

Problem D: Follow the Rainbow Brick Roads

Filename: *oz*

Time limit: 8 seconds

After being swept away by a large tornado for a second time, Dorothy once again awakens in the magical land of Oz where she must embark on a journey to see the Wizard! On her previous journey here, she consulted the Munchkins (the residents of the land of Oz) who told her to “Follow the yellow brick road — follow the yellow brick road — follow, follow, follow, follow, follow the yellow brick road”!

Unfortunately for her, the magical land of Oz has been developed significantly in the 85 years she’s been gone. Not only are there now more potential cities on her journey in the land of Oz, but there are also more brick roads which connect two different cities to each other. Each road is colored and takes a set time to cross. To make matters worse, Dorothy can only walk on select color roads that have been protected by the Good Witch of the North, since all others have been cursed by the Wicked Witch of the West!

Finally, since it has been almost a century since she last visited the magical land of Oz, Dorothy forgot where the Wizard resides and doesn’t know which color roads are protected. Because of this, she has decided to consult some munchkins, each of which tells her the city they think the Wizard resides in, and the color roads they think the Good Witch of the North has protected.

The Problem

Since the Wicked Witch of the West will be trying to intercept her on her journey, please help Dorothy calculate the minimum time to travel to the Wizard of Oz for each of the Munchkin’s constraints.

The Input

The first line of the input will contain an integer: t ($1 \leq t \leq 50$), representing the number of test cases in the input.

The first line of each test case will contain 3 integers: n ($1 \leq n \leq 250$), m ($0 \leq m \leq 5n$) and q ($1 \leq q \leq 5000$), representing the number of cities, number of brick roads, and the number of Munchkins Dorothy consults, respectively. Note that Dorothy always starts at city **1**.

The next m lines in each case will each contain 3 integers: a , b ($1 \leq a, b \leq n$, $a \neq b$), t ($1 \leq t \leq 10^9$) and a character $c \in \{R, O, Y, G, B, I, V\}$, the two nodes the bidirectional brick road connects, the time it takes to travel across that brick road, and the color of the road. It is guaranteed that there will be at most one road that connects the same pair of cities of a particular color. (Thus, there could be a Red road between cities 3 and 7 as well as a Green road between cities 3 and 7, but there won’t be two Red roads between cities 3 and 7.)

The final q lines of each case will each contain the information a Munchkin told her. This includes an integer e ($1 \leq e \leq n$), representing the city that Munchkin thinks the Wizard is in, and a string, s ($1 \leq |s| \leq 7$), containing the color roads the Good Witch of the North has protected. The possible characters in s are $\{R, O, Y, G, B, I, V\}$, and each character will appear at most once in s .

Output

For each munchkin Dorothy has consulted, print out an integer on its own line representing the shortest time it takes to visit the Wizard given the constraints of the i^{th} munchkin, or -1 if it is impossible.

Sample Input

```
2
4 5 4
1 2 2 R
1 4 3 Y
1 3 2 I
2 4 2 V
3 4 3 G
4 ROYV
4 GBI
4 RGIV
2 OB
2 7 7
1 2 1 R
1 2 2 O
1 2 3 Y
1 2 4 G
1 2 5 B
1 2 6 I
1 2 7 V
2 R
2 O
2 Y
2 G
2 B
2 I
2 V
```

Sample Output

```
3
5
4
-1
1
2
3
4
5
6
7
```