Problem E. Product Tuples

Input file:	standard input
Output file:	standard output
Time limit:	8 seconds
Memory limit:	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 $A = a_1, a_2, ..., a_N$ of length N, and a number K.

Define array B as $B(q, A) = \ q - a_1, q - a_2, ..., q - a_N$. 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

standard input	standard output
5 2 1 2 3 4 5 3 1 6 1 1 1 6 5 2 2 6 2 3 1	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