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D2. Minimum with Left Shift (Hard Version)

time limit per test: 1 second memory limit per test: 256 megabytes

This is the hard version of this problem. In this version, you need to answer multiple queries.

Wuhudsm got irritated because Sanjay kept proposing too many questions to him. So Wuhudsm decided to give Sanjay a tough question. Wuhudsm told Sanjay that he cannot ask any more questions until he solves this one. Since he had no friends, he handed it over to you. Please solve it for him.

Given an array a of length n, the cost c is defined as:

$$c = a_1 \cdot 1 + a_2 \cdot 2 + \dots + a_n \cdot n$$

You are given q queries of two types:

- 1 p x Set the value of a_p to x.
- 2 k Find the cost if the array is shifted left cyclically **exactly** k times. **Note:** we do not actually perform any shift operation on this array.

A left cyclic shift operation moves each element of the array one position to the left, with the first element moving to the end.

For example,

$$a = [1, 2, 3, 4]$$

after one left shift becomes

$$a = [2, 3, 4, 1]$$

Input

- The first line contains an integer t ($1 < t < 10^5$) the number of test cases.
- For each test case:
 - \circ The first line contains an integer n ($1 \le n \le 10^5$) the size of the array.
 - \circ The second line contains n integers a_1,a_2,\ldots,a_n $(-10^9 \le a_i \le 10^9)$ the elements of the array.
 - The third line contains an integer q ($1 \le q \le 10^5$) the number of queries.
 - $\circ~$ Then q lines follow. The i-th line contains the i-th query is given either as

$$\circ$$
 1 p x $(1 \le p \le n, -10^9 \le x \le 10^9)$
 \circ 2 k $(0 \le k \le 10^9)$

The sum of n and q across all test cases does not exceed 10^5 .

Output

For each query of type 2, print the answer to this query in a new line.

Example



Note

In the first query of the first test case, if the array a is left shifted 2 times, a = [3, 4, 1, 2].

We get
$$c=3\cdot 1 + 4\cdot 2 + 1\cdot 3 + 2\cdot 4 = 3 + 8 + 3 + 8 = 22$$
.

TheForces Round #39 (1000-Forces) Finished Practice

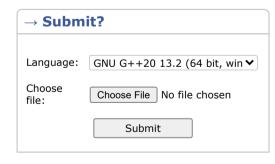


→ Virtual participation

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Start virtual contest





| → Last submissions | | |
|--------------------|----------------------|----------|
| Submission | Time | Verdict |
| 307462300 | Feb/23/2025 23:42 | Accepted |
| 307414725 | Feb/23/2025 16:23 | Accepted |

