400 Nth Digit

2018年4月10日 15:27

Question:

Find the n^{th} digit of the infinite integer sequence 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, ...

Note:

n is positive and will fit within the range of a 32-bit signed integer ($n < 2^{31}$).

Example 1:

Input:

3

Output:

3

Example 2:

Input:

11

Output:

0

Explanation:

The 11th digit of the sequence 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, ... is a 0, which is part of the number 10.

来自 <https://leetcode.com/problems/nth-digit/description/>

在无限的整数序列 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, ...中找到第 n 个数字。

注意:

n 是正数且在32为整形范围内 ($n < 2^{31}$)。

来自 <https://leetcode-cn.com/problems/nth-digit/description/>

Solution for Python3:

```python
class Solution:
    def findNthDigit(self, n):
        """
        :type n: int
        :rtype: int
        """
        n -= 1
        for digits in range(1, 11):
            first = 10**(digits - 1)
            if n < 9 * first * digits:
                return int(str(first + n // digits)[n % digits])
            n -= 9 * first * digit
```

Solution for C++:

```cpp
class Solution1 {
public:
    int findNthDigit(int n) {
        // 先确定该数由多少位的数字组成
        long base = 9, digits = 1;
        while (n - base * digits > 0) {
            n -= base * digits;
            base *= 10;
            digits++;
        }
        // 计算这个数字是什么
        int index = n % digits;
        if (index == 0)
            index = digits;

        long num = 1;
        for (int i = 1; i < digits; i++)
            num *= 10;
        num += (index == digits) ? n /digits - 1: n /digits;
        // 找出该数的index位置上的数字
        for (int i = index; i < digits; i++)
            num /= 10;
        return num % 10;

    }
};

class Solution2 {
public:
    int findNthDigit(int n) {
        n -= 1;
        int digits = 1, first = 1;
        while (n / 9 / first / digits >= 1) {
            n -= 9 * first * digits;
            digits++;
            first *= 10;
        }
        int t = first + n / digits;
        for (int i = 1; i < digits - n % digits; i++) {
            t /= 10;
        }
        return t %= 10;
    }
};
```