Pasture Walking

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Points: 200

The N cows (2 <= N <= 1,000) conveniently numbered 1..N are grazing among the N pastures also conveniently numbered 1..N. Most conveniently of all, cow i is grazing in pasture i.

Some pairs of pastures are connected by one of N-1 bidirectional walkways that the cows can traverse. Walkway i connects pastures A_i and B_i (1 <= A_i <= N; 1 <= B_i <= N) and has a length of L_i (1 <= L_i <= 10,000).

The walkways are set up in such a way that between any two distinct pastures, there is exactly one path of walkways that travels between them. Thus, the walkways form a tree.

The cows are very social and wish to visit each other often. Ever in a hurry, they want you to help them schedule their visits by computing the lengths of the paths between Q (1 <= Q <= 1,000) pairs of pastures (each pair given as a query p1,p2 (1 <= p1 <= N; 1 <= p2 <= N).

Input

- Line 1: Two space-separated integers: N and Q
- Lines 2..N: Line i+1 contains three space-separated integers: A_i, B_i, and L_i
- Lines N+1..N+Q: Each line contains two space-separated integers representing two distinct pastures between which the cows wish to travel: p1 and p2

Output

- Lines 1..Q: Line i contains the length of the path between the two pastures in query i.

Example

Input:
4 2
2 1 2
4 3 2
1 4 3
1 2
3 2

Output:
2
7

Output details

Query 1: The walkway between pastures 1 and 2 has length 2.

Query 2: Travel through the walkway between pastures 3 and 4, then the one between 4 and 1, and finally the one between 1 and 2, for a total length of 7.