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E. Vasya and a Tree

time limit per test: 2 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Vasya has a tree consisting of n vertices with root in vertex 1. At first all vertices has 0 written on it.

Let $d(i, j)$ be the distance between vertices i and j , i.e. number of edges in the shortest path from i to j . Also, let's denote k -subtree of vertex x — set of vertices y such that next two conditions are met:

- x is the ancestor of y (each vertex is the ancestor of itself);
- $d(x, y) \leq k$.

Vasya needs you to process m queries. The i -th query is a triple v_i, d_i and x_i . For each query Vasya adds value x_i to each vertex from d_i -subtree of v_i .

Report to Vasya all values, written on vertices of the tree after processing all queries.

Input

The first line contains single integer n ($1 \leq n \leq 3 \cdot 10^5$) — number of vertices in the tree.

Each of next $n - 1$ lines contains two integers x and y ($1 \leq x, y \leq n$) — edge between vertices x and y . It is guarantied that given graph is a tree.

Next line contains single integer m ($1 \leq m \leq 3 \cdot 10^5$) — number of queries.

Each of next m lines contains three integers v_i, d_i, x_i ($1 \leq v_i \leq n, 0 \leq d_i \leq 10^9, 1 \leq x_i \leq 10^9$) — description of the i -th query.

Output

Print n integers. The i -th integers is the value, written in the i -th vertex after processing all queries.

Examples

input

[Copy](#)

```
5
1 2
1 3
2 4
2 5
3
1 1 1
2 0 10
4 10 100
```

output

[Copy](#)

```
1 11 1 100 0
```

input

[Copy](#)

```
5
2 3
2 1
5 4
3 4
5
2 0 4
3 10 1
```

Educational Codeforces Round 54 (Rated for Div. 2)

Finished

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→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest](#)

→ Problem tags

[data structures](#) [trees](#) [*1900](#)

No tag edit access

→ Contest materials

- Announcement
- Tutorial #1
- Tutorial #2

```
1 2 3
2 3 10
1 1 7
```

output

Copy

```
10 24 14 11 11
```

Note

In the first example initial values in vertices are 0, 0, 0, 0, 0. After the first query values will be equal to 1, 1, 1, 0, 0. After the second query values will be equal to 1, 11, 1, 0, 0. After the third query values will be equal to 1, 11, 1, 100, 0.

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