Binary Search Playlist

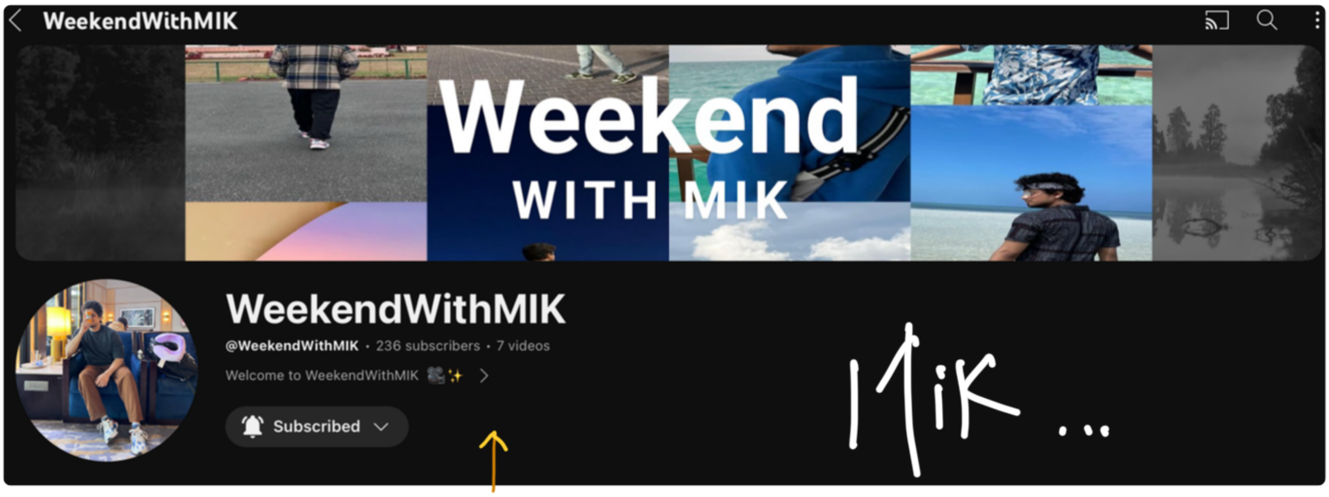
Video-42

Leetcode
- 2040
Hard

→ codestorywithmiK

X → CswithMIK

→ codestorywithMIK


WeekendWithMIK

Weekend WITH MIK

WeekendWithMIK

@WeekendWithMIK · 236 subscribers · 7 videos

Welcome to WeekendWithMIK

Subscribed

MIK...

↑

Try this channel to know:-

"Life behind the Screen + tech news"

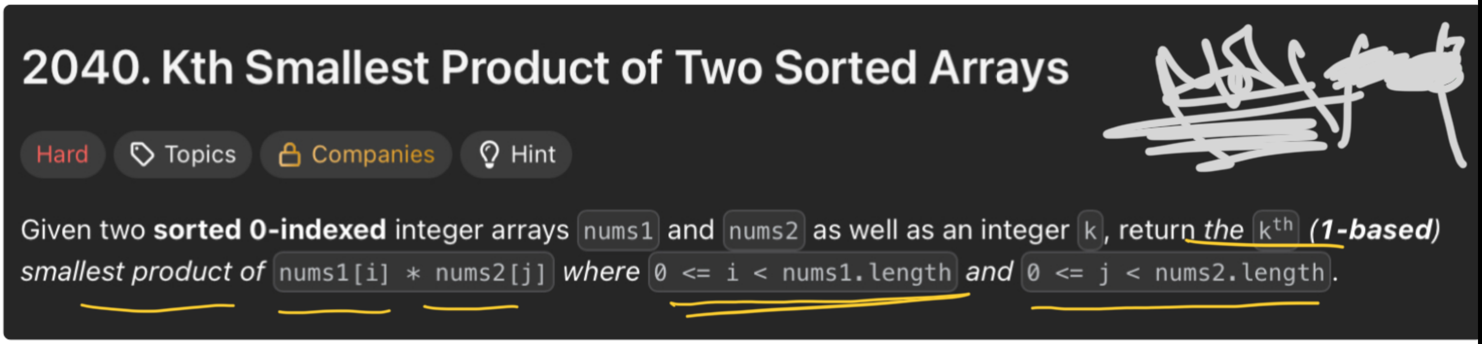
Motivation :-

Just keep this in your mind that

" Koi doosra agar, kar pa raha hai, to tum bhi kar sakte ho"

This mentality will help you alot.

MIK...



2040. Kth Smallest Product of Two Sorted Arrays

[redacted]

Hard | Topics | Companies | Hint

Given two **sorted 0-indexed** integer arrays `nums1` and `nums2` as well as an integer `k`, return *the* `k`th ***(1-based)*** *smallest product of* `nums1[i] * nums2[j]` *where* `0 <= i < nums1.length` *and* `0 <= j < nums2.length`.

