

Problem F

Encrypt and Decrypt

Time Limit: 1 seconds

Memory Limit: 1024 megabytes

There are many manuscripts in HCMUS that Mr. Do Le wants to encrypt and decrypt. The plaintext is encrypted using a short keyword consisting of lowercase Latin letters. Only Latin letters are replaced during the encryption, all other symbols remain unchanged. The letters are divided into blocks so that all (except for the last one, possibly) have



the same length as the key. If a_1 is the position of the first letter of the plaintext in the alphabet and b_1 is the position of the first letter of the key, then the first letter of the text is replaced with the letter at the position $a_1 + b_1$ of the alphabet (if $a_1 + b_1 > 26$, the letter $a_1 + b_1 - 26$ is used instead). The case of the letters of the plaintext is preserved. The following letters of each block are encrypted in the same manner, using the corresponding letter of the key.

For example, let the plaintext be “crusader” and the key be “bow”. The first letter of the ciphertext is ‘e’ (the position of the first letter of the plaintext is 3 and the position of the first letter of the key is 2, thus the first letter of the ciphertext must be at the position 5 of the alphabet). The second letter of the plaintext is replaced with ‘g’ ($18 + 15 = 33$, $33 - 26 = 7$). Continuing in the same manner, the whole ciphertext turns out to be “egrupagg”. Note that in this case each letter of the plaintext is always represented by the same letter in the ciphertext, but this is a mere coincidence – it does not happen when the distance between the occurrences of a letter in the plaintext is not a multiple of the length of the key!

You are given two fragments of a document: one in the plaintext, the other encrypted using the above system. The lengths of the two fragments are equal and it is known that the first character of the ciphertext is obtained from the first character of the plaintext. It is also known that the number of letters in each fragment is no less than the length of the keyword. It is, however, not known if the fragments start at the beginning of a document!

Based on the given data, derive the shortest possible keyword!

Input

The first line contains N ($1 \leq N \leq 10^6$) – the number of characters in each fragment.

It is followed by the two text fragments, first the plaintext and then the ciphertext. The plaintext and ciphertext always start in a new line, but each of the fragments may be arbitrarily split across several lines. In the example below, the newlines are marked with the character ‘•’ which will not be present in the actual input.

Output

The output contains only one string, which is the keyword. If there are several possible keywords, output the smallest one in the lexicographical order.

Sample Input

Sample Output

8 Crusader• Egrupagg•	bow
41 To be or not t• o be? What is the question!• Yp ru aw oej ft cu?• Mtfu yi fmf gkqxuyez!•	apple