

Problem C: Contaminated Rivers

Advanced Algorithms for Programming Contests

Restrictions

Time: 2 seconds

Memory: 512 MB

Problem description

You recently moved to a Chinese province with lots and lots of rivers in it. Unfortunately, even though numerous regulations against their pollution have been put in place in recent years, those are still largely being ignored by the industries they were targeting. As a result, most of the rivers are highly contaminated with toxic waste.

Of course this by itself causes lots of issues for the people living there. Nonetheless, one aspect of the pollution is particularly problematic: Some pollutants can drastically increase their harmfulness to humans when they come into contact with certain other pollutants. Naturally, when all ingredients for such a catastrophe are being disposed of into the same network of rivers, they eventually meet.

After some fatal cases of this phenomenon occurred in recent months, the local government has vowed to do a better job in monitoring the pollution and warning or even evacuating those parts of the population that – due to their proximity to the mixing spot – would be most affected by it. However, they still need some help to find out in which part of the river network given pollutants will mix. As you were already worried about getting your visa extended, you decided to offer your service to them.

Input

The input consists of

- one line containing N – the number of rivers ($2 \leq N \leq 10^5$)
- one line containing all connections between rivers, given via integers a_2, \dots, a_n , with a_i being the index of the river that river i flows into ($1 \leq a_i \leq N$) and 1 being the index of the large stream everything ultimately flows into before it reaches the ocean
- several lines containing the queries: Each query begins with the number k of pollutants involved ($2 \leq k \leq 10$) in the anticipated reaction,

followed by k numbers r_1, \dots, r_k , representing the indices of the rivers the pollutants are dumped into ($1 \leq r_i \leq N$). There will be between 1 and 10^5 such queries. The program is supposed to terminate when given a line containing only 0.

Output

For every non-terminating query, output the index of the river in which the given pollutants meet (assuming that each pollutant contaminates all rivers that carry it further downstream), in a separate line.

Sample input and output

Input	Output
12	1
1 1 2 2 3 3 4 5 5 5 8	2
2 7 8	4
3 12 9 10	5
2 4 12	6
5 9 10 11 10 10	
3 6 6 6	
0	