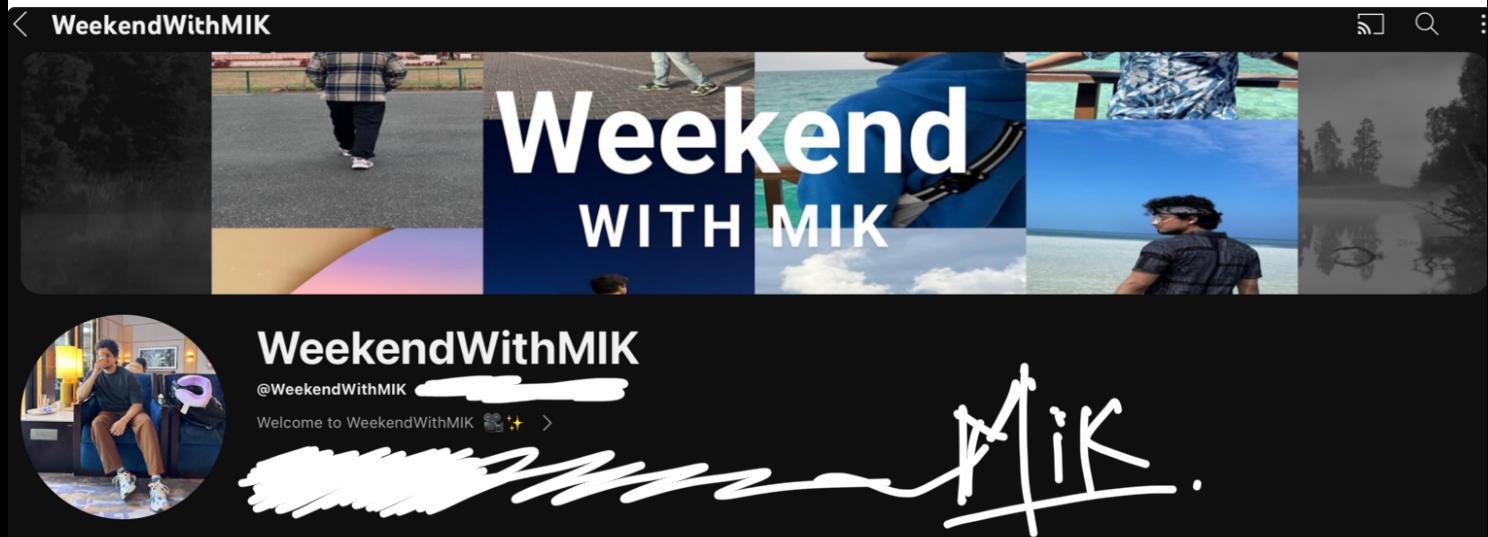


(γ)aths : Video -

25



∞ → codestorywithmiK
X → CSwithMIK
 → codestorywithMIK



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

Motivation -

Hard times come into our lives to tell you how powerful you are. You can become unstoppable if you don't quit.



MIK..

Every failure is a test case - eventually they teach you what went wrong and where you need to correct yourself.

2818. Apply Operations to Maximize Score

Hard Topics Companies Hint

You are given an array nums of n positive integers and an integer k .

Initially, you start with a score of 1 . You have to maximize your score by applying the following operation at most k times:

- Choose any non-empty subarray $\text{nums}[l, \dots, r]$ that you haven't chosen previously.
- Choose an element x of $\text{nums}[l, \dots, r]$ with the highest prime score. If multiple such elements exist, choose the one with the smallest index.
- Multiply your score by x .

Here, $\text{nums}[l, \dots, r]$ denotes the subarray of nums starting at index l and ending at the index r , both ends being inclusive.

The prime score of an integer x is equal to the number of distinct prime factors of x . For example, the prime score of 300 is 3 since $300 = 2 * 2 * 3 * 5 * 5$.

Return the maximum possible score after applying at most k operations.

Example :- $\text{nums} = \{ \underbrace{8, 3, 9, 3, 8}_{\{1, 1, 1, 1, 1\}}, K=2 \}$

Output :- 81

$\{9, 3, 8\}$

Score = $1 * 9 * 9 = 81$

Thought Process

$\text{nums} = \{ \underbrace{19, 12, 14, 6, 10, 18}_{\{1, 2, 2, 2, 2, 2\}}, K=3 \}$

Primescores = {1, 2, 2, 2, 2, 2}

$$\begin{aligned} \text{result} &= 1 * 19 * 18 \\ &= 342 * 14 \\ &= 4788 \end{aligned}$$

Thoughts from a beginner POV :-

- (•) Prime Scores
- (•) Number is multiplied to score.
- (•) Greedily I would want to multiply bigger number to maximize my score.

