Problem A. Prefix-free Queries

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	256 mebibytes

Let $C(s_1, s_2, \ldots, s_k)$ be the number of ways to construct a prefix-free set from the multiset of strings $s_1, s_2, \ldots, s_k$. A prefix-free set is a set of distinct strings in which there are no two strings such that one of these strings is a prefix of another one. In particular, an empty set is a valid prefix-free set. For example, if for any $i \neq j$, s_i is not a prefix of s_j, then $C(s_1, \ldots, s_k) = 2^k$.

Note that we count not the sets themselves, but the ways to construct such sets: the number of ways to choose a subset of indices out of $\{1, 2, \ldots, k\}$ such that the strings with these indices form a prefix-free set. For example, $C(\text{“}\texttt{aa}\text{”},\text{“}\texttt{aa}\text{”},\text{“}\texttt{a}\text{”},\text{“}\texttt{a}\text{”}) = 5$: the five ways are to construct an empty set, a set containing the first string, a set containing the second string, a set containing the third string, and a set containing the fourth string.

You are given a string s consisting of n lowercase English letters, and q queries. Let $s[l, r]$ be the substring $s_l s_{l+1} \ldots s_{r-1} s_r$. For each query denoted as “$k\ m\ l_1\ r_1\ l_2\ r_2\ \ldots\ l_k\ r_k$”, print one integer: the value $C(s[l_1, r_1], s[l_2, r_2], \ldots, s[l_k, r_k])$, taken modulo m.

Input

The first line contains two integers: n, the length of s, and q, the number of queries to answer ($1 \le n \le 4 \cdot 10^5$, $1 \le q \le 4 \cdot 10^5$).

The second line contains a string s of length n consisting of lowercase English letters.

Next q lines contain queries, one query per line. Each query has the form “$k\ m\ l_1\ r_1\ l_2\ r_2\ \ldots\ l_k\ r_k$” ($1 \le k \le 4 \cdot 10^5$, $2 \le m \le 10^9$, $1 \le l_j \le r_j \le n$).

The total sum of all k over all queries does not exceed $4 \cdot 10^5$.

Output

For each query, print a line containing a single integer: the value $C(s[l_1, r_1], s[l_2, r_2], \ldots, s[l_k, r_k])$, taken modulo m.

Example

standard input	standard output
10 6 aabbaacaba 4 30 1 2 5 6 10 10 10 10 5 20 1 2 3 4 5 6 7 8 9 10 1 2 1 10 3 20 9 9 7 7 8 8 5 20 6 6 7 7 8 8 9 9 10 10 4 20 1 1 2 2 3 3 4 4	5 4 0 8 16 9