Problem B
A Tree and Two Edges
Time Limit: 3 Seconds, Memory Limit: 2G

Given a connected simple graph (with at most one edge between any pair of nodes) with n nodes and $n+1$ edges (that's a tree with two extra edges), answer a list of queries: for two distinct nodes, how many simple paths are there between them? A simple path is a path that does not repeat nodes.

Input

The first line of input contains two integers n ($4 \leq n \leq 5 \times 10^4$) and q ($1 \leq q \leq 5 \times 10^4$), where n is the number of nodes and q is the number of queries. The nodes are numbered from 1 to n.

Each of the next $n+1$ lines contains two integers a and b ($1 \leq a < b \leq n$) indicating that there is an edge in the graph between nodes a and b. All edges are distinct.

Each of the next q lines contains two integers u and v ($1 \leq u < v \leq n$). This is a query for the number of simple paths between nodes u and v.

Output

Output q lines. On each line output a single integer, which is the number of simple paths between the query nodes. Output the answers to the queries in the order they appear in the input.

Sample Input 1	Sample Output 1
4 6 1 2 1 3 1 4 2 3 2 4 1 2 1 3 1 4 2 3 2 4 3 4	3 3 3 3 3 4

Sample Input 2	Sample Output 2
6 4 1 2 1 3 1 6 2 3 3 4 3 5 4 5 1 2 1 3 1 4 1 6	2 2 4 1