CODE FORCES
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HOME   TOP   CONTESTS   GYM   PROBLEMSET   GROUPS   RATING   API   CALENDAR   HELP   10 YEARS! 🎁

PROBLEMS   SUBMIT CODE   MY SUBMISSIONS   STATUS   HACKS   ROOM   STANDINGS   CUSTOM INVOCATION

C. Glass Carving

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Leonid wants to become a glass carver (the person who creates beautiful artworks by cutting the glass). He already has a rectangular w mm $\times$ h mm sheet of glass, a diamond glass cutter and lots of enthusiasm. What he lacks is understanding of what to carve and how.

In order not to waste time, he decided to practice the technique of carving. To do this, he makes vertical and horizontal cuts through the entire sheet. This process results in making smaller rectangular fragments of glass. Leonid does not move the newly made glass fragments. In particular, a cut divides each fragment of glass that it goes through into smaller fragments.

After each cut Leonid tries to determine what area the largest of the currently available glass fragments has. Since there appear more and more fragments, this question takes him more and more time and distracts him from the fascinating process.

Leonid offers to divide the labor — he will cut glass, and you will calculate the area of the maximum fragment after each cut. Do you agree?

Input

The first line contains three integers w, h, n ($2 \leq w, h \leq 200\ 000$, $1 \leq n \leq 200\ 000$).

Next n lines contain the descriptions of the cuts. Each description has the form $H\ y$ or $V\ x$. In the first case Leonid makes the horizontal cut at the distance y millimeters ($1 \leq y \leq h$ - 1) from the lower edge of the original sheet of glass. In the second case Leonid makes a vertical cut at distance x

Codeforces Round #296 (Div. 2)
Finished

→ Practice?

Want to solve the contest problems after the official contest ends? Just register for practice and you will be able to submit solutions.

Register for practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest
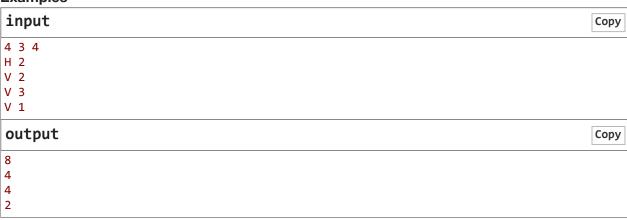
→ Problem tags

binary search   data structures

$(1 \leq x \leq w - 1)$ millimeters from the left edge of the original sheet of glass. It is guaranteed that Leonid won't make two identical cuts.

Output

After each cut print on a single line the area of the maximum available glass fragment in mm ^{2}.
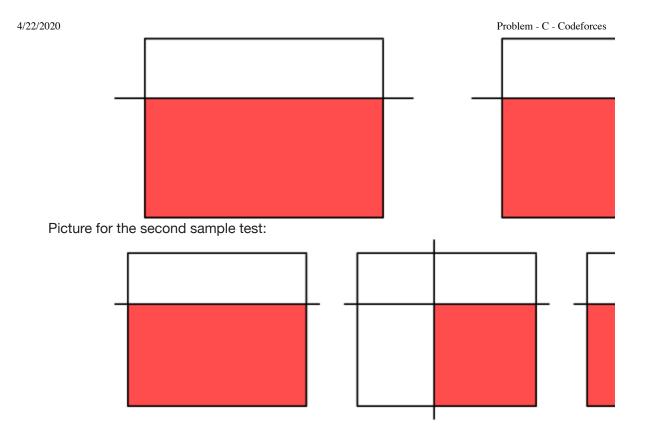
Examples

input	Copy

```
4 3 4
H 2
V 2
V 3
V 1
```

output	Copy

```
8
4
4
2
```

input	Copy

```
7 6 5
H 4
V 3
V 5
H 2
V 1
```

output	Copy

```
28
16
12
6
4
```

Note

Picture for the first sample test:

Picture for the second sample test: