

338. Counting Bits

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Question

Editorial Solution

My Submissions (/problems/counting-bits/submissions/)

Total Accepted: **61229** Total Submissions: **102921** Difficulty: **Medium** Contributors: **Admin**

Given a non negative integer number **num**. For every numbers **i** in the range $0 \leq i \leq \text{num}$ calculate the number of 1's in their binary representation and return them as an array.

Example:

For `num = 5` you should return `[0,1,1,2,1,2]`.

Follow up:

- It is very easy to come up with a solution with run time $O(n \cdot \text{sizeof(integer)})$. But can you do it in linear time $O(n)$ /possibly in a single pass?
- Space complexity should be $O(n)$.
- Can you do it like a boss? Do it without using any builtin function like `__builtin_popcount` in c++ or in any other language.

Hint:

- You should make use of what you have produced already.
- Divide the numbers in ranges like [2-3], [4-7], [8-15] and so on. And try to generate new range from previous.
- Or does the odd/even status of the number help you in calculating the number of 1s?

Credits:

Special thanks to @syedee (<https://leetcode.com/discuss/user/syedee>) for adding this problem and creating all test cases.

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Python



```
1 class Solution(object):
2     def countBits(self, num):
3         """
4         :type num: int
5         :rtype: List[int]
6         """
7         c=[]
8         for n in range(num+1):
9             count=0
10            while n!=0:
11                if n%2==1:
12                    count=count+1
13                n=n//2
14            c.append(count)
15        return c
```

Custom Testcase

Contribute Testcase

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One line for one parameter. Hint ▾

Run Code

Submit Solution

Run Code Status: Finished

Run Code Result: ×

Your input

20

Your answer

`[0,1,1,2,1,2,2,3,1,2,2,3,2,3,3,4,1,2,2,3,2]`

Expected answer

`[0,1,1,2,1,2,2,3,1,2,2,3,2,3,3,4,1,2,2,3,2]`[Show Diff](#)

Runtime: 35 ms

Note: is Run Code inconsistent with Submit Solution? If you are using global variables or C/C++, check this (/faq/#different-output) out.

Submission Result: Accepted (/submissions/detail/89192715/) ⓘ

[More Details ▶ \(/submissions/detail/89192715/\)](#)Next challenges: [\(E\) Reverse Bits \(/problems/reverse-bits\)](#) [\(M\) Single Number III \(/problems/single-number-iii\)](#) [\(M\) Integer Break \(/problems/integer-break\)](#)

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