3125. Maximum Number That Makes Result of Bitwise AND Zero Premium

Medium | Topics | Companies | Hint

Given an integer `n`, return the **maximum** integer `x` such that `x <= n`, and the bitwise `AND` of all the numbers in the range `[x, n]` is 0.

Example 1:

> **Input:** n = 7
>
> **Output:** 3
>
> **Explanation:**
>
> The bitwise `AND` of `[6, 7]` is 6.
> The bitwise `AND` of `[5, 6, 7]` is 4.
> The bitwise `AND` of `[4, 5, 6, 7]` is 4.
> The bitwise `AND` of `[3, 4, 5, 6, 7]` is 0.

Example 2:

> **Input:** n = 9
>
> **Output:** 7
>
> **Explanation:**
>
> The bitwise `AND` of `[7, 8, 9]` is 0.

Example 3:

> **Input:** n = 17
>
> **Output:** 15
>
> **Explanation:**
>
> The bitwise `AND` of `[15, 16, 17]` is 0.

Constraints:

- `1 <= n <= 10^15`

Seen this question in a real interview before? 1/5

Yes No

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Hint 1

Examine the set bits of `n`.

Hint 2

When performing bitwise AND operations sequentially down from `n`, the last set bit to turn to 0 identifies the highest set bit.

Hint 3

If the index of the highest set bit is `x`, the answer is `2^x - 1`.

Discussion (2)