# Epilogue of Happiness

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|---|---|
| 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<br>1 2 3 3<br>907 609 48 670 184<br>2<br>3<br>5<br>1 2 5<br>1 3 3<br>1 3 2<br>2 3 1<br>2 3 3<br>2 3 4<br>3 3 5 | 48<br>1516<br>1516<br>0<br>0<br>0<br>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.