Q Given a string which contains lower case alphabets. Return the no. of pairs (i, j) such that

$$i < j$$
$$S[i] = 'a'$$
$$S[j] = 'g' \quad > 'ag'$$

0	1	2	3	4	5
a	b	c	g	a	g

(0, 3)
(0, 5) $\Rightarrow 3$
(4, 5)

0	1	2	3	4	5	6
a	c	g	d	g	a	g

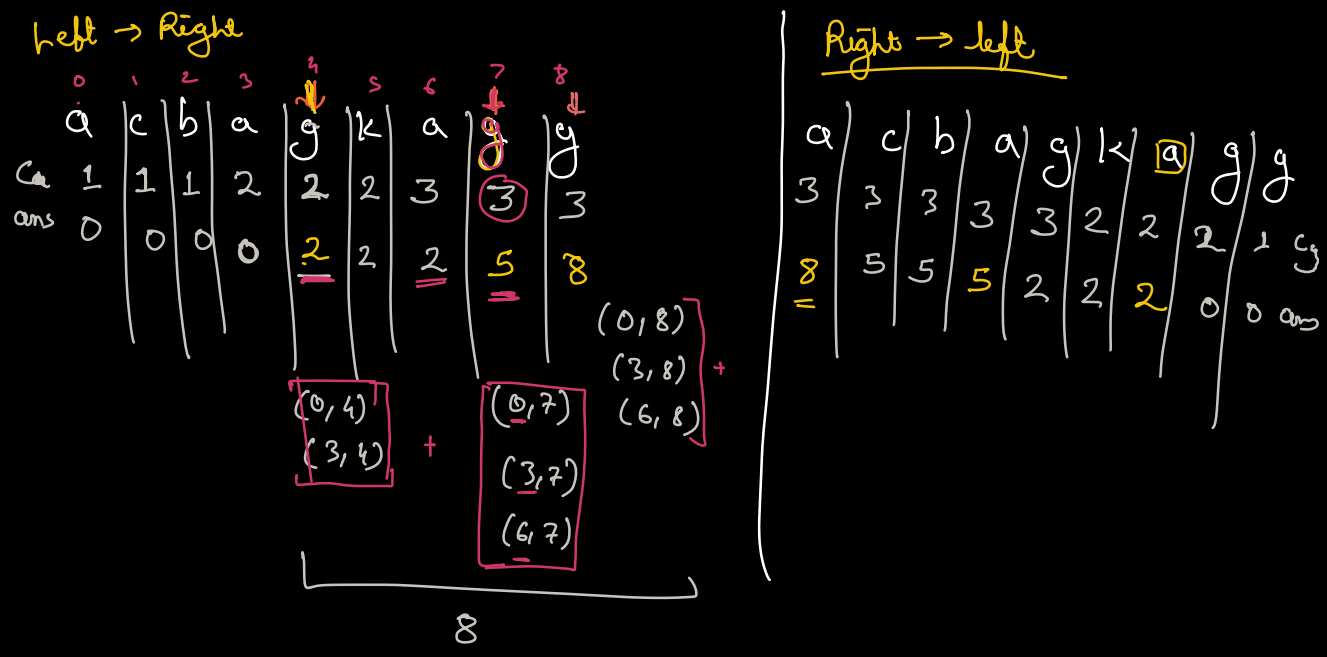
(0, 2) (5, 6)
(0, 4) $\Rightarrow 4$
(0, 6)

0	1	2	3	4	5	6	7
b	c	a	g	g	a	a	g

(2, 3) (5, 7) (6, 7)
(2, 4)
(2, 7) $\Rightarrow 5$

```
ans = 0;
for (i=0; i<N; i++){
  if (s[i] == 'a'){
    for (j=i+1; j<N; j++){
      if (s[j] == 'g')
        ans++;
    }
  }
}
```

TC : $O(N^2)$



TC : O(N)

SC : O(1) (Extra)

Q Given an array return the length of the smallest subarray that contains both max & min of the array.

