2551 - Put Marbles in Bag

Monday, March 31, 2025

Link: https://leetcode.com/problems/put-marbles-in-bags

You have k bags. You are given a 0-indexed integer array weights where weights[i] is the weight of the i^{th} marble. You are also given the integer k.

Divide the marbles into the k bags according to the following rules:

- No bag is empty.
- If the i^{th} marble and j^{th} marble are in a bag, then all marbles with an index between the i^{th} and j^{th} indices should also be in that same bag.
- If a bag consists of all the marbles with an index from i to j inclusively, then the cost of the bag is weights[i] + weights[j].

The score after distributing the marbles is the sum of the costs of all the k bags.

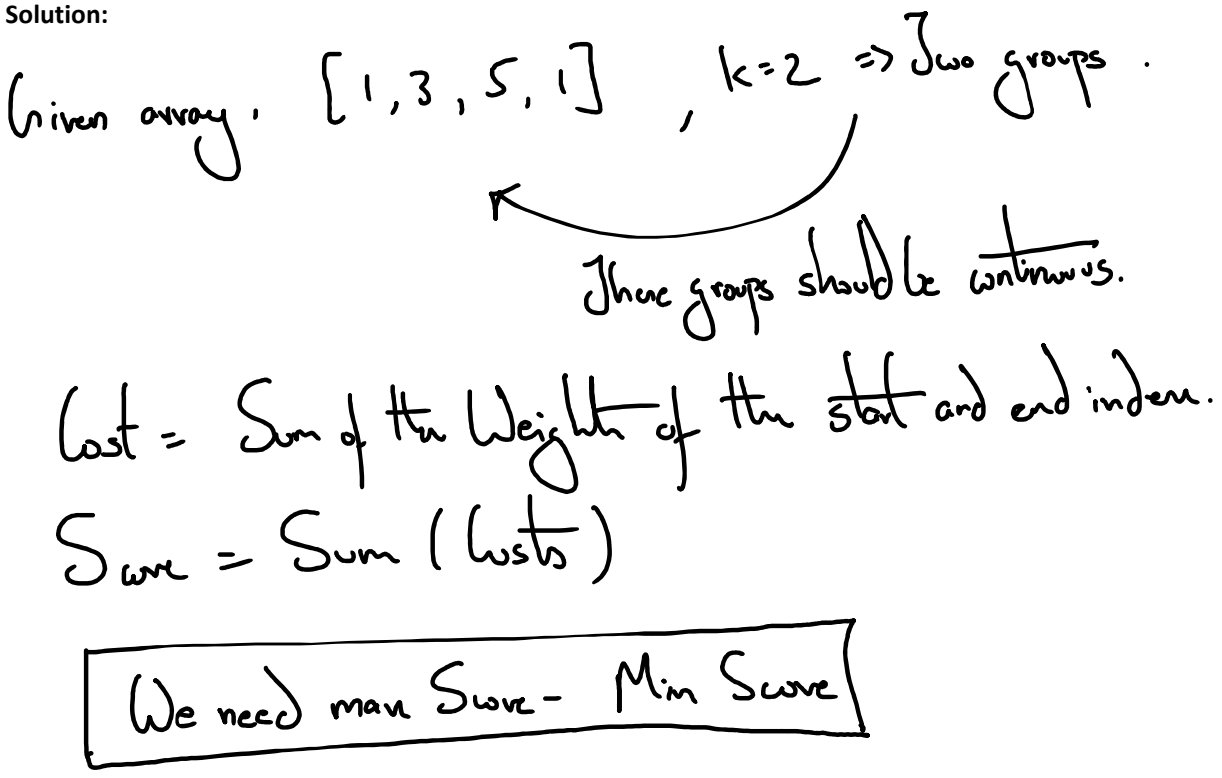
Return *the difference between the maximum and minimum scores among marble distributions*.

Example 1:
Input: weights = [1,3,5,1], k = 2
Output: 4
Explanation:
The distribution [1],[3,5,1] results in the minimal score of (1+1) + (3+1) = 6.
The distribution [1,3],[5,1], results in the maximal score of (1+3) + (5+1) = 10.
Thus, we return their difference 10 - 6 = 4.
Example 2:
Input: weights = [1, 3], k = 2
Output: 0
Explanation: The only distribution possible is [1],[3].
Since both the maximal and minimal score are the same, we return 0.

Constraints:

- 1 <= k <= weights.length <= 10^5
- 1 <= weights[i] <= 10^9

Solution:



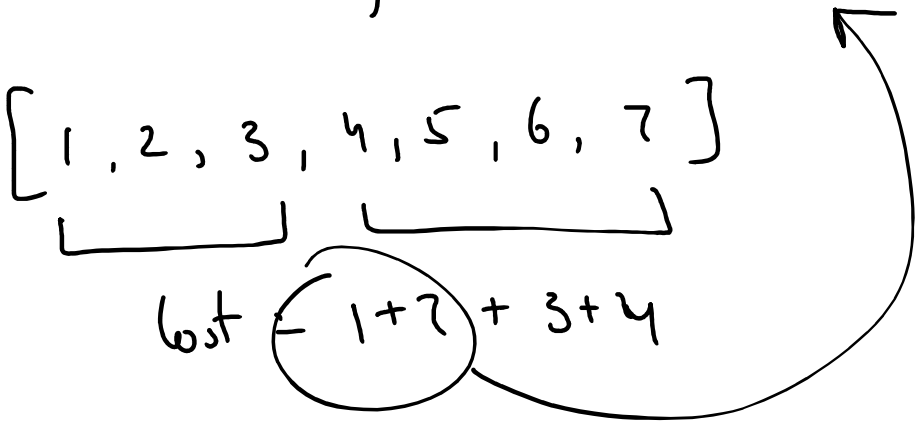
Simple Solution:

Say the array is longer, [1, 2, 3, 4, 5, 6, 7]

Now (1) and (7) are fixed [k ≥ 1]

=> Min = 1+7+i+j , Max = 1+7+i+j

First and last element sum is always a part of the Overall cost



This true for any number of splits.

For any k, we have to compare the split.

if k == 1 : return 0.

splits [] -> Create Array

for i in range (len(Weight) - 1):

add Weight[i] + weight[i+1] to split

sort split

sort split

max_score = weight[0] + weights[-1] + sum[last k values]

min_score = weight[0] + weight[-1] + sum[first k values]

return the difference