

Range Periodicity Query

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 1024 megabytes

For a string $w = w_1w_2 \dots w_{len}$, we say that an integer p is a period of w if $w_i = w_{i+p}$ holds for all i ($1 \leq i \leq len - p$) and $1 \leq p \leq len$.

You will be given a string $d = d_1d_2 \dots d_n$ to generate $n + 1$ strings $S_0, S_1, S_2, \dots, S_n$, where S_0 is an empty string, and for all i ($1 \leq i \leq n$):

- When d_i is a lowercase English letter, $S_i = d_i + S_{i-1}$.
- When d_i is an uppercase English letter, assume its lowercase version is c_i , then $S_i = S_{i-1} + c_i$.

Here, “+” denotes concatenation of strings.

You will then be given a sequence of integers p_1, p_2, \dots, p_m . You need to answer q queries, in each query, you will be given three integers k, l and r . You need to find the minimum number among $p_l, p_{l+1}, \dots, p_{r-1}, p_r$ such that it is a period of string S_k , or determine there is no answer.

Input

The first line contains a single integer n ($1 \leq n \leq 500\,000$) denoting the number of non-empty strings.

The second line contains a string d of length n consists of lowercase and uppercase English letters.

The third line contains a single integer m ($1 \leq m \leq 500\,000$) denoting the length of the sequence p .

The fourth line contains m integers p_1, p_2, \dots, p_m ($1 \leq p_i \leq n$).

The fifth line contains a single integer q ($1 \leq q \leq 500\,000$) denoting the number of queries.

Each of the next q lines contains three integers k, l and r ($1 \leq k \leq n, 1 \leq l \leq r \leq m$), denoting a query.

Output

For each query, print a single line containing an integer denoting the answer. Note that when there is no answer, please print “-1” instead.

Example

standard input	standard output
7	1
AABAAbA	1
9	2
4 3 2 1 7 5 3 6 1	-1
6	3
1 4 4	6
2 1 4	
2 1 3	
3 3 5	
5 4 7	
7 8 9	