Ola Share Chat

1, 2, 3, 1, 3, 4, 6, 4, 6, 3

Max = 6

Min = 1

ans = 4

Quiz

2, 2, 6, 4, 5, 1, 5, 2, 6, 4, 1

Max = 6

Min = 1

⇒ [8 → 10] = 3

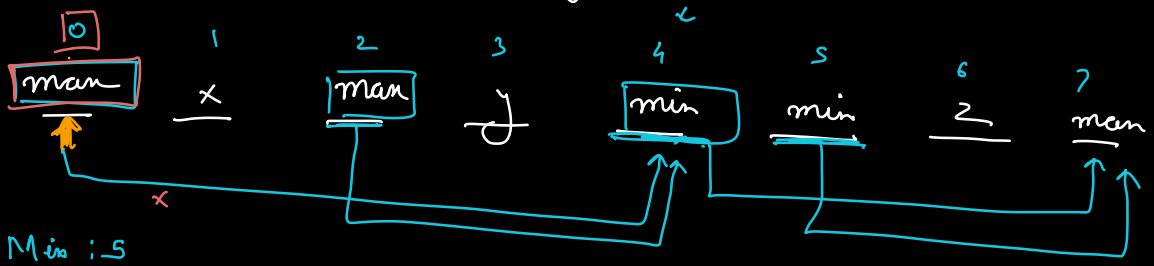
Quiz

0	1	2	3	4	5	6	7	8	9	10	11
1,	6,	4,	2,	7,	7,	5,	1,	3,	1,	1,	5

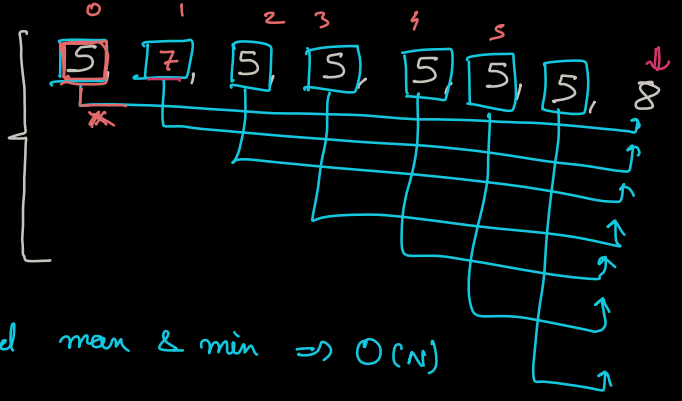
Max = 7
Min = 1 $[5 \rightarrow 7] \Rightarrow 3$

Observations

1. The ans subarray will contain exactly 1 min & 1 max
2. The max & min will always be in the bounds of the ans subarray.



Min : 5
Max : 8



Right

TC : $O(N^2)$

8,

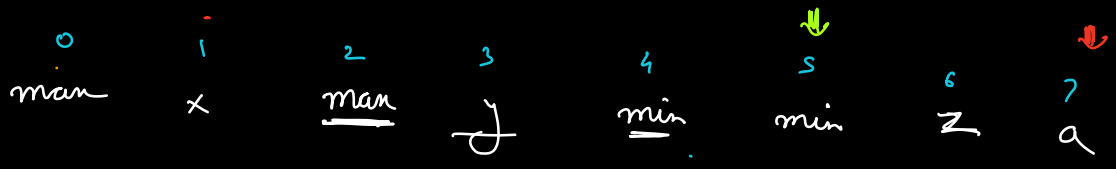
// find max & min $\Rightarrow O(N)$

```
for (i=0; i<N; i++) {
    if (a[i] == min) {
        for (j=i; j<N; j++) {
            if (a[j] == max)
                ans = min(ans, j-i+1);
        }
    }
}
```

$\Rightarrow$ if (a[j] == max)

Quiz 8, 8, 8, 8, 8, 8

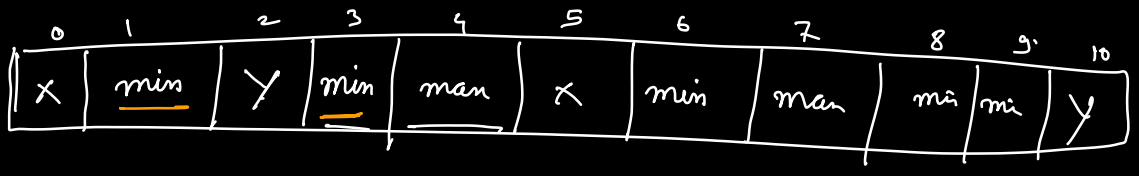
Max : 8
Min : 8



Last Max = ~~0~~ 2

Last Min = ~~4~~ 5

length = 3



Last Min => ~~1~~ ~~3~~ ~~6~~ ~~8~~ 9

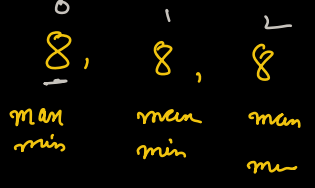
Last Max => ~~4~~ 7

Min Length = (2)

