Problem PK
Chemical Storage

Time limit: 1 second
Memory limit: 1024 megabytes

Problem Description

International Chemical Producing Company (ICPC) is an international company that manufactures various chemicals. The company built several chemical rooms for storing chemicals. They made a short railroad to connect two chemical rooms for convenience to move the chemicals. The network of the chemical rooms and the railroads form a special tree graph in which all the nodes are within distance 2 of a central path. We label each node a number sequentially from 1. Fig. 1 gives an example of networks.

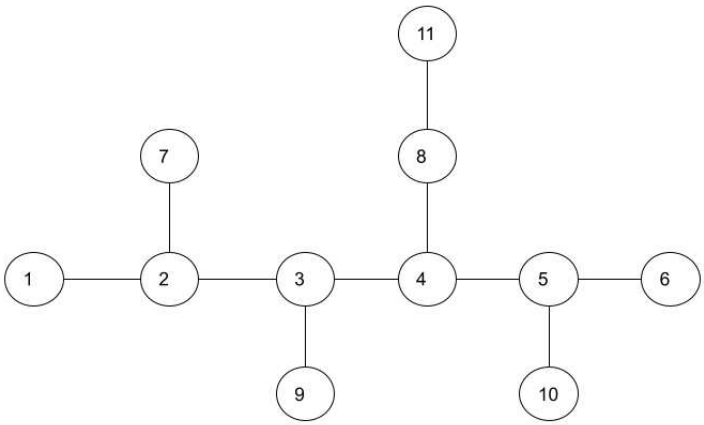


Figure 1: An example of networks with chemical rooms and railroads.

Each chemical product will be stored in a tank placed in a chemical room. Since the chemicals may leak into the air, the safety rule is that the chemicals cannot be placed in two adjacent rooms to avoid adverse chemical reactions between the chemicals. Fig. 2 gives two chemical placement network examples: (a) is safety, and (b) is unsafety.

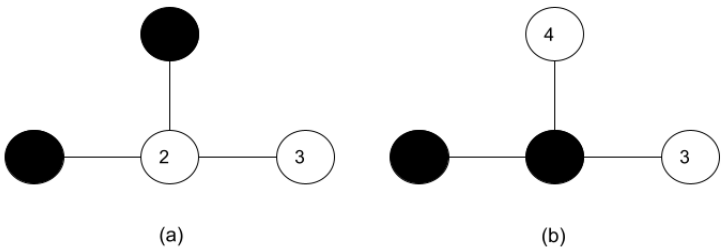


Figure 2: Two examples of chemical placement networks: (a) safety and (b) unsafety.

Sometimes, the workers must clean the tanks and move some chemicals to the other chemical rooms. Peter is the worker, and his manager will assign him a task with two safety placement networks: the source network T_s and the destination network T_d. A task is called $feasible$ if a possible strategy exists to move the chemicals from T_s to T_d following the safety rules; otherwise, it is called $infeasible$. Notice that we do not restrict chemicals to be placed in a specific room. If T_s and T_d are the same, the task is also treated as feasible. Fig. 3 and Fig. 4 show examples of feasible and infeasible tasks, respectively.

