The Cake is a Dessert

Time limit: 4.5s **Memory limit:** 1G

At the end of a tasty meal, Capba just wants some tasty dessert. Today, his cafeteria is serving a rectangular cake, with a coordinate system carved on its delicious graham cracker crust base. The cake can be thought of as a 2D grid of squares, with square $(1, 1)$ at the bottom-left, and (N, M) at the top-right $(1 \leq N, M \leq 5\,000)$.

The cake also has K $(0 \leq K \leq 200\,000)$ different icings on it, numbered from 1 to K, which have been applied in a strange fashion. Icing i covers all squares in the rectangle from (x_i, y_i) to (X_i, Y_i) $(1 \leq x_i, X_i \leq N, 1 \leq y_i, Y_i \leq M)$, inclusive, with 1 cubic centimeter $(1\ \mathrm{cm}^3)$ of icing each. If icings overlap, there will be squares with multiple layers of icing on them; for example, some of the squares in the sample input below are covered by $2\ \mathrm{cm}^3$ of icing.

Capba likes icing... but then, he also doesn't like too much icing. He considers Q $(1 \leq Q \leq 200\,000)$ choices, numbered from 1 to Q, regarding which part of the cake to eat. Choice i involves cutting out and rapidly consuming the rectangle from (A_i, B_i) to (C_i, D_i) $(1 \leq A_i \leq C_i \leq N, 1 \leq B_i \leq D_i \leq M)$, inclusive.

To decide on the best choice, he first wants to know how much icing is present in each potential piece of cake.

Input Specification

Line 1: N, M, K.
Next K lines: x_i, y_i, X_i, Y_i.
Next line: Q.
Next Q lines: A_i, B_i, C_i, D_i.

Output Specification

Q lines. Line i should contain the amount of icing present on the piece of cake described by choice i, in cm^3.

Note: The answers may overflow 32-bit integers.

Sample Input

```
6 5 3
1 3 4 5
1 1 6 1
2 2 3 3
5
2 1 2 2
5 2 6 5
2 4 2 4
3 1 4 2
2 1 4 4
```

Sample Output

```
2
0
1
3
13
```

Explanation for Sample Output

The cake has the following amounts of icing on it (in cm^3):

```
111100
111100
122100
011000
111111
```

To answer the queries, just look at the diagram above and add up the numbers in each rectangle.