Problem 2141: Maximum Running Time of N Computers

Problem Information

Difficulty: Hard
Acceptance Rate: 49.84%
Paid Only: No
Tags: Array, Binary Search, Greedy, Sorting

Problem Description

You have `n` computers. You are given the integer `n` and a **0-indexed** integer array `batteries` where the `ith` battery can **run** a computer for `batteries[i]` minutes. You are interested in running **all** `n` computers **simultaneously** using the given batteries.

Initially, you can insert **at most one battery** into each computer. After that and at any integer time moment, you can remove a battery from a computer and insert another battery **any number of times**. The inserted battery can be a totally new battery or a battery from another computer. You may assume that the removing and inserting processes take no time.

Note that the batteries cannot be recharged.

Return _the**maximum** number of minutes you can run all the _`n` _computers simultaneously._

Example 1:

Input: n = 2, batteries = [3,3,3] **Output:** 4 **Explanation:** Initially, insert battery 0 into the first computer and battery 1 into the second computer. After two minutes, remove battery 1 from the second computer and insert battery 2 instead. Note that battery 1 can still run for one minute. At the end of the third minute, battery 0 is drained, and you need to remove it from the first computer and insert battery 1 instead. By the end of the fourth minute, battery 1 is also drained, and the first computer is no longer running. We can run the two computers simultaneously for at most 4 minutes, so we return 4.

Example 2:

Input: n = 2, batteries = [1,1,1,1] **Output:** 2 **Explanation:** Initially, insert battery 0 into the first computer and battery 2 into the second computer. After one minute, battery 0 and battery 2 are drained so you need to remove them and insert battery 1 into the first computer and battery 3 into the second computer. After another minute, battery 1 and battery 3 are also drained so the first and second computers are no longer running. We can run the two computers simultaneously for at most 2 minutes, so we return 2.

Constraints:

* `1 <= n <= batteries.length <= 105` * `1 <= batteries[i] <= 109`

Code Snippets

C++:

```cpp
class Solution {
public:
    long long maxRunTime(int n, vector<int>& batteries) {

    }
};
```

Java:

```java
class Solution {
    public long maxRunTime(int n, int[] batteries) {

    }
}
```

Python3:

```python
class Solution:
    def maxRunTime(self, n: int, batteries: List[int]) -> int:
```