Sum of the Maximums

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

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

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:

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

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, $a_0, a_1, \ldots, a_{n-1}$ describing each element a_j (where $0 \le j < n$) 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 $0 \le i < m$).

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

```
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: $F(A,1,2) = \max_{1 \le x \le 1} A[x] + \max_{1 \le x \le 2} A[x] + \max_{2 \le x \le 2} A[x]$
$= 1 + 3 + 3 = 7$

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