Problem 2208: Minimum Operations to Halve Array Sum

Problem Information

Difficulty: Medium
Acceptance Rate: 49.67%
Paid Only: No
Tags: Array, Greedy, Heap (Priority Queue)

Problem Description

You are given an array `nums` of positive integers. In one operation, you can choose **any** number from `nums` and reduce it to **exactly** half the number. (Note that you may choose this reduced number in future operations.)

Return _the**minimum** number of operations to reduce the sum of _`nums` _by**at least** half._

Example 1:

Input: nums = [5,19,8,1] **Output:** 3 **Explanation:** The initial sum of nums is equal to 5 + 19 + 8 + 1 = 33. The following is one of the ways to reduce the sum by at least half: Pick the number 19 and reduce it to 9.5. Pick the number 9.5 and reduce it to 4.75. Pick the number 8 and reduce it to 4. The final array is [5, 4.75, 4, 1] with a total sum of 5 + 4.75 + 4 + 1 = 14.75. The sum of nums has been reduced by 33 - 14.75 = 18.25, which is at least half of the initial sum, 18.25 >= 33/2 = 16.5. Overall, 3 operations were used so we return 3. It can be shown that we cannot reduce the sum by at least half in less than 3 operations.

Example 2:

Input: nums = [3,8,20] **Output:** 3 **Explanation:** The initial sum of nums is equal to 3 + 8 + 20 = 31. The following is one of the ways to reduce the sum by at least half: Pick the number 20 and reduce it to 10. Pick the number 10 and reduce it to 5. Pick the number 3 and reduce it to 1.5. The final array is [1.5, 8, 5] with a total sum of 1.5 + 8 + 5 = 14.5. The sum of nums has been reduced by 31 - 14.5 = 16.5, which is at least half of the initial sum, 16.5 >= 31/2 = 15.5. Overall, 3 operations were used so we return 3. It can be shown that we cannot

reduce the sum by at least half in less than 3 operations.

Constraints:

* `1 <= nums.length <= 105` * `1 <= nums[i] <= 107`

Code Snippets

C++:

```cpp
class Solution {
public:
int halveArray(vector<int>& nums) {

}
};
```

Java:

```java
class Solution {
public int halveArray(int[] nums) {

}
}
```

Python3:

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