

Problem 3179: Find the N-th Value After K Seconds

Problem Information

Difficulty: Medium

Acceptance Rate: 53.71%

Paid Only: No

Tags: Array, Math, Simulation, Combinatorics, Prefix Sum

Problem Description

You are given two integers `n` and `k`.

Initially, you start with an array `a` of `n` integers where `a[i] = 1` for all `0 <= i <= n - 1`. After each second, you simultaneously update each element to be the sum of all its preceding elements plus the element itself. For example, after one second, `a[0]` remains the same, `a[1]` becomes `a[0] + a[1]`, `a[2]` becomes `a[0] + a[1] + a[2]`, and so on.

Return the **value** of `a[n - 1]` after `k` seconds.

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

Example 1:

Input: n = 4, k = 5

Output: 56

Explanation:

Second	State After
0	[1,1,1,1] 1
[1,6,21,56]	

Example 2:

Input: n = 5, k = 3

****Output:**** 35

****Explanation:****

Second | State After ---|--- 0 | [1,1,1,1,1] 1 | [1,2,3,4,5] 2 | [1,3,6,10,15] 3 | [1,4,10,20,35]

****Constraints:****

* `1 <= n, k <= 1000`

Code Snippets

C++:

```
class Solution {  
public:  
    int valueAfterKSeconds(int n, int k) {  
  
    }  
};
```

Java:

```
class Solution {  
public int valueAfterKSeconds(int n, int k) {  
  
}  
}
```

Python3:

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