

# Problem 1649: Create Sorted Array through Instructions

## Problem Information

Difficulty: **Hard**

Acceptance Rate: 0.00%

Paid Only: No

## Problem Description

Given an integer array

instructions

, you are asked to create a sorted array from the elements in

instructions

. You start with an empty container

nums

. For each element from

left to right

in

instructions

, insert it into

nums

. The

cost

of each insertion is the

minimum

of the following:

The number of elements currently in

nums

that are

strictly less than

instructions[i]

.

The number of elements currently in

nums

that are

strictly greater than

instructions[i]

.

For example, if inserting element

3

into

nums = [1,2,3,5]

, the

cost

of insertion is

$\min(2, 1)$

(elements

1

and

2

are less than

3

, element

5

is greater than

3

) and

nums

will become

[1,2,3,3,5]

.

Return

the

total cost

to insert all elements from

instructions

into

nums

. Since the answer may be large, return it

modulo

10

9

+ 7

Example 1:

Input:

instructions = [1,5,6,2]

Output:

1

Explanation:

Begin with `nums = []`. Insert 1 with cost  $\min(0, 0) = 0$ , now `nums = [1]`. Insert 5 with cost  $\min(1, 0) = 0$ , now `nums = [1,5]`. Insert 6 with cost  $\min(2, 0) = 0$ , now `nums = [1,5,6]`. Insert 2 with cost  $\min(1, 2) = 1$ , now `nums = [1,2,5,6]`. The total cost is  $0 + 0 + 0 + 1 = 1$ .

Example 2:

Input:

instructions = [1,2,3,6,5,4]

Output:

3

Explanation:

Begin with nums = []. Insert 1 with cost  $\min(0, 0) = 0$ , now nums = [1]. Insert 2 with cost  $\min(1, 0) = 0$ , now nums = [1,2]. Insert 3 with cost  $\min(2, 0) = 0$ , now nums = [1,2,3]. Insert 6 with cost  $\min(3, 0) = 0$ , now nums = [1,2,3,6]. Insert 5 with cost  $\min(3, 1) = 1$ , now nums = [1,2,3,5,6]. Insert 4 with cost  $\min(3, 2) = 2$ , now nums = [1,2,3,4,5,6]. The total cost is  $0 + 0 + 0 + 0 + 1 + 2 = 3$ .

Example 3:

Input:

instructions = [1,3,3,3,2,4,2,1,2]

Output:

4

Explanation:

Begin with nums = []. Insert 1 with cost  $\min(0, 0) = 0$ , now nums = [1]. Insert 3 with cost  $\min(1, 0) = 0$ , now nums = [1,3]. Insert 3 with cost  $\min(1, 0) = 0$ , now nums = [1,3,3]. Insert 3 with cost  $\min(1, 0) = 0$ , now nums = [1,3,3,3]. Insert 2 with cost  $\min(1, 3) = 1$ , now nums = [1,2,3,3,3]. Insert 4 with cost  $\min(5, 0) = 0$ , now nums = [1,2,3,3,3,4]. Insert 2 with cost  $\min(1, 4) = 1$ , now nums = [1,2,2,3,3,3,4]. Insert 1 with cost  $\min(0, 6) = 0$ , now nums = [1,1,2,2,3,3,3,4]. Insert 2 with cost  $\min(2, 4) = 2$ , now nums = [1,1,2,2,2,3,3,3,4]. The total cost is  $0 + 0 + 0 + 0 + 1 + 0 + 1 + 0 + 2 = 4$ .

Constraints:

```
1 <= instructions.length <= 10
```

```
5
```

```
1 <= instructions[i] <= 10
```

```
5
```

## Code Snippets

### C++:

```
class Solution {  
public:  
    int createSortedArray(vector<int>& instructions) {  
  
    }  
};
```

### Java:

```
class Solution {  
    public int createSortedArray(int[] instructions) {  
  
    }  
}
```

### Python3:

```
class Solution:  
    def createSortedArray(self, instructions: List[int]) -> int:
```

### Python:

```
class Solution(object):  
    def createSortedArray(self, instructions):  
        """  
        :type instructions: List[int]  
        :rtype: int  
        """
```

### JavaScript:

```
/**
 * @param {number[]} instructions
 * @return {number}
 */
var createSortedArray = function(instructions) {

};
```

### TypeScript:

```
function createSortedArray(instructions: number[]): number {

};
```

### C#:

```
public class Solution {
    public int CreateSortedArray(int[] instructions) {

    }
}
```

### C:

```
int createSortedArray(int* instructions, int instructionsSize){

}
```

### Go:

```
func createSortedArray(instructions []int) int {

}
```

### Kotlin:

```
class Solution {
    fun createSortedArray(instructions: IntArray): Int {
```

```
}  
}
```

### Swift:

```
class Solution {  
    func createSortedArray(_ instructions: [Int]) -> Int {  
  
    }  
}
```

### Rust:

```
impl Solution {  
    pub fn create_sorted_array(instructions: Vec<i32>) -> i32 {  
  
    }  
}
```

### Ruby:

```
# @param {Integer[]} instructions  
# @return {Integer}  
def create_sorted_array(instructions)  
  
end
```

