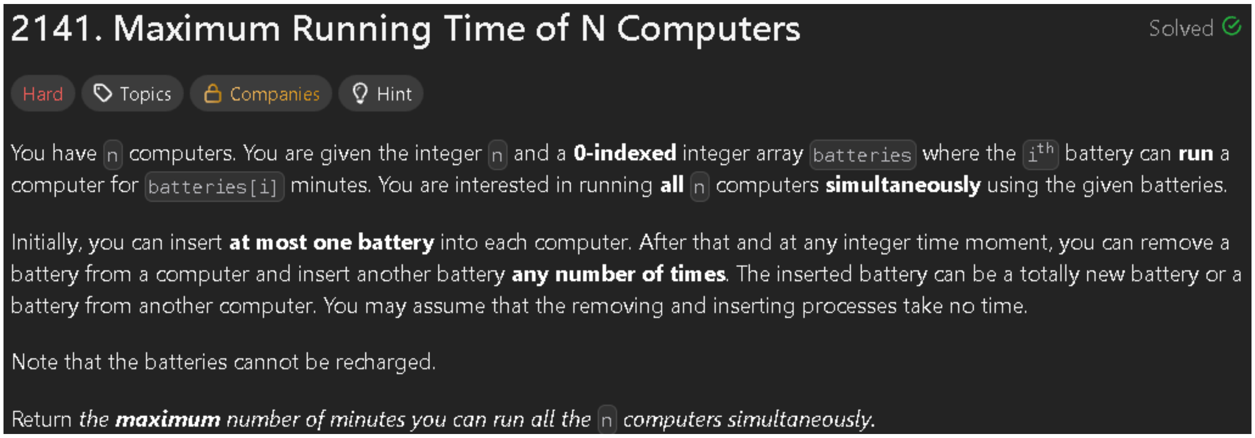


2141. Maximum Running Time of N Computers

Solved ✓

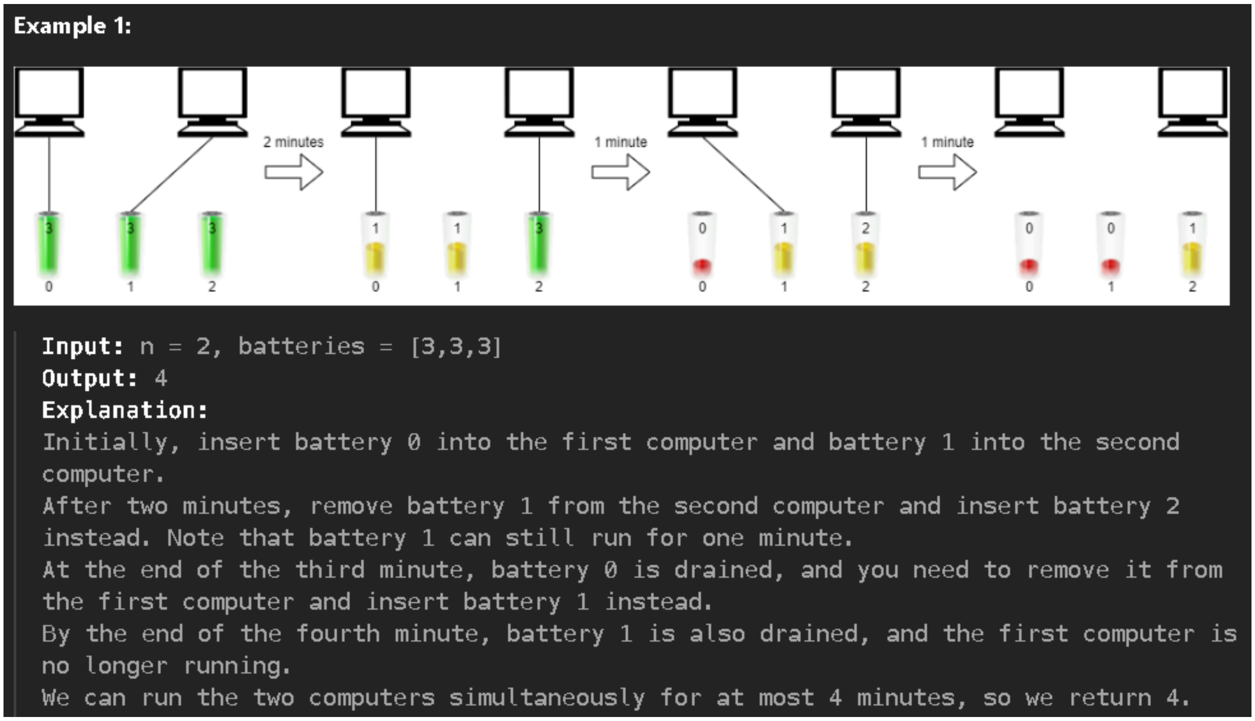
Hard | Topics | Companies | Hint

You have `n` computers. You are given the integer `n` and a **0-indexed** integer array `batteries` where the `i^th` 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.

