

Voyage

SEASON 6 – ROUND TWO – 300 points



At last, Ivancho finished his heavy duties and now it is time for him to date Sashka. Our characters live on a tree – in other words, they live in a city, which can be re represented as a graph where there is exactly one path between each two vertices. All edges are undirected.

Ivancho and Sashka start travelling by car, each of them in the direction towards the other. Travelling by car does not cost anything. Unfortunately, not all places are reachable by car. From time to time, in some regions of the city (vertices) the authorities ban the use of personal transport. Upon passing through such vertex, our characters are obliged to leave their cars behind and continue using the public transport. This is expensive though! For each edge you are given the price for passing through it using the public transport.

In a given moment one of them could stop in order to wait for the other to reach him. Ivancho wants to know the minimum price the two of them need to pay in order to meet.

Your program processes two types of queries:

1. $0\ x$ – change the state of vertex x . If there is not a car ban in it, the authorities introduce such a ban. If cars are already banned, they are unbanned;
2. $1\ x\ y$ – compute the minimum price Ivancho and Sashka need to pay if they are placed in vertices x and y respectively, taking into account the current state of the car bans.

Notice: in the beginning there are no bans.

Input

The first line of the input file `voyage.in` contains a single integer N . Each of the following $N-1$ rows contain three numbers x , y and z , $1 \leq x \leq N$ and $1 \leq y \leq N$. This shows that there is an edge between vertices x and y and the price for passing through it using the public transport is z . The next line contains the number M . The following M lines contain information about the queries – one query for a line. Their format is described above.

Output

In the output file `voyage.out` for each query of type 2 output the minimum price on a separate line.

Constraints

$$1 \leq N \leq 10^5$$

$$1 \leq M \leq 10^5$$

$$1 \leq z \leq 10^3$$

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Time limit: 0.6 sec

Memory limit: 256 MB

Example

Input (voyage.in)	Output (voyage.out)
6	97
1 2 20	97
1 3 100	77
2 4 77	0
4 6 9	
4 5 1	
9	
0 4	
0 1	
1 6 3	
1 3 4	
0 2	
0 1	
1 5 1	
0 4	
1 5 3	

Explanation

Sequence of actions:

- A ban is added to vertex 4;
- A ban is added to vertex 1;
- Ivancho can travel by car only to vertex 4 and Sashka only to vertex 1, they need to pay 97;
- Ivancho can travel by car only to vertex 1 and Sashka cannot use a car at all, they need to pay 97;
- A ban is added to vertex 2;
- The ban is removed from vertex 1;
- Ivancho can travel by car only to vertex 4 and Sashka only to vertex 2, they need to pay 77;
- The ban is removed from vertex 4;
- Ivancho can travel by car to vertex 2, Sashka can travel by car to vertex 2 too, they do not need to pay for public transport.