

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 $0 \leq i \leq n - 1$. 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 | [1,2,3,4]
2 | [1,3,6,10]
3 | [1,4,10,20]
4 | [1,5,15,35]
5 | [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:
```