89. Gray Code

Description

An **n-bit gray code sequence** is a sequence of 2^n integers where:

- Every integer is in the **inclusive** range $[0, 2^n - 1]$,
- The first integer is 0,
- An integer appears **no more than once** in the sequence,
- The binary representation of every pair of **adjacent** integers differs by **exactly one bit**, and
- The binary representation of the **first** and **last** integers differs by **exactly one bit**.

Given an integer n, return *any valid* ***n-bit gray code sequence***.

Example 1:

```
Input: n = 2
Output: [0,1,3,2]
Explanation:
The binary representation of [0,1,3,2] is [00,01,11,10].
- 0 0 and 0 1 differ by one bit
-  0 1 and  1 1 differ by one bit
- 1 1 and 1 0 differ by one bit
-  1 0 and  0 0 differ by one bit
[0,2,3,1] is also a valid gray code sequence, whose binary representation is [00,10,11,01].
-  0 0 and  1 0 differ by one bit
- 1 0 and 1 1 differ by one bit
-  1 1 and  0 1 differ by one bit
- 0 1 and 0 0 differ by one bit
```

Example 2:

```
Input: n = 1
Output: [0,1]
```

Constraints:

- $1 <= n <= 16$