Problem 3066: Minimum Operations to Exceed Threshold Value II

Problem Information

Difficulty: Medium
Acceptance Rate: 45.79%
Paid Only: No
Tags: Array, Heap (Priority Queue), Simulation

Problem Description

You are given a **0-indexed** integer array `nums`, and an integer `k`.

You are allowed to perform some operations on `nums`, where in a single operation, you can:

* Select the two **smallest** integers `x` and `y` from `nums`. * Remove `x` and `y` from `nums`. * Insert `(min(x, y) * 2 + max(x, y))` at any position in the array.

Note that you can only apply the described operation if `nums` contains **at least** two elements.

Return the **minimum** number of operations needed so that all elements of the array are **greater than or equal to** `k`.

Example 1:

Input: nums = [2,11,10,1,3], k = 10

Output: 2

Explanation:

1. In the first operation, we remove elements 1 and 2, then add `1 * 2 + 2` to `nums`. `nums` becomes equal to `[4, 11, 10, 3]`. 2. In the second operation, we remove elements 3 and 4, then add `3 * 2 + 4` to `nums`. `nums` becomes equal to `[10, 11, 10]`.

At this stage, all the elements of nums are greater than or equal to 10 so we can stop.

It can be shown that 2 is the minimum number of operations needed so that all elements of the array are greater than or equal to 10.

Example 2:

Input: nums = [1,1,2,4,9], k = 20

Output: 4

Explanation:

1. After one operation, `nums` becomes equal to `[2, 4, 9, 3]`. 2. After two operations, `nums` becomes equal to `[7, 4, 9]`. 3. After three operations, `nums` becomes equal to `[15, 9]`. 4. After four operations, `nums` becomes equal to `[33]`.

At this stage, all the elements of `nums` are greater than 20 so we can stop.

It can be shown that 4 is the minimum number of operations needed so that all elements of the array are greater than or equal to 20.

Constraints:

* `2 <= nums.length <= 2 * 105` * `1 <= nums[i] <= 109` * `1 <= k <= 109` * The input is generated such that an answer always exists. That is, after performing some number of operations, all elements of the array are greater than or equal to `k`.

Code Snippets

C++:

```
class Solution {
public:
int minOperations(vector<int>& nums, int k) {

}
};
```

Java:

```
class Solution {
public int minOperations(int[] nums, int k) {

}
}
```

Python3:

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