Problem 3405: Count the Number of Arrays with K Matching Adjacent Elements

Problem Information

Difficulty: Hard
Acceptance Rate: 58.34%
Paid Only: No
Tags: Math, Combinatorics

Problem Description

You are given three integers `n`, `m`, `k`. A **good array** `arr` of size `n` is defined as follows:

* Each element in `arr` is in the **inclusive** range `[1, m]`. * _Exactly_ `k` indices `i` (where `1 <= i < n`) satisfy the condition `arr[i - 1] == arr[i]`.

Return the number of **good arrays** that can be formed.

Since the answer may be very large, return it **modulo**`109 + 7`.

Example 1:

Input: n = 3, m = 2, k = 1

Output: 4

Explanation:

* There are 4 good arrays. They are `[1, 1, 2]`, `[1, 2, 2]`, `[2, 1, 1]` and `[2, 2, 1]`. * Hence, the answer is 4.

Example 2:

Input: n = 4, m = 2, k = 2

Output: 6

Explanation:

* The good arrays are `[1, 1, 1, 2]`, `[1, 1, 2, 2]`, `[1, 2, 2, 2]`, `[2, 1, 1, 1]`, `[2, 2, 1, 1]` and `[2, 2, 2, 1]`. * Hence, the answer is 6.

Example 3:

Input: n = 5, m = 2, k = 0

Output: 2

Explanation:

* The good arrays are `[1, 2, 1, 2, 1]` and `[2, 1, 2, 1, 2]`. Hence, the answer is 2.

Constraints:

* `1 <= n <= 105` * `1 <= m <= 105` * `0 <= k <= n - 1`

Code Snippets

C++:

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

}
};
```

Java:

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

}
}
```

Python3:

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