

Problem Challenge 2

Problem Challenge 3

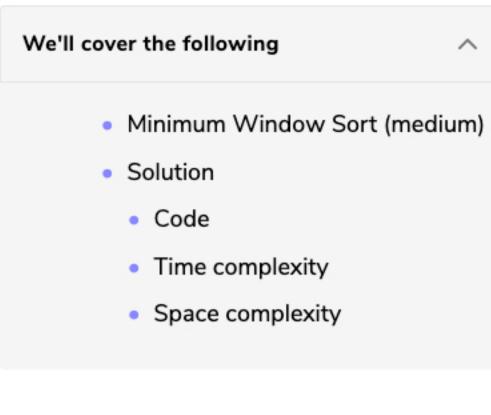
Challenge 2

Challenge 3

Solution Review: Problem

Solution Review: Problem

Solution Review: Problem Challenge 3



Given an array, find the length of the smallest subarray in it which when sorted will sort the whole array.

Minimum Window Sort (medium)

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? Ask a Question

Input: [1, 2, 5, 3, 7, 10, 9, 12]

Example 1:

```
Output: 5
 Explanation: We need to sort only the subarray [5, 3, 7, 10, 9] to make the whole array sorted
Example 2:
```

Explanation: We need to sort only the subarray [1, 3, 2, 0, -1] to make the whole array sorted

Output: 5

Input: [1, 3, 2, 0, -1, 7, 10]

```
Example 3:
 Input: [1, 2, 3]
```

```
Output: 0
 Explanation: The array is already sorted
Example 4:
```

Input: [3, 2, 1]

```
Output: 3
Explanation: The whole array needs to be sorted.
```

As we know, once an array is sorted (in ascending order), the smallest number is at the beginning and the largest number is at the end of the array. So if we start from the beginning of the array to find the first

Solution

element which is out of sorting order i.e., which is smaller than its previous element, and similarly from the end of array to find the first element which is bigger than its previous element, will sorting the subarray between these two numbers result in the whole array being sorted? Let's try to understand this with Example-2 mentioned above. In the following array, what are the first numbers out of sorting order from the beginning and the end of the array:

[1, 3, 2, 0, -1, 7, 10]1. Starting from the beginning of the array the first number out of the sorting order is '2' as it is smaller

- than its previous element which is '3'. 2. Starting from the end of the array the first number out of the sorting order is '0' as it is bigger than its
- previous element which is '-1' As you can see, sorting the numbers between '3' and '-1' will not sort the whole array. To see this, the

The problem here is that the smallest number of our subarray is '-1' which dictates that we need to include

problem if the maximum of the subarray is bigger than some elements at the end of the array. To sort the

more numbers from the beginning of the array to make the whole array sorted. We will have a similar

[1, -1, 0, 2, 3, 7, 10]

our final algorithm will look like: 1. From the beginning and end of the array, find the first elements that are out of the sorting order. The two elements will be our candidate subarray.

whole array we need to include all such elements that are smaller than the biggest element of the subarray. So

- 2. Find the maximum and minimum of this subarray. 3. Extend the subarray from beginning to include any number which is bigger than the minimum of the
- subarray.

following will be our original array after the sorted subarray:

- 4. Similarly, extend the subarray from the end to include any number which is smaller than the maximum of the subarray.
- Code

() F

Here is what our algorithm will look like:

Js JS Python3 **⊚** C++ 👙 Java class ShortestWindowSort {

```
public static int sort(int[] arr) {
           int low = 0, high = arr.length - 1;
           // find the first number out of sorting order from the beginning
           while (low < arr.length - 1 && arr[low] <= arr[low + 1])</pre>
             low++;
           if (low == arr.length - 1) // if the array is sorted
   11
  12
           // find the first number out of sorting order from the end
           while (high > 0 && arr[high] >= arr[high - 1])
   13
   14
             high--;
   15
  16
           // find the maximum and minimum of the subarray
           int subarrayMax = Integer.MIN_VALUE, subarrayMin = Integer.MAX_VALUE;
   17
           for (int k = low; k <= high; k++) {</pre>
   18
             subarrayMax = Math.max(subarrayMax, arr[k]);
   19
             subarrayMin = Math.min(subarrayMin, arr[k]);
  20
   21
  22
           // extend the subarray to include any number which is bigger than the minimum of the subarray
   23
           while (low > 0 && arr[low - 1] > subarrayMin)
   24
   25
             low--;
           // extend the subarray to include any number which is smaller than the maximum of the subarray
   26
           while (high < arr.length - 1 && arr[high + 1] < subarrayMax)</pre>
   27
   28
             high++;
   Run
                                                                                            Save
                                                                                                     Reset
Time complexity
  We'll cover the following
                                         \wedge
```

Minimum Window Sort (medium) Solution

```
Code

    Time complexity

    Space complexity

Minimum Window Sort (medium)
Given an array, find the length of the smallest subarray in it which when sorted will sort the whole array.
Example 1:
```

Input: [1, 2, 5, 3, 7, 10, 9, 12] Output: 5

Explanation: The array is already sorted

Explanation: We need to sort only the subarray [5, 3, 7, 10, 9] to make the whole array sorted Example 2:

Input: [1, 3, 2, 0, -1, 7, 10] Output: 5 Explanation: We need to sort only the subarray [1, 3, 2, 0, -1] to make the whole array sorted

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Example 3:
 Input: [1, 2, 3]
```

Example 4: Input: [3, 2, 1]

Output: 0

