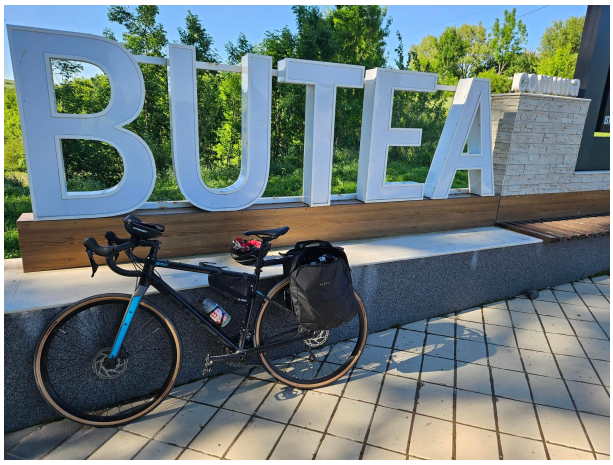
Problem Butea

Input file `stdin`
Output file `stdout`



Little IR12660 decided to make a detour in Butea

Task

You are given a weighted binary tree with n nodes and q queries.

For the i-th query ($1 \leq i \leq q$):

- you are given an integer k_i and a set of k_i nodes $S_1, S_2, \ldots, S_{k_i}$;
- you must choose another set of exactly k_i nodes $T_1, T_2, \ldots, T_{k_i}$;

  Note that T can also contain nodes from S (or even T=S)
- your goal is to minimize the following value: $\sum_{a=1}^{k_i} \sum_{b=1}^{k_i} \text{dist}(S_a, T_b)$ where $\text{dist}(u, v)$ denotes the length of the shortest path between nodes u and v in the tree.

Input

The first line contains two integers n and q — the number of nodes and the number of queries.

The next n - 1 lines describe the edges of the tree. On the i-th of these lines, three integers u_i, v_i, and w_i are given, indicating that there is an edge between nodes u_i and v_i with weight w_i.

The next q lines describe the queries. On the i-th of these lines are given:

- an integer k_i,
- followed by k_i distinct integers representing the nodes $S_1, S_2, \ldots, S_{k_i}$.

The values written on the same line are separated by a single space.

Output

The output will contain q lines. On line j ($1 \leq j \leq q$) output a single integer — the minimum possible value of the expression corresponding to the j-th query.

Restrictions

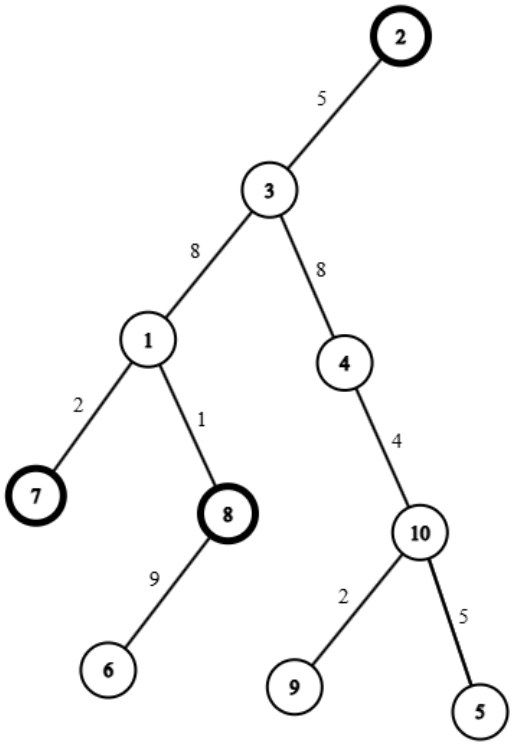
- $1 \leq n, q \leq 2 \cdot 10^5$
- $1 \leq w_i \leq 10$ for all $1 \leq i \leq n$.
- $\sum_{i=1}^{q} k_i \leq 2 \cdot 10^5$.
- $1 \leq S_i \leq n$ for all queries.
- It is guaranteed that the given edges form a binary tree (i.e. for a suitable choice of the root node each node has at most 2 children).

#	Points	Restrictions
1	0	Examples
2	10	$n, q \leq 200, \sum_{i=1}^{q} k_i \leq 400$
3	15	$n, q \leq 2000, \sum_{i=1}^{q} k_i \leq 4000$
4	20	The tree is a chain (i.e. each node has degree at most 2)
5	55	No further restrictions.

Examples

Input file	Output file
10 5 3 4 8 10 9 2 8 1 1 4 10 4 7 1 2 10 5 5 6 8 9 1 3 8 3 2 5 3 8 2 7 5 6 7 8 10 9 4 2 10 9 3 5 6 8 1 9 4 3 2 1 5	51 306 128 280 103

The sample is explained on the next page.



The tree from the sample input. Bold nodes correspond to the first query.

For the first query, picking $T = \{1, 8, 7\}$ yields a cost of 51:

- From node 1, the cost is

$$\text{dist}(1, 7) + \text{dist}(1, 8) + \text{dist}(1, 2) = 2 + 1 + 13 = 16.$$

- From node 8, the cost is

$$\text{dist}(8, 7) + \text{dist}(8, 8) + \text{dist}(8, 2) = 3 + 0 + 14 = 17.$$

- From node 7, the cost is

$$\text{dist}(7, 7) + \text{dist}(7, 8) + \text{dist}(7, 2) = 0 + 3 + 15 = 18.$$

$$16 + 17 + 18 = 51.$$