Problem 1846: Maximum Element After Decreasing and Rearranging

Problem Information

Difficulty: Medium
Acceptance Rate: 65.75%
Paid Only: No
Tags: Array, Greedy, Sorting

Problem Description

You are given an array of positive integers `arr`. Perform some operations (possibly none) on `arr` so that it satisfies these conditions:

* The value of the **first** element in `arr` must be `1`. * The absolute difference between any 2 adjacent elements must be **less than or equal to**`1`. In other words, `abs(arr[i] - arr[i - 1]) <= 1` for each `i` where `1 <= i < arr.length` (**0-indexed**). `abs(x)` is the absolute value of `x`.

There are 2 types of operations that you can perform any number of times:

* **Decrease** the value of any element of `arr` to a **smaller positive integer**. * **Rearrange** the elements of `arr` to be in any order.

Return _the**maximum** possible value of an element in _`arr` _after performing the operations to satisfy the conditions_.

Example 1:

Input: arr = [2,2,1,2,1] **Output:** 2 **Explanation:** We can satisfy the conditions by rearranging arr so it becomes [1,2,2,2,1]. The largest element in arr is 2.

Example 2:

Input: arr = [100,1,1000] **Output:** 3 **Explanation:** One possible way to satisfy the conditions is by doing the following: 1. Rearrange arr so it becomes [1,100,1000]. 2. Decrease the value of the second element to 2. 3. Decrease the value of the third element to 3. Now arr = [1,2,3], which satisfies the conditions. The largest element in arr is 3.

Example 3:

Input: arr = [1,2,3,4,5] **Output:** 5 **Explanation:** The array already satisfies the conditions, and the largest element is 5.

Constraints:

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

Code Snippets

C++:

```
class Solution {
public:
int maximumElementAfterDecrementingAndRearranging(vector<int>& arr) {

}
};
```

Java:

```
class Solution {
public int maximumElementAfterDecrementingAndRearranging(int[] arr) {

}
}
```

Python3:

```
class Solution:
def maximumElementAfterDecrementingAndRearranging(self, arr: List[int]) -> int:
```