### PHP:

```
class Solution {  
  
    /**  
     * @param Integer[] $instructions  
     * @return Integer  
     */  
    function createSortedArray($instructions) {  
  
    }  
}
```

### Scala:



```

object Solution {
  def createSortedArray(instructions: Array[Int]): Int = {

  }
}

```

## Solutions

### C++ Solution:

```

/*
 * Problem: Create Sorted Array through Instructions
 * Difficulty: Hard
 * Tags: array, tree, sort, search
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(h) for recursion stack where h is height
 */

class Solution {
public:
  int createSortedArray(vector<int>& instructions) {

  }
};

```

### Java Solution:

```

/**
 * Problem: Create Sorted Array through Instructions
 * Difficulty: Hard
 * Tags: array, tree, sort, search
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(h) for recursion stack where h is height
 */

class Solution {
  public int createSortedArray(int[] instructions) {

```

```
}  
}
```

### Python3 Solution:

```
"""  
Problem: Create Sorted Array through Instructions  
Difficulty: Hard  
Tags: array, tree, sort, search  
  
Approach: Use two pointers or sliding window technique  
Time Complexity: O(n) or O(n log n)  
Space Complexity: O(h) for recursion stack where h is height  
"""  
  
class Solution:  
    def createSortedArray(self, instructions: List[int]) -> int:  
        # TODO: Implement optimized solution  
        pass
```

### Python Solution:

```
class Solution(object):  
    def createSortedArray(self, instructions):  
        """  
        :type instructions: List[int]  
        :rtype: int  
        """
```

### JavaScript Solution:

```
/**  
 * Problem: Create Sorted Array through Instructions  
 * Difficulty: Hard  
 * Tags: array, tree, sort, search  
 *  
 * Approach: Use two pointers or sliding window technique  
 * Time Complexity: O(n) or O(n log n)  
 * Space Complexity: O(h) for recursion stack where h is height  
 */
```

```

/**
 * @param {number[]} instructions
 * @return {number}
 */
var createSortedArray = function(instructions) {

};

```

### TypeScript Solution:

```

/**
 * Problem: Create Sorted Array through Instructions
 * Difficulty: Hard
 * Tags: array, tree, sort, search
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(h) for recursion stack where h is height
 */

function createSortedArray(instructions: number[]): number {

};

```

### C# Solution:

```

/*
 * Problem: Create Sorted Array through Instructions
 * Difficulty: Hard
 * Tags: array, tree, sort, search
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(h) for recursion stack where h is height
 */

public class Solution {
    public int CreateSortedArray(int[] instructions) {

    }
}

```

```
}
```

### C Solution:

```
/*
 * Problem: Create Sorted Array through Instructions
 * Difficulty: Hard
 * Tags: array, tree, sort, search
 *
 * Approach: Use two pointers or sliding window technique
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(h) for recursion stack where h is height
 */

int createSortedArray(int* instructions, int instructionsSize){

}
```

### Go Solution:

```
// Problem: Create Sorted Array through Instructions
// Difficulty: Hard
// Tags: array, tree, sort, search
//
// Approach: Use two pointers or sliding window technique
// Time Complexity: O(n) or O(n log n)
// Space Complexity: O(h) for recursion stack where h is height

func createSortedArray(instructions []int) int {

}
```

### Kotlin Solution:

```
class Solution {
    fun createSortedArray(instructions: IntArray): Int {

    }
}
```

### Swift Solution:

```
class Solution {  
    func createSortedArray(_ instructions: [Int]) -> Int {  
  
    }  
}
```

### Rust Solution:

```
// Problem: Create Sorted Array through Instructions  
// Difficulty: Hard  
// Tags: array, tree, sort, search  
//  
// Approach: Use two pointers or sliding window technique  
// Time Complexity: O(n) or O(n log n)  
// Space Complexity: O(h) for recursion stack where h is height  
  
impl Solution {  
    pub fn create_sorted_array(instructions: Vec<i32>) -> i32 {  
  
    }  
}
```

### Ruby Solution:

```
# @param {Integer[]} instructions  
# @return {Integer}  
def create_sorted_array(instructions)  
  
end
```

### PHP Solution:

```
class Solution {  
  
    /**  
     * @param Integer[] $instructions  
     * @return Integer  
     */  
    function createSortedArray($instructions) {
```

```
}  
}
```

### Scala Solution:

```
object Solution {  
  def createSortedArray(instructions: Array[Int]): Int = {  
  
  }  
}
```