



Medium Difficulty

Integer to Roman calculator (Leetcode)

CSX3009
Term Project
Semester 2/2021

Pakin Charoenchanachai 6210195
Rattanapol Wattanatanasup 6211515



Problem

Given an integer, convert the input to a roman numeral. (Constraint $1 \leq \text{num} \leq 3999$)

Example 1: Input: num = 3, Output: "III"

Example 2: Input: num = 4, Output: "IV"

Example 3: Input: num = 9, Output: "IX"

Example 4: Input: num = 58, Output: "LVIII"

Explanation: L = 50, V = 5, III = 3

Example 5: Input: num = 1994, Output: "MCMXCIV"

Explanation: M = 1000, CM = 900, XC = 90 and IV = 4

Symbol	Value
I	1
V	5
X	10
L	50
C	100
D	500
M	1000

Analysis

- The problem is based on the conversion of integer to the roman number as roman number always ordered the largest number symbol to be on the leftest side.
- The roman number symbol have the constant number of in integer for example 'M' is represent 1000 which is straightforward but the roman number have some minus of symbol like 'CM' that are 'M-C' equal (1000 -100) moreover the result is also constant in conversion.

Code (1st Attempt)

```
class Solution:
    def intToRoman(self, num):
        int_num = (1000, 900, 500, 400, 100, 90, 50, 40, 10, 9, 5, 4, 1)
        roman_num = ('M', 'CM', 'D', 'CD', 'C', 'XC', 'L', 'XL', 'X', 'IX', 'V', 'IV', 'I')
        answer = ""
        while num > 0:
            for i in range(len(int_num)):
                count = int(num / int_num[i])
                answer = answer + (roman_num[i] * count)
                num = num - (int_num[i] * count)
        return answer
```

Reference

<https://www.w3resource.com/python-exercises/class-exercises/python-class-exercise-1.php>

Result

Success [Details](#) >

Runtime: **44 ms**, faster than **57.40%** of Python online submissions for Integer to Roman.

Memory Usage: **13.3 MB**, less than **90.44%** of Python online submissions for Integer to Roman.

Code (2nd Attempt)

```
class Solution:
    def intToRoman(self, num):
        int_num = (1000, 900, 500, 400, 100, 90, 50, 40, 10, 9, 5, 4, 1)
        roman_num = ('M', 'CM', 'D', 'CD', 'C', 'XC', 'L', 'XL', 'X', 'IX', 'V', 'IV', 'I')
        answer = ""
        while num > 0:
            for i in range(len(int_num)):
                count = num // int_num[i]
                answer = answer + (roman_num[i] * count)
                num = num - (int_num[i] * count)
        return answer
```

Result

Success [Details >](#)

Runtime: **40 ms**, faster than **69.92%** of Python online submissions for Integer to Roman.

Memory Usage: **13.5 MB**, less than **39.90%** of Python online submissions for Integer to Roman.

How does it work?

WHAT IF the input is 3000?

```
num = 3000
```

```
while num > 0:
```

```
    for i in range(len(int_num)):
```

```
        count = num // int_num[i]
```

```
        Count = 3000//1000
```

```
        Count = 3
```

```
        answer = answer + (roman_num[i] * count)
```

```
        answer = M * 3
```

```
        answer = MMM
```

```
    num = num - (int_num[i] * count)
```

```
    num = 3000 - (1000 * 3)
```

```
    num = 0
```

```
Finalized answer = MMM
```

Result Summary

1st Attempt

Success [Details >](#) `count = int(num / int_num[i])`

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2nd Attempt

Success [Details >](#) `count = num // int_num[i]`

Runtime: **40 ms**, faster than **69.92%** of Python online submissions for Integer to Roman.

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Thank you