Difference Array

Concepts & Qns

Video-
5

(M)otivation :-

It's very easy to get distracted.
If you are able to control
your distractions, you are
already ahead of more than

90% of people.

3346. Maximum Frequency of an Element After Performing Operations I

Solved

Prefix

Medium | Topics | Companies | Hint

You are given an integer array `nums` and two integers `k` and `numOperations`.

You must perform an **operation** `numOperations` times on `nums`, where in each operation you:

- Select an index `i` that was **not** selected in any previous operations.
- Add an integer in the range `[-k, k]` to `nums[i]`.

Return the **maximum** possible frequency of any element in `nums` after performing the **operations**.

Example :- nums = [1, 4, 5], K = 1, numOperations = 2

K = 1
(-K, K] = -1, 0, 1
4 + 0 = 5
5 + 0 = 5

Output : 2

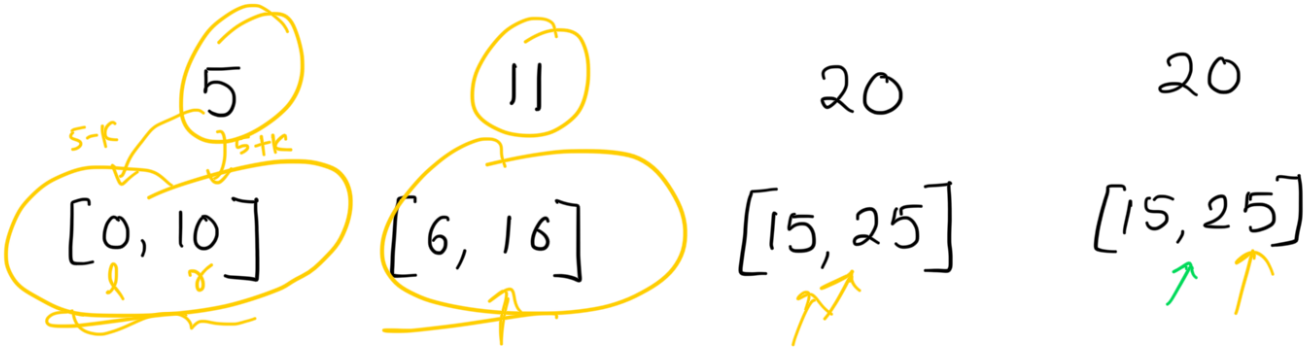
Thought Process

nums = [5, 11, 20, 20]

K = 5

numOperations = 1

5 + (-4) = 1



0, 1, 2, 3, 4, 5, 6, 7, ... 9, 10, 11, 12, ... 15, 16, 17, 18, ... 20, 21, 22, 23, 24, 25, 26

1 0 0 0 0 0 1 0 0 0 -1 0 2 0 -1 0 0 0 0 0 0 0, -2

[1, 1, 1, 1, 1, 1, 2, 2, .. 2, 2, 1, 1, 1.... 3, 3, 2, 2 .... 2, 2, 2, 2, 2, 2, 0]

O(9 * n)

totalCount = 3

ElemOwnFrq = 0

needConversion = 3 - 0 = 3

maxPerOperant = min(3, numOperant)
= min(3, 1) = 1

totalOp = 0 + 1 = 1

DAT

① $[l, r] \rightarrow$ `diff[l]++;`
`diff[r+1]--;`

② Cumulative Sum.

maxVal = (max-element) + K

```
diff <maxEl+2, 0> ;
unordered_map<int, int> freq;

for ( int i=0; i< nums.size(); i++) {
    freq[nums[i]]++;

    l = max( nums[i] - K, 0);
    r = min(nums[i] + K, maxVal);

    diff[l]++;
    diff[r+1]--;

}
```

Step-1 (DAT)

// CumSum

```
for (int target = 0; target <= maxval; target++) {
    diff[target] = (target > 0 ? diff[target - 1] : 0);
    int targetFreq = freq[target];
    int needConversion = diff[target] - targetFreq;
    int maxPossFreq = min(needConversion,
                          numOpent);
    result = max(result, targetFreq +
                 maxPossFreq);
}
return result;
```

O(maxval)

S.C O(maxval)