Simple Graphical Editor

The workspace of the editor is a rectangular canvas consisting of W × H cells.
There are H rows, each contains W cells. The cells are indexed from the top left, starting with zero. Each cell is specified by its row index and column index, in this order. The indices of the top left corner cell are (0, 0), the indices of the bottom right corner cell are (H−1, W−1),

Each cell can contain either a dot (period, fullstop, ASCII 46) or a capital letter of English alphabet. The dot represents an empty cell.

The editor supports four commands:
Clear, Rectangle, Substitute and Pyramid.
Each command is a string which first character specifies the command and the rest of the string specifies the command parameters. All parameters are separated by spaces.

Clear command
`C y1 x1 y2 x2`
The command fills all cells in the given rectangle with dots.

Rectangle command
`R y1 x1 y2 x2 char`
The command fills all cells in the given rectangle with character `char`.

Substitute command
`R y1 x1 y2 x2 char1 char2`
The command substitutes each character `char1` in the given rectangle with character `char2`.

In Clear, Rectangle and Substitute commands, the rectangle is specified by parameters `y1 x1 y2 x2`.
(`y1 x1`) are the row and column indices of the upper left corner of the rectangle, (`y2 x2`) are the row and column indices of the bottom right corner of the rectangle.

Pyramid command
`R y1 x1 x2 char`
A pyramid is a triangular shape which has left-right (mirror) symmetry. It is filled filled with character `char`. The pyramid consists of layers, stacked one upon another. Each layer, except for the base layer, is shorter by two cells than the immediately lower layer. The base of a pyramid is a sequence of cells in the row `y1`, the sequence starts at column `x1` and ends in column `x2`.

A common property in all commands is that any atempt to access a cell outside the editor canvas is ignored. Therefore, for example, a shape (pyramid, rectangle) which is the bigger than the canvas size will be displayed only partially or not at all.

All row and column indices in all commands are non-negative integers.

The task

You are given the width and the height of the editor canvas and a sequence of commands.
Perform all commands and print the final contents of the canvas.

Input

The first input line contains three integers *W*, *H*, *N*, which specify the width and the height of the editor canvas and the number of commands. Next, *N* lines follow, each line contains one command. The format of the commands correspond to the specification in the text above.
It holds, $2 \leq W, H \leq 1000$, 1 &le $N \leq 1000$.

Output

The output contains the exact content of the editor canvas after all input commands have been performed. We assume that the canvas is initailly empty (filled with dots). The first line of output contains the first row of the canvas, that is the row with index 0. The next lines contain subsequently rows with indices 1, 2, ..., $H-1$.

Example 1

Input

```
20 12 5
P 8 2 15 A
C 7 6 10 10
R 1 13 2 18 B
R 4 15 6 19 A
S 3 9 7 16 A I
```

Output

```
....................
............BBBBBB.
........AA...BBBBBB.
.......AAII.........
......AAAIII...IIAAA
.....AAAAIIII..IIAAA
....AAAAAIIIII.IIAAA
...AAA.....IIII.....
..AAAA.....AAAAA....
....................
....................
....................
```

Example 2

Input

```
15 8 4
R 7 8 132 9 A
R 6 12 200 200 B
P 10 1 7 C
P 3 12 300 D
```

Output

```
...............
............D
...........DD
..........DDD
...............
...............
...........BBB
```

```
....C...AA..BBB
```

Example 3

Input

```
23 22 8
R 20 2 20 20 A
R 13 4 19 18 A
R 3 14 10 15 C
P 12 3 19 B
R 1 17 2 18 O
C 15 6 17 7
C 15 10 19 12
C 15 15 17 16
```

Output

```
.......................
..................OO....
..................OO....
..............CC.......
............B..CC.......
...........BBB.CC.......
.........BBBBBCC.......
.........BBBBBBC.......
.......BBBBBBBBB.......
......BBBBBBBBBBB......
.....BBBBBBBBBBBBB.....
....BBBBBBBBBBBBBBB....
...BBBBBBBBBBBBBBBBB...
....AAAAAAAAAAAAAAA....
....AAAAAAAAAAAAAAA....
....AA..AA...AA..AA....
....AA..AA...AA..AA....
....AA..AA...AA..AA....
....AAAAAA...AAAAAA....
....AAAAAA...AAAAAA....
..AAAAAAAAAAAAAAAAAA..
.......................
```