for all stars, and an initial brightness s_i ($0 \leq s_i \leq c$).

Over time the stars twinkle. At moment 0 the i -th star has brightness s_i . Let at moment t some star has brightness x . Then at moment $(t + 1)$ this star will have brightness $x + 1$, if $x + 1 \leq c$, and 0, otherwise.

You want to look at the sky q times. In the i -th time you will look at the moment t_i and you will see a rectangle with sides parallel to the coordinate axes, the lower left corner has coordinates (x_{1i}, y_{1i}) and the upper right — (x_{2i}, y_{2i}) . For each view, you want to know the total brightness of the stars lying in the viewed rectangle.

A star lies in a rectangle if it lies on its border or lies strictly inside it.

Input

The first line contains three integers n, q, c ($1 \leq n, q \leq 10^5$, $1 \leq c \leq 10$) — the number of the stars, the number of the views and the maximum brightness of the stars.

The next n lines contain the stars description. The i -th from these lines contains three integers x_i, y_i, s_i ($1 \leq x_i, y_i \leq 100$, $0 \leq s_i \leq c \leq 10$) — the coordinates of i -th star and its initial brightness.

The next q lines contain the views description. The i -th from these lines contains five integers $t_i, x_{1i}, y_{1i}, x_{2i}, y_{2i}$ ($0 \leq t_i \leq 10^9$, $1 \leq x_{1i} < x_{2i} \leq 100$, $1 \leq y_{1i} < y_{2i} \leq 100$) — the moment of the i -th view and the coordinates of the viewed rectangle.

Output

For each view print the total brightness of the viewed stars.

Examples

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

input
3 4 5 1 1 2 2 3 0 3 3 1 0 1 1 100 100 1 2 2 4 4 2 2 1 4 7 1 50 50 51 51
output

3
3
5
0

Note

Let's consider the first example.

At the first view, you can see only the first star. At moment 2 its brightness is 3, so the answer is 3.

At the second view, you can see only the second star. At moment 0 its brightness is 0, so the answer is 0.

At the third view, you can see both stars. At moment 5 brightness of the first is 2, and brightness of the second is 1, so the answer is 3.