Tourism
Problem ID: tourism

You are a tourist and want to consider some possible trip scenarios.

There are n cities and $n-1$ bidirectional roads such that each city is reachable from any other city (in other words, the graph of cities is a tree). Some roads require tolls, and some cities have friends who can give you money.

You have m independent queries to answer. Each query is a trip you are considering: you would start in some city a, and want to reach some city b along the shortest path (in other words, you must travel along the unique simple path from city a to city b). Whenever you pass a road with a toll, you must pay that amount of money to pass. Whenever you pass a city with friends, they will give you money. In some scenarios, you would need to have some initial amount of money with you before you start your trip, or else you would run out of money before reaching your destination city.

Note: If there are friends in the starting city, you do receive money from them.

For each independent query, determine the minimum amount of money you would have to start with in order to travel from starting city a to ending city b. You are considering several trips, so you will be given several queries, each consisting of a single pair of starting and ending cities. Only consider one query trip at a time; the queries are not cumulative.

Input

Your program will receive input from standard input.

The first line of the input contains two space-separated integers, n, the number of cities (numbered from 1 to n) and m, the number of independent queries to answer.

The second line contains n integers $x_1, \ldots, x_n$ representing your friends. Friends in city i are willing to give you x_i dollars.

Next, there are $n-1$ lines describing the roads between cities. The i-th contains three integers v_i, w_i, t_i indicating that there is a road from city v_i to city w_i, which charges toll t_i, to pass in either direction. It is guaranteed that the resulting graph will form a tree.

Finally, there are m more lines. The i-th of these lines represents the i-th query and contains two integers a_i and b_i. a_i is the start city and b_i is the destination city.

Output

Your program should write to standard output.

Write m lines. The i-th line should be the minimum amount of money you must have to successfully complete the i-th trip.

Constraints

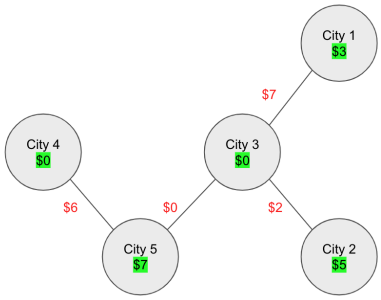
- $2 \leq n \leq 2 \cdot 10^5$
- $2 \leq m \leq 2 \cdot 10^5$
- $0 \leq x_i, t_i \leq 10^9$
- $1 \leq v_i, w_i \leq n; v_i \neq w_i$
- $1 \leq a_i, b_i \leq n; a_i \neq b_i$

Subtasks

You will get points for each subtask when you pass all of the testcases of the subtask.

1. $nm \leq 5 \cdot 10^5$ (13 points)
2. The given graph is a line (18 points)
3. No additional constraints (69 points)

Sample Explanation



This image illustrates the graph in the sample Input/Output.

In the first query, you need 4 to start with in order to travel from city 1 to city 3 (you get $\$3$ from your friends in the starting city, city 1, and you need $\$4$ more in order to pay the $\$7$ toll).

In the second query, you need $\$0$ to start with in order to travel from city 2 to city 4.

In the third query, you need $\$6$ to start with in order to travel from city 4 to city 2.

Sample Input 1	Sample Output 1
5 3 3 5 0 0 7 3 1 7 2 3 2 5 4 6 3 5 0 1 3 2 4 4 2	4 0 6