

Lowest Common Ancestor

You are given a *rooted tree* and an ordered list of queries. Each query is specified by two nodes u and v and the answer to a query is the lowest common ancestor of u and v .

Recall that the *Lowest Common Ancestor* of two nodes is the node that is furthest from the root and also an ancestor of the two nodes. In this problem we use the convention that a node is in fact an ancestor of itself.

Input

The first line contains an integer N , the number of nodes in the tree ($N \leq 10000$). Each of the next N lines 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. Nodes will be labeled from 0 to $N-1$. Following will be a number Q , the number of queries that will be asked ($Q \leq 10000$). Each of the next Q lines will have two numbers u and v ($0 \leq u, v < N$) which specify the parameters of that specific query.

The root of the tree will always be node 0.

Output

For each query output the answer on its own line. Answers should follow the same order as given in the input.

Example

Input:

```
3
2 1 2
0
0
3
1 2
1 1
2 2
```

Output:

```
0
1
2
```