**1658. Minimum Operations to Reduce X to Zero: -**

Medium Accepted: 120.8K Submissions: 317.9K Acceptance Rate: 38.0%

You are given an integer array nums and an integer x. In one operation, you can either remove the leftmost or the rightmost element from the array nums and subtract its value from x. Note that this **modifies** the array for future operations.

Return *the****minimum number****of operations to reduce*x *to****exactly*** 0 *if it is possible, otherwise, return*-1.

**Example 1:**

**Input:** nums = [1,1,4,2,3], x = 5

**Output:** 2

**Explanation:** The optimal solution is to remove the last two elements to reduce x to zero.

**Example 2:**

**Input:** nums = [5,6,7,8,9], x = 4

**Output:** -1

**Example 3:**

**Input:** nums = [3,2,20,1,1,3], x = 10

**Output:** 5

**Explanation:** The optimal solution is to remove the last three elements and the first two elements (5 operations in total) to reduce x to zero.

**Constraints:**

* 1 <= nums.length <= 105
* 1 <= nums[i] <= 104
* 1 <= x <= 109

**Code: -**

class Solution {

public:

    int find1(int target, vector<int> &pre){

      int low = 0, high = pre.size()-1;

      while(low <= high){

        int mid = low + (high - low) / 2;

        if(pre[mid] == target)

          return mid;

        else if(target > pre[mid])

          low = mid + 1;

        else

          high = mid - 1;

      }

      return -1;

    }

    int find2(int target, vector<int> &suf){

      int low = 0, high = suf.size()-1;

      while(low <= high){

        int mid = low + (high - low) / 2;

        if(suf[mid] == target)

          return mid;

        else if(target > suf[mid])

          high = mid - 1;

        else

          low = mid + 1;

      }

      return -1;

    }

    int minOperations(vector<int>& nums, int x) {

      int n = nums.size();

      vector<int> pre(n), suf(n);

      pre[0] = nums[0];

      suf[n-1] = nums[n-1];

      for(int i=1; i<n; ++i)

        pre[i] = pre[i-1] + nums[i];

      for(int i=n-2; i>=0; --i)

        suf[i] = suf[i+1] + nums[i];

      int ans = INT\_MAX;

      for(int i=n-1; i>=0; --i){

        if(suf[i] > x)

          break;

        int count = n - i;

        if(x - suf[i] == 0)

          ans = min(ans, count);

        else{

          int ind = find1(x-suf[i], pre);

          if(ind != -1 and ind < i){

            count += (ind + 1);

            ans = min(ans, count);

          }

        }

      }

      for(int i=0; i<n; ++i){

        if(pre[i] > x)

          break;

        int count = i + 1;

        if(x - pre[i] == 0)

          ans = min(ans, count);

        else{

          int ind = find2(x-suf[i], pre);

          if(ind != -1 and ind > i){

            count += (n - ind);

            ans = min(ans, count);

          }

        }

      }

      if(ans != INT\_MAX)

        return ans;

      return -1;

    }

};

**T.C: - O(N \* log N)**

**S.C: - O(N)**