CODE FORCES
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E. Misha and LCP on Tree

time limit per test: 8 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

Misha has a tree with characters written on the vertices. He can choose two vertices s and t of this tree and write down characters of vertices lying on a path from s to t. We'll say that such string corresponds to pair (s, t).

Misha has m queries of type: you are given 4 vertices a, b, c, d; you need to find the largest common prefix of the strings that correspond to pairs (a, b) and (c, d). Your task is to help him.

Input

The first line contains integer n ($1 \le n \le 300\,000$) — the number of vertices in the tree.

Next follows a line consisting of n small English letters. The i-th character of the string corresponds to the character written on the i-th vertex.

Next n - 1 lines contain information about edges. An edge is defined by a pair of integers u, v ($1 \le u, v \le n, u \ne v$), separated by spaces.

The next line contains integer m ($1 \le m \le 1\,000\,000$) — the number of queries.

Next m lines contain information about queries. A query is defined by four integers a, b, c, d ($1 \le a, b, c, d \le n$), separated by spaces.

Output

For each query print the length of the largest common prefix on a separate line.

Examples

input	Copy
6 bbbabb 2 1 3 2 4 3 5 2 6 5 6 2 5 3 1 1 5 2 3 5 6 5 6 6 3 4 1 6 2 3 4 2 2 4 5	

output	Copy
2 2 2 0 1 0	

→ Codeforces Round #285 (Div. 1)
Finished

→ Practice?

Want to solve the contest problems after the official contest ends? Just register for practice and you will be able to submit solutions.

Register for 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 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

→ Problem tags

binary search   dfs and similar   hashing
string suffix structures   trees   *3000
No tag   edit access

→ Contest materials

- Announcement   ✕
- Tutorial #1 (ru)   ✕
- Tutorial #2 (en)   ✕

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