Chinese Version
Russian Version

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.

The **update query** is of the format

```
i j X
```

This means you'd have to add a GP series to the nodes which lie in the path from node `i` to node `j` (both inclusive) with first term of the GP as `X` on node `i` and the common ratio as `R` (given in the input)

The **retrieval** query is of the format

i j

You need to return the sum of the node values (S) lying in the path from node i to node j modulo 100711433.

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 a b separated by a single space denotes an edge between a, b.
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 3 space separated integers (i,j, and X 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 <= 100000
2 <= R <= 10^9
1 <= U <= 100000
1 <= Q <= 100000
1 <= X <= 10
1 <= a, b, i, j <= N

Sample Input

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

Sample Output

```
31
18
```

Explanation

The node values after the first updation becomes :

```
3 6 0 0 0 12
```

The node values after second updation becomes :

```
3 6 20 10 5 12
```

Answer to Query #1: 12 + 6 + 3 + 10 = 31
Answer to Query #2: 5 + 10 +3 = 18