Problem 1680: Concatenation of Consecutive Binary Numbers

Problem Information

Difficulty: Medium
Acceptance Rate: 56.83%
Paid Only: No
Tags: Math, Bit Manipulation, Simulation

Problem Description

Given an integer `n`, return _the**decimal value** of the binary string formed by concatenating the binary representations of _`1` _to_`n` _in order,**modulo**_`109 + 7`.

Example 1:

Input: n = 1 **Output:** 1 **Explanation:** "1" in binary corresponds to the decimal value 1.

Example 2:

Input: n = 3 **Output:** 27 **Explanation:** In binary, 1, 2, and 3 corresponds to "1", "10", and "11". After concatenating them, we have "11011", which corresponds to the decimal value 27.

Example 3:

Input: n = 12 **Output:** 505379714 **Explanation** : The concatenation results in "110111001011101111000100110101010111100". The decimal value of that is 118505380540. After modulo 109 + 7, the result is 505379714.

Constraints:

* `1 <= n <= 105`

Code Snippets

C++:

```
class Solution {
public:
int concatenatedBinary(int n) {

}
};
```

Java:

```
class Solution {
public int concatenatedBinary(int n) {

}
}
```

Python3:

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