

GREEDY



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- 3048
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3048. Earliest Second to Mark Indices I

Medium

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Hint

You are given two **1-indexed** integer arrays, nums and, changeIndices, having lengths n and m, respectively.

Initially, all indices in nums are unmarked. Your task is to mark **all** indices in nums.

In each second s , in order from 1 to m (inclusive), you can perform **one** of the following operations:

- Choose an index i in the range $[1, n]$ and **decrement** $\text{nums}[i]$ by 1 .
- If $\text{nums}[\text{changeIndices}[s]]$ is **equal** to 0 , **mark** the index $\text{changeIndices}[s]$.
- Do nothing.

Return an integer denoting the **earliest second** in the range $[1, m]$ when **all** indices in nums can be marked by choosing operations optimally, or -1 if it is impossible.

Example:-

$$\text{nums} = [2, 2, 0], \quad n = 3$$

$$\text{changeIndices} = [2, 2, 2, 2, 3, 2, 2, 1], \quad m = 8$$

$$\text{Output} = 8 \quad \text{Second} = s = 1, 2,$$

Point to note :-

(i) 1 to m seconds

(ii) $\text{changeIndices} \rightarrow \text{values} \rightarrow \text{index of nums}$

(i)

$$\text{nums} = [2, 2, 0], \quad n = 3$$

$$\text{changeIndices} = [2, 2, 2, 2, 3, 2, 2, 1], \quad m = 8$$

Output = 8

$S=8$

Second=1 : decr 1 index $\begin{bmatrix} 1^1 & 2^2 & 0^3 \end{bmatrix}$

second = 2 : decr 1 index $\begin{bmatrix} 0^1 & 2^2 & 0^3 \end{bmatrix}$

Second=3 : dec 2 index $\begin{bmatrix} 0^1 & 1^2 & 0^3 \end{bmatrix}$

Second=4 : dec 2 index $\begin{bmatrix} 0^1 & 0^2 & 0^3 \end{bmatrix}$

Second=5 : marked index 3

Second=6 : marked index 2

Second=7 : Do nothing.

Sec = 8 : marked index 1

Example-2

nums = $\begin{bmatrix} 1^1 & 3^2 \end{bmatrix}$

$n=2$

ChangeIndices = $\begin{bmatrix} 1^1 & 1^2 & 1^3 & 2^4 & 1^5 & 1^6 & 1^7 \end{bmatrix}$

$m=7$

(1) 2

1 2

1

1 2

1 2

$$[1, 3] \rightarrow [0, 3]$$

marked index 1 in nums

$$[0, 3] \rightarrow [0, 2]$$

$$[0, 2] \rightarrow [0, 1]$$

$$[0, 1] \rightarrow [0, 0]$$

Do Nothing

Do Nothing

$$[1, 3] \rightarrow [1, 2]$$

$$[1, 2] \rightarrow [1, 1]$$

$$[1, 1] \rightarrow [1, 0]$$

marked index=2 $[1, 0]$

$$[1, 0] \rightarrow [0, 0]$$

marked index=1

6 seconds.

(c) I should store when an index
(nums) appears last in changeIndex
array.

Example-2

$$\text{nums} = [1, 3]$$

$$n = 2$$

nums = [1, 3]

n = 2

ChangeIndices = [1, 1, 1, 2, 1, 1, 1]

m = 7

lastPosition =

1	2
7	4

position idx
→ {7, 1}
{4, 2}

{ {4, 2}, {7, 1} }

↓ last appear ↓ idx ↓ last appear ↓ idx

map

Key	val
lastapp	idx
4	2
7	1

nums = [1, 3]

n = 2

ChangeIndices = [1, 1, 1, 2, 1, 1, 1]

m = 7

{ {4, 2}, {7, 1} }

↓ last appear ↓ idx ↓ last appear ↓ idx

seconds-passed = 0 + 4

last-app = 7
idx = 1



$$\text{time-req} = \text{num}(\text{idx}) + 1$$
$$1 + 1$$
$$= 2$$

$$\textcircled{4} + 2 = 6$$

$$\text{nums} = \{ \overset{\textcircled{1}}{\text{0}}^*, \overset{2}{\text{0}}^* \}, \quad n = 2$$

$$\text{ChangeIndices} = \{ \underset{1}{\textcircled{1}}, \underset{2}{\textcircled{1}}, \underset{3}{\textcircled{2}}, \underset{4}{\textcircled{1}}, \underset{5}{\textcircled{1}}, \underset{6}{\textcircled{2}} \}, \quad m = 6$$