D - Garbage Removal

Editorial (/contests/abc406/tasks/abc406_d/editorial) /

Time Limit: 2.5 sec / Memory Limit: 1024 MiB

Score : 400 points

Problem Statement

There is a grid with H rows and W columns. Let (i, j) denote the cell at the i-th row from the top and the j-th column from the left.

There are N pieces of trash on the grid; the i-th piece is at cell (X_i, Y_i).

You are given Q queries, which you must process in order. Each query is of one of the following types:

- Type 1: Given in the format `1 x` in the input. Report the number of trash pieces in the x-th row. Then, all trash pieces in the x-th row are removed from the grid.
- Type 2: Given in the format `2 y` in the input. Report the number of trash pieces in the y-th column. Then, all trash pieces in the y-th column are removed from the grid.

Constraints

- $1 \leq H, W, N \leq 2 \times 10^5$
- $1 \leq X_i \leq H$
- $1 \leq Y_i \leq W$
- If $i \neq j$, then $(X_i, Y_i) \neq (X_j, Y_j)$.
- $1 \leq Q \leq 2 \times 10^5$
- For a type 1 query, $1 \leq x \leq H$.

- For a type 2 query, $1 \leq y \leq W$.
- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$
\begin{aligned}
&H \quad W \quad N \\
&X_1 \quad Y_1 \\
&X_2 \quad Y_2 \\
&\vdots \\
&X_N \quad Y_N \\
&Q \\
&\mathrm{query}_1 \\
&\mathrm{query}_2 \\
&\vdots \\
&\mathrm{query}_Q
\end{aligned}
$$

Here, query_i denotes the i-th query, which is given in one of the following formats:

$$1 \quad x$$

$$2 \quad y$$

Output

Output Q lines. The i-th line should contain the response to the i-th query.

Sample Input 1 Copy

Copy

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

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Sample Output 1 Copy

```
2
1
0
1
0
```

Initially, trash pieces are at cells $(1, 2), (1, 3), (3, 4), (3, 1), (2, 2)$.

In the 1st query, the 1st row contains two pieces of trash at $(1, 2)$ and $(1, 3)$, so report 2. These pieces are then removed; the remaining trash is at $(3, 4), (3, 1), (2, 2)$.

In the 2nd query, the 2nd row contains one piece of trash at $(2, 2)$, so report 1. This piece is then removed; the remaining trash is at $(3, 4), (3, 1)$.

In the 3rd query, the 2nd column contains no trash, so report 0.

In the 4th query, the 4th column contains one piece of trash at $(3, 4)$, so report 1. This piece is then removed; the remaining trash is at $(3, 1)$.

In the 5th query, the 2nd row contains no trash, so report 0.

Sample Input 2 Copy

```
1 2 1
1 2
7
2 1
2 1
2 1
2 1
2 1
2 1
2 1
```

Sample Output 2 Copy

```
0
0
0
0
0
0
0
```

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Sample Input 3 Copy

```
4 4 16
1 1
1 2
1 3
1 4
2 1
2 2
2 3
2 4
3 1
3 2
3 3
3 4
4 1
4 2
4 3
4 4
7
2 1
1 1
2 2
1 2
2 3
1 3
2 4
```

Sample Output 3 Copy

```
4
3
3
2
2
1
1
```

#telegram)

url=https%3A%2F%2Fatcoder.jp%2Fcontests%2Fabc406%2Ftasks%2Fabc406_d%3Flang%3Den&title=D%20-

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