

Binary Search Playlist

Video - 42



Leetcode
- 2040
Hard



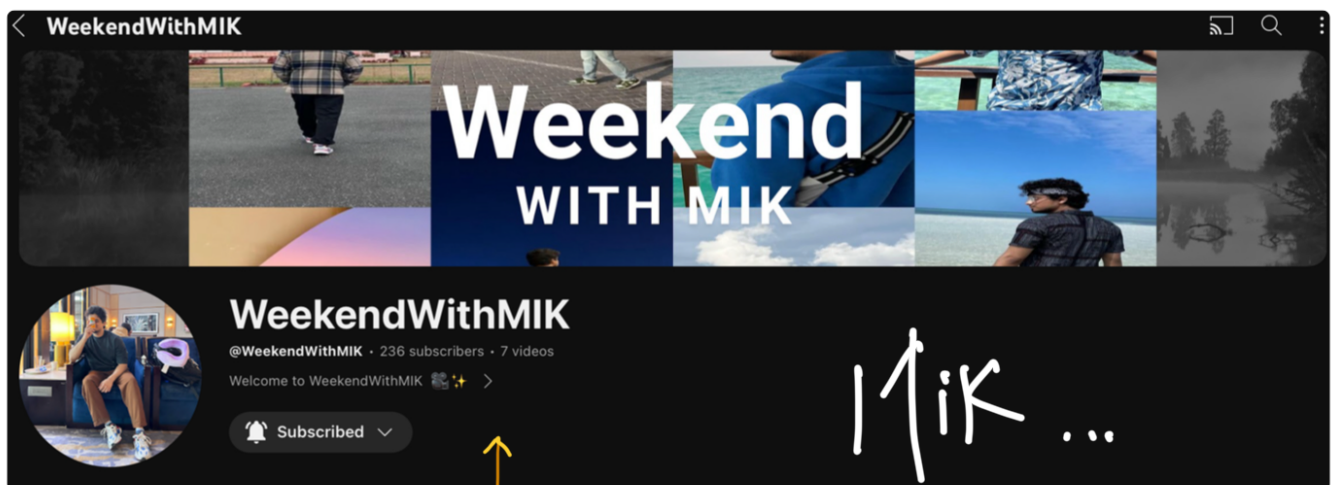
codestorywithmiK



Cs withMIK



codestorywithMIK

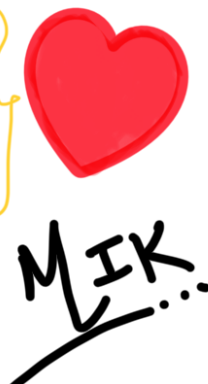


Try this channel to know:-

ee "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 a lot.



2040. Kth Smallest Product of Two Sorted Arrays

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 $\text{nums1}[i] * \text{nums2}[j]$ where $0 \leq i < \text{nums1.length}$ and $0 \leq j < \text{nums2.length}$.

