DMOPC '18 Contest 2 P5 - Another Sequence Problem

Time limit: 1.4s **Memory limit:** 256M

Bob is investigating properties of integer sequences in an attempt to solve George's least favourite problem: Maintaining A Sequence!

To help Bob achieve his dreams, George gives Bob a warm up problem:

> How many ordered sequences of N non-negative integers are such that each element is a member of the set $\{a_1, a_2, \ldots, a_K\}$ and whose sum is at most M?

Bob points out that this number might be a bit large, so George lets him return the answer modulo $10^9 + 7$.

Can you help Bob solve his warm up problem?

Constraints

For all subtasks:

$0 \leq a_k \leq M$

Each a_i is guaranteed to be pairwise distinct.

Subtask 1 [20%]

$1 \leq N, M, K \leq 500$

Subtask 2 [20%]

$a_k = k - 1$ for all $1 \leq k \leq K$

$K = M$

$1 \leq N \leq 10^{18}$

$1 \leq M, K \leq 2\,500$

Subtask 3 [20%]

$1 \leq N \leq 10^{18}$

$1 \leq M, K \leq 500$

Subtask 4 [40%]

$1 \leq N \leq 10^{18}$

$1 \leq M, K \leq 2\,500$

Input Specification

The first line of input will contain three space separated integers, N, M, and K.
The second line of input will contain K space-separated integers, $a_1, a_2, \ldots, a_K$.

Output Specification

The number of sequences that satisfy the given conditions, modulo $10^9 + 7$.

Sample Input

```
2 3 4
1 3 2 0
```

Sample Output

```
10
```

Explanation for Sample

The possible sequences are: $[0, 0]$, $[0, 1]$, $[0, 2]$, $[0, 3]$, $[1, 0]$, $[1, 1]$, $[1, 2]$, $[2, 0]$, $[2, 1]$, and $[3, 0]$.