Problem 2403: Minimum Time to Kill All Monsters

Problem Information

Difficulty: Hard
Acceptance Rate: 56.87%
Paid Only: Yes
Tags: Array, Dynamic Programming, Bit Manipulation, Bitmask

Problem Description

You are given an integer array `power` where `power[i]` is the power of the `ith` monster.

You start with `0` mana points, and each day you increase your mana points by `gain` where `gain` initially is equal to `1`.

Each day, after gaining `gain` mana, you can defeat a monster if your mana points are greater than or equal to the power of that monster. When you defeat a monster:

* your mana points will be reset to `0`, and * the value of `gain` increases by `1`.

Return _the**minimum** number of days needed to defeat all the monsters._

Example 1:

Input: power = [3,1,4] **Output:** 4 **Explanation:** The optimal way to beat all the monsters is to: - Day 1: Gain 1 mana point to get a total of 1 mana point. Spend all mana points to kill the 2nd monster. - Day 2: Gain 2 mana points to get a total of 2 mana points. - Day 3: Gain 2 mana points to get a total of 4 mana points. Spend all mana points to kill the 3rd monster. - Day 4: Gain 3 mana points to get a total of 3 mana points. Spend all mana points to kill the 1st monster. It can be proven that 4 is the minimum number of days needed.

Example 2:

Input: power = [1,1,4] **Output:** 4 **Explanation:** The optimal way to beat all the monsters is to: - Day 1: Gain 1 mana point to get a total of 1 mana point. Spend all mana

points to kill the 1st monster. - Day 2: Gain 2 mana points to get a total of 2 mana points. Spend all mana points to kill the 2nd monster. - Day 3: Gain 3 mana points to get a total of 3 mana points. - Day 4: Gain 3 mana points to get a total of 6 mana points. Spend all mana points to kill the 3rd monster. It can be proven that 4 is the minimum number of days needed.

Example 3:

Input: power = [1,2,4,9] **Output:** 6 **Explanation:** The optimal way to beat all the monsters is to: - Day 1: Gain 1 mana point to get a total of 1 mana point. Spend all mana points to kill the 1st monster. - Day 2: Gain 2 mana points to get a total of 2 mana points. Spend all mana points to kill the 2nd monster. - Day 3: Gain 3 mana points to get a total of 3 mana points. - Day 4: Gain 3 mana points to get a total of 6 mana points. - Day 5: Gain 3 mana points to get a total of 9 mana points. Spend all mana points to kill the 4th monster. - Day 6: Gain 4 mana points to get a total of 4 mana points. Spend all mana points to kill the 3rd monster. It can be proven that 6 is the minimum number of days needed.

Constraints:

* `1 <= power.length <= 17` * `1 <= power[i] <= 109`

Code Snippets

C++:

```
class Solution {
public:
long long minimumTime(vector<int>& power) {


}
};
```

Java:

```
class Solution {
public long minimumTime(int[] power) {


}
}
```

Python3:

```python
class Solution:
    def minimumTime(self, power: List[int]) -> int:
```