Art Academy IV: Alice's Blazing Fury

Time limit: 2.5s
Java: 5.0s
Python: 20.0s

Memory limit: 128M
Python: 256M

> You notice a disturbance in the area. Something on this particular day is strangely, *off*?
>
> Is it because **hewmatt10** has been sabotaged?
>
> Is it because both **astrocat879** and **skyflaren** are nowhere to be found?
>
> Simply put, it's **much** more frightening than that.

Today marks the end of an era. **[REDACTED]** has finally had enough of scandals like **hewmatt10** being able to freely roam around her majestic Empire. To ensure that her task is as quick as possible, she will be activating her Empire's secret stash of illegal weaponry, which has been crafted with only one purpose in mind - destruction.

Since this is *her* Empire after all, the weapons have been specifically named after her - The *Alicizer*. **[REDACTED]** has not only one, not two, but an infinite stash of *Alicizers*, which she will be placing down at specific coordinates along her N row by M column Empire. The more in a line, either vertically or horizontally, there are, the more powerful and destructive they get. Since **[REDACTED]** is a cruel person by nature, she will be placing down *Alicizers* in large square-shaped chunks at a time.

Such a ruthless task will definitely face resistance, as **hewmatt10** and his army will be tryharding epically to defend his ~~basement~~ art academy. **hewmatt10**'s basement workers have engineered a special line of defense that they will be using to protect themselves, called the *Anti-Alicizer*. Just like how *Alicizers* will be placed in large square-shaped chunks at a time, an *Anti-Alicizer* will be able to remove square-shaped chunks of *Alicizers*.

As a spectator of this war, **yeahbennou** would rather not get completely obliterated in battle, and instead like to record down some statistics as the war goes on. Since he is lazy, **yeahbennou** wants you to create a program which will answer Q queries to help him keep track of the battle.

Input Specification

On the first line, there will be three space-separated integers - N, M $(1 \leq N \times M \leq 5 \times 10^5)$, and Q $(1 \leq Q \leq 5 \times 10^4)$, representing the size of **[REDACTED]**'s empire, and the number of queries **yeahbennou** wants you to perform.

The following Q lines will contain one of the following queries:

Format	Description
$1\ x\ y\ z$	At the position (x, y), place down *Alicizers* in a z by z square. $(1 \leq x \leq N)$, $(1 \leq y \leq M)$, $(1 \leq z \leq \min(N, M, 200))$ For example, if x, y, and z were 2, 3, and 2 respectively, there would now be *Alicizers* at $(2, 3)$, $(3, 3)$, $(2, 4)$, and $(3, 4)$. It is guaranteed that these newly placed *Alicizers* will not be "overlapping" any previously placed ones. It is also guaranteed that no *Alicizers* in the square will land outside of the empire.

Format	Description
$2\ x\ y\ z$	Place down an *Anti-Alicizer* at position (x, y) of power level z $(1 \leq x \leq N)$, $(1 \leq y \leq M)$, $(1 \leq z \leq \min(N, M, 200))$. For example, if x, y, and z were 2, 3, and 2 respectively, the *Alicizers* at $(2, 3)$, $(3, 3)$, $(2, 4)$, or $(3, 4)$ would now be destroyed. It is guaranteed that there WILL be *Alicizers* fully encompassing the area being destroyed.
$3\ x\ y\ z$	Query the length of the longest **contiguous** subsequence of *Alicizers* that goes strictly in one direction (Horizontal or Vertical), that includes at least one of the points in the range $[x, x + z)$, $[y, y + z)$. For example, if x, y, and z were 2, 3, and 2 respectively, the points in this range would be $(2, 3)$, $(3, 3)$, $(2, 4)$, and $(3, 4)$. $(1 \leq x \leq N)$, $(1 \leq y \leq M)$, $(1 \leq z \leq \min(N, M, 200))$.

It is guaranteed that for all queries, $x + z \leq N$ and $y + z \leq M$.

Output Specification

For each type 3 query, print the result on a new line.

Constraints

Subtask 1 [30%]

$1 \leq N, M, Q \leq 10^2$, and $z = 1$ for all queries.

Subtask 2 [70%]

No additional constraints.

Sample Input

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

Sample Output

```
2
4
```

Note: Passing the sample is not required for passing the subtasks.

Explanation

After the first two queries of type 1, there are now *Alicizers* at $(1, 1)$, $(1, 2)$, $(2, 1)$, $(2, 2)$, $(2, 3)$, $(3, 3)$, $(2, 4)$, $(3, 4)$.

In the third query, only the position $(1, 1)$ is in the range $[x, x + z)$, $[y, y + z)$.

The longest contiguous subsequence of *Alicizers* that spans strictly on one direction, that includes $(1, 1)$, would either be the subsequence containing $(1, 1)$ and $(1, 2)$, or the subsequence containing $(1, 1)$ and $(2, 1)$. Both of these are of length 2.

In the last query, the positions $(1, 1)$, $(1, 2)$, $(2, 1)$, $(2, 2)$ are in the range $[x, x + z)$, $[y, y + z)$.

The longest contiguous subsequence of *Alicizers* that spans strictly on one direction, that includes any of these points, would be the subsequence containing $(2, 1)$, $(2, 2)$, $(2, 3)$, and $(2, 4)$, which is of length 4.