

Problem 1959: Minimum Total Space Wasted With K Resizing Operations

Problem Information

Difficulty: Medium

Acceptance Rate: 0.00%

Paid Only: No

Problem Description

You are currently designing a dynamic array. You are given a

0-indexed

integer array

nums

, where

nums[i]

is the number of elements that will be in the array at time

i

. In addition, you are given an integer

k

, the

maximum

number of times you can

resize

the array (to

any

size).

The size of the array at time

t

,

size

t

, must be at least

nums[t]

because there needs to be enough space in the array to hold all the elements. The

space wasted

at time

t

is defined as

size

t

- nums[t]

, and the

total

space wasted is the

sum

of the space wasted across every time

t

where

$0 \leq t < \text{nums.length}$

.

Return

the

minimum

total space wasted

if you can resize the array at most

k

times

.

Note:

The array can have

any size

at the start and does

not

count towards the number of resizing operations.

Example 1:

Input:

nums = [10,20], k = 0

Output:

10

Explanation:

size = [20,20]. We can set the initial size to be 20. The total wasted space is $(20 - 10) + (20 - 20) = 10$.

Example 2:

Input:

nums = [10,20,30], k = 1

Output:

10

Explanation:

size = [20,20,30]. We can set the initial size to be 20 and resize to 30 at time 2. The total wasted space is $(20 - 10) + (20 - 20) + (30 - 30) = 10$.

Example 3:

Input:

nums = [10,20,15,30,20], k = 2

Output:

15

Explanation:

size = [10,20,20,30,30]. We can set the initial size to 10, resize to 20 at time 1, and resize to 30 at time 3. The total wasted space is $(10 - 10) + (20 - 20) + (20 - 15) + (30 - 30) + (30 - 20) = 15$.

Constraints:

$1 \leq \text{nums.length} \leq 200$

$1 \leq \text{nums}[i] \leq 10$

6

$0 \leq k \leq \text{nums.length} - 1$

Code Snippets

C++:

```
class Solution {
public:
    int minSpaceWastedKResizing(vector<int>& nums, int k) {
        }
};
```

Java:

```
class Solution {
public int minSpaceWastedKResizing(int[] nums, int k) {
    }
```

```
}
```

Python3:

```
class Solution:  
    def minSpaceWastedKResizing(self, nums: List[int], k: int) -> int:
```

Python:

```
class Solution(object):  
    def minSpaceWastedKResizing(self, nums, k):  
        """  
        :type nums: List[int]  
        :type k: int  
        :rtype: int  
        """
```

JavaScript:

```
/**  
 * @param {number[]} nums  
 * @param {number} k  
 * @return {number}  
 */  
var minSpaceWastedKResizing = function(nums, k) {  
  
};
```

TypeScript:

```
function minSpaceWastedKResizing(nums: number[], k: number): number {  
  
};
```

C#:

```
public class Solution {  
    public int MinSpaceWastedKResizing(int[] nums, int k) {  
  
    }  
}
```

C:

```
int minSpaceWastedKResizing(int* nums, int numsSize, int k) {  
  
}
```

Go:

```
func minSpaceWastedKResizing(nums []int, k int) int {  
  
}
```

Kotlin:

```
class Solution {  
    fun minSpaceWastedKResizing(nums: IntArray, k: Int): Int {  
  
    }  
}
```

Swift:

```
class Solution {  
    func minSpaceWastedKResizing(_ nums: [Int], _ k: Int) -> Int {  
  
    }  
}
```

Rust:

```
impl Solution {  
    pub fn min_space_wasted_k_resizing(nums: Vec<i32>, k: i32) -> i32 {  
  
    }  
}
```

Ruby:

```
# @param {Integer[]} nums  
# @param {Integer} k  
# @return {Integer}  
def min_space_wasted_k_resizing(nums, k)
```

```
end
```

PHP:

```
class Solution {  
  
    /**  
     * @param Integer[] $nums  
     * @param Integer $k  
     * @return Integer  
     */  
    function minSpaceWastedKResizing($nums, $k) {  
  
    }  
}
```

Dart:

```
class Solution {  
int minSpaceWastedKResizing(List<int> nums, int k) {  
  
}  
}
```

Scala:

```
object Solution {  
def minSpaceWastedKResizing(nums: Array[Int], k: Int): Int = {  
  
}  
}
```

Elixir:

```
defmodule Solution do  
@spec min_space_wasted_k_resizing(nums :: [integer], k :: integer) :: integer  
def min_space_wasted_k_resizing(nums, k) do  
  
end  
end
```

Erlang:

```

-spec min_space_wasted_k_resizing(Nums :: [integer()], K :: integer()) ->
    integer().
min_space_wasted_k_resizing(Nums, K) ->
    .

