

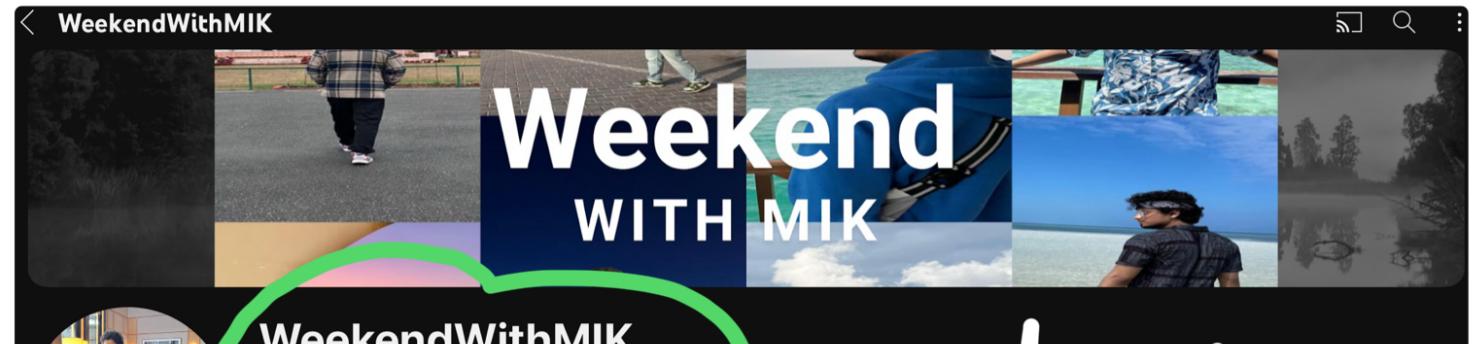
Segment Tree Concepts & Qns



Facebook [Instagram] → code story with MIK
(Twitter) → CS with MIK
codestorywithMIK →

“No more fear of Segment Tree”

video - 12





Try this channel to see
my "Life behind the Scenes + Tech News"

Motivation:-

A DREAM written down with a date
becomes a GOAL. A GOAL broken
down into steps becomes a PLAN
A PLAN backed by actions makes your dream
come True... MIK..

2179. Count Good Triplets in an Array

Hard

Topics

Companies

Hint

{
0, ... n-1 } }
n

You are given two **0-indexed** arrays `nums1` and `nums2` of length `n`, both of which are permutations of `[0, 1, ..., n - 1]`.

A **good triplet** is a set of **3 distinct values** which are present in **increasing order** by position both in `nums1` and `nums2`. In other words, if we consider `pos1v` as the index of the value `v` in `nums1` and `pos2v` as the index of the value `v` in `nums2`, then a good triplet will be a set `(x, y, z)` where `0 <= x, y, z <= n - 1`, such that `pos1x < pos1y < pos1z` and `pos2x < pos2y < pos2z`.

Return the **total number** of good triplets.

Example :- $\text{nums1} = \{2, 0, 1, 3\}$ $\begin{matrix} 2, 0, 1 \\ 2, 0, 3 \\ 0, 1, 3 \end{matrix} \times$
 $\text{nums2} = \{0, 1, 2, 3\}$

