Next Lexicographically Greater Substring

Consider a string **S**, consisting of only lowercase alphabets.

You are given a list of queries, each containing a non-empty string **STR**.

For each query, you have to output:

Among all substrings of S, the next lexicographically greater substring after STR.

Note: If no such substring of S exists which is lexicographically greater than STR, output -1.

Constraints:

1<=|S|<=10^5

1<= Q <=10^5

1<=|STR|<=10^5

summation of |STR| for all Q <=10^5

Input

First line contains the string **S**.

The next line contains **Q**, the number of Queries to answer.

The next Q lines contain **STR** for each query.

Output

Output the answer for each query in a new line.

Example

Input:
dabab
3
ab
abaa
bab
Output:
aba
abab
d

Input:
a
1
a
Output:
-1