2-kun Masala

📘 2-KUN: Massivlar, Prefix yig‘indi, Two Pointers

🎯 Maqsad:

- List (massiv) bilan ishlashni mukammal bilish
- Prefiks yig‘indi orqali segmentlarni tez hisoblash
- Two Pointers (sliding window) algoritmini tushunish
- Saralash (`sorted`) va `set()` bilan tez ishlashni o‘rganish

🧱 1. List (massiv) bilan ishlash

```
arr = [3, 1, 4, 1, 5, 9]

print(len(arr))    # 6
print(sum(arr))    # 23
print(max(arr))    # 9
```

```
print(min(arr))     # 1

arr.sort()          # o‘sish tartibida
print(arr)          # [1, 1, 3, 4, 5, 9]

arr.reverse()       # teskari
print(arr)          # [9, 5, 4, 3, 1, 1]
```

🧩 2. Prefiks yig‘indi (Prefix Sum)

Masalan, har safar [l, r] oraliqdagi yig‘indini hisoblamoqchisan.

Oddiy usul bilan har safar `O(n)` vaqt ketadi.

Prefiks bilan bu `O(1)` bo‘ladi.

💡 G‘oya:

`prefix[i]` = 1 dan i-gacha bo‘lgan yig‘indi.

`sum(l..r) = prefix[r] - prefix[l-1]`

```
arr = [2, 4, 6, 8, 10]
n = len(arr)

prefix = [0]*(n+1)
for i in range(1, n+1):
    prefix[i] = prefix[i-1] + arr[i-1]

l, r = 2, 4
print(prefix[r] - prefix[l-1])  # 18 (4+6+8)
```

🪟 3. Two Pointers (ikki ko‘rsatkich)

Masalalar turi:

- Berilgan yig‘indiga teng juftlik topish

- Eng uzun segment (yig‘indi ≤ K)
- Minimal uzunlikli segment (yig‘indi ≥ K)

💡 G‘oya:

- `left` va `right` ko‘rsatkichlar orqali massivni aylantiramiz
- Har safar yig‘indini yangilaymiz
- Shart buzilganda chapni siljitamiz

```
arr = [1, 2, 3, 4, 5]
n = len(arr)
target = 7

left = 0
cur_sum = 0
for right in range(n):
    cur_sum += arr[right]
    while cur_sum > target:
        cur_sum -= arr[left]
        left += 1
    if cur_sum == target:
        print(left+1, right+1)
```

📚 4. Takrorlanmas elementlar va Set()

```
arr = [1, 2, 2, 3, 3, 3, 4]
unique = set(arr)
print(len(unique))  # 4
```

🧠 10 TA MASALA TO‘PLAMI (RoboContest tipidagi)

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1. Massiv yig‘indisi

Kirish:

```
5
1 2 3 4 5
```

Chiqish:

```
15
```

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2. Eng katta farq

Kirish:

```
6
3 9 1 5 8 2
```

Chiqish:

```
8
```

Izoh: 9-1 = 8

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3. Takrorlanmaydigan sonlar soni

Kirish:

```
7
1 2 2 3 3 3 4
```

Chiqish:

```
4
```

---

4. Saralangan massivdagi K-chi element

Kirish:

```
5 3
8 4 9 1 6
```

Chiqish:

```
6
```

Izoh: Saralansa → [1,4,6,8,9], 3-chi element = 6.

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5. Prefiks yig‘indi orqali oraliq yig‘indisi

Kirish:

```
5
2 4 6 8 10
2 4
```

Chiqish:

```
18
```

---

6. Juftliklar soni (a[i] + a[j] == K)

Kirish:

```
5 7
1 2 3 4 5
```

Chiqish:

```
2
```

Izoh: (2+5, 3+4)

---

7. Eng uzun segment (yig‘indi ≤ K)

Kirish:

```
5 8
2 1 5 1 3
```

Chiqish:

```
3
```

Izoh: segment [2,1,5] dan oshmaydi (≤8).

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8. Eng kichik sonning indeksi

Kirish:

```
6
4 2 7 1 5 9
```

Chiqish:

```
4
```

Izoh: 1 eng kichik, indeksi 4 (1-based).

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9. Chastota hisoblash

Kirish:

```
5
3 1 3 2 1
```

Chiqish:

```
1 2
2 1
```

```
3 2
```

---

10. Ikki massivning umumiy elementlari soni

Kirish:

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

Chiqish:

```
2
```
