Problem J. Jewel Sorting

Input file:	*standard input*
Output file:	*standard output*
Time limit:	10 seconds
Memory limit:	1024 mebibytes

Jill has some jewels, and she wants to sort them in non-decreasing order based on size. She uses a unique method to sort the jewels, described below:

Given n jewels, Jill performs a total of $n-1$ steps to sort them. For each step k from 1 to $n-1$:

- She compares the first jewel with the second jewel. If the second jewel is smaller, she swaps their positions.
- She then compares the second jewel with the third jewel. If the third jewel is smaller, she swaps their positions.
- She continues this process until she compares the $(n-k)$-th jewel with the $(n-k+1)$-st jewel, and swaps their positions if the $(n-k+1)$-st jewel is smaller.

Jill's friend Jessie quickly realizes that this is the famous bubble sorting algorithm. To illustrate the inefficiency of this algorithm to Jill, Jessie decides to ask Jill q questions. A question is represented by a tuple $[s, e, m, l, r]$. For a given sequence of n jewels, each question $[s, e, m, l, r]$ asks for the sum of the sizes of jewels from position l to r of the (partially) sorted subsequence after applying the first m steps of Jill's method to the subsequence of jewels from position s to e of the initial sequence.

For instance, consider four ($n = 4$) jewels with sizes $(1, 3, 4, 2)$ and two ($q = 2$) questions: $[2, 4, 1, 2, 2]$ and $[1, 4, 2, 3, 4]$.

For the first question, the subsequence of the sizes from the second ($s = 2$) jewel to the fourth ($e = 4$) jewel is $(3, 4, 2)$. After applying one step ($m = 1$) of Jill's method, it becomes $(3, 2, 4)$. The sum of the sizes of jewels from the second position ($l = 2$) to the second position ($r = 2$) in this (partially) sorted subsequence is 2.

For the second question, the subsequence is $(1, 3, 4, 2)$. After applying two steps, it becomes $(1, 2, 3, 4)$. The sum of the sizes of jewels from position 3 to position 4 in this (partially) sorted sequence is $3+4 = 7$.

Given a sequence of n jewels and q questions, write a program that computes the answer for each question.

Input

The input starts with a line containing two integers, n and q ($2 \le n \le 1\,000\,000$, $1 \le q \le 500\,000$), where n represents the number of jewels and q represents the number of questions.

The second line contains n integers, separated by spaces, representing the sizes of the jewels in their initial order. Each size is between 1 and 10^9, both inclusive.

Each of the next q lines contains five positive integers s, e, m, l, r of query $[s, e, m, l, r]$, separated by spaces, representing a question, where $1 \le s < e \le n$, $1 \le m \le e - s$, and $1 \le l \le r \le e - s + 1$.

Output

For each of the q questions, output one line with the answer. The answer for a question $[s, e, m, l, r]$ is the sum of the sizes of jewels from position l to r of the partially sorted subsequence after applying the first m steps of Jill's method to the subsequence of jewels from position s to e of the input sequence.

Examples

standard input	standard output
4 2 1 3 4 2 2 4 1 2 2 1 4 2 3 4	2 7
5 3 4 2 5 1 3 1 5 1 3 3 1 3 1 3 3 2 4 2 1 2	1 5 3
6 2 5 4 5 1 1 4 3 6 1 1 3 1 6 1 1 4	6 11