Kick Start 2022 - Coding Practice with Kick Start Session #2

Building Palindromes

Problem

Download the Starter Code!

Anna has a row of $\mathbf{N}$ blocks, each with exactly one letter from `A` to `Z` written on it. The blocks are numbered $1, 2, \cdots, \mathbf{N}$ from left to right.

Today, she is learning about palindromes. A palindrome is a string that is the same written forwards and backwards. For example, `ANNA`, `RACECAR`, `AAA` and `X` are all palindromes, while `AB`, `FROG` and `YOYO` are not.

Bob wants to test how well Anna understands palindromes, and will ask her $\mathbf{Q}$ questions. The i-th question is: can Anna form a palindrome using all of the blocks numbered from L_i to R_i, inclusive? She may rearrange the blocks if necessary. After each question, Anna puts the blocks back in their original positions.

Please help Anna by finding out how many of Bob's questions she can answer "yes" to.

Input

The first line of the input gives the number of test cases, $\mathbf{T}$. $\mathbf{T}$ test cases follow. Each test case starts with a line containing the two integers $\mathbf{N}$ and $\mathbf{Q}$, the number of blocks and the number of questions, respectively. Then, another line follows, containing a string of $\mathbf{N}$ uppercase characters (`A` to `Z`). Then, $\mathbf{Q}$ lines follow. The i-th line contains the two integers L_i and R_i, describing the i-th question.

Output

For each test case, output one line containing `Case #`x`:` y, where x is the test case number (starting from 1) and y is the number of questions Anna can answer "yes" to.

Limits

Time limit: 30 seconds.
Memory limit: 1 GB.
$1 \leq \mathbf{T} \leq 100$.
$1 \leq L_i \leq R_i \leq \mathbf{N}$.

Test Set 1

$1 \leq \mathbf{N} \leq 20$.
$1 \leq \mathbf{Q} \leq 20$.

Test Set 2

$1 \leq \mathbf{N} \leq 100000$.
$1 \leq \mathbf{Q} \leq 100000$.

Sample

Sample Input

```
2
7 5
ABAACCA
3 6
4 4
2 5
6 7
3 7
3 5
XYZ
1 3
1 3
1 3
1 3
1 3
```

Sample Output

```
Case #1: 3
Case #2: 0
```

In Sample Case #1, $\mathbf{N}$ = 7 and $\mathbf{Q}$ = 5.

- For the first question, Anna must use the blocks `AACC`. She can rearrange these blocks into the palindrome `ACCA` (or `CAAC`).
- For the second question, Anna must use the blocks `A`. This is already a palindrome, so she does not need to rearrange them.
- For the third question, Anna must use the blocks `BAAC`. These blocks cannot be rearranged into a palindrome.
- For the fourth question, Anna must use the blocks `CA`. These blocks cannot be rearranged into a palindrome.
- For the fifth question, Anna must use the blocks `AACCA`. She can rearrange these blocks to form the palindrome `ACACA` (or `CAAAC`).

In total, she is able to answer "yes" to 3 of Bob's questions, so the answer is 3.

In Sample Case #2, $\mathbf{N}$ = 3 and $\mathbf{Q}$ = 5. For the first question, Anna must use the blocks `XYZ` to create a palindrome. This is impossible, and since the rest of Bob's questions are the same as the first one, the answer is 0.