

18/9/23 Class -> 4 Array -> 4

APCO
Date: 18/9/23

(Q) \rightarrow Negative to Positive Arrange

Input \rightarrow [-7 | 12 | -10 | -11 | 40 | 60]

Output \rightarrow [-7 | -10 | -11 | 12 | 23 | 40 | 60]

Approach \rightarrow A) Sorting $\rightarrow O(n \log n)$

B) \Rightarrow Two pointer Approach

C) \rightarrow temp array \rightarrow phle negative daal
 $O(n)$ do phle positive
L space
 \hookrightarrow getting space

\Rightarrow So, Sorting \rightarrow Two pointer \rightarrow temp

Two pointers \rightarrow [-7 | 12 | -10 | -11 | 40 | 60]
 $i = 0, j = 6$

$i \rightarrow$ -ve element
Pahla Saku

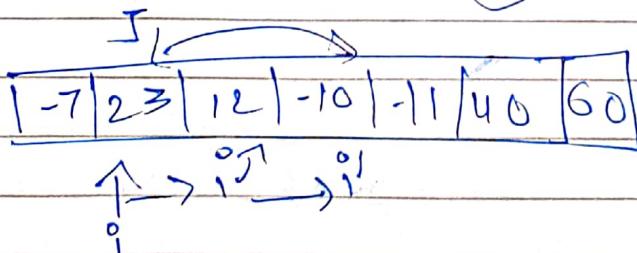
j index \rightarrow

for ($i = 0, i < j$;
 $i++$)

