JOI '19 Open P1 - Triple Jump

Time limit: 2.0s   **Memory limit:** 512M

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 $(1 \le i \le N)$ is A_i.

JOI-kun, the gifted sports 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.
- $b - a \le c - b$. 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 $(1 \le j \le Q)$ triple jump, he should take off at sections whose numbers are in the range of L_j to R_j. In other words, $L_j \le a < b < c \le R_j$ must be held.

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.

Input Specification

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

N

$A_1 \ A_2 \ldots A_N$

Q

$L_1 \ R_1$

$L_2 \ R_2$

$\vdots$

$L_Q \ R_Q$

Output Specification

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

Constraints

- $3 < N < 500\,000$.

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

Subtasks

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

Sample Input 1

```
5
5 2 1 5 3
3
1 4
2 5
1 5
```

Sample Output 1

```
12
9
12
```

Explanation for Sample 1

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 $b - a \le c - b$ 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 $b - a \le c - b$ is not satisfied.

Sample Input 2

```
5
5 4 4 5 4
1
1 5
```

Sample Output 2

```
14
```

Explanation for Sample 2

This sample input satisfies the constraints for Subtask 3.

Sample Input 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
```

Sample Output 3

277
227
72
262
178
181
174
257
208
262
262
113