Character Walk

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

You are given a string $s = s_1 s_2 \ldots s_n$ consisting of lowercase English letters.

For $1 \leq i \leq j \leq n$, let $s_{i,j}$ be the substring of s from position i to j inclusive.

Consider the integer points on the number line: $0, 1, \ldots, n$. From a position x, you may move to another position y if and only if the substring $s_{\min(x,y)+1,\, \max(x,y)}$ is a palindrome.

You are given q queries. In the i-th query, you start at position a_i. For each query, determine the minimum number of moves required to reach either position 0 or position n.

Input

There is only one test case in each test file.

The first line contains the string s ($1 \leq n \leq 10^6$, where n is the length of s).

The second line contains an integer q ($1 \leq q \leq 10^6$).

The third line contains q integers $a_1, a_2, \ldots, a_q$ ($0 \leq a_i \leq n$), the starting positions.

Output

Print q integers in a single line, where the i-th integer is the answer to the i-th query.

Examples

standard input	standard output
abcdce 2 2 3	2 3
daabaddabaaaxy 2 2 9	2 3
aabaaaqwertyuiopsdfghjklzxcvnm 2 4 6	2 2

Note

In the third example, one possible way to move to position 0 (for both queries) is as follows.

- In the first move, we move to position 5 from either position 4 or 6.
- Then, we move to position 0 from position 5.