E. A and B and Lecture Rooms

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

A and B are preparing themselves for programming contests.

The University where A and B study is a set of rooms connected by corridors. Overall, the University has n rooms connected by $n - 1$ corridors so that you can get from any room to any other one by moving along the corridors. The rooms are numbered from 1 to n.

Every day A and B write contests in some rooms of their university, and after each contest they gather together in the same room and discuss problems. A and B want the distance from the rooms where problems are discussed to the rooms where contests are written to be equal. The distance between two rooms is the number of edges on the shortest path between them.

As they write contests in new rooms every day, they asked you to help them find the number of possible rooms to discuss problems for each of the following m days.

Input

The first line contains integer n ($1 \le n \le 10^5$) — the number of rooms in the University.

The next $n - 1$ lines describe the corridors. The i-th of these lines ($1 \le i \le n - 1$) contains two integers a_i and b_i ($1 \le a_i, b_i \le n$), showing that the i-th corridor connects rooms a_i and b_i.

The next line contains integer m ($1 \le m \le 10^5$) — the number of queries.

Next m lines describe the queries. The j-th of these lines ($1 \le j \le m$) contains two integers x_j and y_j ($1 \le x_j, y_j \le n$) that means that on the j-th day A will write the contest in the room x_j, B will write in the room y_j.

Output

In the i-th ($1 \le i \le m$) line print the number of rooms that are equidistant from the rooms where A and B write contest on the i-th day.

Examples

input
4 1 2 1 3 2 4 1 2 3

output
1

input
4 1 2 2 3 2 4 2

Codeforces Round #294 (Div. 2)

Finished

Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Submit?

Language: GNU G++ 5.1.0

Choose file: Choose File No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

→ Last submissions

Submission	Time	Verdict
23775747	Jan/13/2017 06:54	Wrong answer on test 1

→ Problem tags

binary search | data structures | dfs and similar | dp | trees

No tag edit access

```
1 2
1 3
```

output

```
0
2
```

Note

in the first sample there is only one room at the same distance from rooms number 2 and 3 — room number 1.

→ **Contest materials**

- Announcement
- Tutorial