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Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 256 mebibytes

You are given a tree T consisting of n vertices and $n - 1$ edges. Each edge of the tree is associated with a lowercase English letter c_i .

You are given a string s consisting of lowercase English letters. Your task is to find a simple path in the tree such that the string formed by concatenation of letters associated with edges of this path contains string s as a subsequence, or determine that there exists no such simple path.

Input

The first line of input contains two positive integers n and m ($2 \leq n \leq 5 \cdot 10^5$, $1 \leq m \leq n - 1$), the number of vertices in the tree and the length of the string s .

The following $n - 1$ lines contain triples u_i, v_i, c_i ($1 \leq u_i, v_i \leq n$, $u_i \neq v_i$, c_i is a lowercase English letter), denoting an edge (u_i, v_i) associated with letter c_i .

The last line contains a string s ($|s| = m$) consisting of lowercase English letters.

Output

If the desired path exists, output its endpoints a and b . Otherwise, output “-1 -1”. If there are several possible answers, you are allowed to output any of them.

Example

standard input	standard output
9 3 1 2 a 2 3 b 2 4 a 4 5 b 4 6 c 6 7 d 6 8 a 8 9 b acb	8 3