Problem 1269: Number of Ways to Stay in the Same Place After Some Steps

Problem Information

Difficulty: Hard
Acceptance Rate: 49.98%
Paid Only: No
Tags: Dynamic Programming

Problem Description

You have a pointer at index `0` in an array of size `arrLen`. At each step, you can move 1 position to the left, 1 position to the right in the array, or stay in the same place (The pointer should not be placed outside the array at any time).

Given two integers `steps` and `arrLen`, return the number of ways such that your pointer is still at index `0` after **exactly** `steps` steps. Since the answer may be too large, return it **modulo** `109 + 7`.

Example 1:

Input: steps = 3, arrLen = 2 **Output:** 4 **Explanation:** There are 4 differents ways to stay at index 0 after 3 steps. Right, Left, Stay Stay, Right, Left Right, Stay, Left Stay, Stay, Stay

Example 2:

Input: steps = 2, arrLen = 4 **Output:** 2 **Explanation:** There are 2 differents ways to stay at index 0 after 2 steps Right, Left Stay, Stay

Example 3:

Input: steps = 4, arrLen = 2 **Output:** 8

Constraints:

* `1 <= steps <= 500` * `1 <= arrLen <= 106`

Code Snippets

C++:

```
class Solution {
public:
int numWays(int steps, int arrLen) {

}
};
```

Java:

```
class Solution {
public int numWays(int steps, int arrLen) {

}
}
```

Python3:

```
class Solution:
def numWays(self, steps: int, arrLen: int) -> int:
```