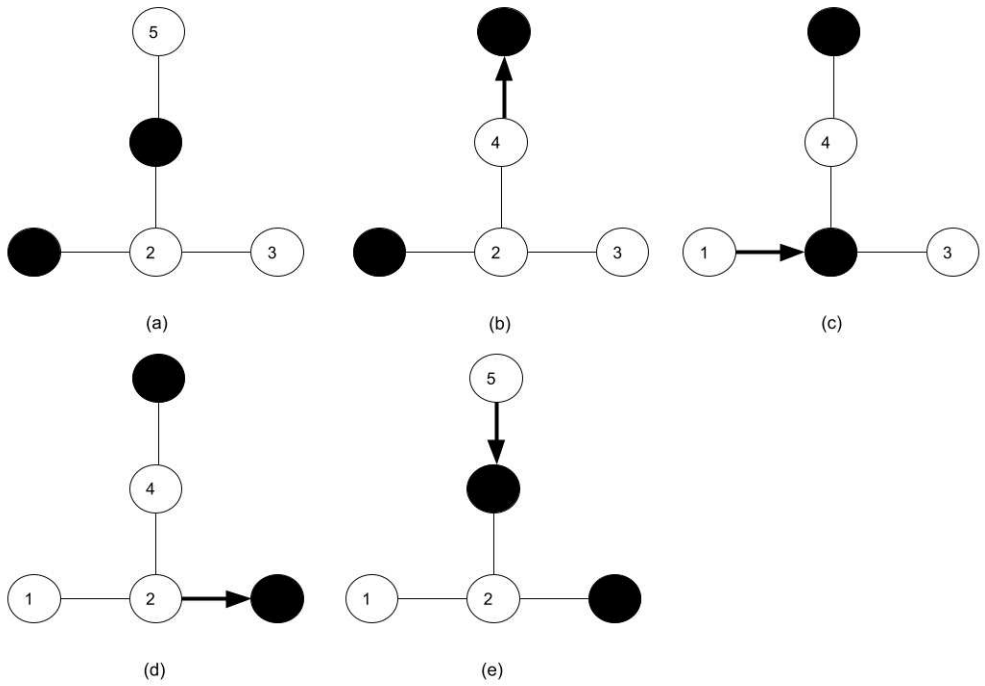


Figure 3: A feasible task: (a) the source network, (b) move the chemical from 4 to 5, (c) move the chemical from 1 to 2, (d) move the chemical from 2 to 3, (e) move the chemical from 5 to 4 to the destination network.

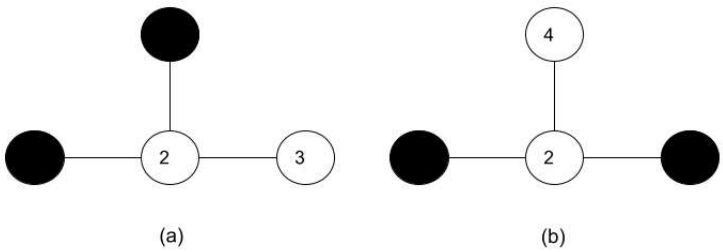


Figure 4: An infeasible task: (a) the source network, (b) the destination network.

Please write a program to help Peter judge whether a task is feasible or not.

Input Format

The first line contains exactly one integer t, which represents the number of test cases. Each test case below contains four lines. For each test case, the first line contains two integers n and m, where n represents the number of chemical rooms and m represents the number of chemicals; the second line contains $n-1$ integers $r_1, r_2, \cdots r_{n-1}$, which represents that room $i+1$ has a railroad connecting to room r_i for $1 \leq i \leq n-1$; the third line contains m integers s_j for $1 \leq j \leq m$, representing the room numbers in which chemicals are placed at the source network; and the fourth line contains m integers d_k for $1 \leq k \leq m$, representing the room numbers in which chemicals are placed at the destination network.

Output Format

Each test case outputs 1 if the task is feasible, otherwise outputs 0 in a line.

Technical Specification

- $5 \leq t \leq 10$.
- $1 \leq m \leq n \leq 10,000$.
- $1 \leq r_i < i+1$, $1 \leq i \leq n-1$.
- $1 \leq s_j \leq n$ and $s_p \neq s_q$ if $p \neq q$, $1 \leq d_j \leq n$ and $d_p \neq d_q$ if $p \neq q$.

Sample Input 1

```
6
4 2
1 2 2
1 4
3 4
4 2
1 2 2
1 4
1 4
5 2
1 2 2 4
1 4
3 4
11 4
1 2 3 4 5 2 4 3 5 8
1 6 7 8
1 3 5 8
11 4
1 2 3 4 5 2 4 3 5 8
1 3 5 8
7 8 9 10
10 5
1 2 3 4 2 3 3 6 4
2 4 7 8 9
1 5 6 7 8
```

Sample Output 1

```
0
1
1
0
1
1
```