UPDTREE- Updating Edges on Trees

Problem Statement :

You have a tree consisting of **N** vertices numbered **1** to **N**.
Initially each edge has a value equal to zero. You have to first perform **M1** operations and then answer **M2**queries. Note you have to first perform all the operations and then answer all queries after all operations have been done.

Operations are defined by:
A B C D: On the path between nodes numbered **A** and **B** increase the value of each edge by **1**, except for those edges which occur on the path between **C** and **D**. Note that there is an unique path between every pair of nodes ie. we don't consider values on edges for finding the path. All four values given in input will be distinct.

Queries are of the following type:
E F: Print the sum of values of all the edges on the path between two distinct nodes **E** and **F**. Again the path will be unique.

Input

Input description.
First line contains **N**, **M1** and **M2**. Each of the next **N-1** lines contain two integers **u v** denoting an undirected edge between node numbered **u** and **v**. Each of the next **M1** lines contain four integers A_i B_i $C_i$$D_i$, denoting the operations. Each of the next **M2** lines contain two integers E_i F_i denoting the queries.

Output

For each query, print the required answer in one line.

Constraints

- $1 \le N \le 10^5$
- $1 \le M1, M2 \le 5*10^5$
- $1 \le A_i, B_i, C_i, D_i, E_i, F_i \le N$

Example

Input:

5 2 2
1 2
2 4
2 5
1 3
1 4 2 3
3 4 2 5
4 5
4 3

Output:
2
4

Explanation

On first operation, value of edge (2-4) is increased by one. On second operation, value of edges (1-3), (1-2), (2-4) are increased by one.

Warning: Use fast input/output. Large input files.