Bob's Gemstones

Time Limit: 1.0s   **Memory Limit:** 512M

Bob has N gemstones, numbered from 1 to N. The gem i has a value a_i. All N gems are placed in a circle, i.e. the i-th $(1 < i \leq N)$ gem is besides the $i - 1$-th gem and the N-th gem is besides the 1-st gem. Bob wants to choose a subset of gems, but he cannot select 4 or more consecutive gems. Bob needs your help to find out the max sum of his subset. But he thinks this problem is too easy. So, he will give you Q queries. Each query will be in the form of `k x`, indicating that Bob will change the value of k-th gem to x. After each query, can you help Bob find out the max sum of values in Bob's gem subset?

Input Specification:

The first line of input contains one integers N ($4 \leq N \leq 40\,000$), the number of gems Bob has.

The second line of input contains N integers a_i, ($0 \leq a_i \leq 10^9$), the value of the i-th gem.

The third line contains one integer Q, ($0 \leq Q \leq 40\,000$), the number of queries.

Each of the following Q lines contains two integers k and x, ($1 \leq k \leq N, 0 \leq x \leq 10^9$), indicating a query.

Output Specification:

Output $Q + 1$ lines. Each line contains one integer, the max sum of Bob's subset of gems.

Constraints

Subtask	Points	Additional constraints
1	11	$N \leq 10$, $Q = 0$.
2	12	$N \leq 10$, $Q \leq 10$
3	13	$N \leq 1000$, $Q \leq 1000$
4	17	$Q = 0$
5	47	No additional constraints.

Sample Input:

```
6
1 2 3 4 5 6
2
6 0
2 5
```

Sample Output:

```
17
13
15
```

Explanation:

At beginning, Bob's gems are $[1, 2, 3, 4, 5, 6]$ and he can select $[2, 4, 5, 6]$ with the max sum of 17.

After the change $a_6 = 0$, Bob's gems are $[1, 2, 3, 4, 5, 0]$ and he can select $[1, 3, 4, 5]$ with the max sum of 13.

After the change $a_2 = 5$, Bob's gems are $[1, 5, 3, 4, 5, 0]$ and he can select $[1, 5, 4, 5]$ with the max sum of 15.