C. Star sky

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 ($0 \le s_i \le c$).

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 $x+1 \le c$, 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 ($1 \le n, q \le 10^5, 1 \le c \le 10$) — 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 ($1 \le x_i, y_i \le 100, 0 \le s_i \le c \le 10$) — 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 $t_i, x_{1i}, y_{1i}, x_{2i}, y_{2i}$ ($0 \le t_i \le 10^9, 1 \le x_{1i} < x_{2i} \le 100, 1 \le y_{1i} < y_{2i} \le 100$) — 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   Copy

```
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.