Center Balance Index 1 - Solution Outline

Key Ideas

Keep the total sum on the right and a running sum on the left. When they match, the current index is a valid balance point. The first such index is the answer.

Algorithm

1. Compute `right = sum(a)` and set `left = 0`.
2. For each index `i` from `0` to `n - 1`:
   - Subtract `a[i]` from `right`.
   - If `left == right`, output `i` and stop.
   - Add `a[i]` to `left`.
3. If no index works, output `-1`.

Correctness Sketch

At index `i`, `left` equals the sum of elements strictly left of `i`, and `right` equals the sum strictly right of `i`. The definition of a center balance index is exactly `left == right`, and the scan finds the leftmost such index.

Complexity

- Time: `O(n)`
- Space: `O(1)`