

Problem 3700: Number of ZigZag Arrays II

Problem Information

Difficulty: Hard

Acceptance Rate: 47.53%

Paid Only: No

Tags: Math, Dynamic Programming

Problem Description

You are given three integers n , l , and r .

A **ZigZag** array of length n is defined as follows:

- * Each element lies in the range $[l, r]$.
- * No **two** adjacent elements are equal.
- * No **three** consecutive elements form a **strictly increasing** or **strictly decreasing** sequence.

Return the total number of valid **ZigZag** arrays.

Since the answer may be large, return it **modulo** $10^9 + 7$.

A **sequence** is said to be **strictly increasing** if each element is strictly greater than its previous one (if exists).

A **sequence** is said to be **strictly decreasing** if each element is strictly smaller than its previous one (if exists).

Example 1:

Input: $n = 3, l = 4, r = 5$

Output: 2

Explanation:

There are only 2 valid ZigZag arrays of length $n = 3$ using values in the range $[4, 5]$:

* $[4, 5, 4]$ * $[5, 4, 5]$

Example 2:

Input: $n = 3, l = 1, r = 3$

Output: 10

Explanation:

There are 10 valid ZigZag arrays of length $n = 3$ using values in the range $[1, 3]$:

* $[1, 2, 1]$, $[1, 3, 1]$, $[1, 3, 2]$ * $[2, 1, 2]$, $[2, 1, 3]$, $[2, 3, 1]$, $[2, 3, 2]$ * $[3, 1, 2]$, $[3, 1, 3]$, $[3, 2, 3]$

All arrays meet the ZigZag conditions.

Constraints:

$3 \leq n \leq 109$ * $1 \leq l < r \leq 75$

Code Snippets

C++:

```
class Solution {
public:
    int zigZagArrays(int n, int l, int r) {

    }
};
```

Java:

```
class Solution {
    public int zigZagArrays(int n, int l, int r) {
```

```
}  
}
```

Python3:

```
class Solution:  
    def zigZagArrays(self, n: int, l: int, r: int) -> int:
```