Problem 2214: Minimum Health to Beat Game

Problem Information

Difficulty: Medium
Acceptance Rate: 58.81%
Paid Only: Yes
Tags: Array, Greedy

Problem Description

You are playing a game that has `n` levels numbered from `0` to `n - 1`. You are given a **0-indexed** integer array `damage` where `damage[i]` is the amount of health you will lose to complete the `ith` level.

You are also given an integer `armor`. You may use your armor ability **at most once** during the game on **any** level which will protect you from **at most** `armor` damage.

You must complete the levels in order and your health must be **greater than** `0` at all times to beat the game.

Return _the**minimum** health you need to start with to beat the game._

Example 1:

Input: damage = [2,7,4,3], armor = 4 **Output:** 13 **Explanation:** One optimal way to beat the game starting at 13 health is: On round 1, take 2 damage. You have 13 - 2 = 11 health. On round 2, take 7 damage. You have 11 - 7 = 4 health. On round 3, use your armor to protect you from 4 damage. You have 4 - 0 = 4 health. On round 4, take 3 damage. You have 4 - 3 = 1 health. Note that 13 is the minimum health you need to start with to beat the game.

Example 2:

Input: damage = [2,5,3,4], armor = 7 **Output:** 10 **Explanation:** One optimal way to beat the game starting at 10 health is: On round 1, take 2 damage. You have 10 - 2 = 8 health. On round 2, use your armor to protect you from 5 damage. You have 8 - 0 = 8 health. On round 3, take 3 damage. You have 8 - 3 = 5 health. On round 4, take 4 damage. You have

5 - 4 = 1 health. Note that 10 is the minimum health you need to start with to beat the game.

Example 3:

Input: damage = [3,3,3], armor = 0 **Output:** 10 **Explanation:** One optimal way to beat the game starting at 10 health is: On round 1, take 3 damage. You have 10 - 3 = 7 health. On round 2, take 3 damage. You have 7 - 3 = 4 health. On round 3, take 3 damage. You have 4 - 3 = 1 health. Note that you did not use your armor ability.

Constraints:

* `n == damage.length` * `1 <= n <= 105` * `0 <= damage[i] <= 105` * `0 <= armor <= 105`

Code Snippets

C++:

```
class Solution {
public:
long long minimumHealth(vector<int>& damage, int armor) {

}
};
```

Java:

```
class Solution {
public long minimumHealth(int[] damage, int armor) {

}
}
```

Python3:

```
class Solution:
def minimumHealth(self, damage: List[int], armor: int) -> int:
```