Problem H. Range Periodicity Query

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

For a string $w = w_1 w_2 \dots w_{len}$, we say that an integer p is a period of w if $w_i = w_{i+p}$ holds for all i $(1 \le i \le len - p)$ and $1 \le p \le len$.

You will be given a string $d = d_1 d_2 \dots d_n$ 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 $(1 \le i \le n)$:

- 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 $(1 \le n \le 500\,000)$ 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 $(1 \le m \le 500\,000)$ denoting the length of the sequence p.

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

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

Each of the next q lines contains three integers k, l and r $(1 \le k \le n,\ 1 \le l \le r \le m)$, 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 AABAAba 9 4 3 2 1 7 5 3 6 1 6 1 4 4 2 1 4 2 1 3 3 3 5 5 4 7 7 8 9	1 1 2 -1 3 6