EASTER EGGS

This is a communication (interactive) problem!

Antonio is known in his city, Barlad, for being the winner of the last edition of JBOI, a contest for juniors only. As he is a senior from now on, he wants to show his best friend, Zetul, that he can solve harder problems too.

In order to do this, Zetul hid an Easter Egg in the Public Garden, a beautiful park in their hometown. The Public Garden contains N islands, connected by N-1 bridges, so that the set of the N islands is beautiful.

Now, Antonio should find the Easter Egg asking Zetul several questions: Antonio will give Zetul a set of islands and Zetul will tell him whether or not, among the set, there is the island where the Easter Egg is hidden. The only condition Zetul is asking for is the set of islands to be beautiful. A set of islands is beautiful if any two islands are connected by some bridges . More precisely, there is a path of bridges between any two islands from the set.

You should help Antonio find the Easter Egg, using as few questions as you can, to show Zetul that Antonio can solve senior problems too!

In a test case, there will be **at least** one Easter Egg hidden, so make sure your program supports multiple Easter Eggs findings. There will be maximum 60 *findEgg* calls in a test case, the time limit is for all these calls.

TASK

You need to implement a function ***findEgg*** that determines the island where the Easter Egg is hidden.

- ***findEgg(N, bridges)***
  - N: the number of islands.
  - bridges: vector of length N-1; it contains N-1 pairs of islands, so that for every pair there is a bridge connecting the two islands.

You can call a function ***query*** to help you find the Easter Egg. This function will return 1, if the egg is found on the islands from the ***query*** and 0 if not.

- ***query(islands)***

  islands: vector of integers; the set of islands Antonio is giving to Zetul (don't forget that set of islands must be beautiful).

SUBTASKS

Q - is the number of queries your program will call for finding an egg.

Subtask	N	Points	Percentage
1	N <= 16	30	100%, $0 \leq Q \leq 4$
			80%, $5 \leq Q \leq 6$
			66%, $7 \leq Q \leq 10$
			40%, $11 \leq Q \leq 14$
			25%, $Q = 15$
			15%, $Q = 16$
2	N <= 500	40	100%, $0 \leq Q \leq 9$
			85%, $10 \leq Q \leq 11$
			66%, $12 \leq Q \leq 45$
3	N = 512	30	100%, $0 \leq Q \leq 9$
			75%, $10 \leq Q \leq 11$
			66%, $12 \leq Q \leq 45$

IMPLEMENTATION DETAILS

You have to submit exactly one cpp file. This file implements ***findEgg*** as described above using the following signature: (There will not be a main)

int findEgg(int N, vector < pair < int, int > > bridges);

The signature of ***query*** is as follows:

int query(vector < int > islands);

EXAMPLE

For N = 5, and bridges: (1, 2), (1, 3), (2,4), (4,5)

The set {1, 2, 3} is beautiful. The set {1, 2, 4, 5} is beautiful. The set {1, 2, 3, 5} is **NOT** beautiful(The islands are 1-indexed).