16/11/2017 HackerRank

















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Sum of the Maximums





Problem

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Editorial A

Alexey is playing with an array, A, of n integers. His friend, Ivan, asks him to calculate the sum of the maximum values for all subsegments of A. More formally, he wants Alexey to find $F(A) = \sum_{l=1}^{n} \sum_{r=l}^{n} \max_{l < x < r} A[x]$.

Alexey solved Ivan's challenge faster than expected, so Ivan decides to add another layer of difficulty by having Alexey answer m gueries. The ith guery contains subsegment $[L_i,R_i]$, and he must calculate the sum of maximum values on all subsegments inside subsegment $[L_i,R_i]$.

More formally, for each query i, Alexey must calculate the following function:

$$F(A, L_i, R_i) = \sum\limits_{l=L_i}^{R_i} \sum\limits_{r=l}^{R_i} \max\limits_{l \leq x \leq r} A[x].$$

Can you help Alexey solve this problem?

Input Format

The first line contains $m{2}$ space-separated positive integers, $m{n}$ (the length of array $m{A}$) and $m{m}$ (number of queries), respectively. The second line contains n space-separated integers, a_0,a_1,\ldots,a_{n-1} describing each element a_j (where $0\leq j < n$) in array A. Each of the m subsequent lines contains 2 space-separated positive integers describing the respective values for L_i and R_i in query i (where $0 \leq i < m$).

Constraints

- $1 \le n, m \le 135000$
- $-10^9 \le a_i \le 10^9$
- $1 \le L_i \le R_i \le n$

Output Format

For each query i (where $0 \le i < m$), print its answer on a new line.

Sample Input

- 2 3
- 3 3

Sample Output

- 1

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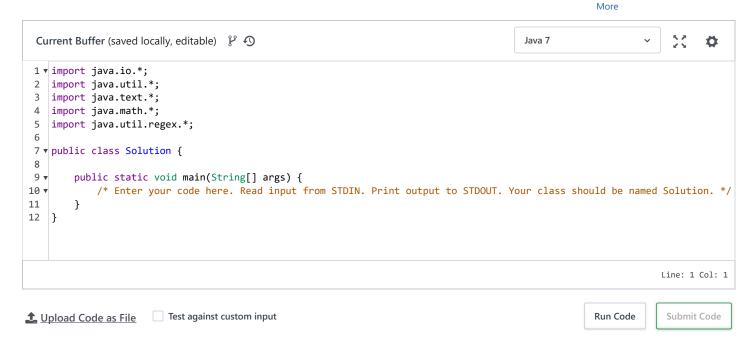
3 8 2

Explanation

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The answer for the second query is shown below: F(A,1,2) = \max_{1 \leq x \leq 1} A[x] + \max_{1 \leq x \leq 2} A[x] + \max_{2 \leq x \leq 2} A[x] = 1 + 3 + 3 = 7
```

The answer for the third query is shown below: $F(A,1,3) = \max_{1 \le x \le 1} A[x] + \max_{1 \le x \le 2} A[x] + \max_{1 \le x \le 3} A[x] + \max_{2 \le x \le 2} A[x] + \max_{2 \le x \le 3} A[x] + \max_{3 \le x \le 3} A[x] = 1 + 3 + 3 + 3 + 3 + 2 = 15$

f in Submissions:<u>122</u> Max Score:90 Difficulty: Advanced Rate This Challenge: ☆ ☆ ☆ ☆ ☆



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