Height

Cats like to sit in high places. It is not uncommon to see cats climbing trees or furniture in order to lie on the top-most area within their feline reach. Rar the Cat is no exception. However, he does not know how high is one area relative to another.

Height can be measured in centimeters (cm) above sea level but Rar the Cat does not know the absolute height of any place. However, he knows that area B_i will be higher than area A_i by H_i centimetres because he needs to jump H_i to get from area A_i to B_i. There will be N areas in total with $N-1$ such descriptions. Areas are labelled from **1** to **N** and $0 < A, B \leq N$ where $A \neq B$. Also, all H_i will satisfy the following range $0 \leq H_i \leq 1,000,000$.

Rar the Cat also has **Q** queries, each consisting 2 integers **X** and **Y**. He wants to know the height of area **Y** with respect to area **X**. Do note that $0 < X, Y \leq N$ but **X** can be equal to **Y**. In the event that area **Y** is lower than area **X**, please output a negative number. Otherwise, output a positive number.

It is guaranteed that the relative heights of all pairs of areas can be computed from the data provided in the input. To be precise, the graph provided will be connected and has **N-1** edges connecting **N** vertices in total.

Input
The first line of input will contain 1 integer, **N**.
The following **N-1** lines of input will contain 3 integers each, with the **i**-th line containing A_i, B_i and H_i.
The next line will contain a single integer, **Q**.
The following **Q** lines will contain 2 integers each, **X** and **Y**.

Output
For each line of query, you are supposed to output the relative heights of area **Y** compared to area **X**, in centimeters, one line per query.

Limits
- $0 < N \leq 100,000$ and $0 \leq Q \leq 100,000$

Sample Testcase 1

Sample Input (**height1.in**)	Sample Output (**height1.out**)
5 2 3 5 4 2 2 4 1 3 5 2 10 3 1 2 3 5 1 3	-1 -15 4

Explanation for Sample Testcase 1
Area 1 is 3 centimeters above Area 4 while Area 2 is 2 centimeters above Area 4. Hence, Area 2 is 1 centimeters below Area 1.
Area 2 is 10 centimeters above Area 5. Area 3 is 5 centimeters above Area 2 and hence 15 centimeters above Area 5. As such, Area 5 is 15 centimeters below Area 3.
From the first query, Area 2 is 1 centimeters below Area 1. Area 3 is 5 centimeters above Area 2. As such, Area 3 is 4 centimeters above Area 1.

Notes:
1. You should develop your program in the subdirectory **ex3** and use the skeleton java file provided. You should not create a new file or rename the file provided.
2. You are free to define your own helper methods and classes (or remove existing ones).
3. Please be reminded that the marking scheme is:
   a. Public Test Cases (1%) - 1% for passing **all** test cases, 0% otherwise
   b. Hidden Test Cases (1%) - Partial scoring depending on test cases passed
   c. Manual Grading (1%)
      i. Overall Correctness (correctness of algorithm, severity of bugs)
      ii. Coding Style (meaningful comments, modularity, proper indentation, meaningful method and variable names)
4. Your program will be tested with a time limit of not less than **2 sec** on Codecrunch.

Skeleton File – Height.java

You are given the skeleton file Height.java. You should see a non-empty file when you open the skeleton file. Otherwise, you might be in the wrong working directory.

You should see the following contents when you open the skeleton file:

```java
import java.util.*;
public class Height {
    private void run() {
        //implement your "main" method here
    }
    public static void main(String[] args) {
        Height newHeight = new Height();
        newHeight.run();
    }
}
```