1524. Number of Sub-arrays With Odd Sum

Medium | Topics | Companies | Hint

Given an array of integers `arr`, return *the number of subarrays with an **odd** sum*.

Since the answer can be very large, return it modulo $10^9 + 7$.

Example 1:

```
Input: arr = [1,3,5]
Output: 4
Explanation: All subarrays are [[1],[1,3],[1,3,5],[3],[3,5],
[5]]
All sub-arrays sum are [1,4,9,3,8,5].
Odd sums are [1,9,3,5] so the answer is 4.
```

Example 2:

```
Input: arr = [2,4,6]
Output: 0
Explanation: All subarrays are [[2],[2,4],[2,4,6],[4],[4,6],
[6]]
All sub-arrays sum are [2,6,12,4,10,6].
All sub-arrays have even sum and the answer is 0.
```

ython3 Auto

```python
class Solution:
    def numOfSubarrays(self, arr: List[int]) -> int:
        odd, even = 0, 0
        m = 10 ** 9 + 7
        for n in arr:
            if n % 2 == 0:
                even += 1
            else:
                odd += 1

        evens = 2 ** even % m
        odds = 2 ** (odd - 1) % m

        print(odd, even, odds, evens)

        return evens * odds % m
```

1st solution . X

1° odd = 1 → error

2° only odd # of ~~odd~~ sum together can be odd,

even # of odd can't.

→ ① Sum of subarray arr[i..j] is ~~odd~~ if prefix sum at i and j+1 differ.

All Submissions

Accepted 151 / 151 testcases passed

AndrewC275 submitted at Feb 25, 2025 14:14

Editorial | Solution

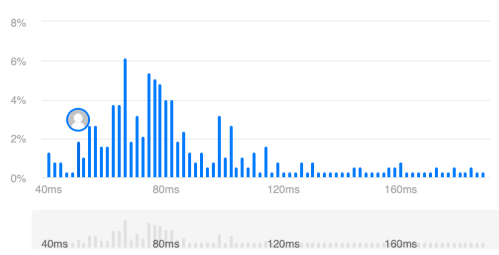
Runtime

51 ms | Beats 96.51%

Analyze Complexity

Memory

21.94 MB | Beats 43.01%



Code | Python3

Python3 Auto

```python
class Solution:
    def numOfSubarrays(self, arr: List[int]) -> int:
        prefix_parity = 0
        even = 1 #  start at 0, so count_even = 1
        odd = 0
        m = 10 ** 9 + 7

        for n in arr:
            prefix_parity = (prefix_parity + n) % 2
            if prefix_parity == 0:
                even += 1
            else:
                odd += 1

        return even * odd % m
```

Ln 15, Col 30 | Saved

Run

Testcase | Test Result

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3