

## 2214. Minimum Health to Beat Game Premium

Medium Topics Companies Hint

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  $i^{\text{th}}$  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:

- $n == \text{damage.length}$
- $1 \leq n \leq 10^5$
- $0 \leq \text{damage}[i] \leq 10^5$
- $0 \leq \text{armor} \leq 10^5$

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

Yes No

Accepted 31.9K | Submissions 55.4K | Acceptance Rate 57.6%

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Hint 1

When should you use your armor ability?

Hint 2

It is always optimal to use your armor ability on the level where you take the most amount of damage.

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