2 Catering Contracts Remix

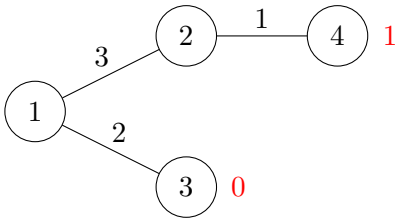
The railway network of Siruseri is organized so that there is a unique route connecting any pair of railway stations. Each railway station has a canteen that is assigned to a contractor. Trains pick up food for on-board catering at these stations.

The contractors' union has forbidden food of rival contractors from entering a station, so if a train moves from a station served by one contractor to a station served by another contractor, all the food on board has to be discarded and fresh food has to be bought at the next station.

With each segment of track directly connecting two stations, there is a cost associated with discarding food along that segment if the contractors at the two endpoints are different. If the contractors at the two endpoints are the same, this cost is ignored because food does not have to be discarded.

The process of awarding contracts has started, so some canteens have already been awarded to contractors. Your task is to award contracts for the canteens that are still unassigned in such a way that the sum of the cost of discarding food across all segments is minimized. Remember that you only incur a cost for each segment that directly connects two stations served by different contractors.

For example, consider the following network with 4 stations {1,2,3,4}, in which stations 3 and 4 have already been assigned to contractors 0 and 1, respectively. In this example, if we assign stations 1 and 2 to contractor 0, the overall cost that we incur is 1, corresponding to the segment connecting stations 2 and 4. It can be shown that this is the best possible assignment of contracts in terms of minimizing the total cost incurred.



Input format

- The first line consists of a single integer N, the number of stations. The stations are numbered $1..N$.
- The next $N-1$ lines describe the direct connections between the stations. Each line consists of three space separated integers u, v and w indicating that there is a direct connection between stations u and v with a cost of w if the canteens at u and v are assigned to different contractors.
- This is followed by a line containing N space separated integers in the range $-1, 0, \ldots, M-1$. These describe the contractors assigned to the stations. Each contractor is denoted by a non-negative integer in the range $0..M-1$. A value -1 denotes a station whose canteen has not been assigned a contractor.

Output format

A single integer, the minimum overall cost you can achieve by a suitable assignment of the unassigned canteens to contractors.

Test Data

In all testcases, the cost w of each segment connecting two stations is bounded by 10^4.

- Subtask 1 (20 marks) : $M \leq 10$, $N \leq 10000$, the railway network is a complete binary tree with station 1 as the root, and a station's canteen has already been assigned a contractor if and only if the station is a terminus on the network (a leaf).
- Subtask 2 (50 marks) : $M \leq 10$, $N \leq 100000$, and a station's canteen has already been assigned a contractor if and only if the station is a terminus on the network (a leaf).
- Subtask 3 (15 marks) : $M \leq 100$, $N \leq 100000$, and a station's canteen has already been assigned a contractor if and only if the station is a terminus on the network (a leaf).
- Subtask 4 (15 marks) : $M \leq 100$, $N \leq 100000$, and there is no constraint on which station's canteens have already been assigned to contractors.

Sample Input

```
4
1 2 3
1 3 2
2 4 1
-1 -1 0 1
```

Sample output

```
1
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Limits

- *Time limit:* 4 s
- *Memory limit:* 256 MB