Caesar's Palindrome

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1.5 seconds
Memory limit:	256 megabytes

Percy, a shark in the world of programming, became interested in ciphers. Recently, he read an article about the Caesar cipher, where all letters are cyclically shifted backward by a fixed step d. For example, with $d = 1$, the letter "b" becomes "a", and the letter "a" becomes "z". If the alphabet consists of the first k letters (for example, $k = 26$ for the Latin alphabet), the shift occurs within these k symbols. For instance, with $k = 4$, the alphabet consists of the characters `a`, `b`, `c`, `d`. In this case:

- With $d = 1$: `b` $\to$ `a`, `a` $\to$ `d`.
- With $d = 2$: `c` $\to$ `a`, `a` $\to$ `c`.

At this time, Spotty gifted Percy a string s consisting of lowercase Latin letters. Percy became curious: if within the segment $[l, r]$ he chooses any substring and shifts all characters in it by step d (as in the Caesar cipher), what is the maximum length of a palindrome substring that can be obtained in the entire string? The step d is chosen by Percy himself. Spotty has q such questions, and an answer is required for each of them.

A palindrome is a string that reads the same forwards and backwards. For example, the strings `abacaba`, `aaaa`, `abba`, `racecar` are palindromes.

Input

Each test consists of several sets of input data. The first line contains a single integer t ($1 \le t \le 10^5$), the number of input data sets. The description of the input data sets follows.

The first line of each input data set contains the string s ($1 \le |s| \le 10^5$) — the string gifted to Percy.

The second line of each input data set contains an integer k ($1 \le k \le 26$) — the size of the alphabet. It is guaranteed that the string s consists only of the first k letters of the Latin alphabet.

The third line of each input data set contains an integer q ($1 \le q \le 10^5$) — the number of queries.

In the next q lines of each input data set, there are two integers l and r ($1 \le l \le r \le |s|$) describing the segment.

It is guaranteed that the sum of $|s|$ and the sum of q across all input data sets does not exceed 10^5.

Output

For each query, output the length of the longest palindrome.

Scoring

Subtask	Points	Additional Constraints					Required Subgroups
		$\lvert s\rvert$	q	$\sum \lvert s\rvert$	$\sum q$	l and r	
1	5	$\lvert s\rvert \le 10$	$q \le 10$	$\sum \lvert s\rvert \le 30$	$\sum q \le 30$	–	–
2	8	$\lvert s\rvert \le 50$	$q \le 50$	$\sum \lvert s\rvert \le 100$	$\sum q \le 100$	–	1
3	13	$\lvert s\rvert \le 100$	$q \le 100$	$\sum \lvert s\rvert \le 200$	$\sum q \le 200$	–	1, 2
4	23	$\lvert s\rvert \le 10^3$	$q \le 10^3$	–	–	–	1–3
5	16	–	–	$\sum \lvert s\rvert \le 10^4$	–	$l = r$	–
6	35	–	–	–	–	–	1–5

Example

standard input	standard output
1 abbccacccc 3 10 6 8 7 10 1 5 3 10 5 6 1 5 3 10 5 9 4 7 3 7	7 9 9 9 7 9 9 7 7 7