Problem H
Hard Queries

Lokk loves data structure, and his favorite leisure activity is inventing new and exotic data structure problems, and challenge his friends to solve it. Today, Lokk came up with the problem below and sent it to Quang.

You are given an array a containing n elements $a_1, a_2, \ldots, a_n$. You task is to process q queries of the following types:

- $1\ p$: Swap two elements a_p and a_{p+1}.
- $2\ l\ r\ x$: Calculate the sum of square of all positions from l to r whose element is equal to x. Formally, calculate $\sum_{i=l}^{r} i^2 \times [a_i = x]$, where $[P]$ denotes an expression that evaluate to 1 if P is true, and 0 otherwise.
- $3\ l\ r\ x$: Define b as the array of all positions in array a whose element is equal to x, listed from 1 to n. Calculate $\sum_{i=l}^{r} {b_i}^2$.

Being a brilliant problem solver, Quang tackled the problem quickly. Therefore, Lokk put an additional challenge: Quang has to answers the queries **online**, meaning that the queries are encoded in a way that the correct answer to the current query is required to decode the next one.

This is too much for Quang to handle, so he gave up on the problem and ask the contestants to help him. Can you solve it?

Input

The first line contains two integers n and q ($2 \le n \le 2 \times 10^5$, $1 \le q \le 2 \times 10^5$) — the length of a, and the number of queries to process.

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le n$) — the elements of array a.

Each of the next q lines describe a query to process. The first number is t ($1 \le t \le 3$) — the type of the query. The given queries will be encoded in the following way: let $last$ be the answer to the last query of the type 2 or 3 that you have answered (initially, $last = 0$).

If $t = 1$, an integer p' follows ($1 \le p' < n$). Perform the operation $p = (p' + last - 1) \bmod (n - 1) + 1$ to decode the query.

If $t = 2$ or $t = 3$, three integers l', r', and x' follow ($1 \le l', r', x' \le n$). Perform the following operations to decode the query:

- $l = (l' + last - 1) \bmod n + 1$
- $r = (r' + last - 1) \bmod n + 1$
- $x = (x' + last - 1) \bmod n + 1$
- If $l > r$, swap l and r.

For $t = 3$, it is guaranteed that r will not exceed the length of array b (defined in the query description).

Output

For each query of type 2 or 3, print a single integer — the answer to the query.

Sample explanation

Query 1 after decoding is 2 1 6 1. The positions from $l = 1$ to $r = 6$ whose element is equal to $x = 1$ are 1, 3 and 6. Therefore, the answer to this query is $1^2 + 3^2 + 6^2 = 46$.

Query 2 after decoding is 3 2 3 1. In this case, array b is $[1, 3, 6]$, so the answer to this query is $3^2 + 6^2 = 45$.

Query 3 after decoding is 2 6 6 2. Since $a_6 = 1$ which is different from $x = 2$, the answer to this query is 0.

Query 4 after decoding is 2 1 7 5. Since none of the elements of a equal $x = 5$, the answer to this query is 0.

Query 5 after decoding is 1 6. After swapping a_p and a_{p+1} (which is a_6 and a_7), array a become $[1, 2, 1, 3, 2, 2, 1]$.

Query 6 after decoding is 2 1 6 1. The answer to this query is $1^2 + 3^2 = 10$.

Query 7 after decoding is 3 2 3 1. The answer to this query is $3^2 + 7^2 = 58$.

Query 8 after decoding is 2 6 6 2. The answer to this query is $6^2 = 36$.

Sample Input 1	Sample Output 1
7 8 1 2 1 3 2 1 2 2 1 6 1 3 6 5 4 2 3 3 6 2 1 7 5 1 6 2 6 1 1 3 7 6 5 2 4 4 7	46 45 0 0 10 58 36