Example :- nums1 = [2, 5] , nums2 = [3, 4] , K = 2

Output :- 8

{ 6, 8, 15, 20 }

Thought Process

$nums1 = [\overset{i}{2}, 5]$, $nums2 = [3, 4]$, $K = 2$

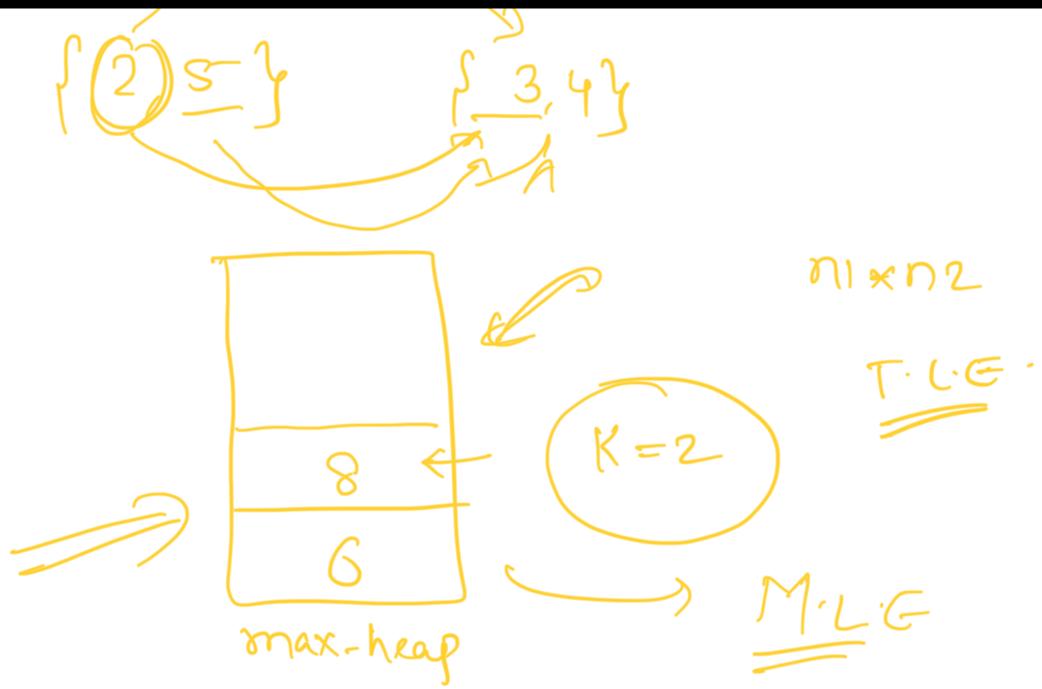
$\{\textcircled{6}, \textcircled{8}, 15, 20\}$

T.C = $n1 * n2$ → T.L.E

Brute Force → T.L.E.

K^{th} Smallest/Largest

→ Heap.



Optimal Approach

nums1 = {2, 5} , nums2 = {3, 4, 6} , K = 5

Products = {6, 8, 12, 15, 20, 30} .K = 5

$\text{nums1} = \{\overset{0}{a}, \underset{i}{\overset{1}{b}}, \overset{2}{c}, \overset{3}{d}\}$, $\text{nums2} = \{\overset{0}{e}, \overset{1}{f}, \overset{2}{g}, \underset{j}{\overset{3}{h}}\}$

nums1[i] * nums2[j]

(a*e), (a*f), (a*g), (a*h), (b*e), (b*f)... <= (a*h)

(j+1) = 4

Product = (a*h)

4 products <= (a*h)

Product = (a*h)

4th smallest

10th smallest

Product = P ;

how many products are there which are <= P

{6, 8, 12, 15, 20}

nums1 = {2, 5}

nums2 = {3, 4, 6}

K = 5

Product = 20

num1[i] * num2[mid]

2 * 6 = 30 <= 20 ✗

mid = 1
(mid+1) = 2

ProductsCount Covered = (mid+1) = 3 + 2 = 5   K = 5

5th smallest product.

Product = 1, 2, 100
←50

l = 1   mid   r = ∞

Kth smaller

(i) Product → Binary Search on answer.
(ii) mid Product → isthis Kth smallest. ??

(i) nums1 → i → Binary Se nums2 ...

One more dry run :-

nums1 = { 2, 5 }
i i

nums2 = { 3, 4 } , K = 2
l r

{ 6, 8, 15, 20 }

midProduct = 4 ← K^{th} ??

nums1[i] * nums2[mid]

5 * 3 = 15 > 9

m =

(m+1) =

ProdCount = 2 == K

2

K^{th} = 2

midP = 8

answer = 8

8

Corner Case :-

nums1 = {2, -5} , nums2 = {3, 4}

i

Product = 6

{-15, -20}

l r

m

$-15 < 6$

r = mid - 1

{15, 20}

l r

m

r = mid - 1 ;

$\boxed{15 > 6}$

l

```
if (num[i] < 0) {

} else {
        ______
}
```

[redacted]