Probe

Input File: *probein.txt*
Output File: *probeout.txt*

Earth is the only known planet to harbour life. There are many planets out there that have *some* of the things needed for life. Let me introduce you to one in particular, *Kepler-442b*.

Discovered early last year, it is the most Earth-like planet we know about. Although *a little* bigger than Earth, the conditions are almost perfect for life. Almost. It's missing liquid water.

The Australian Institute for Observing the Cosmos has just sent out a massive probe full of water to crash into the planet. The water will spill out on impact to plant the metaphorical seeds of life, but the shock of the impact will also cause a fissure to form elsewhere, which will spill lava.

Scientists have selected a small, empty desert for the probe which can be represented by a grid of squares with R rows and C columns. They happen to know exactly which square the probe will crash in and also the square where the fissure will form.

The square where the probe crashes is *instantly* covered in *water*, while the square where the fissure forms is *instantly* covered in *lava*. As time passes, the water and lava spread out over the desert in a simple way. Each minute:

- Any empty square that shares a side with a square covered in *water* will also become covered in *water*.
- Any empty square that shares a side with a square covered in *lava* will also become covered in *lava*.
- Any empty square that shares a side with both a square covered in *lava* and one covered in *water* will form into rocky *mountains* (probably made of obsidian), over which neither water nor lava will flow.

Lava and water never flow outside the desert.

You have been tasked with helping the scientists figure out what the desert will look like after the water and lava finish flowing. You will be asked Q questions, for each of which you must answer whether a given square will be covered in *water*, *lava* or *mountains*.

Input

The first line of input will contain six integers (separated by spaces), R, C, r_p, c_p, r_f and c_f.

- R and C denote the number of rows and columns in the grid respectively. Rows are labelled from 1 to R (from top to bottom) and columns are labelled from 1 to C (from left to right).
- The probe will crash in the square in the r_pth row and c_pth column.
- The fissure will form in a different square in the r_fth row and c_fth column.

The second line will contain a single integer Q, the number of questions that will be asked. Q lines follow, the ith of which contains two integers r_i and c_i.

Output

You should output Q lines. The ith line should contain a single word describing the state of the square in the r_ith row and c_ith column:

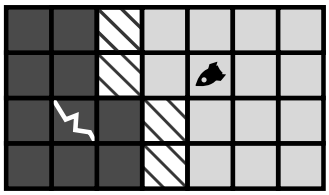
- `LAVA` if the square is covered in *lava*.

- `WATER` if the square is covered in *water*.
- `MOUNTAINS` if the square is covered in *mountains*.

You know for a fact that every square will eventually be covered by one of the above.

Sample Input 1	Sample Output 1	Sample Input 2	Sample Output 2

`4 7 2 5 3 2`
`3`
`1 1`
`1 3`
`3 6`
	`LAVA`
	`MOUNTAINS`
	`WATER`
		`2 3 1 1 1 2`
		`2`
		`1 1`
		`2 2`
			`WATER`
			`LAVA`



Explanation

The two diagrams above show the state of the desert after the water and lava have finished flowing. The fissure and the probe have been marked on the map for clarity. Dark grey squares are covered in lava while light grey squares are covered in water. The striped squares are mountains.

Subtasks & Constraints

For all subtasks, $1 \leq R, C, Q \leq 100\,000$, $1 \leq r_p, r_f, r_i \leq R$ and $1 \leq c_p, c_f, c_i \leq C$. Additionally, the fissure will always form in a different square to the probe's landing spot.

- For Subtask 1 (20 marks), $r_p = 1$, $c_p = 1$, $r_f = R$ and $c_f = C$. That is, if your program correctly solves the problem when the probe is always in the top-left corner and the fissure is always in the bottom-right corner, you will receive 20 marks.
- For Subtask 2 (15 marks), $R = 1$.
- For Subtask 3 (25 marks), $R, C \leq 50$.
- For Subtask 4 (20 marks), $R, C \leq 1000$.
- For Subtask 5 (20 marks), there are no further constraints.