Output :- 1

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

nums1 = {4, 0, 1, 3, 2}

nums2 = {4, 1, 0, 2, 3}

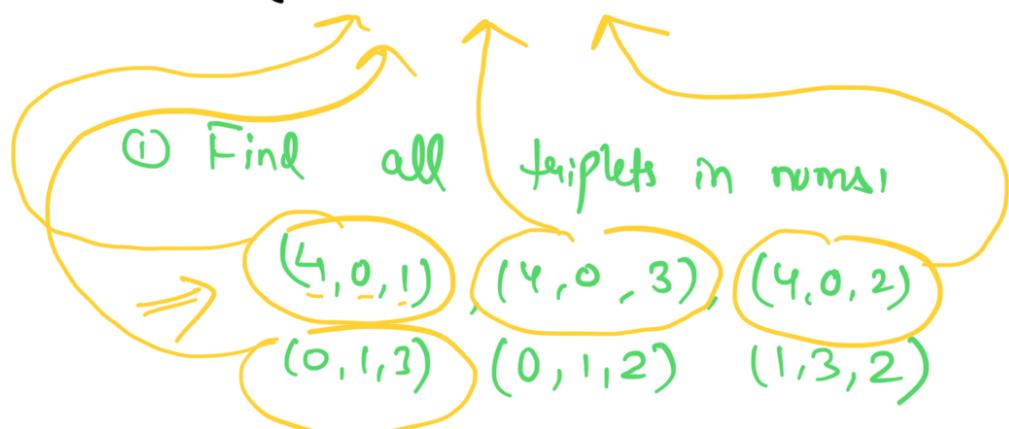
Output :- 4

(4, 1, 2) →
0 < 1 < 3 →

Thought Process

nums1 = {4, 0, 1, 3, 2}

nums2 = {4, 1, 0, 2, 3}



$O(n^3)$

Think on how we
can solve optimally

- We only need count ~~9~~ valid triplets

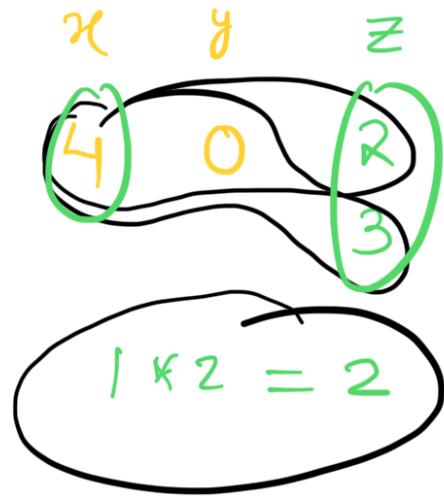
a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q
r
s
t
u
v
w
x
y
z

$$4 * 3 = 12$$

(x, y, z)