8, 5, 5, 5

Last Mi
Last Max
le

TC : O(N) | SC : O(1) (Extra)



Last Min 0
Last Max 0
Length = 1

Direct i

Q Given an array. Given Q queris each representing a subarray (L, R) & o/e

L, R, O ⇒ Return sum of all odd indexed elements from L to R
or
L, R, e ⇒ Return sum of all even indexed elements from L to R.

0	1	2	3	4	5	6	7
2,	3,	1,	−1,	0,	8,	5,	4

3, 6, Odd ⇒ 7

1, 5, even ⇒ 1

	$	↓						
A:	2,	3,	1,	−1,	0,	8,	5,	4
PS_E:	2,	2,	3,	3,	3,	3,	8,	8
PS_O:	0,	3,	3,	2,	2,	10,	10,	14

	0	1	2	3	4
	2	4	3	1	5
PS_O:	0	4	4	5	5

1, 4, Odd ⇒ Sum = $PS_O[4] - PS_O[0]$ = 5

	0	1	2	3	4	5	6
	4,	1,	0,	−2,	3,	2,	5
PS_E	4,	4,	4,	4,	7,	7,	12

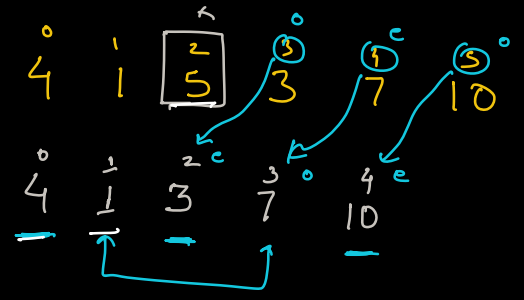
2, 5, e ⇒ Sum = $PS_E[5] - PS_E[1]$ = 3

☆ Given an array. Count the no. of special indices.

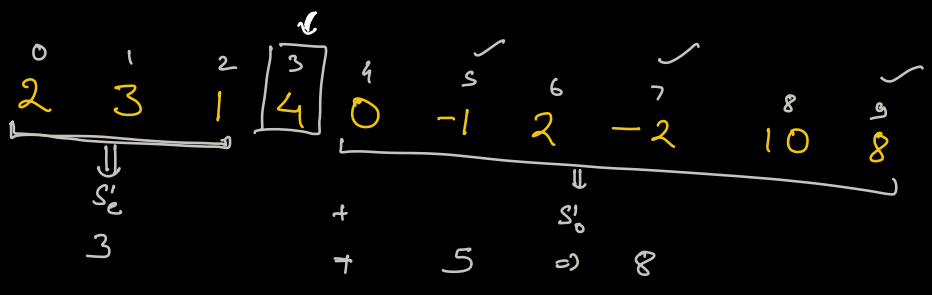
Special Indem : If this indem (& val) is removed then the sum of odd indexed elements should be equal to sum of even indexed elements. (In resulting array)

4, 3, 2, 7, 6, -2			
3, 2, 7, 6, -2	$S_e = 8$	$S_o = 8$	✓
4, 2, 7, 6, -2	$S_e = 9$	$S_o = 8$	✗
4, 3, 7, 6, -2	$S_e = 9$	$S_o = 9$	✓

Quiz

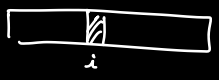


Quiz



Se : S'_e 3 + S'_o 5 ⇒ 8

after removing element at index i



$S_e = S_e[0, (i-1)] + S_o[i+1, N-1]$

$S_o = S_o[0, (i-1)] + S_e[i+1, N-1]$ ⇐

// Create PS_e

// Create PS_o

Why?

```
for (i=0; i<N ; i++) {
    // Se after removal of i
    // So after removal of i
    if (Se == So)
        Count++;
}
```

Space Repetition

Book Mark

Equilibrium finden in $O(1)$ Space.

Hint