



Problem L. Lines for the subway

Source file name: lines.c, lines.cpp, lines.java
Input: Standard
Output: Standard
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This year Guadalajara's government has decided to build another line for the subway. Building a subway line means a lot of work and a headache for the citizens because the traffic. As you will imagine, joining the most important points of the city is the goal, but, unfortunately, they don't have enough money to build all the lines they need. They need your help as an ace coder to solve their problem.

The subway design consists in a set of important points on the city, those are meant to be the stations. There are some tunnels joining two stations. There are no two different paths between two stations and all are connected. Each tunnel has its own length and hardness. The hardness refers to how difficult it is to be dug and the sharpness needed to break the hardest stones in the tunnel.

The government only can buy a single drill. To calculate the price of building a whole line you have to calculate first the sum of the lengths of all the tunnels between the two stations and which one is the hardest, so the price is given as the product of both quantities.

Given a scheme of the subway and a set of proposals from the people, can you determine the cost of each one?

Input

There will be only one test per case. In the first line a number N , the number of stations in the plane. The next $N - 1$ lines 4 numbers, a , b , h and l which means that the station a is connected with the station b and has a length of l and h the hardness of the terrain. The next line contains a number p , the total of proposals from the people and finally, p lines with 2 numbers, r and s , a proposal of a line starting in the station r and ending in the station s .

- $1 \leq p \leq 10^5$
- $2 \leq a, b, r, s \leq N \leq 10^5$
- $1 \leq l, h \leq 10^6$

Output

p lines with one number on each, the cost of building the i proposal.



Example

Input	Output
8	208
1 2 3 4	468
1 3 2 8	36
3 6 9 7	390
6 4 12 14	324
8 6 13 1	
4 5 10 15	
4 7 7 6	
5	
1 8	
2 7	
3 2	
5 8	
7 3	