Problem 1420: Build Array Where You Can Find The Maximum Exactly K Comparisons

Problem Information

Difficulty: Hard
Acceptance Rate: 66.17%
Paid Only: No
Tags: Dynamic Programming, Prefix Sum

Problem Description

You are given three integers `n`, `m` and `k`. Consider the following algorithm to find the maximum element of an array of positive integers:

You should build the array arr which has the following properties:

* `arr` has exactly `n` integers. * `1 <= arr[i] <= m` where `(0 <= i < n)`. * After applying the mentioned algorithm to `arr`, the value `search_cost` is equal to `k`.

Return _the number of ways_ to build the array `arr` under the mentioned conditions. As the answer may grow large, the answer **must be** computed modulo `109 + 7`.

Example 1:

Input: n = 2, m = 3, k = 1 **Output:** 6 **Explanation:** The possible arrays are [1, 1], [2, 1], [2, 2], [3, 1], [3, 2] [3, 3]

Example 2:

Input: n = 5, m = 2, k = 3 **Output:** 0 **Explanation:** There are no possible arrays that satisfy the mentioned conditions.

Example 3:

Input: n = 9, m = 1, k = 1 **Output:** 1 **Explanation:** The only possible array is [1, 1, 1, 1, 1, 1, 1, 1, 1]

Constraints:

* `1 <= n <= 50` * `1 <= m <= 100` * `0 <= k <= n`

Code Snippets

C++:

```
class Solution {
public:
int numOfArrays(int n, int m, int k) {

}
};
```

Java:

```
class Solution {
public int numOfArrays(int n, int m, int k) {

}
}
```

Python3:

```
class Solution:
def numOfArrays(self, n: int, m: int, k: int) -> int:
```