

## Problem J. Square Substrings

Input file: *standard input*  
Output file: *standard output*  
Time limit: 8 seconds  
Memory limit: 512 mebibytes

Bob has a string  $s_1 s_2 \dots s_n$  and  $q$  queries  $(l_i, r_i)$  ( $i = 1, 2, \dots, q$ ). For each query  $(l_i, r_i)$ , he would like to know the number of intervals  $(L, R)$  such that  $l_i \leq L \leq R \leq r_i$  and  $s_L s_{L+1} \dots s_R$  is a square. Could you please help him?

A string  $t_1 t_2 \dots t_m$  is a square if and only if:

- $m$  is even;
- $t_i = t_{i+\frac{m}{2}}$  for  $i = 1, 2, \dots, \frac{m}{2}$ .

### Input

The input contains several test cases. The first line contains an integer  $T$  indicating the number of test cases. The following describes all test cases. For each test case:

The first line contains two integers  $n$  and  $q$ .

The second line contains a string of  $n$  lowercase letters,  $s_1 s_2 \dots s_n$ .

The  $i$ -th one of the following  $q$  lines contains two integers  $l_i$  and  $r_i$ , representing a query.

- $1 \leq T \leq 100$
- $1 \leq n, q \leq 10^6$
- $1 \leq l_i \leq r_i \leq n$
- The sum of  $n$  in all test cases does not exceed  $10^6$ .
- The sum of  $q$  in all test cases does not exceed  $10^6$ .

### Output

For each test case, firstly output a line containing "Case #x:" (without quotes), where  $x$  is the test case number starting from 1.

Then, for each query, output a line containing an integer, denoting the answer to this query.

### Example

standard input	standard output
1	Case #1:
7 5	1
ababbab	1
1 4	1
2 5	1
3 6	3
4 7	
1 7	

### Note

bb, abab and babbab are squares, while abba is not a square.