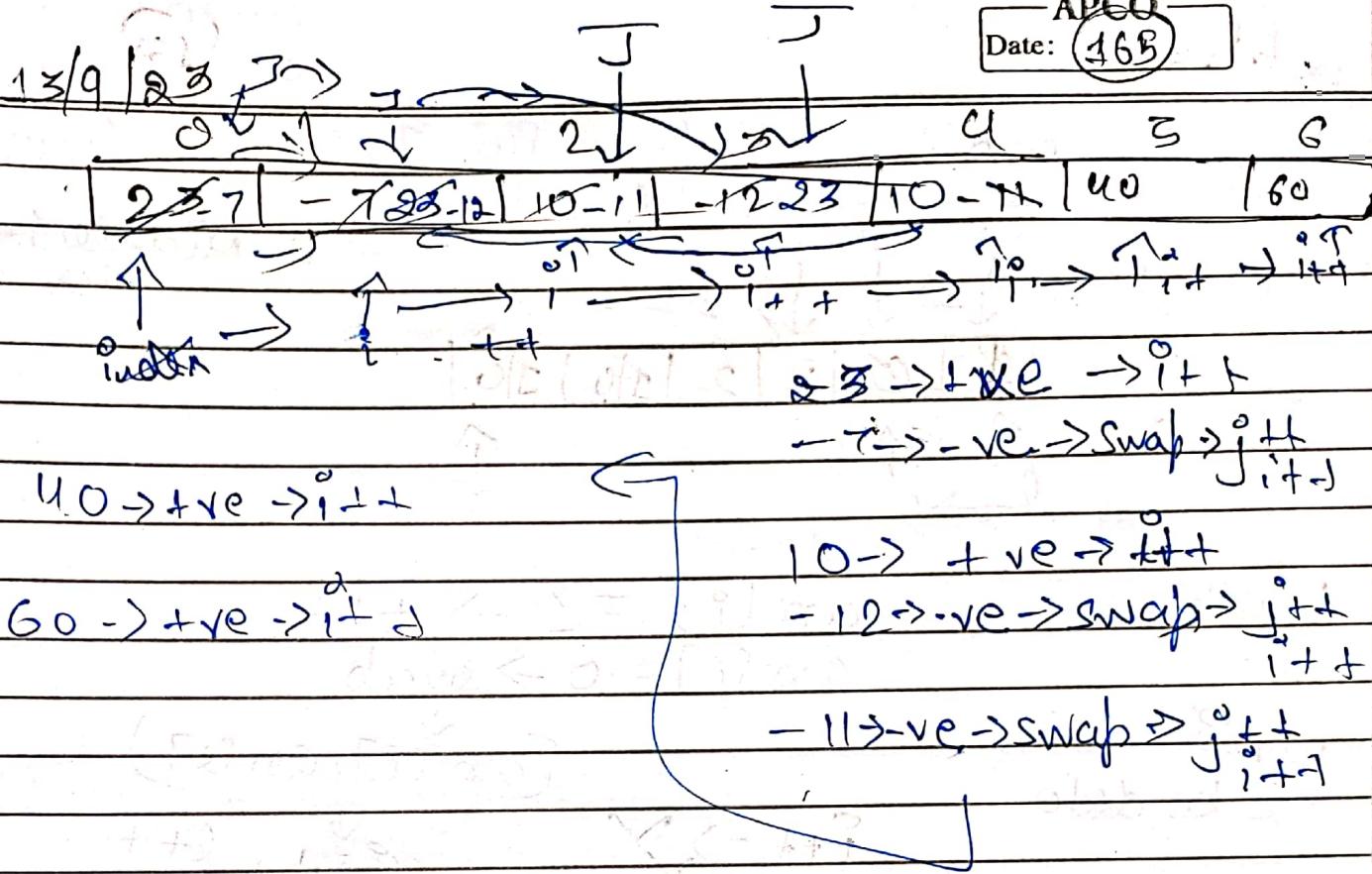
if ($arr[i] > 0$)
 $i++$

$arr[i] < 0$

swap ($arr[i], arr[j]$)
 $(i++, j++)$



Mat kaise kare i++
for loop me ho



Assignment Question \rightarrow ② Sort Colors
(sort 0, 1, 2)

In-place \rightarrow Don't use extra space

③ Dutch National flag Problem

0/p \rightarrow [0 1 3 1 2 0 1 2] 1 T

0/p \rightarrow [0 0 1 1 1 1 2 2] 1 T
 \underbrace{0's} \underbrace{1's} \underbrace{2's}

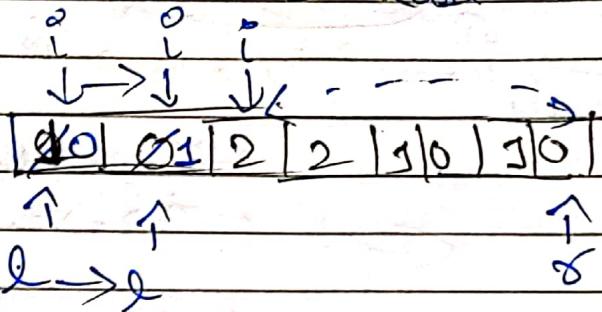
\rightarrow we are doing with two pointer

[0 1 3 1 2 0 1 2 1]
 ↓
 i \rightarrow index 0
 j \rightarrow index 1
 k \rightarrow index 2
 ↑ indicate
 2 swapped

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\Rightarrow Agaraseare 0 front Mp] \rightarrow Tok off count
2 Last Mp \rightarrow Middle log, na



