

## Task 5: Sandwich

Weighted for both Div 1 and Div 2

There is an array  $A$  of length  $N$ .

Define a pair  $(l, r)$  as a sandwich if  $\max(A_{l+1}, A_{l+2}, \dots, A_{r-1}) \leq \min(A_l, A_r)$ . In particular, if  $r - l \leq 1$ , the pair is considered a sandwich as well.

Given  $Q$  queries, where the  $i$ -th query is described by  $X_i$  and  $Y_i$ , find number of pairs  $(l, r)$  such that  $X_i \leq l \leq r \leq Y_i$  and it is a sandwich.

Since the input may be quite large, a fast IO template is provided in the attachments.

### Input Format

The first line of input contains two integers  $N$  and  $Q$ .

The second line of input contains  $N$  integers  $A_1, A_2, \dots, A_N$ .

The following  $Q$  lines of input contain two integers each, where the  $i$ -th line contains  $X_i$  and  $Y_i$ .

### Output Format

Output  $Q$  lines containing a single integer each, where the  $i$ -th line is the answer to the  $i$ -th query.

### Constraints

- $1 \leq N, Q \leq 2500000$
- $1 \leq A_i \leq N$
- $1 \leq X_i \leq Y_i \leq N$

### Subtasks

1. (4 points)  $A_i \leq 2, N \leq 1000000$
2. (9 points)  $A_i \leq 10, N \leq 1000000$
3. (7 points)  $A$  is pairwise distinct,  $N \leq 1000000$
4. (13 points)  $N \leq 1000000, Q = 1, X_1 = 1, Y_1 = N$
5. (12 points)  $N, Q \leq 40000$
6. (5 points)  $N, Q \leq 200000$
7. (22 points)  $N, Q \leq 500000$
8. (3 points)  $N, Q \leq 1000000$
9. (25 points) No additional constraints.

### Sample Input 1

```
4 10
3 1 2 2
1 1
1 2
1 3
1 4
2 2
2 3
2 4
3 3
3 4
4 4
```

### Sample Output 1

```
1
3
6
9
1
3
5
1
3
1
```

### Sample Explanation

All pairs  $(i, j)$  such that  $1 \leq i \leq j \leq 4$  are valid sandwiches except for  $(2, 4)$ .

$(2, 4)$  is not a valid sandwich since  $\max(2) \not\leq \min(1, 2)$ .