

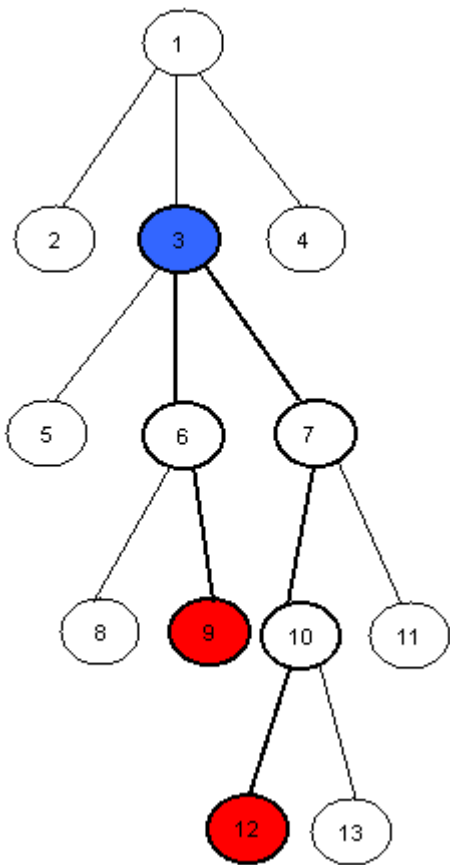
LCA - Lowest Common Ancestor

no tags

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 Nth node, $0 \leq M \leq 999$ followed by M numbers the child nodes of the Nth 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.

 Submit solution! (/submit/LCA/)

Added by: hossamyosef (/users/hossamyosef)
Date: 2013-05-13
Time limit: 0.600s-1.113s
Source limit: 50000B
Memory limit: 1536MB
Cluster: Cube (Intel G860) (/clusters/)
Languages: All
Resource: FCIS/ASU Local Contest 2013

Evaluate this problem 

Nobody has rated this problem yet, maybe you'll be the first?

Concept difficulty

easy normal hard extreme

Implementation difficulty

easy normal hard extreme

 Recommend!



Own tags

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |
| # | # | # | # | # | # | # | # | # | # | # |

Tag name

Add

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


Submit solution! (/submit/LCA/)


hide comments


| | | | | |
|--------------------------------|-------------------------------|---|-----------------------------|-----------------------------|
| < | Previous | 1 | 2 (/problems/LCA/cstart=10) | 3 (/problems/LCA/cstart=20) |
| 4 (/problems/LCA/cstart=30) | 5 (/problems/LCA/cstart=40) | | | |
| 6 (/problems/LCA/cstart=50) | 7 (/problems/LCA/cstart=60) | | | |
| 8 (/problems/LCA/cstart=70) | 9 (/problems/LCA/cstart=80) | | | |
| 10 (/problems/LCA/cstart=90) | 11 (/problems/LCA/cstart=100) | | | |
| Next (/problems/LCA/cstart=10) | > (/problems/LCA/cstart=140) | | | |


 dvelagap (/users/dvelagap): 2024-04-06 05:29:20
Used HLD , getting TLE. logic to find LCA is jumping chains using parent[head] of the chain, until both heads are same.


 luuphucvinh (/users/luuphucvinh): 2023-09-13 06:28:48
use sqrt


 baodepzai (/users/baodepzai): 2023-09-13 05:18:07
easy

 vuduoc (/users/vuduoc): 2023-09-13 04:28:07
wow u re so good


 metalavocado99 (/users/metalavocado99): 2023-05-23 09:39:00
AC in one Go , I ued HLD , the best method , search ahegao face on youtube and self pleasure for the rest of the day

 anujjadhav0215 (/users/anujjadhav0215): 2023-04-18 16:12:29
It is giving wrong ans, for my accepted code on hackerrank


 sky_0509 (/users/sky_0509): 2023-04-08 09:38:10
my code ac in cses and hear give wr and

 prateek7248 (/users/prateek7248): 2022-10-09 19:30:55
<snip>
[Simes]: Read the footer - Don't post source code here

Last edit: 2022-10-09 22:16:31

 ninhdn2006 (/users/ninhdn2006): 2022-10-03 11:44:42
I need help ! My code is time limit excced . Can you help me to fix it
<snip>
[Simes]: Read the footer - use the forum.

Last edit: 2022-10-03 18:34:56

 m_dodiya_072 (/users/m_dodiya_072): 2022-09-06 15:44:54
clear the vector for new test case

Last edit: 2022-09-06 15:45:36

Leave a Comment