Problem 2234: Maximum Total Beauty of the Gardens

Problem Information

Difficulty: Hard
Acceptance Rate: 30.13%
Paid Only: No
Tags: Array, Two Pointers, Binary Search, Greedy, Sorting, Enumeration, Prefix Sum

Problem Description

Alice is a caretaker of `n` gardens and she wants to plant flowers to maximize the total beauty of all her gardens.

You are given a **0-indexed** integer array `flowers` of size `n`, where `flowers[i]` is the number of flowers already planted in the `ith` garden. Flowers that are already planted **cannot** be removed. You are then given another integer `newFlowers`, which is the **maximum** number of flowers that Alice can additionally plant. You are also given the integers `target`, `full`, and `partial`.

A garden is considered **complete** if it has **at least** `target` flowers. The **total beauty** of the gardens is then determined as the **sum** of the following:

* The number of **complete** gardens multiplied by `full`. * The **minimum** number of flowers in any of the **incomplete** gardens multiplied by `partial`. If there are no incomplete gardens, then this value will be `0`.

Return _the**maximum** total beauty that Alice can obtain after planting at most _`newFlowers` _flowers._

Example 1:

Input: flowers = [1,3,1,1], newFlowers = 7, target = 6, full = 12, partial = 1 **Output:** 14 **Explanation:** Alice can plant - 2 flowers in the 0th garden - 3 flowers in the 1st garden - 1 flower in the 2nd garden - 1 flower in the 3rd garden The gardens will then be [3,6,2,2]. She planted a total of 2 + 3 + 1 + 1 = 7 flowers. There is 1 garden that is complete. The minimum

number of flowers in the incomplete gardens is 2. Thus, the total beauty is 1 * 12 + 2 * 1 = 12 + 2 = 14. No other way of planting flowers can obtain a total beauty higher than 14.

Example 2:

Input: flowers = [2,4,5,3], newFlowers = 10, target = 5, full = 2, partial = 6 **Output:** 30 **Explanation:** Alice can plant - 3 flowers in the 0th garden - 0 flowers in the 1st garden - 0 flowers in the 2nd garden - 2 flowers in the 3rd garden The gardens will then be [5,4,5,5]. She planted a total of 3 + 0 + 0 + 2 = 5 flowers. There are 3 gardens that are complete. The minimum number of flowers in the incomplete gardens is 4. Thus, the total beauty is 3 * 2 + 4 * 6 = 6 + 24 = 30. No other way of planting flowers can obtain a total beauty higher than 30. Note that Alice could make all the gardens complete but in this case, she would obtain a lower total beauty.

Constraints:

* `1 <= flowers.length <= 105` * `1 <= flowers[i], target <= 105` * `1 <= newFlowers <= 1010` * `1 <= full, partial <= 105`

Code Snippets

C++:

```
class Solution {
public:
long long maximumBeauty(vector<int>& flowers, long long newFlowers, int
target, int full, int partial) {

}
};
```

Java:

```
class Solution {
public long maximumBeauty(int[] flowers, long newFlowers, int target, int
full, int partial) {

}
}
```

Python3:

```
class Solution:
def maximumBeauty(self, flowers: List[int], newFlowers: int, target: int,
full: int, partial: int) -> int:
```