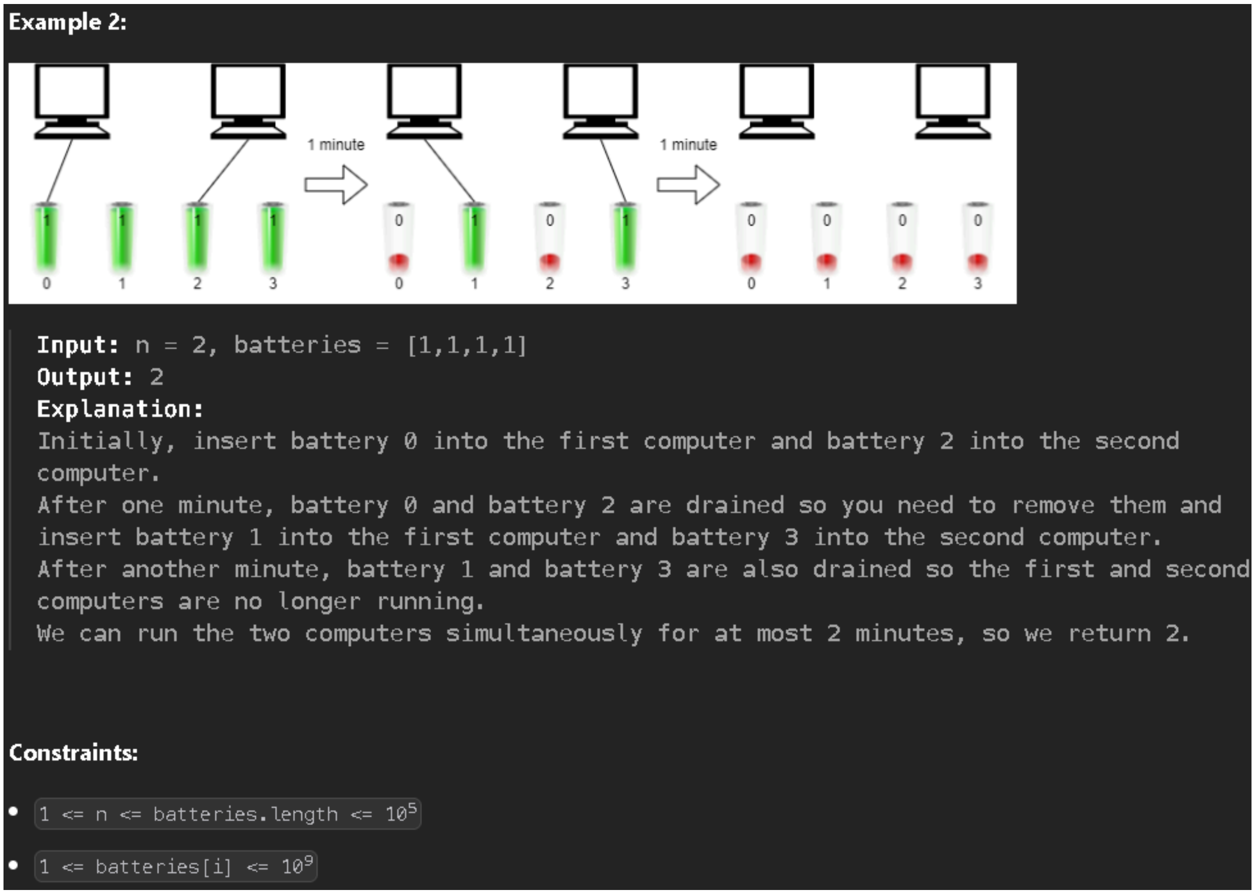
Note that the batteries cannot be recharged.

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 <=` 10^5
- `1 <= batteries[i] <=` 10^9

Python:

```
class Solution:
    def maxRunTime(self, n: int, batteries: List[int]) -> int:
        batteries.sort()
        extra = sum(batteries[:-n])
        batteries = batteries[-n:]

        ans = prefix = 0
        for i, x in enumerate(batteries):
            prefix += x
            if i+1 < len(batteries) and batteries[i+1]*(i+1) - prefix > extra: return (prefix + extra) //
(i+1)
        return (prefix + extra) // n
```

JavaScript:

```
/**
 * @param {number} n
 * @param {number[]} batteries
 * @return {number}
 */
```

```
var maxRunTime = function(n, batteries) {
            batteries.sort((a, b) => a - b);
        let left = 1, right = Math.floor(batteries.reduce((a, b) => a + b) / n);
        while (left < right) {
            let target = right - Math.floor((right - left) / 2);
            let total = batteries.reduce((a, b) => a + Math.min(b, target), 0);
            if (total >= target * n) {
                left = target;
            } else {
                right = target - 1;
            }
        }
        return left;
};
```

Java:

```
class Solution {
    public long maxRunTime(int n, int[] A) {
        Arrays.sort(A);
        long sum = 0;
        for (int a: A)
            sum += a;
        int k = 0, na = A.length;
        while (A[na - 1 - k] > sum / (n - k))
            sum -= A[na - 1 - k++];
        return sum / (n - k);
    }
}
```