Triple Jump

There is a very long straight road, which consists of N sections numbered from 1 through N. Each section has specific firmness, and the firmness of the section i ($1 \leq i \leq N$) is A_i.

JOI-kun, the gifted sport star, is going to play triple jump. A triple jump consists of three consecutive jumps. Let a, b, c be the numbers of sections at which JOI-kun takes off, then the following conditions should be met.

- $a < b < c$. Namely, the numbers of the sections should be increasing.
- $b - a \leq c - b$. Namely, the jumping distance of the first jump should be less than or equal to the jumping distance of the second jump.

JOI-kun is going to perform Q triple jumps. In the j-th ($1 \leq j \leq Q$) triple jump, he should take off at sections whose numbers are in the range of L_j to R_j. In other words, $L_j \leq a < b < c \leq R_j$ must be hold.

JOI-kun wants to take off at firmer sections. For each triple jump, JOI-kun is curious to know the maximum sum of firmness of the sections at which JOI-kun takes off.

Write a program that, given the number of sections and the information of triple jumps, calculates for each triple jump the maximum sum of firmness of the sections at which JOI-kun takes off.

Inputs

Read the following data from the standard input. All the values in the input are integers.

N
$A_1\ A_2\ \cdots\ A_N$
Q
$L_1\ R_1$
$L_2\ R_2$
$\vdots$
$L_Q\ R_Q$

Outputs

Write Q lines to the standard output. The j-th ($1 \leq j \leq Q$) line should contain the maximum sum of firmness of the sections at which JOI-kun takes off in the j-th triple jump.

Constraints

- $3 \leq N \leq 500\,000$.
- $1 \leq A_i \leq 100\,000\,000$ $(1 \leq i \leq N)$.
- $1 \leq Q \leq 500\,000$.
- $1 \leq L_j < L_j + 2 \leq R_j \leq N$ $(1 \leq j \leq Q)$.

Subtasks

1. (5 points) $N \leq 100$, $Q \leq 100$.
2. (14 points) $N \leq 5\,000$.
3. (27 points) $N \leq 200\,000$, $Q = 1$, $L_1 = 1$, $R_1 = N$.
4. (54 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
5 5 2 1 5 3 3 1 4 2 5 1 5	12 9 12

In the first jump, JOI-kun can achieve the maximum sum of 12 by taking off at the sections 1, 2 and 4.

In the second jump, JOI-kun can achieve the maximum sum of 9 by taking off at the sections 3, 4 and 5. If he takes off at the sections 2, 4 and 5, the sum of firmness is 10, but $b - a \leq c - b$ is not satisfied.

In the third jump, JOI-kun can achieve the maximum sum of 12 by taking off at the sections 1, 2 and 4. If he takes off at the sections 1, 4 and 5, the sum of firmness is 13, but $b - a \leq c - b$ is not satisfied.

Sample Input 2	Sample Output 2
5 5 4 4 5 4 1 1 5	14

This sample input satisfies the constraints for Subtask 3.

Sample Input 3	Sample Output 3
15 12 96 100 61 54 66 37 34 58 21 21 1 13 50 81 12 1 15 3 12 11 14 1 13 5 9 4 6 6 14 2 5 4 15 1 7 1 10 8 13	277 227 72 262 178 181 174 257 208 262 262 113