Problem G. Meet in the Middle

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	512 megabytes

Byteland has n cities numbered from 1 to n, and $n-1$ bidirectional roads and $n-1$ bidirectional railways connecting them. For each pair of cities, one can always arrive one from another one through the roads only, and the same thing also holds for the railways.

Alice and Bob are planning q long journeys in Byteland. In each journey, Alice starts from the a-th city and then visits some other cities through the roads only, while Bob starts from the b-th city and then visits some other cities through the railways only. Both of them will finally reach the destination city without visiting any cities more than once. You need to find the maximum total length of their journey routes among all the selections of the destination city.

Input

The first line contains two integers n ($2 \le n \le 10^5$) and q ($1 \le q \le 5 \times 10^5$), indicating the number of cities in Byteland and the number of journey plans.

Each of the next $n-1$ lines contains three integers u, v ($1 \le u, v \le n$) and w ($1 \le w \le 10^9$), indicating a road of length w connecting the u-th and v-th cities.

Each of the next $n-1$ lines contains three integers u, v ($1 \le u, v \le n$) and w ($1 \le w \le 10^9$), indicating a railway of length w connecting the u-th and v-th cities.

Each of the next q lines contains two integers a and b ($1 \le a, b \le n$), indicating a journey where Alice starts from the a-th city and Bob starts from the b-th city.

Output

Output q lines, each of which contains a single integer, indicating the maximum total length of Alice's and Bob's journey routes among all the selections of the destination city.

Example

standard input	standard output
3 4 1 2 1 2 3 2 1 2 2 2 3 1 1 1 1 2 2 1 2 2	6 4 5 3