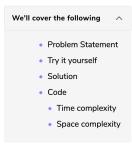


Grokking the Coding Interview: Patterns for **Coding Questions** 49% completed Q Search Course Pattern: Cyclic Sort Introduction Cyclic Sort (easy) Find the Missing Number (easy) Find all Missing Numbers (easy) Find the Duplicate Number (easy) Find all Duplicate Numbers (easy) Problem Challenge 1 Solution Review: Problem Challenge 1 Problem Challenge 2 Solution Review: Problem Challenge 2 Problem Challenge 3 Solution Review: Problem Challenge 3 Pattern: In-place Reversal of a LinkedList Introduction Reverse a LinkedList (easy) Reverse a Sub-list (medium) Reverse every K-element Sub-list (medium) Problem Challenge 1 Solution Review: Problem Challenge 1 Problem Challenge 2 Solution Review: Problem Challenge 2 Pattern: Tree Breadth First Search Introduction Binary Tree Level Order Traversal (easy) Reverse Level Order Traversal Zigzag Traversal (medium) Level Averages in a Binary Tree Minimum Depth of a Binary Tree (easy) Level Order Successor (easy) Connect Level Order Siblings (medium) Problem Challenge 1 Solution Review: Problem Challenge 1 Problem Challenge 2 Solution Review: Problem Challenge 2 Pattern: Tree Depth First Search Introduction Binary Tree Path Sum (easy) All Paths for a Sum (medium) Sum of Path Numbers (medium) Path With Given Sequence

Find all Duplicate Numbers (easy)



Problem Statement

We are given an unsorted array containing 'n' numbers taken from the range 1 to 'n'. The array has some duplicates, find all the duplicate numbers without using any extra space.

Example 1:

```
Input: [3, 4, 4, 5, 5]
Output: [4, 5]
```

Example 2:

```
Input: [5, 4, 7, 2, 3, 5, 3]
Output: [3, 5]
```

Try it yourself

Try solving this question here:

Solution

This problem follows the **Cyclic Sort** pattern and shares similarities with Find the Duplicate Number. Following a similar approach, we will place each number at its correct index. After that, we will iterate through the array to find all numbers that are not at the correct indices. All these numbers are duplicates.

Code

Here is what our algorithm will look like:



