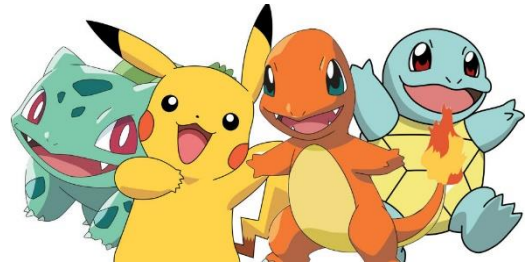


Problem A

Catch 'em all

Time Limit: 4 seconds

In a far far away world, people love ACMon (AC-Monster) a lot. Currently a new game named ACMon Go has been released and everyone is rushing out of their house to catch ACMons. ACMon usually appears in public places such as streets, parks, museums... Thanh is also addicted to this game and one of his



favorite places for catching ACMon is a park near his house. The park is divided into N blocks in a straight line and numbered from 1 to N . After some researches he found that in each block there always be exactly one ACMon. The i^{th} block contains an ACMon with a fixed type t_i and after that ACMon is caught, another one with the same type appears right away.

Today Thanh has planned to catch the ACMons in that park for exactly M times. Each time he catches all ACMons in a continuous segment of blocks from block L_i to block R_i (inclusively, $L_i \leq R_i$). If there are many ACMons with the same type, Thanh only wants to catch one of them. There is one exception: There is a type of ACMon named Pukachi and Thanh will try to catch all of them, as he loves Pukachi very much. The Pukachi is the ACMon with type equal to 1 (i.e. $t_i = 1$). Note that a new ACMon with the same time will appear right away after the previous ACMon is caught in each block.

Help Thanh to determine how many ACMons he will catch for each time. As Thanh does not have enough time to plan all the segments L_i and R_i for catching ACMon at the beginning, he decides that the next segment is determined based on the result of the previous time. Precisely, each time he generates 4 numbers: A_i , B_i , C_i and D_i . Let's call x as the result for the previous time, in case this is the first time then $x = 0$. Then we can calculate two values:

- $U = (A_i * x + B_i - 1 + N) \bmod N + 1$;
- $V = (C_i * x + D_i - 1 + N) \bmod N + 1$;

and the segment for this time will be:

- $L_i = \min(U, V)$;
- $R_i = \max(U, V)$;

Input

The first line contains 2 numbers N, M ($1 \leq N, M \leq 10^5$).

The second line contains N numbers, the i^{th} number is the type t_i ($1 \leq t_i \leq 10^9$) of the ACMon at the i^{th} block.

Each of the next M lines contains 4 numbers A_i, B_i, C_i, D_i ($0 \leq A_i, B_i, C_i, D_i \leq 10^5$).

Output

Display M lines, each contains one number: the number of ACMons that Thanh will catch.

Sample Input

Sample Output

5 2	2
1 3 2 2 1	4
1 2 3 4	
2 1 0 1	

Explanation

In the first time, the segment is $[2, 4]$, he only catches 2 ACMons as there are two ACMons of type 2.

In the second time, the segment is $[1, 5]$, as he will catch all of the Pukachi (ACMons with type 1), he catches 4 ACMons in total.