Please keep up with
the assignments

Topics: 1- Sub arr Intro
2- # of subarrs
3- print subarr
4- sum of each subarr
5- total sum of all subarr sum!

Subarray: a **continuous** part of an array

ex a {

| 4 | 1 | 2 | 3 | -1 | 6 | 9 | 8 | 12 | 11 | 6 | }
|---|---|---|---|----|---|---|---|----|----|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

① 2, 3, -1, 6 ✓   ② 4, 1, 2, ..., 11, 6 ✓

circle   ③ 11, 6, 4, 1 ✗   extra ④ 4, 1, 100 ✗
                                    element

order   ⑤ 8, 9, 12 ✗   single ⑥ 9 ✓
                                    element

⟶

Quiz

2	4	1	6	-3	7	8	4
0	1	2	3	4	5	6	7

✗a) 1, 6, 8   ✗b) 1, 4   c) 6, 1, 4, 2 ✗
d) 7, 8, 4

Quiz

4	5	1	9	0	2	3	5
0	1	2	3	4	5	6	7

✓a) 5   b) 4, 5, 1, 0 ✗   ⟩ 3
✓c) 9, 0, 1, 3 ✓d) 4, 5, 1   a, c, d
                                 ans ⟩

How to identify a subarray?

S
e

4	2	10	3	12	-2	15
0	1	2	3	4	5	6

⟶

① Start Index, End Index (s, e) $s \leq e$
   s   e

② Start Index, length of subarr.   3, 3
   s l
                           ⟶ $s, \underline{s+l-1}$
                               end Index

$\boxed{s+l-1 < n}$

number of subarrays of a given array start from index i.

ex

4	2	10	3	12	2	15
0	1	2	3	4	5	6

Quiz
ans = 7

s	e
0	0
0	1
0	2
0	3
0	4
0	5
0	6

Quiz
ans = 6

s	e
1	1
1	2
1	3
1	4
1	5
1	6

total number of subarrays of a given array

s	# of subarrays
0	n +
1	$n-1$ +
2	$n-2$ +
⋮	⋮
$n-1$	$n-(n-1)$ +

$n-(n-1)$ → 1

$1 + 2 + \cdots + (n-2) + (n-1) + n$

$= \dfrac{n(n+1)}{2} \sim O(n^2)$

Quiz $n = 7$ $\dfrac{7 \times 8}{2} = \dfrac{56}{2} = 28 \leftarrow$ ans

Print specific sub array

P1

TC: O(n)
SC: O(1)

```
void printSubarray(int start, int end, int a[]){
    for(i=start; i<=end; i++){
        print(a[i]+" ")              → O(1)
    }
    print("\n")
}
```

P2 Print all sub-arrays:

a: {4, 1, 3, 6}
   0 1 2 3

	0	1	2	3
0	0,0	0,1	0,2	0,3
1		1,1	1,2	1,3
2			2,2	2,3
3				3,3

j=i   (k)

Quiz

TC:
SC:

```
void printAllSubarrays(int a[]){
    n=a.Len
    for(i=0; i<n; i++){
        for(j=i; j<n; j++){
            for(k=i; k<=j; k++){
                print(a[k]+" ")
            }
            print("\n") // new line
        }
    }
}
```