

Problem C. Score Queries

Input file: standard input
Output file: standard output
Time limit: 5 seconds
Memory limit: 1024 megabytes

Let B be an array of length M . The **score** of B is the number of indices i ($2 \leq i \leq M - 1$) such that there exist indices x and y satisfying $1 \leq x < i < y \leq M$ and

$$2 \cdot B_i > B_x + B_y$$

You are given an array A of length N .

You need to answer Q queries.

For each query $L R$ ($1 \leq L < R \leq N$, $R - L + 1 \geq 3$), find

$$\sum_{i=L}^{R-2} \sum_{j=i+2}^R \text{score}(A_i, A_{i+1}, \dots, A_j)$$

In other words, find the sum of scores over all subarrays of length at least 3 fully contained inside A_L, A_{L+1}, \dots, A_R .

Input

The input is given in the following format:

T
$N Q$
$A_1 A_2 \dots A_N$
$L_1 R_1$
\vdots
$L_Q R_Q$
\vdots

- All input values are integers.
- $1 \leq T \leq 10^4$
- $3 \leq N \leq 5 \times 10^5$
- $1 \leq Q \leq 5 \times 10^5$
- $1 \leq A_i \leq N$
- $1 \leq L < R \leq N$ and $R - L + 1 \geq 3$.
- It is guaranteed that the sum of N over all test cases does not exceed 5×10^5 .
- It is guaranteed that the sum of Q over all test cases does not exceed 5×10^5 .

Output

For each query, output one integer: the sum of scores over all subarrays of length at least 3 fully contained inside A_L, A_{L+1}, \dots, A_R .

Examples

standard input	standard output
1	6
5 4	2
2 5 1 3 4	2
1 5	1
2 5	
1 4	
3 5	

Note

Test case 1: For query $[1, 5]$, the subarrays of length at least 3 are:

- $[2, 5, 1]$, score = 1,
- $[5, 1, 3]$, score = 0,
- $[1, 3, 4]$, score = 1,
- $[2, 5, 1, 3]$, score = 1,
- $[5, 1, 3, 4]$, score = 1,
- $[2, 5, 1, 3, 4]$, score = 2.

So, the answer is 6.