

G. Sealed Orbital Conduit

Standard I/O | Time Limit: 4.0s | Memory Limit: 256MB

Deep inside the power core of Sector 2026, an orbital ring conduit consists of M docking berths arranged along a one-way circular rail, indexed clockwise from 0 to $M - 1$. Berth x is directly followed clockwise by berth $(x + 1) \bmod M$.

There are r modular fuel canisters with distinct identification labels 1, 2, ..., r . Initially, canister i is docked at berth a_i , and its designated final docking berth is b_i .

A mechanical stroke chooses exactly one canister and advances it clockwise by one berth. A stroke is legal if and only if the destination berth is currently vacant. Canisters can never move counter-clockwise.

A complete operational log is a sequence of exactly K legal strokes after which every canister occupies its target destination berth b_i . Two complete logs are distinct if and only if their sequences of chosen canister labels differ.

Let the sequence of chosen labels be $w = (w_1, w_2, \dots, w_K)$. The console strain of the log is defined as:

$\text{strain}(w) = \text{sum of } h \text{ over all } 1 \leq h < K \text{ for which } w_h > w_{h+1}.$

That is, after stroke h , the console accumulates h units of strain whenever the subsequent stroke activates a canister with a strictly smaller label. (For $r = 1$, the strain is always 0).

The energy weight of a complete log is defined as $9^{\text{strain}(w)}$.

The initial and target configurations share the same circular cyclic cut: listing the occupied berths in strictly decreasing numerical order gives canister labels 1, 2, ..., r . That is: $M > a_1 > a_2 > \dots > a_r \geq 0$ and $M > b_1 > b_2 > \dots > b_r \geq 0$.

Compute the sum of weights of all valid complete logs modulo 998244353. If $K = 0$, the only candidate is the empty log, which contributes weight 1 if and only if the initial and final configurations are already identical (and 0 otherwise).

Input

The first line contains three integers: M , r , and K ($2 \leq M \leq 10^9$, $1 \leq r \leq 5$, $r < M$, $0 \leq K \leq 200,000$). The second line contains r strictly decreasing integers: $a_1, a_2, \dots, a_r$. The third line contains r strictly decreasing integers: $b_1, b_2, \dots, b_r$.

Output

Print a single integer: the weighted sum of all complete logs modulo 998244353. If no complete log exists, print 0.

Standard Input	Standard Output
3 2 6 1 0 1 0	531441
5 2 12 3 0 4 1	214993899
8 3 3 3 2 1 4 3 2	1

Explanation 1: There is only one empty berth, so the unique complete log is [1, 2, 1, 2, 1, 2]. Descents occur after strokes 2 and 4, so $\text{strain} = 2 + 4 = 6$. $\text{Weight} = 9^6 = 531441$.