

# Recalling Early Days GP with Trees



[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  $i^{\text{th}}$  line describes the  $i^{\text{th}}$  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  $i^{\text{th}}$  query.

## Constraints

$2 \leq N \leq 100000$

$2 \leq R \leq 10^9$

$1 \leq U \leq 100000$

$1 \leq Q \leq 100000$

$1 \leq X \leq 10$

$1 \leq a, b, i, j \leq N$

## 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:  $5 + 10 + 3 = 18$