Logic

$arr[i] = 1 \rightarrow i++$

$arr[i] = 0 \rightarrow \text{swap}$

0 mila

2 ko dedo

$i++ \rightarrow \checkmark$

$(arr[i], arr[s])$

$i++ \rightarrow l++$

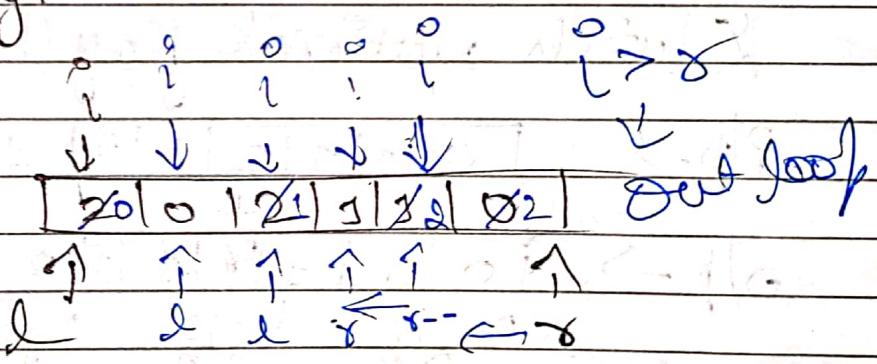
2 mila Tok

$arr[i] = 2 \rightarrow \text{swap}(arr[i], arr[s])$

R ko dedo

$s = -, i \neq j$

~~$i++ \rightarrow \text{get } i^{\circ} \text{ hogi}$~~



$arr[i] = 2 \rightarrow \text{swap}(i, s) \rightarrow r--$

$arr[i] = 0 \rightarrow \text{swap}(i, l) \rightarrow l++, i++$

$arr[i] = 2 \rightarrow \text{swap}(i, s) \rightarrow s--$

$arr[i] = 1 \rightarrow i++$

$arr[i] = 1 \rightarrow i++ \Rightarrow i > s \Rightarrow \text{out of loop}$

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||||| \rightarrow roka Pra Nai kya
 swap hua ah 2 ke sath
 kya Rha ah Toh $i+1$ hoga swap ke baad

swap hua ah 2 ke sath 0 ke 1

So, check karna Padega

That's why $0 \rightarrow i+1$

Q) \rightarrow Rotate Array \rightarrow

$k = 2$

[10 | 20 | 30] 40 | 50 | 60 |

60 10 20 30 40 50,
 50 60 10 20 30

Approaches
 i) Modulus
 ii) temp array

50 60 10 20 30
 [50 | 20 | 30 | 40 | 50 | 60 | 40]

(A) \rightarrow Print $bxx[k]$

(B) \rightarrow for ($n-1 \rightarrow i=1$)

{ $arr[i] = arr[i+k]$ }

(C) \rightarrow for ($i=0 \rightarrow k$)
 $arr[i] = bxx[i]$

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Q) Missing Number →

i/p → $\boxed{1 \ 7 \ 3 \ 2 \ 5 \ 6 \ 8 \ 0}$
 0 1 2 3 4 5 6 7 → missing kon sa

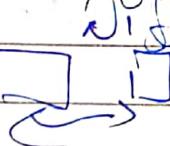
[0 → 8] for ex 4 is Missing wh

Approach → for ($i = 0 \rightarrow n$)

at every $i \rightarrow$ linear search(i)

TC $\rightarrow O(n^2)$

ii) sort $\rightarrow n \log n$

→ Traversed \rightarrow  $\rightarrow i \rightarrow 1$

iii) Sum $\rightarrow A \boxed{1 \ 3 \ 8 \ 3 \ 2 \ 7 \ 5 \ 6 \ 0} \rightarrow$ $\rightarrow \text{Sum} = 32$

B $\boxed{0 \ 4 \ 1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8} \rightarrow$

$\rightarrow \text{Sum} = 36$

$$36 - 32 = 4$$

$$A - B = 4 \quad \text{no of terms}$$

$$A \geq \sum = \frac{n}{2} (a + l) \quad \begin{array}{l} \text{last term} \\ \downarrow \\ \text{first term} \end{array} \quad \text{OR} \quad \frac{n(n+1)}{2}$$

also can do $A \cap B \rightarrow 4$

Rotated Array

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This is after Pg. 167

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In circular things \rightarrow can use Mod

[30|20|30|40|50|60]
0 1 2 3 4 5

q/b op

10 = 0 \rightarrow 2 (Index + k)

