Effortless

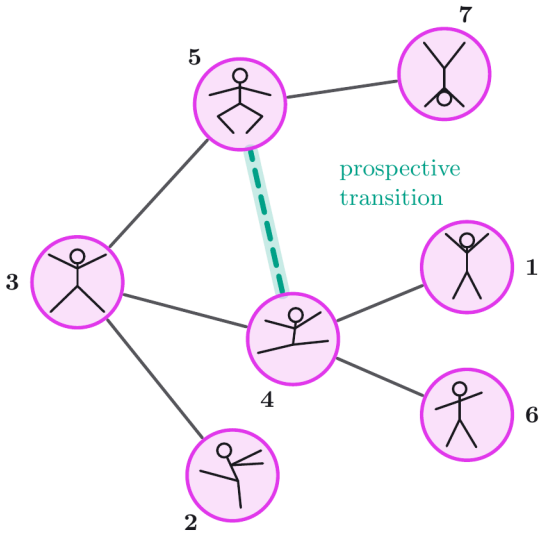
time limit per test: 2 seconds (5 seconds for Python)
memory limit per test: 1 gigabyte
input: standard input
output: standard output

points: 100 · problem code: effortless · author: glipR

Nicole is planning her routine for the rhythmic gymnastics.

Currently, her ability can be described as a collection of poses, and two-way transitions between these poses. She has simplified her skillset so that using the transitions, there is only a single path between any pair of poses. In other words, she can choose any start and end pose, and there is a unique combination of transitions that take her from the starting pose to the ending pose.

Nicole is considering adding a new transition to her skillset, which would now allow her some options when getting from pose A to pose B. It would be interesting to know just how many pairs of poses require less transitions to get between them, if this new transition was added.



adding the transition $4 \leftrightarrow 5$
shortens 6 of the 21 pairs

these 6 pairs of poses get closer

pair	transitions needed
1 – 5	3 → **2**
1 – 7	4 → **3**
4 – 5	2 → **1**
4 – 7	3 → **2**
5 – 6	3 → **2**
6 – 7	4 → **3**

Input

Input will begin with two integers n ($2 \leq n \leq 3 \times 10^5$) and q ($1 \leq q \leq 5000$) - the number of poses in Nicole's skillset, and the number of queries.

$n - 1$ lines will follow, containing 2 distinct integers each, corresponding with the transitions between poses.

q lines will follow, containing 2 distinct integers each, representing a prospective transition. You can be guaranteed this transition is not present in the original skillset.

You can be guaranteed that $n \times q \leq 3 \times 10^6$ for all test cases.

Output

Output q lines containing a single integer per each query - the number of distinct pairs of poses that would require less transitions to get between the two poses, if the prospective transition was included in Nicole's skillset.

A pair of poses is distinct if at least one pose is present in one but not the other - so (a, b) is not distinct from (b, a).

Example 1

Input

```
7 3
4 1
2 3
3 4
5 7
3 5
4 6
1 7
1 6
4 5
```

Output

```
4
1
6
```