Pick Bigger Numbers

$$\text{nums} = \{19, 12, \underbrace{14, 6, 10, 18\}_{\text{K=4}}}$$

3
2
1

$$\text{Primescores} = \{1, 2, \textcircled{2}, \textcircled{2}, \textcircled{2}, \textcircled{2}\}$$

$$\text{Score} = 1 * 19 * 18 * 14 * 14 * 14 * 14$$

$$\text{nums} = \{a, b, \textcircled{14}, c, d, e\}$$

$$\text{PS} = \{2, 1, \textcircled{2}, 2, 2, 3\}$$

$\{b, 14\}$ $\{14\}$

NextGreaterRight

$$\{b, 14, c\} \quad \{14, c\} = \emptyset$$

$$\{b, 14, c, d\} \quad \{14, c, d\}$$

Valid Starting Point = 2

Valid Ending Point = 3

$$2 * 3 = 6$$

{

 * NextGreaterToRight

 * PrevGreaterToLeft
 } Monotonic Standard Problem

$\text{nums} = \{19, 12, 14, 6, 10, 18\}, K=3$, $n=6$

$\text{PrimeScores} = \{1, 2, 2, 2, 2, 2\}$

✓ NextGreater = { 1, 6, 6, 6, 6, 6 }

✓ PreyGreater = { -1, -1, 1, 2, 3, 4 }

$$1 - i = 1 - 0 = 1$$
$$i - (-1) = 0 + 1 = 1$$

$$\begin{array}{l} 6 - 2 = 4 \\ 2 - 1 = 1 \end{array} \quad \text{and } 4 = 4$$

$$6 - 2 = 4$$

$$2 - 1 = 1$$

$$6 - 5 = 1$$

$$i - 4 = 5 - 4 = 1$$

$| * | = 1$
Subarray.

(1 * 4) subarrays $\frac{1 * 4}{14}$

Result = 1 * 19 * 18 * 14 * *

14

Subarrays $(1 * 4) = 4$

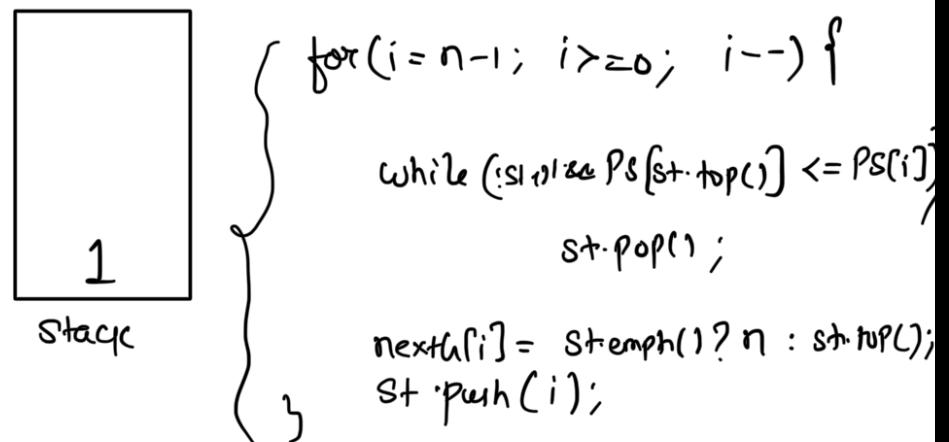
$\min(K, 4) = 4$

$K = \frac{8}{2}$

Find Next Greater Element

$$PS = \{ 1, 2, 2, 2, 2, 2 \}, n=6$$

$$\text{NextGreater} = \{ 1, 6, 6, 6, 6, 6 \}$$



Find Previous Greater Equal Element :-

$$PS = \{ 1, 2, 2, 2, 2, 2 \}, n=6$$

$$\text{PrevGreater} = \{ -1, -1, 1, 2, 3, 4 \}$$



7
3
2
1

$PS[st.top()] < PrimeScore[i]$

$\checkmark \text{nums} = \{19, 12, 14, 6, 10, 18\}$

$\checkmark \text{PrimeScores} = \{1, 2, 2, 2, 2, 2\}$

$\checkmark \text{nextGreater} = \{1, 6, 6, 6, 6, 6\}$

$\checkmark \text{prevGreater} = \{-1, -1, 1, 2, 3, 4\}$

$\checkmark \text{Subarrays} = \{1, 10, 4, 3, 2, 1\}$

$\underset{i}{\{\{ (19, 0), (18, 5), (14, 2), (12, 1), (10, 4), (6, 3) \}\}}$

$K = 3$

$\text{num} = 19$

$\text{idx} = 0$

{

$\text{Operations} = \min(K, \text{Subarrays}[0]);$

$\text{Score} = \text{Score} * \boxed{\text{Pow}(19, \text{Operations})};$

$\left\{ \begin{matrix} K \\ (K! = 0) \end{matrix} \right.$ $K - =$ Operations;
 \downarrow
 Binary
Exponent

Prime Scores :-

$$\text{nums} = \{ \begin{matrix} 0 & 1 & 2 & 3 & 4 & 5 \\ 19, & 12, & 14, & 6, & 10, & 18 \end{matrix} \}$$

Find all
 Primes { 2, 3, 5, 7, 11, 13, 17, 19 }
 until
 max number
 in nums

Sieve of
Eratosthenes

$$\begin{matrix} 0 & 1 & 2 & 3 & 4 & 5 \\ \text{Sieve} & \rightarrow & 11 & 7 & 10 & 1 \end{matrix}$$

nums = [19, 12, 19, 7, 10, 18]
i

Primes = {2, 3, 5, 7, 11, 13, 17, 19}

14 → 7

PS = {1, 2, 1, 0, 0, 0}

2, 3, 5, 7, 11, 13, 17, 19

x → n → —

factors = \sqrt{x}

if (prime > $\sqrt{\text{nums}[i]}$)
break;

$5 > \sqrt{15}$

3...

15 → 5

If ($\text{num} > 1$)

P_{i+1}
=

(1) Prime S.

(2) NextG

(2) PrevG.

(3) Suban