Problem B

The road network in the Minimalistic Kingdom forms a tree. You are tasked with developing a navigation system for this Kingdom, and as a subroutine, you need to be able to quickly determine the distance between any two towns.

Input and output

The first line of the input contains two integers n and m ($1 \leq n \leq 3 \cdot 10^5$, $1 \leq m \leq 10^6$), the number of towns and the number of queries. The towns are numbered from 1 to n. Each of the following $n-1$ lines contains three integers a, b, d ($1 \leq a, b \leq n$, $1 \leq d \leq 1000$), describing that there exists a road from the town a to the town b of length d. You can assume that the road system forms a tree. Each of the following m lines contains two integers x and y ($1 \leq x, y \leq n$). For each of them, output a line containing a single integer, the distance between the towns x and y.

Example

Input:

```
4 3
1 2 5
1 3 6
1 4 7
2 3
2 4
3 4
```

Output:

```
11
12
13
```