Problem C

# Continuous Replacement Algorithm

Alice and Bob are planning to have a secret way to communicate within each other, they know it is not a good idea to create their own cryptographic algorithm, but they insist they need to do something new as they do not want anyone to understand what they are saying in their messages if any gets intercepted.

They have come with a simple idea: Alice created a list of pair of words that can be substituted in the message, this is, if the list contains words $u$ and $v$, then the word $u$ can be replaced by $v$, and the word $v$ can be replaced by $u$ in the message. What they will do to communicate is write the message they want to communicate and start replacing the words following the substitution list. If after replacing all the words, the resulting message has words that can be replaced they will repeat the process, they do this making sure that after replacing the words they always get a smaller message. The process will stop once the message can not be smaller replacing any of the words.

Alice and Bob found this is a very difficult process to be done manually, so they have come to you asking for help, given the list of words for substitution and a message to communicate output the message after applying the substitution process.

### Input

The first line of input contains a single integer number $N$ the number of pairs of words in the substitution list ($1 \leq N \leq 10^5$), each of the next $N$ lines contains two words separated by a space $u$ and $v$ ($1 \leq |u|, |v| \leq 15$), representing that the word $u$ in the message can be substituted with the word $v$ or vice versa. The next and last line of input contains the message $m$ to be communicated ($1 \leq |m| \leq 2 \times 10^5$).

### Output

Output a line containing the message after applying Alice and Bob substitution process. In case there are multiple possible messages print the one with the smallest amount of characters, if there are multiple messages with the smallest amount of characters, print the lexicographically smallest.

| Input example 1 | Output example 1 |
|---|---|
| 8 | i c u n u r k |
| sea see | |
| see c | |
| you u | |
| and an | |
| n an | |
| are r | |
| ok k | |
| k z | |
| i sea you and you are ok | |