nums1 = { 4, 0, 1, 3, 2 }

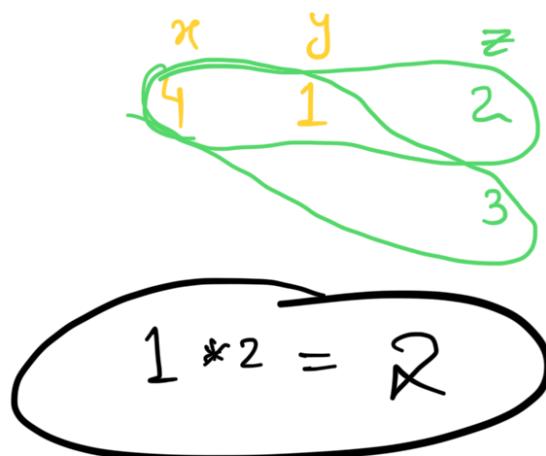
nums2 = { 4, 1, 0, 2, 3 }



$0 < 1 < 4$	$0 < 2 < 3$	$0 < 3 < 4$
4, 0, 1, 3	4, 0, 2, 3	0 < 2 < 4

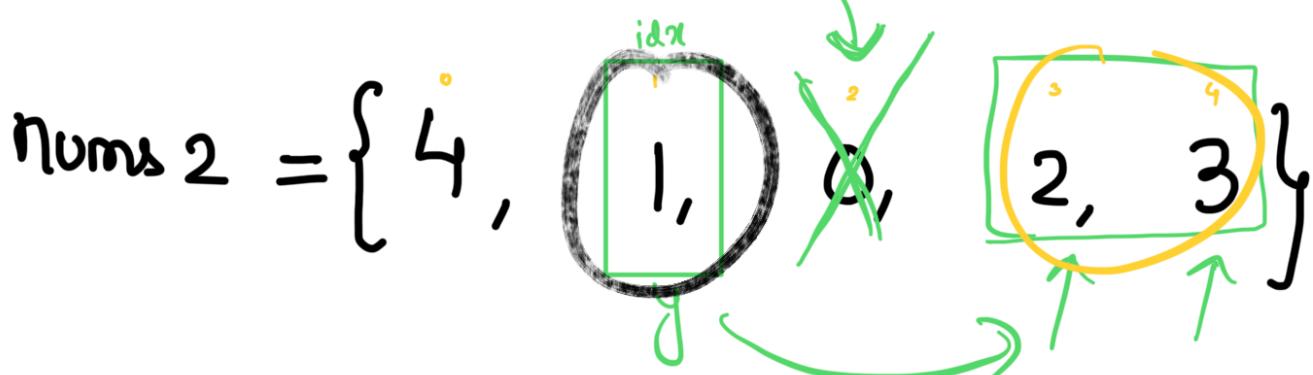
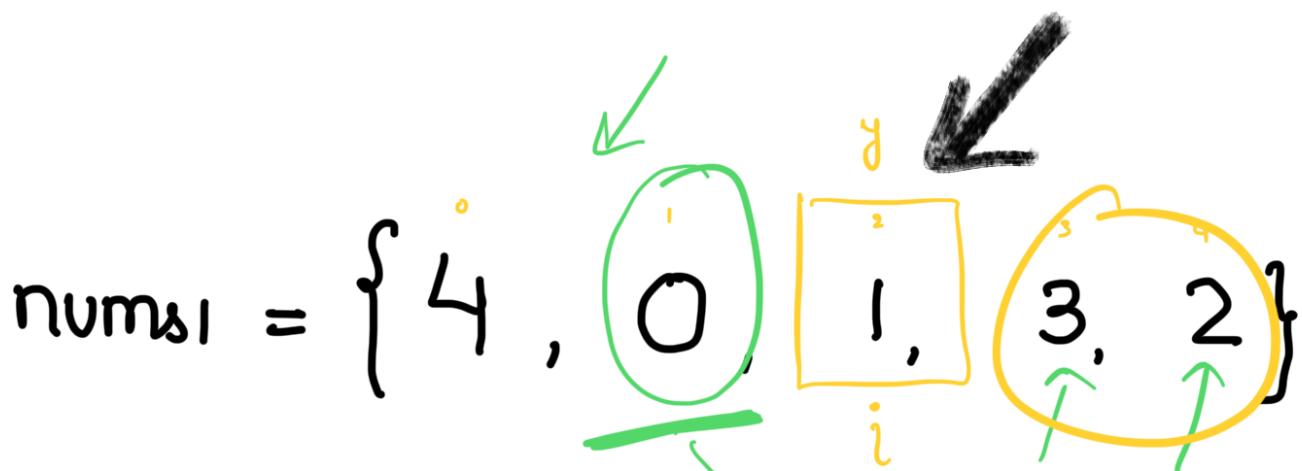
$$\text{num1} = \{ 4, 0, \boxed{1}, \underline{\underline{3}}, \underline{\underline{2}} \}$$

$$\text{num2} = \{ \boxed{4}, \boxed{1}, 0, \boxed{2}, \boxed{3} \}$$



$$2 + 2 = 4$$

We have almost cracked the
Mathematical way to find count of
valid triplets ...



The diagram illustrates the state of two arrays, nums1 and nums2 , at index $i = 3$.

$\text{nums1} = \{ 4, 0, 1, 3, 2 \}$

$\text{nums2} = \{ 4, 1, 0, 2, 3 \}$

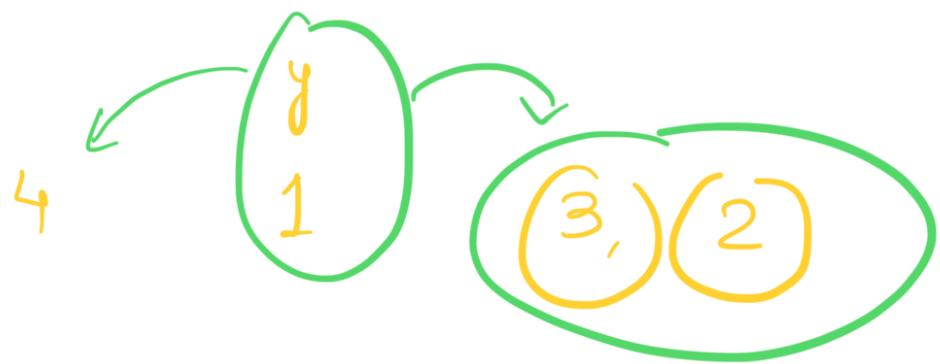
A green arrow points from the first element of nums1 to the first element of nums2 . A yellow arrow points from the second element of nums1 to the second element of nums2 . A green circle highlights the first element of nums1 (4), and a yellow circle highlights the second element of nums1 (0). A green circle highlights the first element of nums2 (4), and a yellow circle highlights the second element of nums2 (1).

