Problem 1760: Minimum Limit of Balls in a Bag

Problem Information

Difficulty: Medium
Acceptance Rate: 66.76%
Paid Only: No
Tags: Array, Binary Search

Problem Description

You are given an integer array `nums` where the `ith` bag contains `nums[i]` balls. You are also given an integer `maxOperations`.

You can perform the following operation at most `maxOperations` times:

* Take any bag of balls and divide it into two new bags with a **positive** number of balls. * For example, a bag of `5` balls can become two new bags of `1` and `4` balls, or two new bags of `2` and `3` balls.

Your penalty is the **maximum** number of balls in a bag. You want to **minimize** your penalty after the operations.

Return _the minimum possible penalty after performing the operations_.

Example 1:

Input: nums = [9], maxOperations = 2 **Output:** 3 **Explanation:** - Divide the bag with 9 balls into two bags of sizes 6 and 3. [**_9_**] -> [6,3]. - Divide the bag with 6 balls into two bags of sizes 3 and 3. [**_6_** ,3] -> [3,3,3]. The bag with the most number of balls has 3 balls, so your penalty is 3 and you should return 3.

Example 2:

Input: nums = [2,4,8,2], maxOperations = 4 **Output:** 2 **Explanation:** - Divide the bag with 8 balls into two bags of sizes 4 and 4. [2,4,**_8_** ,2] -> [2,4,4,4,2]. - Divide the bag with 4 balls into two bags of sizes 2 and 2. [2,**_4_** ,4,4,2] -> [2,2,2,4,4,2]. - Divide the bag with 4 balls into two bags of sizes 2 and 2. [2,2,2,**_4_** ,4,2] -> [2,2,2,2,2,4,2]. - Divide the bag with 4 balls into two bags of sizes 2 and 2. [2,2,2,2,2,**_4_** ,2] -> [2,2,2,2,2,2,2,2]. The bag with the most number of balls has 2 balls, so your penalty is 2, and you should return 2.

Constraints:

* `1 <= nums.length <= 105` * `1 <= maxOperations, nums[i] <= 109`

Code Snippets

C++:

```
class Solution {
public:
int minimumSize(vector<int>& nums, int maxOperations) {

}
};
```

Java:

```
class Solution {
public int minimumSize(int[] nums, int maxOperations) {

}
}
```

Python3:

```
class Solution:
def minimumSize(self, nums: List[int], maxOperations: int) -> int:
```