



Leetcode Daily Challenge

03/03/2022

T.C. $O(n)$
S.C. $O(1)$



problem

Arithmetic Slices

pre-requisites

Basic Maths

difficulty
Medium

est. time
10-15 min

can be asked in...



60%
Accuracy



Statement

Description

- An integer array is called arithmetic if it consists of at least three elements and if the difference between any two consecutive elements is the same.

I/P

nums = [1,2,3,4]

O/P

3

Explanation->

- [1,2,3,4] has 3 Arithmetic series
 - > [1,2,3]
 - > [2,3,4]
 - > [1,2,3,4]



Observations

An arithmetic series of size n has how many possible arith.series ?

$n = 3$ total

[1,2,3] 1

$n = 4$ total

[1,2,3,4] 3

$n = 5$ total

[1,2,3,4,5] 6

- If you observe total values for each case
- removing corner elements we get

for $n = 3$, total = sum(1) //sum of 1st 1 natural no.

for $n = 4$, total = sum(2) //sum of 1st 2 natural no.

for $n = 5$, total = sum(3) //sum of 1st 3 natural no.



Intuition

We can generalise, for arithmetic series of size n , total arithmetic series it will have =

$\text{sum}(\text{first } n-2 \text{ natural no})$

ex - 1

[1,2,3,6,9]

has 2 a.s. [1,2,3] size = 3

[3,6,9] size = 3

total = 2

ex - 2

[1,2,3,5,6,9,12,15]

has 2 a.s. [1,2,3] size = 3

[6,9,12,15] size = 4

total = 4

size 3 a.s contributes total of 1 a.s

size 4 a.s contributes total of 3 a.s

so total becomes = 1 + 3
= 4 we generalised this formula
in prev. file



Intuition

our aim is to find no. of a.s. possible.

as per question, we are considering only consecutive elements for arithmetic series

0	1	2	3	4	5	6	7
[1,	2,	3,	5,	6,	9,	12,	15]



from above pic, we can observe-

-> if we iterate from left, we can easily get
no. of a.s & their size just by checking...

```
if(nums[i]-nums[i-1] == nums[i+1]-nums[i])  
    a,b,c are in a.p if b-a == c-b  
    increase a.s size
```

```
else start new arithmetic series.
```



```
class Solution {
public:
    int numberOfArithmeticSlices(vector<int>& nums) {

        int ans = 0; // total no. of a.s.
        int cnt = 0; // cnt = size of a.s. - 2
        int n = nums.size();
        for(int i = 1; i < n - 1; i++) {
            if(nums[i] - nums[i-1] == nums[i+1] - nums[i]) {
                cnt++;
            } else {
                ans += (cnt*(cnt+1)/2);
                cnt = 0;
            }
        }
        ans += (cnt*(cnt+1)/2);
        return ans;
    }
};
```



follow-up

we generalised that
for arithmetic series of size n
total arithmetic series it will contribute =
 $\text{sum}(\text{first } n-2 \text{ natural no.})$

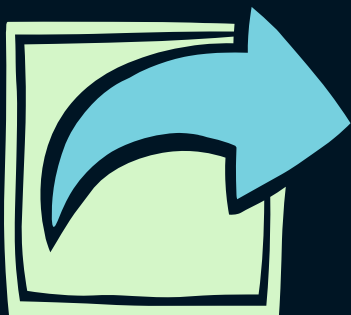
it has a pretty simple proof, try to come up with that.



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