E. Function

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Serega and Fedor play with functions. One day they came across a very interesting function. It looks like that:

- $f(1, j) = a[j], 1 \le j \le n.$
- $f(i, j) = min(f(i - 1, j), f(i - 1, j - 1)) + a[j], 2 \le i \le n, \boldsymbol{i \le j \le n}.$

Here a is an integer array of length n.

Serega and Fedya want to know what values this function takes at some points. But they don't want to calculate the values manually. So they ask you to help them.

Input

The first line contains integer n ($1 \le n \le 10^5$) — the length of array a. The next line contains n integers: $a[1], a[2], ..., a[n]$ ($0 \le a[i] \le 10^4$).

The next line contains integer m ($1 \le m \le 10^5$) — the number of queries. Each of the next m lines contains two integers: x_i, y_i ($1 \le x_i \le y_i \le n$). Each line means that Fedor and Serega want to know the value of $f(x_i, y_i)$.

Output

Print m lines — the answers to the guys' queries.

Examples

input
6 2 2 3 4 3 4 4 4 5 3 4 3 4 2 3

output
12 9 9 5

input
7 1 3 2 3 4 0 2 4 4 5 2 3 1 4 4 6

output
11 4 3 0