B. Diverging Directions

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a directed weighted graph with n nodes and $2n$ - 2 edges. The nodes are labeled from 1 to n, while the edges are labeled from 1 to $2n$ - 2. The graph's edges can be split into two parts.

- The first n - 1 edges will form a rooted spanning tree, with node 1 as the root. All these edges will point away from the root.
- The last n - 1 edges will be from node i to node 1, for all $2 \leq i \leq n$.

You are given q queries. There are two types of queries

- 1 i w: Change the weight of the i-th edge to w
- 2 u v: Print the length of the shortest path between nodes u to v

Given these queries, print the shortest path lengths.

Input

The first line of input will contain two integers n, q ($2 \leq n, q \leq 200\,000$), the number of nodes, and the number of queries, respectively.

The next $2n$ - 2 integers will contain 3 integers a_i, b_i, c_i, denoting a directed edge from node a_i to node b_i with weight c_i.

The first n - 1 of these lines will describe a rooted spanning tree pointing away from node 1, while the last n - 1 of these lines will have $b_i = 1$.

More specifically,

- The edges $(a_1, b_1), (a_2, b_2), \ldots (a_{n-1}, b_{n-1})$ will describe a rooted spanning tree pointing away from node 1.
- $b_j = 1$ for $n \leq j \leq 2n$ - 2.
- $a_n, a_{n+1}, \ldots, a_{2n-2}$ will be distinct and between 2 and n.

The next q lines will contain 3 integers, describing a query in the format described in the statement.

All edge weights will be between 1 and 10^6.

Output

For each type 2 query, print the length of the shortest path in its own line.

Example

input
5 9 1 3 1 3 2 2 1 4 3 3 5 4 5 1 5 3 1 6 2 1 7 4 1 8 2 1 1 2 1 3 2 3 5 2 5 2

```
1 1 100
2 1 3
1 8 30
2 4 2
2 2 4
```

output

```
0
1
4
8
100
132
10
```