



Sum of the Maximums

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Problem

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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 $F(A) = \sum_{l=1}^n \sum_{r=l}^n \max_{l \leq x \leq r} A[x]$.

Alexey solved Ivan's challenge faster than expected, so Ivan decides to add another layer of difficulty by having Alexey answer m queries. The i^{th} query 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:

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

Can you help Alexey solve this problem?

Input Format

The first line contains 2 space-separated positive integers, n (the length of array A) and m (number of queries), respectively.

The second line contains n space-separated integers, a_0, a_1, \dots, 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

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

Output Format

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

Sample Input

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

Sample Output

```
1
7
15
```

3
8
2

Explanation

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: $F(A, 1, 3) = \max_{1 \leq x \leq 1} A[x] + \max_{1 \leq x \leq 2} A[x] + \max_{1 \leq x \leq 3} A[x] + \max_{2 \leq x \leq 2} A[x] + \max_{2 \leq x \leq 3} A[x] + \max_{3 \leq x \leq 3} A[x]$
 $= 1 + 3 + 3 + 3 + 3 + 2 = 15$


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Max Score: 90

Difficulty: Advanced

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Java 7



```
1 import java.io.*;
2 import java.util.*;
3 import java.text.*;
4 import java.math.*;
5 import java.util.regex.*;
6
7 public class Solution {
8
9     public static void main(String[] args) {
10         /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
11     }
12 }
```

Line: 1 Col: 1

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