$\text{leftCommonCount} = 1$

$$\text{leftUncommonCount} = i - \text{leftCommonCount}; // 1$$

$$\text{elementsAfterIdxNums2} = (n-1 - \text{idx}); // 3$$

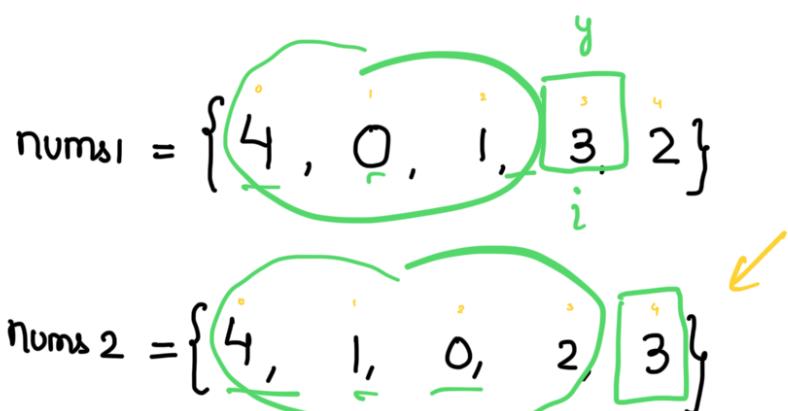
$$\text{rightCommonCount} = \text{elementsAfterIdxNums2} - \text{leftUncommonCount}; // 2$$



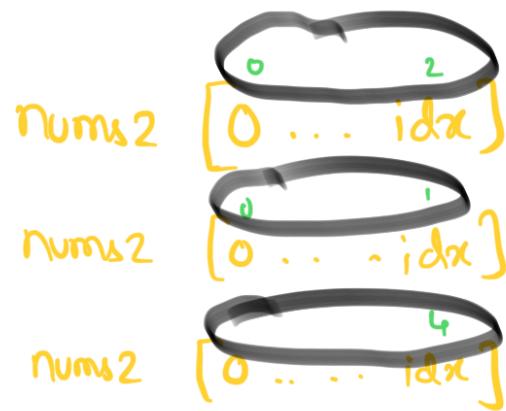
$$1 * 2 = \underline{\underline{2}}$$

The last challenge :-

(why I chose Segment Tree ???)



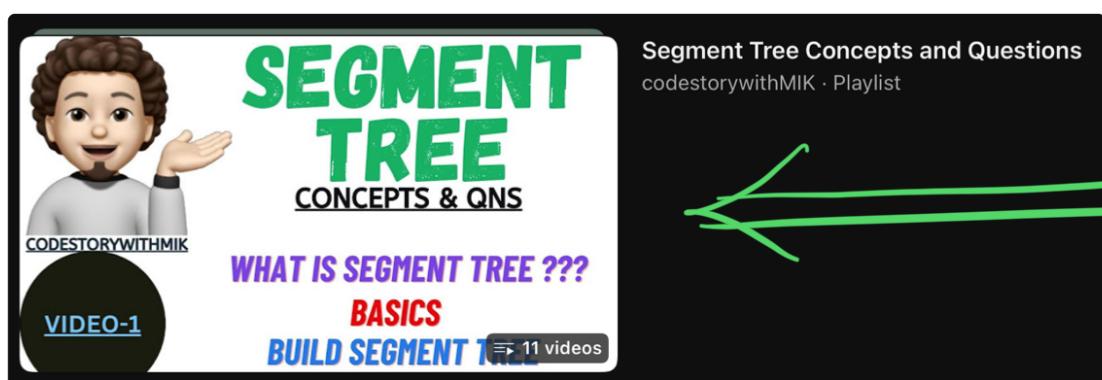
idx



Range Query

left Comm. of

Sym. query. update.



{ 2, 0, 1, 3 }
{ 2, 1, 0, 3 }

