338. Counting Bits

Hint

Given an integer n, return an array ans of length n + 1 such that for each i (0 <= i <= n), ans[i] is the number of 1's in the binary representation of i.

Example 1:

- **Input:** n = 2
- **Output:** [0,1,1]
- **Explanation:**
  - 0 --> 0
  - 1 --> 1
  - 2 --> 10

Example 2:

- **Input:** n = 5
- **Output:** [0,1,1,2,1,2]
- **Explanation:**
  - 0 --> 0
  - 1 --> 1
  - 2 --> 10
  - 3 --> 11
  - 4 --> 100
  - 5 --> 101

Constraints:

- $0 <= n <= 10^5$

Follow up:

- It is very easy to come up with a solution with a runtime of O(n log n). Can you do it in linear time O(n) and possibly in a single pass?
- Can you do it without using any built-in function (i.e., like __builtin_popcount in C++)?