32 Curie's Waterfall
35 points

Introduction

Marie Curie, well known for her contributions to the theory of radioactivity, wants to study the behavior of a new radioactive fluid in a special environment. This environment is intended to simulate a special waterfall, represented by a grid of cells in which any of the following elements can be placed:

- Font: indicates the spot from which the fluid originates.

- Rock: a normal rock, which forces the water flow to split in two, surrounding the rock.

- Wormhole: an interdimensional teleporter which teleports the fluid flow to the other side of the wormhole.

- Black hole: absorbs the fluid, making it vanish completely.

- Magnet: modifies the path of the fluid during its fall, attracting or repelling it one unit horizontally for each cell advanced. However, the effect of the magnet is limited, and it is defined by its radius of action. It has also a power attribute, which has to be used to define the direction of the magnetic field when several magnets affect the same cell.

Are you clever enough to help Marie with her complex simulation?

IMPORTANT NOTES

- Magnets do not affect fonts, they only affect path of the fluid that flows out of the font.

- Magnets are not rocks, so they do not modify the flow of the fluid; fluid can flow through a magnet cell if needed.

- To determine if a cell is affected by a magnet or not, you have to compute the distance between the magnet and the cell, and compare that distance to the magnet's radius of action. If the distance is smaller than the radius, the cell is affected by the magnet. When more than one magnet affects the same cell, the power of all the affecting magnets must be combined (by adding or subtracting), depending on each magnet's sign (attraction or repulsion).

Input

Two integers representing the number of rows and columns of the waterfall wall, followed by a series of waterfall elements, which ends with an "end" string. Each element is represented by a different character, followed by the position of the element, represented by a row and a column. Each of the elements is defined as follows:

- Font: the character 'O'.

- Rock: the character 'R'.

- Wormhole: the character 'W' (followed by 2 connected positions).

- Black hole: the character 'B'.

- Magnet: the character 'M' followed by its position, the type of magnet (- for repulsion and + for attraction), the radius of the magnetic field, and its power (both integer).

All the given numbers are integers.

Output

A two-dimensional diagram of the waterfall, representing the path (or paths) the radioactive fluid will follow, according to the input configuration of Curie's Waterfall. Each cell is represented by a character, with an empty space represented by a dot ('.'), and the rest of the characters as outlined in the instructions.

The path of the fluid should be represented by the character 'O'.

Example 1

Input

```
20
60
O 2 7
R 4 7
M 5 7 - 4 1
R 13 5
R 13 7
R 13 9
O 4 18
R 15 17
R 16 17
R 16 18
R 16 19
R 16 20
R 16 21
R 16 22
R 16 23
R 16 24
W 16 25 4 32
R 5 32
R 10 31
M 4 38 + 7 1
B 9 38
M 10 38 + 7 1
B 15 38
M 19 29 - 5 1
O 4 44
O 4 56
M 10 50 + 15 1
M 11 50 + 15 1
R 12 50
M 18 50 - 8 3
end
```

Output

```
....................................................
....................................................
.......O............................................
......OOO............................................
.....O.R.O........O............OWO....M.....O..........O...
....O..M..O.......O............OR.O.........O..........O...
...O.......O......O............O...O.........O.........O....
..O.......O......O............O....O.........O.......O.....
..O.......O......O............O.....O.........O.....O......
..O.......O......O...........OOO.....B.........O...O.......
..O.......O......O...........OR.O....M..........OMO........
..O.......O......O...........O...O.............OMO........
..O.......O......O...........O....O...........O.R.O.......
...O.R.R.R.O......O...........O.....O..........O.....O......
..O.......O......O...........O......O........O.......O.....
..O.......O.....ROOOOOOOO....O.......B......O.........O....
..O.......O.....RRRRRRRRW.....O............O...........O...
..O.......O....................O.........O.............O..
..O.......O.....................O........O.......M.......O.
..O.......O................M....O.......O.............O..
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