```
Output: 3
Explanation: The whole array needs to be sorted.
Solution
```

As we know, once an array is sorted (in ascending order), the smallest number is at the beginning and the largest number is at the end of the array. So if we start from the beginning of the array to find the first element which is out of sorting order i.e., which is smaller than its previous element, and similarly from the

numbers out of sorting order from the beginning and the end of the array: [1, 3, 2, 0, -1, 7, 10]1. Starting from the beginning of the array the first number out of the sorting order is '2' as it is smaller than its previous element which is '3'. 2. Starting from the end of the array the first number out of the sorting order is '0' as it is bigger than its

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between these two numbers result in the whole array being sorted?

previous element which is '-1' As you can see, sorting the numbers between '3' and '-1' will not sort the whole array. To see this, the following will be our original array after the sorted subarray:

[1, -1, 0, 2, 3, 7, 10]The problem here is that the smallest number of our subarray is '-1' which dictates that we need to include more numbers from the beginning of the array to make the whole array sorted. We will have a similar

our final algorithm will look like:

of the subarray.

prep. See how (i)

← Back

Problem Challenge 3

Code

1. From the beginning and end of the array, find the first elements that are out of the sorting order. The two elements will be our candidate subarray. 2. Find the maximum and minimum of this subarray. 3. Extend the subarray from beginning to include any number which is bigger than the minimum of the

problem if the maximum of the subarray is bigger than some elements at the end of the array. To sort the

whole array we need to include all such elements that are smaller than the biggest element of the subarray. So

- subarray. 4. Similarly, extend the subarray from the end to include any number which is smaller than the maximum
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public static int sort(int[] arr) {

int low = 0, high = arr.length - 1;

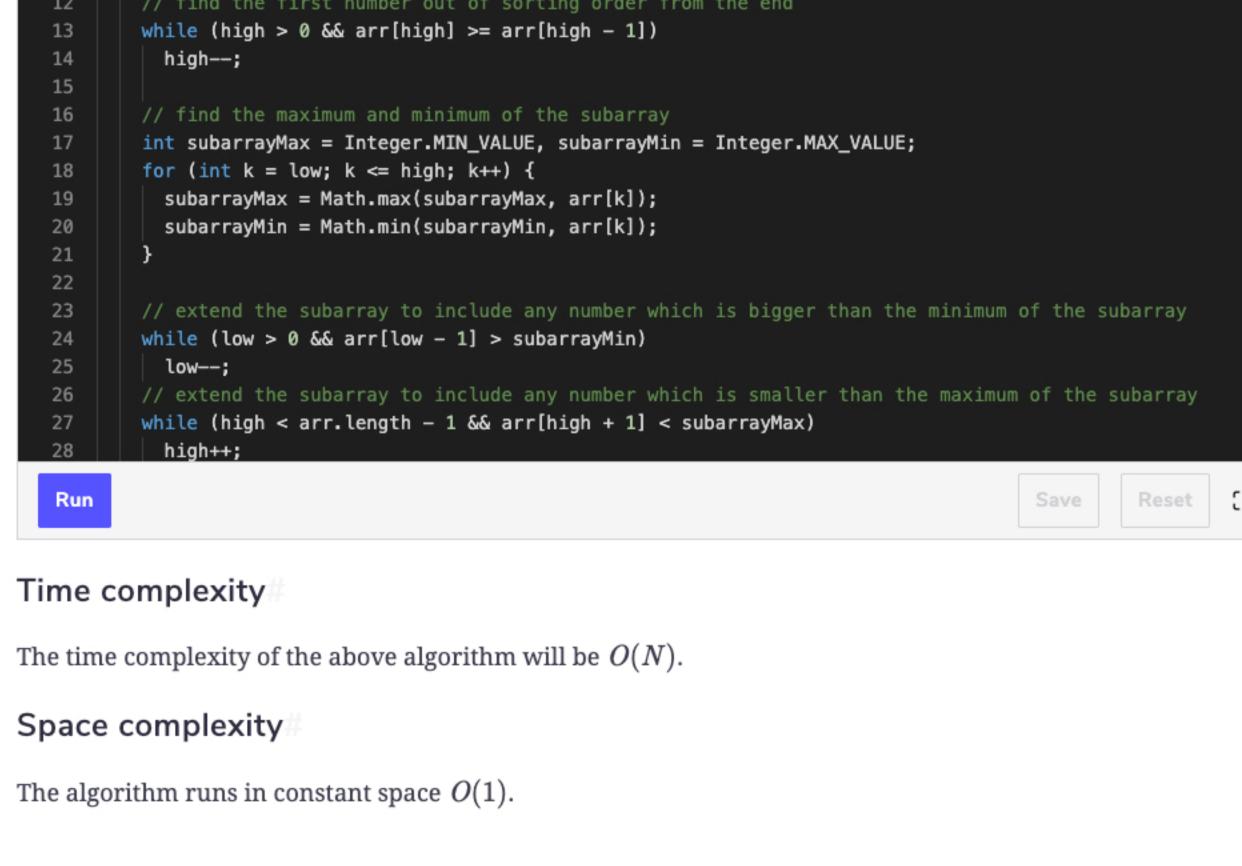
Here is what our algorithm will look like:

// find the first number out of sorting order from the beginning while (low < arr.length - 1 && arr[low] <= arr[low + 1])</pre> low++; if (low == arr.length - 1) // if the array is sorted 9 10 return 0; 11 12 // find the first number out of sorting order from the end while (high > 0 && arr[high] >= arr[high - 1])

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a Target (medium)

Problem Challenge 1

Solution Review: Problem

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