Toll gates

Elyas and Nadir are invited to the final round of the Algeria 3 TV classic, "Toll gates". At the start of the round, Nadir will be blindfolded and placed in a random room within a maze of N rooms. He will then be given a special vest with a screen on it; the value displayed on it is called the **credit counter**, which we will denote C; it is initially 0. To win the game, Elyas must guide Nadir to the exit room.

In this maze, the rooms are connected by M special colored doors; let u and v $(1 \leq u, v \leq N)$ be two connected rooms of the maze. If the side of the door from u to v is colored **Blue**, then Nadir gains one credit and C is incremented by one. Otherwise, that side is **Red**, and Nadir has to pay a credit to open the door (which subtracts one from C). Note that this means the color in $u \to v$ is necessarily the opposite of the one in $v \to u$. There are two simple rules: Nadir cannot open doors from the red side if he has no credits ($C = 0$); furthermore, when Nadir reaches the exit room, he cannot leave with a counter larger than 0. If he does, it will be considered "stealing credits", and he will be electrocuted and humiliated on live television.

Elyas does not know the starting room, but he is given a list of doors that describes the map of the maze: in each line, you have $U[i], V[i], D[i]$ where $D[i]$ gives the color of the side of the door when going from $U[i]$ to $V[i]$. Furthermore, he overheard the organizers of the show talking about the layout of the maze, and eavesdropped (as any good AOIer does) to get a list of Q possible entry-exit pairs. To make sure he doesn't humiliate his good friend, he wants to eliminate all the pairs that don't have valid exit strategies.

However, he only has an hour before the show starts, so he needs to do this quickly. Given the Q possible entry-exit pairs, determine if there exists a path for Nadir to exit safely.

Constraints

- $3 \leq N \leq 2 * 10^5$
- $2 \leq M \leq 2 * 10^5$
- $1 \leq Q \leq 2 * 10^5$

I/O

Let $(U[i]$, $V[i])$ be the ith door from u to v. The unordered pair (u, v) will never appear more than once. Let $D[i]$ be a character representing the color of the side $u \to v$ of the door, 'R' if it is red, 'B' if it is blue. Finally, let $(I[i], O[i])$ be the ith entry-exit pair, and $B[i]$ the answer for that pair, which is 1 if there is a path, and 0 if not.

Input

```
N M
U[1] V[1] D[1]
U[2] V[2] D[2]
...
U[M] V[M] D[M]
Q
I[1] O[1]
I[2] O[2]
...
I[Q] O[Q]
```

Output

```
B[1]
B[2]
...
B[Q]
```

Subtasks

Your final score for this task will be sum of the points of all subtasks that you have passed in atleast one of your submissions.

Test Group	Points	Constraints
1	7	The maze is a single contiguous row of N rooms separated by doors, $Q = 1$.
2	5	The maze is many separate rows of rooms leading to one central room; all doors bringing Nadir closer to the central room are blue.
3	11	In all of Nadir's paths, $0 \leq C \leq 1$; there is a sequence of doors between each pair of rooms.
4	10	The maze is a single contiguous row of N rooms separated by doors.
5	16	$M = N - 1$, there is a sequence of doors between each pair of rooms.
6	27	$N \leq 250$
7	24	No additional constraints.

Examples

Example 1

Input

```
5 4
1 2 B
2 3 R
3 4 B
4 5 R
2
1 3
1 4
```

Output

```
1
0
```

For entry-exit pair $(1, 3)$, the path $1 \to 2 \to 3$ is valid, because the first door increments the counter to $C = 1$, and the second door decrements it back to $C = 0$, which satisfies Nadir's exit condition.

As for pair $(1, 4)$, the path $1 \to 2 \to 3 \to 4$ is not valid, as it results in a counter of $C = 1$ at the end. It can be shown that there are no other paths from 1 to 4 that allow Nadir to leave without stealing.

Example 2

Input

```
4 4
1 2 B
2 3 R
3 4 B
4 1 R
2
1 3
2 4
```

Output

```
1
0
```

From 1 to 3, there are two paths:

- Going $1 \to 2 \to 3$ results in a credit progression of $0 \to 1 \to 0$. Notice how C never goes below 0, and is 0 at the end.
- Going $1 \to 4 \to 3$ results in the same state progression of of $0 \to 1 \to 0$, and thus the same solution.

There is no way to go from 2 to 4 as:

- The side $2 \to 3$ of the corresponding door is red, and initially Nadir has 0 credits, so he can't open the door.
- The side $2 \to 1$ of the door is also red, because it is opposide the $1 \to 2$ side, which is blue. The same problem occurs.

Nadir has no way to leave room 2, so he can't reach room 4.

Example 3

Input

```
6 6
1 2 B
2 3 B
3 4 B
4 5 B
5 6 B
6 4 B
1
1 4
```

Output

```
1
```