

[B5] TheBuzz (150 pts)

Time Limit: 1s
Memory Limit: 512MB

Problem Description

TheBuzz is a decentralized international hacktivist collective primarily known for sharing confidential information about governments, institutions, agencies and corporations.

Periodically, a series of cryptic tweets would be posted containing nothing more than a single character (A, B, or C) and two numbers. For those in the know, each one of these tweets represent hidden dealings between major organizations. TheBuzz would assign N organizations an integer from 1 to N . The single character at the start of each tweet would indicate the type of relationship between organizations x and y :

- A x y – There is an alliance between organizations x and y
- B x y – There is a battle brewing between organizations x and y
- C x y – Organizations x and y are mutually considering to combine together

As a hacktivist yourself, you maintain the political blog “Blanc Space” and have dealt with these organizations before. You know the name of all the organizations and have personal records of the relationships between them. You realize that you can use TheBuzz’s information to cross-reference and verify the correctness of both your information.

Given your own personal records, is it possible to match the organization name with their assigned number from TheBuzz? And if there’s a match, what is it?

Input Specification

The input consists of only a single case.

The first line of the input contains two space separated integers N , the number of organizations, and R , the number of relationships between organizations (as observed by you and the TheBuzz).

N lines follow, each containing a single string o_i describing the name of an organization.

R lines follow, each containing a character followed by two strings, separated by spaces, representing your own personal records:

- p_i – the relationship between the organizations
- x_i – the name of the first organization in this relationship
- y_i – the name of the second organization in this relationship

Here p_i can either be A, B, or C, their definitions described above. Note that all relationship types are symmetric, so x_i and y_i are interchangeable.

Finally, another R lines follow, representing TheBuzz tweets, in a similar format $p_i a_i b_i$ where a_i and b_i are integers representing two organization IDs.

Output Specification

If there is no possible way to match your personal records with TheBuzz tweets, output the string IMPOSSIBLE

If there are more than one possible ways to match, output the string TOO MANY

Otherwise output N lines containing a proper assignment of an organization ID to its name. That is, the first line should contain a single string - the name of the organization referred by ID 1, the second line for ID 2, and so on.

Constraints

$$2 \leq N \leq 10$$

$$1 \leq R \leq N * (N - 1) / 2$$

x_i and y_i contains at most 10 lowercase alphabet letters.

$$1 \leq a_i, b_i \leq N$$

$$x_i \neq y_i$$

$$a_i \neq b_i$$

The relationship between two organizations will appear at most once within your personal records, and also at most once within TheBuzz's tweets.

Sample Input 1

```
3 3
chrysler
ford
gm
A chrysler ford
B ford gm
C chrysler gm
A 1 3
C 2 3
B 2 1
```

Sample Output 1

```
ford
gm
chrysler
```

Sample Input 2

```
4 4
demetrius
hermia
helena
lysander
A lysander hermia
B helena demetrius
B demetrius hermia
C lysander helena
B 1 2
C 1 4
A 3 4
B 1 3
```

Sample Output 2

IMPOSSIBLE

Sample Input 3

```
2 1
good
evil
B good evil
B 1 2
```

Sample Output 3

TOO MANY