

Easy Addition



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

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

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: $0+1+8+0+0 = 9$