

Problem 3: @everyone

5+6=11 Points

Problem ID: pings

Rank: 2+3

Introduction

Wumpus just joined the server - glhf!

Wumpus just joined [the CALICO Community Discord Server!](#) After picking up his roles in #roles, he starts chatting in #general and becomes very popular! It turns out that people in CALICO really like pinging him—so much so that Wumpus begins to feel overwhelmed with the number of pings. To help him stay sane, he aims to track the number of pings for each role in the server.

Problem Statement

Roles in a Discord server act as “tags” for the users within it—they are groups into which you can place users to determine their appearance and privileges. Users can be added to and removed from any of the available roles over time, and roles can be pinged to notify all users currently holding the role.

Given a Discord server with N roles (numbered 1 to N) and M users (numbered 1 to M), find out how many times each user has been pinged after Q actions have taken place.

Each action can be any one of the following:

1. **Adding a role to a user:** The user is now “tagged” with the specified role, and will continue to hold it until it’s removed from the user. Users can hold multiple roles at the same time.
2. **Removing a role from a user:** The user will no longer hold this role, unless it’s added back at a later time.
3. **Pinging a role:** All users who currently hold this role will be pinged once.

Actions occur in the order they are given, from top-to-bottom. All users begin with no roles.

Input Format

The first line of the input contains a positive integer T denoting the number of test cases that follow. For each test case:

- The first line contains three space-separated integers $Q N M$, where:
 - Q denotes the number of actions that take place.
 - N denotes the number of roles available in the server.
 - M denotes the number of users in the server.
- The next Q lines each denote an action that takes place. Actions are one of the following:
 - Adding a role to a user, denoted by three space-separated values $A R_i U_i$. Role R_i was added to user U_i during the i^{th} action.
 - Removing a role from a user, denoted by three space-separated values $R R_i U_i$. Role R_i was removed from user U_i during the i^{th} action.
 - Pinging a role, denoted by two space-separated values $P R_i$. Where R_i is the role that got pinged during the i^{th} action.

Output Format

For each test case, output a single line containing M space-separated integers $P_1 P_2 \dots P_M$, where P_i denotes the number of times user i was pinged. For example, if a test case involves 2 users, your output should be 2 space-separated integers denoting the number of times users 1 and 2 were pinged, respectively.

Problem Constraints

A role will never be added to a user that already has it.

A role will never be removed from a user that doesn't already have it.

Main Test Set

$$1 \leq T \leq 10$$

$$1 \leq Q \leq 100$$

$$1 \leq N, M \leq 10$$

Bonus Test Set

$$1 \leq T \leq 100$$

$$1 \leq Q, N, M \leq 10^5$$

The sum of Q across all test cases in an input file does not exceed 10^5 .

The sum of N across all test cases in an input file does not exceed 10^5 .

Sample Test Cases

Sample Input

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```
3
8 2 2
A 2 1
P 2
A 1 1
A 1 2
P 1
R 1 1
P 1
P 2
6 1 3
P 1
A 1 2
P 1
P 1
A 1 3
P 1
12 2 3
P 1
P 2
A 2 1
R 2 1
P 2
A 1 1
A 1 2
A 1 3
R 1 2
P 1
R 1 1
P 1
```

Sample Output

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```
3 2
0 3 1
1 0 2
```

Sample Explanations

Test Case #1:

The sequence of actions play out as follows:

Action	Roles (post-action)		Pings (post-action)	
	User 1	User 2	User 1	User 2
A 2 1	2		0	0
P 2	2		1	0
A 1 1	1, 2		1	0
A 1 2	1, 2	1	1	0
P 1	1, 2	1	2	1
R 1 1	2	1	2	1
P 1	2	1	2	2
P 2	2	1	3	2

*The highlighted cells outline which user(s) are pinged during the action.

After all the actions are completed, user 1 has been pinged 3 times and user 2 has been pinged 2 times. Therefore, the output is: 3 2

Test Case #2:

After the sequence of actions have completed, each user has been pinged the following amount of times:

1. User 1 was pinged 0 times.
2. User 2 was pinged 3 times.
3. User 3 was pinged 1 time.

Therefore, the output is: 0 3 1

Note: The first action, P 1, does not ping any users as everybody starts out with no roles.