Example :- $\text{nums1} = [2, 5]$, $\text{nums2} = [3, 4]$, $k = 2$

Output :- 8

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

Thought Process

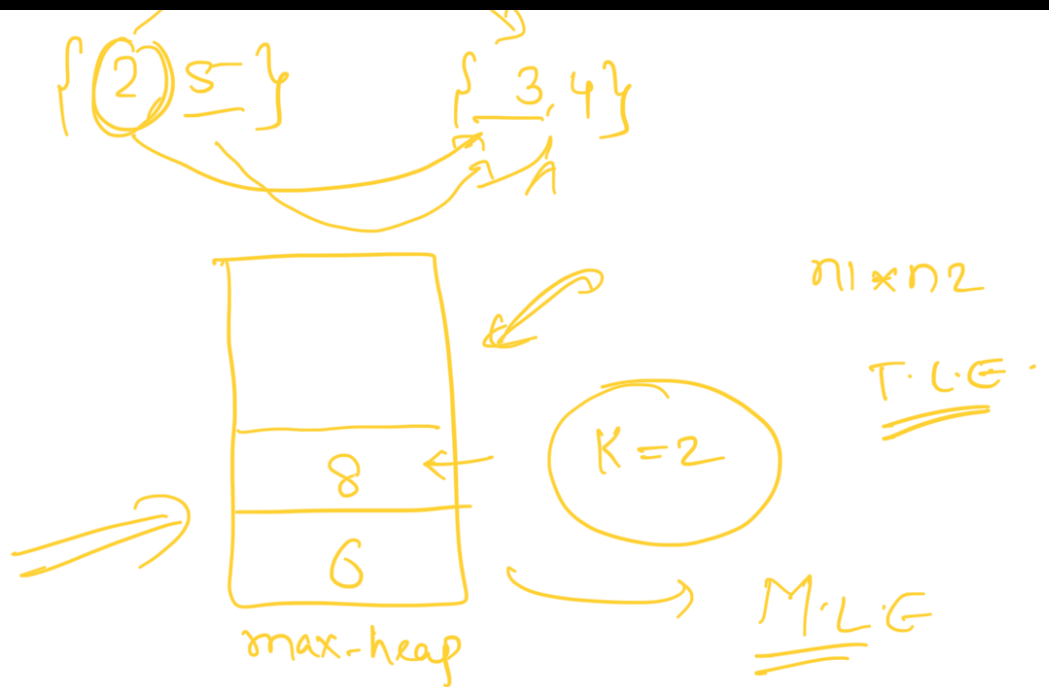
nums₁ = [2, 5], nums₂ = [3, 4], K=2

{(6, 8), 15, 20}

T.C = $n_1 * n_2$ → T.L.C.

Brute Force → T.L.C.

Kth Smallest / Largest
→ heap



Optimal Approach

$$\text{nums1} = \{2, 5\}, \quad \text{nums2} = \{3, 4, 6\}, \quad K = 5$$

$$\text{Products} = \{6, 8, 12, 15, 20, 30\}, \quad K = 5$$

$$\text{nums1} = \{a, b, c, d\}, \quad \text{nums2} = \{e, f, g, h\}$$

Indices 0, 1, 2, 3 are shown above the elements. The element 'h' is circled in green.

$$\text{nums1}[i] * \text{nums2}[j] \quad (a * e), (a * f), (a * g), (a * h), (b * e), (b * f) \dots$$

$(j+1) = 4$

Product $\leq (a * h)$

4 products $\leq (a * h)$

4th smallest

Product $= (a * h)$

10th smallest

Product = P ;

how many products are there
which are $\leq P$

{ 6, 8, 12, 15, 20 }

nums1 = { 2, 5 }

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

$$\text{Product} = 20$$

$$\text{num1}[i] * \text{num2}[\text{mid}]$$

$$2 * 6 = 30 \leq 20$$

$$\text{mid} = 1$$

$$(\text{mid} + 1) = 2$$

$$\text{ProductCount Covered} = (\text{mid} + 1) = 3 + 2 = 5 \quad K = 5$$

5th smallest
product.

$$\text{Product} = 1, 2, 100$$

← 50

$$l = 1$$

mid

$$r = \infty$$

Kth smallest

(i) Product → Binary Search on answer.

(ii) mid product → is this Kth smallest. ??

ii) num1 → i → Binary S_e num2 ...

One more dry run :-

$$\text{nums1} = \{2, 5\}_i$$

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

$$\text{nums2} = \{3, 4\}, K = 2$$

$$\text{midProduct} = 4 \quad \leftarrow \begin{matrix} K^{\text{th}} \\ ?? \end{matrix}$$

$$\text{nums1}[i] * \text{nums2}[\text{mid}]$$

$$5 * 3 = 15 > 9$$

$$m =$$

$$(m+1) =$$

$$\text{ProdCount} = 2 = K$$

✓

2

$$K^{\text{th}} = 2$$

$$\text{mid} = 8$$

$$\text{answer} = 8$$

✓

$$8$$

Corner Case:-

$$\text{nums1} = \{ 2, -5 \}$$

$$\text{nums2} = \{ 3, 4 \}$$

$$\text{Product} = 6$$

$$\begin{array}{cc} \{ -15, -20 \} \\ l \quad r \\ m \end{array}$$

$$\begin{array}{cc} \{ 15, 20 \} \\ l \quad r \\ m \end{array}$$

$$r = \text{mid} - 1;$$

$$15 > 6$$

$$-15 < 6$$

$$r = \text{mid} - 1$$

l

if (nums[i] < 0) {

} else {

}

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million, from 2.5 million in 1980 to 4 million in 1995. The public sector has become a major employer in the UK, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy.

The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy.

The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy.

The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy.

The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy.

The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy. The public sector has also become a major provider of social services, and its growth has been a key factor in the overall growth of the economy.

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million (1990–1999) (Department of Health 2000).

There is a growing emphasis on the importance of the public sector in the provision of health care services, and the need to ensure that the public sector is able to meet the needs of the population. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices. These initiatives have led to a number of changes in the way that the public sector operates, and have resulted in a number of improvements in the quality of health care services.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

the 1990s, the number of people in the UK who are employed in the public sector has increased by 1.5 million (1990–1999) (Department of Health 2000).

There is a growing emphasis on the importance of the public sector in the provision of health care services, and the need to ensure that the public sector is able to meet the needs of the population. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices. These initiatives have led to a number of changes in the way that the public sector operates, and have resulted in a number of improvements in the quality of health care services.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.

One of the key challenges facing the public sector is the need to ensure that it is able to meet the needs of the population in a cost-effective manner. This has led to a number of initiatives aimed at improving the efficiency and effectiveness of the public sector, including the introduction of competition, the restructuring of the public sector, and the introduction of new management practices.



