

Problem D

Open Sesame!

Time Limit: 1 second
Memory Limit: 512 megabytes

Archaeologists find treasure buried deep in the Atlantic world. However, this treasure is protected by cryptographic layers and each layer corresponds to a number. After years of research, archaeologists have found a string S as well as hints to find the password in a mysterious book.

In particular, the i^{th} cryptographic stage will have a magic number k , the cipher being the result of the function $f(w_k)$ where w_k is the k^{th} alphabetically smallest palindromic substring of S . The function f is $f(p) = \sum_{i=1}^{|p|} (p_i \times a^{l-i}) \bmod m$ where p_i is the ASCII value of the i^{th} character in the string p , $a = 100001$, and $m = 10^9 + 7$.

However, over the years, there will be some blurring places leading to w_k not existing, then the answer is -1 .

Input

The first line contains 2 space-separated integers describing the respective values of N (the length of the string S) and Q (the number of cryptographic layers) ($N, Q \leq 10^5$).

The second line contains a single string denoting S . It is guaranteed that the string S consists of only lowercase English alphabetic letters (*i.e.* 'a' to 'z').

Each of the Q subsequent lines contains a single integer denoting the value of K for a query ($K \leq N \times (N + 1)/2$).

Output

For each layer, print the password if the magic number K in the book is correct. Otherwise, print -1 .

Sample Input

```
5 7
abcba
1
2
3
4
6
7
8
```

Sample Output

```
97
97
696207567
98
29493435
99
-1
```