20 = 1 \rightarrow 3

30 = 2 \rightarrow 4

40 = 3 \rightarrow 5

50 = 4 \rightarrow 0

60 = 5 \rightarrow 1

(Index + k) % size of Arr

$\Rightarrow (0+5) \% 6 \rightarrow 2$

$\Rightarrow 2 \% 6 \rightarrow 2$

i) $\rightarrow (1+2) \% 6 \rightarrow 3 \% 6 \rightarrow 3$

ii) $\rightarrow (2+2) \% 6 \rightarrow 4 \% 6 \rightarrow 4$

iii) $\rightarrow (3+2) \% 6 \rightarrow 5 \% 6 \rightarrow 5$

iv) $\rightarrow (4+2) \% 6 \rightarrow 0 \% 6 \rightarrow 0$

v) $\rightarrow (5+2) \% 6 \rightarrow 7 \% 6 \rightarrow 1$

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M1W \rightarrow Rearrange Element Row by Sign

BQ) \rightarrow Row with Maximum Ones

	0	1	2	3	2
0	1	0	0	0	$\rightarrow 1^{\text{st}}$ $\rightarrow 1$
1	0	1	1	0	$\rightarrow 1^{\text{st}}$ $\rightarrow 2$
2	0	1	1	0	$\rightarrow 1^{\text{st}}$ $\rightarrow 2$
3	1	1	1	0	$\rightarrow 1^{\text{st}}$ $\rightarrow 3 \rightarrow \checkmark$
4	0	0	1	0	$\rightarrow 1^{\text{st}}$ $\rightarrow 2$

One count = INT

MIN

GONO = -1

\downarrow

Jab bhi
Nyak Max

One count

Nil

Store

GONO

One Count = \times because

0 & 1

Wh question

One Count = INT MIN

\hookrightarrow Ans ISO ++ , NH Karna

If One Count < current Count

then

One Count = current

One Count

DRY RUN \rightarrow

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~~Rotate Image~~ → (In-place)

0 1 2

0	1	2	3
1	4	5	6
2	7	8	9

Rotate
by 90°

0	1	2
1	8	5
2	9	6

1st Row { arr [0][0] → arr [0][2] $i \leftrightarrow j$
 arr [0][1] → arr [1][2]
 arr [0][2] → arr [2][2]

2nd Row { arr [1][0] → arr [0][1] Post
 arr [1][1] → arr [-1][1]
 arr [1][2] → arr [2][1] + Reverse
 first & last column

3rd Row { arr [2][0] → arr [0][0]
 arr [2][1] → arr [1][0]
 arr [2][2] → arr [2][0]

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(S-1) → Transpose

(S-2) → Reverse

90 degrees = transpose + Reverse

→ reverse (arr.begin(), arr.end()) → vector

→ reverse (arr, arr+n) → Array

(arr[0], arr[i]+1) → 2-D Array

H/W → Rearrange Array Element by Sign →

I/p → [0 1 2 3, 4 5]
[3 1 -2 -5 2 4]One negative
One positive

O/p → [3 1 -2 1 1 -5 2 4]

↑
1st No → +ve

Then → -ve

[0 1 2 3 4 5]
[3 1 -2 -5 2 4]

for (i=0 → <8)

pos=0, neg=1

if (arr[i] ≥ 0)

arr[pos] = arr[i];
pos++;→ if (arr[i] < 0)
arr[neg] = arr[i];

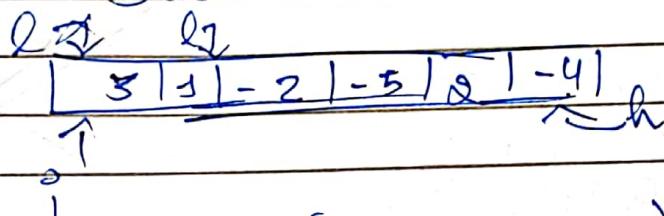
neg++;

