Easy Addition

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You are given a tree with N nodes and each has a value associated with it. You are given Q queries, each of which is either an update or a retrieval operation.

Initially all node values are zero.

The **update query** is of the format

```
a1 d1 a2 d2 A B
```

This means you'd have to add $(a1 + z * d1) * (a2 + z * d2) * R^z$ in all nodes in the path from A to B where z is the distance between the node and A.

The **retrieval** query is of the format

```
i j
```

You need to return the sum of the node values lying in the path from node i to node j modulo 1000000007.

Note:

1. First all update queries are given and then all retrieval queries.
2. Distance between 2 nodes is the shortest path length between them taking each edge weight as 1.

Input Format

The first line contains two integers (N and R respectively) separated by a space.

In the next N-1 lines, the i^{th} line describes the i^{th} edge: a line with two integers x y separated by a single space denotes an edge between nodes x and y.

The next line contains 2 space separated integers (U and Q respectively) representing the number of Update and Query operations to follow.

U lines follow. Each of the next U lines contains 6 space separated integers (a1,d1,a2,d2,A and B respectively).

Each of the next Q lines contains 2 space separated integers, i and j respectively.

Output Format

It contains exactly Q lines and each line containing the answer of the i^{th} query.

Constraints

$2 <= N <= 10^5$
$2 <= R <= 10^9$
$1 <= U <= 10^5$
$1 <= Q <= 10^5$
$1 <= a1,a2,d1,d2 <= 10^8$
$1 <= x, y, i, j, A, B <= N$

Note

For the update operation, x can be equal to y and for the query operation, i can be equal to j.

Sample Input

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

Sample Output

```
1
44
45
9
```

Explanation

The node values after updation becomes :

```
0 8 0 1 0 36 0
```

Answer to Query #1: 1+0 = 1

Answer to Query #2: 8+36+0 = 44

Answer to Query #3: 1+8+36+0 = 45

Answer to Query #4: 0+1+8+0+0 = 9

Submissions:67

Max Score:150

Difficulty: Expert

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Current Buffer (saved locally, editable) Java 7

```
import java.io.*;
import java.util.*;
import java.text.*;
import java.math.*;
import java.util.regex.*;

public class Solution {

    public static void main(String[] args) {
        /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
    }
}
```

Line: 1 Col: 1

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