```

Racket:

```

(define/contract (min-space-wasted-k-resizing nums k)
  (-> (listof exact-integer?) exact-integer? exact-integer?))

```

Solutions

C++ Solution:

```

/*
 * Problem: Minimum Total Space Wasted With K Resizing Operations
 * Difficulty: Medium
 * Tags: array, dp
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) or O(n * m) for DP table
 */

class Solution {
public:
    int minSpaceWastedKResizing(vector<int>& nums, int k) {
        }
    };

```

Java Solution:

```

/**
 * Problem: Minimum Total Space Wasted With K Resizing Operations
 * Difficulty: Medium
 * Tags: array, dp
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)

```

```

* Space Complexity: O(n) or O(n * m) for DP table
*/



class Solution {
    public int minSpaceWastedKResizing(int[] nums, int k) {
        }

    }
}

```

Python3 Solution:

```

"""
Problem: Minimum Total Space Wasted With K Resizing Operations
Difficulty: Medium
Tags: array, dp

Approach: Use two pointers or sliding window technique
Time Complexity: O(n) or O(n log n)
Space Complexity: O(n) or O(n * m) for DP table
"""

class Solution:
    def minSpaceWastedKResizing(self, nums: List[int], k: int) -> int:
        # TODO: Implement optimized solution
        pass

```

Python Solution:

```

class Solution(object):
    def minSpaceWastedKResizing(self, nums, k):
        """
        :type nums: List[int]
        :type k: int
        :rtype: int
        """

```

JavaScript Solution:

```

/**
 * Problem: Minimum Total Space Wasted With K Resizing Operations
 * Difficulty: Medium

```

```

* Tags: array, dp
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* Time Complexity: O(n) or O(n log n)
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*/

```

```

/** 
* @param {number[]} nums
* @param {number} k
* @return {number}
*/
var minSpaceWastedKResizing = function(nums, k) {
}

```

TypeScript Solution:

```

/**
* Problem: Minimum Total Space Wasted With K Resizing Operations
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* Time Complexity: O(n) or O(n log n)
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*/

```

```

function minSpaceWastedKResizing(nums: number[], k: number): number {
}

```

C# Solution:

```

/*
* Problem: Minimum Total Space Wasted With K Resizing Operations
* Difficulty: Medium
* Tags: array, dp
*
* Approach: Use two pointers or sliding window technique
* Time Complexity: O(n) or O(n log n)

```

```

* Space Complexity: O(n) or O(n * m) for DP table
*/
public class Solution {
    public int MinSpaceWastedKResizing(int[] nums, int k) {
        }
    }
}

```

C Solution:

```

/*
 * Problem: Minimum Total Space Wasted With K Resizing Operations
 * Difficulty: Medium
 * Tags: array, dp
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) or O(n * m) for DP table
 */

int minSpaceWastedKResizing(int* nums, int numSize, int k) {
}

```

Go Solution:

```

// Problem: Minimum Total Space Wasted With K Resizing Operations
// Difficulty: Medium
// Tags: array, dp
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// Approach: Use two pointers or sliding window technique
// Time Complexity: O(n) or O(n log n)
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func minSpaceWastedKResizing(nums []int, k int) int {
}

```

Kotlin Solution:

```
class Solution {  
    fun minSpaceWastedKResizing(nums: IntArray, k: Int): Int {  
        }  
        }  
}
```

Swift Solution:

```
class Solution {  
    func minSpaceWastedKResizing(_ nums: [Int], _ k: Int) -> Int {  
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Rust Solution:

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impl Solution {  
    pub fn min_space_wasted_k_resizing(nums: Vec<i32>, k: i32) -> i32 {  
        }  
        }
```

Ruby Solution:

```
# @param {Integer[]} nums  
# @param {Integer} k  
# @return {Integer}  
def min_space_wasted_k_resizing(nums, k)  
  
end
```

PHP Solution:

```

class Solution {

    /**
     * @param Integer[] $nums
     * @param Integer $k
     * @return Integer
     */
    function minSpaceWastedKResizing($nums, $k) {

    }
}

```

Dart Solution:

```

class Solution {
    int minSpaceWastedKResizing(List<int> nums, int k) {
        return 0;
    }
}

```

Scala Solution:

```

object Solution {
    def minSpaceWastedKResizing(nums: Array[Int], k: Int): Int = {
        return 0
    }
}

```

Elixir Solution:

```

defmodule Solution do
  @spec min_space_wasted_k_resizing(nums :: [integer], k :: integer) :: integer
  def min_space_wasted_k_resizing(nums, k) do
    end
  end
end

```

Erlang Solution:

```

-spec min_space_wasted_k_resizing(Nums :: [integer()], K :: integer()) ->
    integer().
min_space_wasted_k_resizing(Nums, K) ->

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```
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