

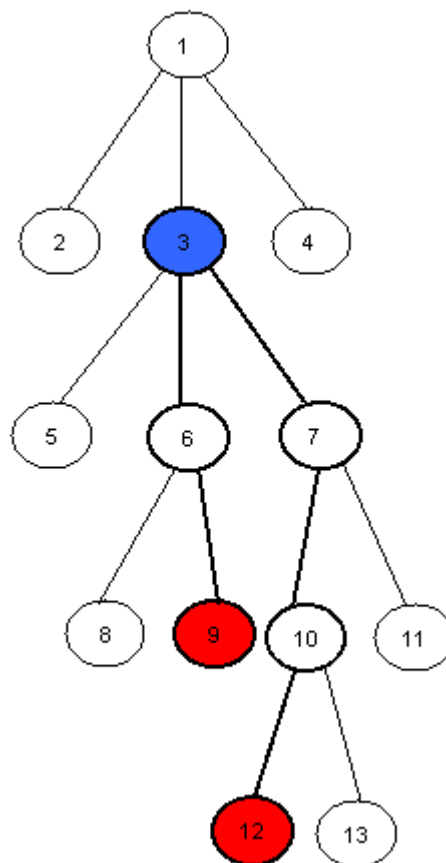
Problem G. Lowest Common Ancestor

| | |
|--------------------------|------------|
| Time limit | 600 ms |
| Mem limit | 1572864 kB |
| Code length Limit | 50000 B |
| OS | Linux |

A tree is an undirected graph in which any two vertices are connected by exactly one simple path. In other words, any connected graph without cycles is a tree. – Wikipedia

The lowest common ancestor (LCA) is a concept in graph theory and computer science. Let T be a rooted tree with N nodes. The lowest common ancestor is defined between two nodes v and w as the lowest node in T that has both v and w as descendants (where we allow a node to be a descendant of itself). – Wikipedia

Your task in this problem is to find the LCA of any two given nodes v and w in a given tree T .



For example the LCA of nodes 9 and 12 in this tree is the node number 3.

Input

The first line of input will be the number of test cases. Each test case will start with a number N the number of nodes in the tree, $1 \leq N \leq 1,000$. Nodes are numbered from 1 to N . The next N

lines each one will start with a number M the number of child nodes of the N th node, $0 \leq M \leq 999$ followed by M numbers the child nodes of the N th node. The next line will be a number Q the number of queries you have to answer for the given tree T , $1 \leq Q \leq 1000$. The next Q lines each one will have two number v and w in which you have to find the LCA of v and w in T , $1 \leq v, w \leq 1,000$.

Input will guarantee that there is only one root and no cycles.

Output

For each test case print $Q + 1$ lines, The first line will have "Case C:" without quotes where C is the case number starting with 1. The next Q lines should be the LCA of the given v and w respectively.

Example

Input:

```
1
7
3 2 3 4
0
3 5 6 7
0
0
0
0
2
5 7
2 7
```

Output:

```
Case 1:
3
1
```