

Problem M. Star sky

Time Limit 2000 ms

Mem Limit 262144 kB

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	Output
2 3 3	3
1 1 1	0
3 2 0	3
2 1 1 2 2	
0 2 1 4 5	
5 1 1 5 5	

Input	Output
3 4 5	3
1 1 2	3
2 3 0	5
3 3 1	0
0 1 1 100 100	
1 2 2 4 4	
2 2 1 4 7	
1 50 50 51 51	

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.