

## H. No Link, Cut Tree!

Time limit: 2s

Memory limit: 256 MB

Marge is already preparing for Christmas and bought a beautiful tree, decorated with shiny ornaments. Her Christmas tree can be represented as a complete binary tree composed of  $N$  nodes, numbered from 1 to  $N$  and rooted on node 1. Each node has an integer value associated to it, representing its shininess.

The shininess of the  $h$ -th level of the tree is the sum of the shininess of all the nodes with depth  $h$  and the shininess of the tree is the largest value of shininess of its levels.

Nicoleta has a crush on a girl and wants to give her a part of Marge's beautiful tree. To do so, he will choose a node  $u$  and give his crush the subtree rooted at node  $u$ , including  $u$ . However, he doesn't want to get in (too much) trouble with Marge, so he will consider some candidates before making the cut.

Nicoleta has  $M$  candidate nodes to be the root of the cut subtree. For each candidate, Nicoleta wants to know what is the value of shininess of the remaining tree.

**Input**

The first line of the input contains three integers  $N$  ( $2 \leq N \leq 10^5$ ) and  $M$  ( $1 \leq M \leq 10^5$ ) and  $w$  ( $0 \leq w \leq 10^4$ ), indicating, respectively, the number of nodes of the tree, the number of candidate nodes and the shininess of node 1.

Each of the next  $N - 1$  lines contains three integers  $u$  ( $2 \leq u \leq N$ ),  $v$  ( $1 \leq v \leq N$ ) and  $w$  ( $0 \leq w \leq 10^4$ ), indicating that node  $u$  is a child of node  $v$  and has shininess  $w$ .

$M$  lines follow, each with a single integer  $u$  ( $2 \leq u \leq N$ ), indicating the number of a candidate node.

**Output**

For each candidate node, in the order that they appear in the input, output a single line containing a single integer: the shininess of the remaining tree.

**Example**

input
6 2 3
4 1 1
5 1 4
2 4 7
3 4 6
6 5 5
4
5
output
5
13

**Note**

More about complete binary trees: [https://en.wikipedia.org/wiki/Binary\\_tree#Types\\_of\\_binary\\_trees](https://en.wikipedia.org/wiki/Binary_tree#Types_of_binary_trees)