

Young Luka is about to enter a house with the evil witch Marica inside. As soon as he enters the house, she asks him questions about her array of N numbers. Luka fearfully asks for a clarification of the questions. Marica explains to him that each query consists of two integers L and R which represent the positions of a contiguous sub-array in her array.

It is Luka's task to answer for each query what the longest **contiguous** sub-array of that contiguous sub-array (it can be the entire sub-array) having the property of being magical. An array is called magical if all the values are between the values of the first and last number in that array. For example, [1 3 1 2 4] is magical, the same as [4 1 1 2 1], whereas [3 3 4 1] is not magical.

INPUT

The first line of input contains the integer N ($1 \leq N \leq 500\,000$), the number of numbers in the array. The second line contains N integers a_i ($1 \leq a_i \leq 10^9$).

The third line contains the integer Q ($1 \leq Q \leq 500\,000$), the number of queries.

Each of the following Q lines contains two integers, L and R ($1 \leq L \leq R \leq N$), representing the sub-array from the query.

OUTPUT

The i^{th} line of output must contain a single integer – the answer to the i^{th} query.

SCORING

In test cases worth 50% of total points, it will hold $N, Q \leq 30\,000$.

SAMPLE TESTS

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