

Shirley and the Mimicking Mimics

Problem ID: shirleymimics

Shirley, a “consulting detective”, came across a cave full of treasure chests! But Shirley thinks that some of the treasure chests might actually be mimics, a type of monster that mimics the look of a treasure chest and makes fun of the unfortunate people who foolishly think they are treasure chests. The problem is: there is no way to distinguish between the real and the mimic only by their looks!

However, as an expert detective, Shirley managed to record some dialogues between the treasure chests and the mimic chests. (Yes, the chests speak, and you can understand them if you are an expert detective!) And she knows from her experience that authentic chests only speak the truth and mimic chests only tell lies. Based on this information, the identity of some chests could be deduced. Consider the following scenario of three chests, A, B, and C:

1. Chest A: C is mimic.
2. Chest B: C is real.
3. Chest C: Both A and B are mimics.

Since A and B disagree on the identity of C, it must be the case that one of them is real and the other is a mimic. Thus, what C said must be false, and it is a mimic. Then A tells the truth, and B is lying. Therefore, A is real, and B and C are mimics.

Given the dialogue logs of the chests, can you help Shirley find out which chests are real?

Input

The first line of the input contains two integers, $1 \leq n \leq 10$, the number of chests, and $1 \leq m \leq 1000$, the number of log entries. Each of the following m lines describes a statement made by one of the chests. Chests are conveniently labeled by the first n uppercase letters starting from A. Each statement can be one of the following patterns. X, Y, and Z are placeholders for chests’ labels.

1. X says Y is mimic
2. X says Y is real
3. X says both Y and Z are mimics
4. X says both Y and Z are real

It is guaranteed that the identity of the chests can be uniquely deduced from the input.

Output

Output n lines. For the i -th line, output “real” (without quotes) if the chest labeled by the i -th letter is real, “mimic” (without quotes) otherwise.

Sample Input 1

2 1 A says both A and B are mimics	mimic real
---------------------------------------	---------------

Sample Output 1

Sample Input 2

3 2 B says both A and C are real C says B is mimic	mimic mimic real
--	------------------------

Sample Output 2