E. Product Tuples

time limit per test: 8 seconds

memory limit per test: 128 megabytes

While roaming the mystic areas of Stonefalls, in order to drop legendary loot, an adventurer was given a quest as follows. He was given an array $A = a_1, a_2, \ldots, a_N$ of length N, and a number K.

Define array B as $B(q, A) = \{ q - a_1, q - a_2, \ldots, q - a_N \}$. Define function F as $F(B, K)$ being sum of products of all K-tuples of elements in array B. For example, if the array B is $[2, 3, 4, 5]$, and with $K = 3$, sum of products of all 3-tuples is

$$F(B, 3) = 2 * 3 * 4 + 2 * 3 * 5 + 3 * 4 * 5 + 2 * 4 * 5$$

He was then given a number Q, number of queries of two types:

- Type 1: Given q, i, and d calculate $F(B(q, A), K)$ where we make change to initial array as $A[i] = d$.
- Type 2: Given q, L, R, and d calculate $F(B(q, A), K)$ where we make change to initial array as $A[i] = A[i] + d$ for all i in range $[L, R]$ inclusive.

All changes are temporarily made to initial array, and don't propagate to following queries. Help the adventurer calculate the answer to a quest, and finally get that loot!

Input

In the first two lines, numbers N ($1 \le N \le 2 * 10^4$) and K ($1 \le K \le N$), the length of initial array A, and tuple size, followed by $a_1, a_2, a_3, \ldots, a_N$ ($0 \le a_i \le 10^9$), elements of array A, in the next line. Then follows number Q ($Q \le 10$), number of queries. In the next Q lines come queries of the form:

- 1 q i d, for type 1,
- 2 q L R d, for type 2,

as explained above ($0 \le q, d \le 10^9, 1 \le i, L, R \le N$)

Output

Print Q lines, the answers to queries, modulo 998244353.

Example

input	Copy
5	
2	
1 2 3 4 5	
3	
1 6 1 1	
1 6 5 2	
2 6 2 3 1	

output	Copy
85	
127	
63	

Note

In the first query array A = [1, 2, 3, 4, 5], B = [5, 4, 3, 2, 1], sum of products of 2-tuples = 85.

In second query array A = [1, 2, 3, 4, 2], B = [5, 4, 3, 2, 4], sum of products of 2-tuples = 127

In third query array A = [1, 3, 4, 4, 5], B = [5, 3, 2, 2, 1], sum of products of 2-tuples = 63

Bubble Cup 12 - Finals [Online Mirror, unrated, Div. 1]

Finished

Practice

⭐

→ Virtual participation ⌄

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest]

→ Clone Contest to Mashup ⌄

You can clone this contest to a mashup.

[Clone Contest]

→ Submit?

Language: [GNU G++20 13.2 (64 bit, win ▾)]

Choose file: [Choose File] No file chosen

[Submit]

→ Last submissions

Submission	Time	Verdict
324687758	Jun/16/2025 21:34	Accepted
324415642	Jun/14/2025 22:40	Accepted
324413965	Jun/14/2025 22:17	Accepted
324413932	Jun/14/2025 22:17	Compilation error
324413806	Jun/14/2025 22:15	Wrong answer on test 13
324413355	Jun/14/2025 22:09	Wrong answer on test 4

→ Problem tags

divide and conquer   fft   *2500

No tag edit access

→ Contest materials

- Announcement (en) ✕
- Statements (PDF) (en) ✕
- E (en) ✕