724. Find Pivot Index

Easy 👍 7.6K 👎 774 ☆ ↻

🔒 Companies

Given an array of integers `nums`, calculate the **pivot index** of this array.

The **pivot index** is the index where the sum of all the numbers **strictly** to the left of the index is equal to the sum of all the numbers **strictly** to the index's right.

If the index is on the left edge of the array, then the left sum is `0` because there are no elements to the left. This also applies to the right edge of the array.

Return *the **leftmost pivot index***. If no such index exists, return `-1`.

Example 1:

```
Input: nums = [1,7,3,6,5,6]
Output: 3
Explanation:
The pivot index is 3.
Left sum = nums[0] + nums[1] + nums[2] = 1 + 7 + 3 = 11
Right sum = nums[4] + nums[5] = 5 + 6 = 11
```

Example 2:

```
Input: nums = [1,2,3]
Output: -1
Explanation:
There is no index that satisfies the conditions in the
problem statement.
```

Example 3:

```
Input: nums = [2,1,-1]
Output: 0
Explanation:
The pivot index is 0.
Left sum = 0 (no elements to the left of index 0)
Right sum = nums[1] + nums[2] = 1 + -1 = 0
```

Constraints:

- `1 <= nums.length <= 10^4`
- `-1000 <= nums[i] <= 1000`

Approach 1: Using two xtra arrays

→ Calculate forwardSum in one array
   and   BackwardSum in other array

→ Return the index at which
forwardSum [i] == BackwardSum [i]

```
  0   1   2   3   4   5
| 1 | 7 | 3 | 6 | 5 | 6 |
```

→ i.e. Sum of elements in $[0, 2]$

```
  0   1   2   3   4   5
| 0 | 1 | 8 | 11 | 17 | 22 |
```

Sum of elements in $[4, 5]$

```
  0   1   2   3   4   5
| 27 | 20 | 17 | 11 | 6 | 0 |
```

So return 3.

$$T(n) = O(n)$$
$$S(n) = O(n) + O(n)$$

Approach 2: without using any xtra space

→ Calculate Sum of all elements of array.
→ Maintain a variable that keeps track of leftSum
    i.e. leftSum at index i holds the sum of elements in $[0, i-1]$
→ now start iterating the array and at each index i check
    if (leftSum == (Sum - leftSum - nums[i]))

if it is true return i.

0	1	2	3	4	5
1	7	3	6	5	6

Sum = 28
LeftSum = 0

$\longrightarrow$ at this index LeftSum = 11
                    and
      11 is equal to (28 - 11 - 6)
                So
                return 3.