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ii) another approach Two pointers

at even \rightarrow pos we want +ve
at odd \rightarrow -ve



Wrong

for ($i = 0 \rightarrow s$)
if ($l \% 2 == 0$) \rightarrow even
 if ($arr[i] > 0$)
 $l++$
 else $\rightarrow < 0 \Rightarrow$ ~~wrong i++~~

else if \rightarrow odd
 if ($arr[i] > 0$)
 y
 else
 y

If ($arr[i] > 0$)
 if ($l \% 2 == 0$) \rightarrow even
 $l++$
 else \rightarrow odd
 y
 else \rightarrow odd

else if \rightarrow less than 0 element
 y

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RRV RUN \rightarrow

($i \leftarrow j$)

$i \leftarrow i + 1$

$\begin{bmatrix} -3 & 1 & -2 & 5 & 2 & -4 \end{bmatrix}$

$\begin{bmatrix} 0 & 1 & 2 & 3 & 4 & 5 \end{bmatrix}$

$$arr[2] = 0 \quad 8 \cdot 2 = 0$$

i) if ($arr[i] < 0$)
 $i++$

ii) if $arr[0] = 0 \quad i = 1$

if ($arr[i] \geq 0$)

swap ($arr[0], arr[i]$)

$i++$

$$arr[] = [3, 1, -2, -5, 2, -4]$$

$$arr[] = \begin{bmatrix} 1 & -2 & 1 & -5 & 2 & -4 \\ 0 & 1 & 2 & 3 & 4 & 5 \end{bmatrix}$$

TC $\rightarrow O(n)$
SC $\rightarrow O(1)$

ii)

$O(n)$ \rightarrow pos $\{ 3, 1, 2 \}$

$O(n)$ \rightarrow Neg $\{ -2, -5, -4 \}$

If $i \rightarrow$ even \rightarrow then place pos

If $i \rightarrow$ odd \rightarrow then \rightarrow odd

14/9/23

Variety 2 → If Neg != Posi

i) \rightarrow arr() = [1, 2, -4, -5, 3, 6]

o/p → arr → = [-1, -4, 2, -5, 3, 6]

Q1 → arr → [1 121-41-513161]

Posi != neg

use Brute force

↓ ↓

posi = [2, 3, 4, 1]

Posi > Neg Neg > Posi

neg → [-1|-3]

1) Neg < posi

{ }

4 elements
in orderSo, 2 pairs
configuration

for (i=0; i < neg; i++)

arr[i*2] = pos(i);

arr[i*2+1] = neg(i)

Posi > Neg

Conf

y

index = neg * 2

for (i=neg; i < pos.size(); i++)

arr[index] = pos(i);
index++

y

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if ($\text{Neg} \geq \text{Pos}$)

for ($i = 0$; $i < \text{Pos}$; $i++$)

$\text{arr}[2 * i] = \text{pos}^i$

$\text{arr}[2 * i + 1] = \text{neg}^i$

index = pos^i

for ($i = \text{pos}$; $i < \text{Neg.size}; i++$)

$\text{arr}[index] = \text{arr}[i]$

index + 1

$T.C \rightarrow O(N) + [O(\min(\text{pos}, \text{neg})) + O(\text{left over})]$

$$\min \quad \max \\ O(0) + O(N) \rightarrow O(N/2)$$

$$O(N) + O(N) = O(2N)$$

13/01/23 Approach

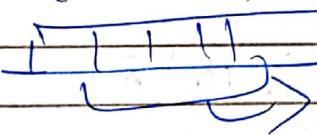
(S-1) \rightarrow pos arr []

Negative array []

loop
2ga
be push
in these array(S-2) \rightarrow

if (pos > neg)

for (i=0; i< neg

2-2 be pair h ab
min hoga utnepush in $i \neq 2 \rightarrow$ even index
 $i = 2 + 1 \rightarrow$ odd index

(S-3) Ab go baki element khe gaye

ith index = Neg + 2 \rightarrow phle dusre hoga
kyuki hme parne khtm ho rhe hain

for (i=Neg; i< pos; i++)

min itne
hi pos

curr[i] = curr[i]

index + 1;

itne pos
element us
ko gaage
hi

|| Similar for

Neg > pos