Chemtech Contagion

Problem ID: chemtechcontagion

Singed has a busy day of experiments in his lab ahead of him. He designed his lab to be a building of N rooms and $N-1$ corridors, such that there exists exactly one simple path between any two rooms. Singed's lab also has M undirected ventilation pipes, where each pipe connects two rooms and allows gas to flow between them.

Singed has a list of Q tasks he will perform to set up his experiments. In each task, he needs to transport a lot of noxious chemicals in between rooms. Each room has a storage cabinet. To transport chemicals from room a to room b, Singed will enter room a, remove the chemicals from the storage cabinet, and then walk through the corridors to room b, before putting the chemicals in room b's storage cabinet. During the transport, the chemicals are not securely stored, so they release toxic gas, which enters any room Singed carries them through. The rooms have doors that prevent gas from spreading through the corridors themselves. However, the gas can still escape through the ventilation pipes. When toxic gas is in a room, the gas will enter any open ventilation pipe connected to the room, and flood the opposing room.

Singed knows exactly which chemicals he needs to transport, and the path he needs to take to get there. But after he transports these chemicals, he must clean every room that may be exposed to the toxic gas. This includes any room he walks through, including his starting and destination rooms. It also includes any room that is connected to a contaminated room by an open ventilation pipe. Singed is trying to figure out how can he minimize the amount of cleaning up he has to do later. Before performing any of the tasks, Singed can close some of the ventilation pipes. What is the minimum number of ventilation pipes Singed must close to ensure that the toxic gas contaminates the smallest possible number of rooms?

Input

The first line of input contains three integers N, M, and Q ($1 \leq N \leq 10^5, 0 \leq M \leq 5 \cdot 10^5, 1 \leq Q \leq 5 \cdot 10^5$), representing the number of rooms, the number of ventilation pipes, and the number of tasks Singed will perform, respectively. The next $N-1$ lines describe the corridors in Singed's lab. Each line contains two integers u and v ($1 \leq u, v \leq N$), describing a corridor between room u and room v. It is guaranteed that the corridors form a tree. The next M lines describe the ventilation pipes in Singed's lab. Each line contains two integers u and v ($1 \leq u, v \leq N, u \neq v$), describing a ventilation pipe between room u and room v. No ventilation pipe connects a room to itself, but there are no additional restrictions on the arrangement of the ventilation pipes. The next Q lines describe the tasks Singed will perform. Each line contains two integers a and b ($1 \leq a, b \leq N, a \neq b$), describing a task where Singed will transport chemicals from room a to room b. Each query should be processed independently of all others.

Output

For each task, output a single integer, representing the number of ventilation pipes Singed must close to minimize the amount of cleaning he has to do later.

Sample Input 1	Sample Output 1
4 1 4 2 3 3 1 1 4 3 4 2 1 3 1 1 4 2 4	1 1 1 0