

Dinosaur Bones Digging

Input file: *standard input*
Output file: *standard output*
Time limit: 4 seconds
Memory limit: 512 mebibytes

Paleontologists are looking for dinosaur bones! They have already found a long line of n square sectors, and numbered them by integers from 1 to n . Each square has a side of 1 meter. Preliminary measurements showed that, in sector i , the depth of the soil potentially containing dinosaur bones is a_i meters. Below that depth lies solid bedrock. All the numbers a_i turned out to be different integers.

Scientists have prepared q different plans for their research. Each plan includes the construction of a research station on a subsegment of sectors numbered from ℓ_j to r_j . After picking a subsegment, they will pick one of its sectors m ($\ell_j \leq m \leq r_j$) as the main sector.

A special device will be buried in the main sector at the depth of a_m meters. This device allows the researchers to analyze the top a_m meters of all the sectors under the research station that have depth **strictly greater** than a_m . In total, $a_m \cdot k$ cubic meters of soil will be analyzed, where k is the number of sectors under the station (that is, between ℓ_j and r_j , inclusive) which are deeper than the main sector.

Paleontologists want to find as much dinosaur bones as possible, so they want to analyze as much soil as possible. Help them! Find the maximum volume of soil which can be analyzed if a subsegment is chosen from the plans, and its main sector is then chosen optimally.

Input

The first line contains a single integer n , the number of sectors ($1 \leq n \leq 10^6$).

The second line contains n distinct integers a_1, a_2, \dots, a_n , the depths of sectors ($1 \leq a_i \leq 10^9$).

The next line contains a single integer q , the number of plans ($1 \leq q \leq 10^6$).

Each of the next q lines describes a plan. The j -th of them contains two integers ℓ_j and r_j which are the endpoints of the subsegment for the j -th plan ($1 \leq \ell_j \leq r_j \leq n$).

Output

Print a line with a single integer: the maximum volume of analyzed soil in cubic meters.

Example

<i>standard input</i>	<i>standard output</i>
6 3 5 2 7 4 6 2 1 5 3 6	9

Note

In the example, scientists should pick the first plan and the first sector as its main sector. Then $3 \cdot 3 = 9$ (since 5, 7, 4 are larger than 3) cubic meters of soil will be analyzed.