

# Problem B: Venetian Bridges

Advanced Algorithms for Programming Contests

## Restrictions

Time: 2 seconds

Memory: 512 MB

## Problem description

The city council of Venice, the Italian city world-renowned for its countless beautiful bridges, has once again decided to refurbish some of them.

Whenever it does this, it needs to be very careful: because bridges cannot be used during renovation and since for the tens of thousands of people that walk the city's streets every day they are by far the most important way to travel between its 118 islands, the council has to watch out never to block any *essential* bridges – that is, bridges whose blockade would break the city into two isolated parts with respect to moving on foot. Obviously, whether a bridge is *essential* depends heavily on which of the surrounding bridges are already being renovated, so this has to be taken into account as well.

You are to write an interactive program that counsels the council on which renovations it can induce. To make things a bit easier for you, they have numerated the islands  $1, \dots, 118$  and will communicate with you only by means of this numeration.

## Input

In the beginning you get a description of the current situation: The first line of input contains  $M$  ( $117 \leq M \leq 400$ ) – the number of currently usable bridges. The next  $M$  lines each contain the description of a bridge, that is, two integers  $a$  and  $b$  ( $1 \leq a, b \leq 118$ ) denoting a (two-way) bridge between islands  $a$  and  $b$ . Be careful: while there never are bridges between an island and itself, there often are multiple bridges between the same two islands!

Then there is a line containing  $Q$  – the number of queries – ( $1 \leq Q \leq 10^3$ ) followed by  $Q$  lines containing queries of the following forms:

- "R  $a$   $b$ " with  $1 \leq a, b \leq 118$ , telling you that the council wishes to renovate a bridge between islands  $a$  and  $b$
- "C  $a$   $b$ " with  $1 \leq a, b \leq 118$ , telling you that the renovation of a bridge between islands  $a$  and  $b$  has been completed

## Output

For each query of the first kind, check whether the bridge in question is currently *essential* (it is guaranteed that the council doesn't ask to renovate a bridge that doesn't exist or is already being renovated). If so, output "Impossibile!", otherwise output "Va bene!" and assume the renovations to begin immediately (i.e. factor in that this bridge isn't usable anymore when answering the next queries).

For each query of the second kind, take into account that one more such bridge is now usable again, when answering the queries that follow.

A sample of how the interaction could look like if there were only 6 islands instead of 118:

## Sample input and output

Input	Output
7	Va bene!
1 2	Impossibile!
1 4	Va bene!
2 3	Va bene!
3 4	
4 5	
4 6	
5 6	
5	
R 3 4	
R 1 4	
R 4 5	
C 3 6	
R 4 6	