Where Is the Root?

`This is an interactive problem`

You are given a tree of n vertices. The tree is a graph such that there is exactly one simple path between every pair of vertices. **It's also guaranteed that at least one vertex is directly connected by an edge to at least 3 vertices.** One of the vertices is the root, and your task is to find it. In order to do this, you are allowed to ask queries of the following form:

- For a given set $a_1, a_2, \ldots, a_m$ of vertices, check if their lowest common ancestor is in this set.

A vertex v is a common ancestor of a set S of vertices if the paths from all vertices in S to the root pass through v. The lowest common ancestor (LCA) of a set S of vertices is the common ancestor of S which is farthest from the root.

Interaction

Start the interaction by reading a single integer n ($4 \le n \le 500$) - the number of vertices.

Then read next $n-1$ lines. The i-th line will contain two integers a_i, b_i ($1 \le a_i, b_i \le n$), indicating that there is an edge between vertices a_i, b_i in the tree.

It's guaranteed that these $n-1$ edges form a tree and at least one vertex is directly connected by an edge to at least 3 vertices.

To ask a query, firstly output "`?`", then the integer m, and then m distinct integers $a_1, a_2, \ldots, a_m$ ($1 \le m \le n$, $1 \le a_i \le n$, all a_i are distinct) - vertices, for which you want to check if their LCA is among them.

As a response, the interactor will output "`YES`" if their LCA is one of $a_1, a_2, \ldots, a_m$, and "`NO`" otherwise.

You can ask at most 1000 queries, but you'll get a different number of points depending on how many queries you ask. Outputting the answer does not count as a query. Please, look at the scoring section for the details.

When you have identified the root, output the symbol "`!`" and then one integer v ($1 \le v \le n$) - the root. Then terminate your program.

After printing a query do not forget to output end of line and flush the output. To do this, use:

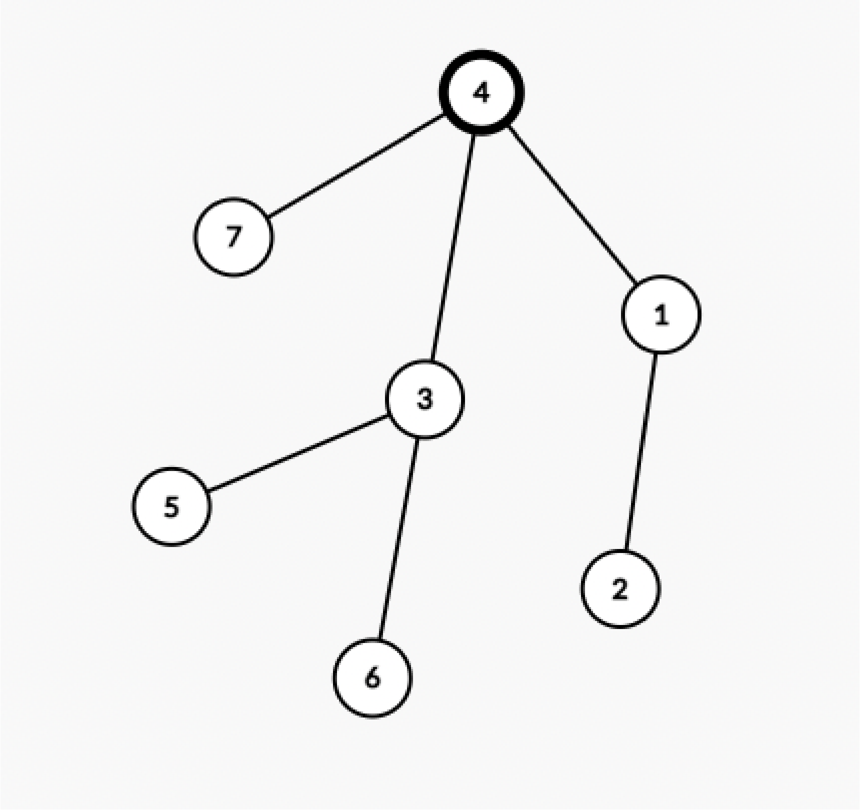
- `fflush(stdout)` or `cout.flush()` in C++;
- `stdout.flush()` in Python;

It is guaranteed that for each test case, the tree and its root are fixed before the start of the interaction. In other words, **the interactor is not adaptive**.

Example

```
Input:
7
4 1
1 2
4 3
3 5
3 6
4 7
Output:
? 2 5 6
Input:
NO
Output:
? 3 6 3 5
Input:
YES
Output:
? 2 1 7
Input:
NO
Output:
? 2 4 6
Input:
YES
Output:
! 4
```

Note



The hidden root is vertex 4.

In the first query, the LCA of vertices 5 and 6 is vertex 3 which is not among vertices 5 and 6 so the answer is "`NO`".

In the second query, the LCA of vertices 3, 5, and 6 is vertex 3 so the answer is "`YES`".

In the third query, the LCA of vertices 1 and 7 is vertex 4 so the answer is "`NO`".

In the fourth query, the LCA of vertices 4 and 6 is vertex 4 so the answer is "`YES`".

After that, we can guess that root is vertex 4 which is the correct answer.

Scoring

1. (7 points): $n \leq 9$
2. (10 points): $n \leq 30$
3. (up to 83 points): $n \leq 500$

In the first and second subtasks you can ask at most 1000 queries.

In the third subtask, let k be the maximum number of queries you asked in any test. If $k \leq 9$, you will get 83 points. Otherwise, you will get $\lfloor \max(10, 83 \cdot (1 - \frac{\ln(k-6)}{7})) \rfloor$ points.

C++ code that computes the number of points for the third subtask:

```
((k <= 9) ? 83: max(10, int(83 * (1 - log(k - 6.0) / 7))))
```