Problem G
Lexicographic Raffle

Time limit: 2 seconds
Memory limit: 1 GB

Problem Description

You have a string S of length N consisting of lower-case English characters.
The process `raffle`(L, R) for $1 \leq L < R \leq N$ is defined as follows:

- **Step 1**: Let X be the substring $S_L S_{L+1} \ldots S_{R-1}$ and Y be the substring $S_{L+1} S_{L+2} \ldots S_R$.
- **Step 2**: If Y is **lexicographically smaller**[†] than X, increment L by 1. Otherwise, decrement R by 1.
- **Step 3**: If $L = R$, terminate the process and return L as the result of the process; otherwise, go back to Step 1.

You are given Q queries, each of which contains two integers L and R ($1 \leq L < R \leq N$). For each query, find the final value of L in the process `raffle`(L, R) defined as above.

Input Format

- The first line of input will contain a single integer T, denoting the number of test cases.
- Each test case consists of multiple lines of input:
  - The first line of each test case contains N and Q - the length of the string and the number of queries.
  - The second line of each test case contains S - a string of size N.
  - The next Q lines each contain 2 integers L and R - representing a query.

Output Format

For each test case, for each query, output on a new line the final value of L after the process `raffle`(L, R).

Constraints

- $1 \leq T \leq 10^4$
- $2 \leq N \leq 2 \cdot 10^5$
- $1 \leq Q \leq 2 \cdot 10^5$
- $|S| = N$
- S contains only lower-case English characters.
- $1 \leq L < R \leq N$
- The sum of N and the sum of Q over all test cases both do not exceed $2 \cdot 10^5$.

Samples

Sample Input 1

```
4
6 3
kanpur
1 6
4 6
5 6
10 2
adccbabbab
1 10
2 9
5 3
accaa
1 5
2 4
3 5
5 1
jddda
3 4
```

Sample Output 1

```
2
4
6
1
6
1
4
4
3
```

Sample Explanation

Test Case 1: Here are the explanations for the first query:

- **Query 1**:
  - Initially, $L = 1, R = 6$; $X =$ `kanpu`, $Y =$ `anpur`. Since Y is lexicographically smaller, we increment L to 2. The process does not terminate here since $L \neq R$.
  - Now, $L = 2, R = 6$; $X =$ `anpu`, $Y =$ `npur`. Since Y is **not** lexicographically smaller, we decrement R to 5. The process does not terminate here since $L \neq R$.
  - Now, $L = 2, R = 5$; $X =$ `anp`, $Y =$ `npu`. Since Y is **not** lexicographically smaller, we decrement R to 4. The process does not terminate here since $L \neq R$.
  - Now, $L = 2, R = 4$; $X =$ `an`, $Y =$ `np`. Since Y is **not** lexicographically smaller, we decrement R to 3. The process does not terminate here since $L \neq R$.
  - Now, $L = 2, R = 3$; $X =$ `a`, $Y =$ `n`. Since Y is **not** lexicographically smaller, we decrement R to 2. The process terminates here as $L = R$.

Therefore, the final values are $L = R = 2$. Hence, the answer is 2.