The 2021 Freshman Programming Contest

Hunan University

Problem J

Rain_w Loves Skirt

Time Limit: 2 seconds   Memory Limit: 256 MB

Description

There are n shops in the city where rain_w lives. And there are $n-1$ roads connecting these shops, any two shops can reach each other directly or indirectly through these $n-1$ roads. The length of the i-th road is w_i, connecting shops u_i and v_i.

As we all know, Rain_w likes wearing skirts. There are m types of skirts, and each shop only sells one type of skirt. More formally, the i-th shop only sells the k_i-th skirt. It is guaranteed that every type of skirt has at least one shop selling it.

Every skirt has its rarity, the x-th skirt is more rare than y-th skirt if and only if there are fewer shops selling skirt x than y. If the number of shops selling them is the same, then the skirt with the smaller id is more rare.

Every day, Rain_w will choose two types of skirts (x, y) which he wants to buy, (**it is guaranteed that x is more rare than y**). Then his mother would send him to a shop which sells x-th skirts as a starting point. After buying skirts in this starting point and putting them on, Rain_w will choose another shop that sells one of these of skirts (means sells x or y) and walk to it along the shortest path, and then he will go home in his mother's car. Because Rain_w enjoys the feeling of wearing a skirt, he will choose the shop with the longest distance that he needs to walk.

Rain_w' s mother knows Rain_w' s thoughts, but she doesn't want the cute Rain_w to walk outside for too long in a skirt. Therefore, she will carefully choose the starting point to minimize the distance Rain_w walks.

There are q days. Each day, you will know the two skirts Rain_w chose, you need to write a program to help Rain_w calculate how long he will walk with skirt that day with his mother's control.

Input

The first line contains two integers $n, m(2 \le n, m \le 50000)$ --the number of shops in the city and the number of skirt types.
Then $n-1$ lines follow, the i-th line contains three integers $u_i, v_i, w_i(1 \le u_i, v_i \le n, 0 < w_i \le 10^5)$ denoting i-th road which connecting two shops.

Then one line follows, contains n integer. The i-th integer $k_i(1 \le k_i \le m)$ denotes the i-th shop sells k_i-th skirt.

Then follows an integer $q(1 \le q \le 50000)$ -- the number of days.

Then q lines follow, the i-th line contain two integers $x_i, y_i(1 \le x_i, y \le m, x_i! = y_i)$, denoting the two types of skirts rain_w chose on the i-th day.

it is guaranteed that x_i is more rare than y_i and every type of skirt has at least one shop selling it

Output

Print q lines, the i-th line contains an integer, denoting how long Rain_w will walk with skirt on i-th day.

Sample Input	Output for Sample input
8 3 1 2 1 2 3 1 3 4 1 4 5 1 3 6 1 6 7 1 7 8 1 1 2 1 2 1 2 1 3 2 2 1 3 2	3 4