277. Find the Celebrity

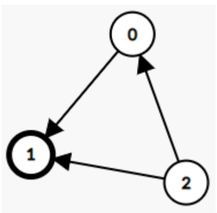
Medium 1962 188 Add to List Share

Suppose you are at a party with `n` people (labeled from `0` to `n - 1`), and among them, there may exist one celebrity. The definition of a celebrity is that all the other `n - 1` people know him/her, but he/she does not know any of them.

Now you want to find out who the celebrity is or verify that there is not one. The only thing you are allowed to do is to ask questions like: "Hi, A. Do you know B?" to get information about whether A knows B. You need to find out the celebrity (or verify there is not one) by asking as few questions as possible (in the asymptotic sense).

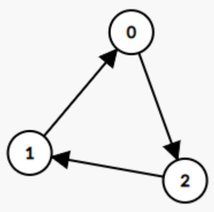
You are given a helper function `bool knows(a, b)` which tells you whether A knows B. Implement a function `int findCelebrity(n)`. There will be exactly one celebrity if he/she is in the party. Return the celebrity's label if there is a celebrity in the party. If there is no celebrity, return `-1`.

Example 1:




```
Input: graph = [[1,1,0],[0,1,0],[1,1,1]]
Output: 1
Explanation: There are three persons labeled with 0, 1 and 2. graph[i][j] = 1 means person i knows person j, otherwise graph[i][j] = 0 means person i does not know person j. The celebrity is the person labeled as 1 because both 0 and 2 know him but 1 does not know anybody.
```

Example 2:




```
Input: graph = [[1,0,1],[1,1,0],[0,1,1]]
Output: -1
Explanation: There is no celebrity.
```

Constraints:

- `n == graph.length`
- `n == graph[i].length`
- `2 <= n <= 100`
- `graph[i][j]` is `0` or `1`.
- `graph[i][i] == 1`

Follow up: If the maximum number of allowed calls to the API `knows` is `3 * n`, could you find a solution without exceeding the maximum number of calls?

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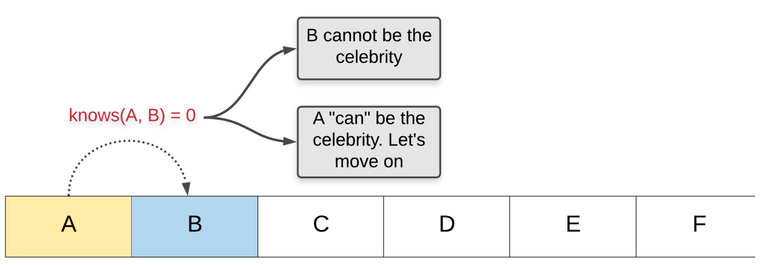
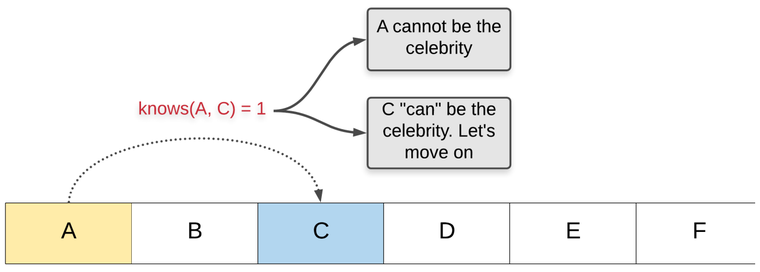
Hide Hint 1

The best hint for this problem can be provided by the following figure:





Hide Hint 2

Well, if you understood the gist of the above idea, you can extend it to find a candidate that can possibly be a celebrity. Why do we say a "candidate"? That is for you to think. This is clearly a greedy approach to find the answer. However, there is some information that would still remain to be verified without which we can't obtain an answer with certainty. To get that stake in the ground, we would need some more calls to the knows API.

Java | Autocomplete

```java
public class Solution extends Relation {

    private int numberOfPeople;

    public int findCelebrity(int n) {
        numberOfPeople = n;
        int celebrityCandidate = 0;
        for (int i = 0; i < n; i++) {
            if (knows(celebrityCandidate, i)) {
                celebrityCandidate = i;
            }
        }
        if (isCelebrity(celebrityCandidate)) {
            return celebrityCandidate;
        }
        return -1;
    }

    private boolean isCelebrity(int i) {
        for (int j = 0; j < numberOfPeople; j++) {
            if (i == j) continue; // Don't ask if they know themselves.
            if (knows(i, j) || !knows(j, i)) {
                return false;
            }
        }
        return true;
    }
}
```