1001 Static Query on Tree

Time Limit: 2000/1000 MS (Java/Others)

Memory Limit: 262144/262144 K (Java/Others)

Problem Description

In country X, there are n cities and $n-1$ **one-way roads**, and all city can reach city 1. One query will give 3 sets of cities A, B, C. Alice will choose a city x in set A, choose a city z in set C, and walk from x to z (if x can reach z). Bob will choose a city y in set B, and walk from y to z (if y can reach z). How many cities can possibly be the city where Alice and Bob meet each other?

In other words, how many cities can be reached from any city in set A, any city in set B, and can reach any city in set C?

There are T test cases, and each case has q queries.

Input

First line is one integer T, indicating T test cases. In each case:

First line is 2 integers n, q, indicating n cities and q queries.

Next line is $n-1$ integers $r_1, r_2, \ldots, r_{n-1}$, the i-th integer indicates the road from city $i+1$ to city r_i.

Next is q queries, in each query:

First line is 3 integer $|A|, |B|, |C|$, indicating the size of set A, B, C.

Next line is $|A|$ integers, indicating the set A.

Next line is $|B|$ integers, indicating the set B.

Next line is $|C|$ integers, indicating the set C.

$1 \le T \le 20, 1 \le n, q, |A|, |B|, |C| \le 2 \times 10^5$, for all cases $\sum n \le 2 \times 10^5$, $\sum q \le 2 \times 10^5$, for all queries in all cases $\sum |A| + \sum |B| + \sum |C| \le 2 \times 10^5$.

Output

In each case, print q integers, one integer per line, i-th integer indicates the answer of i-th query.

Sample Input

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

Sample Output

```
2
4
1
```