Problem E. Epilogue of Happiness

Input file:	`standard input`
Output file:	`standard output`
Time limit:	7 seconds
Memory limit:	1024 megabytes

As the competition was nearing its end, a banquet was held. For decoration, there was a tree with n light bulbs numbered from 1 to n on it, where the i-th bulb has a *beauty* of w_i. The bulbs are connected by $n-1$ circuits. Specifically, for each i from 2 to n, there is a circuit connecting the i-th bulb and the f_i-th bulb ($1 \le f_i < i$).

There is a row of m switches that control the bulbs' lighting. Pressing the i-th switch toggles the state of all bulbs on the simple path from bulb 1 to bulb o_i on the tree (i.e., bulbs that are on turn off, and those that are off turn on).

q children will interact with the tree. The process for the i-th child is described by three integers l_i, r_i, and x_i:

- Initially, all bulbs are off.
- Then, the switches from the l_i-th to the r_i-th are pressed in sequence.
- Finally, a photo is taken of the bulbs on the simple path from 1 to x_i.

The *total beauty* of a photo is the sum of the *beauty* of all bulbs that are on in the photo. Your task is to compute this value for each of the q children.

Input

The first line of the input contains three integers n, m, and q ($1 \le n, m, q \le 5 \cdot 10^5$), where n is the number of bulbs, m is the number of switches, and q is the number of children.

The second line of the input contains $n-1$ integers $f_2, f_3, \ldots, f_n$ ($1 \le f_i < i$), where f_i represents a circuit between the i-th bulb and the f_i-th bulb.

The third line of the input contains n integers $w_1, w_2, \ldots, w_n$ ($0 \le w_i \le 1000$), where w_i is the *beauty* of the i-th bulb.

The next m lines of the input describe the switches. The i-th line of these contains a single integer o_i ($1 \le o_i \le n$).

The next q lines of the input describe the interaction process of the children. The i-th line of these contains three integers l_i, r_i, and x_i ($1 \le l_i \le r_i \le m$, $1 \le x_i \le n$).

Output

Output q lines, each containing an integer, representing the *total beauty* of each photo.

Example

standard input	standard output
5 3 7 1 2 3 3 907 609 48 670 184 2 3 5 1 2 5 1 3 3 1 3 2 2 3 1 2 3 3 2 3 4 3 3 5	48 1516 1516 0 0 0 1748

Note

For the first child:

- First, he pressed the first switch, causing the first and the second bulbs to turn on.
- Then, he pressed the second switch, causing the first and the second bulbs to turn off while the third bulb turns on.
- He took a photo of bulbs $1, 2, 3$, and 5. In the photo, only the 3rd bulb was lit, resulting in a beauty of 48.