# AI Coding Assistance Documentation

## 1. FindMissingNumbers Optimization

**Prompt:** Is there a better way to loop through elements in an array other than if (nums.Contains(i)) if nums is an array

**Response Summary:**

Using nums.Contains(i) in a loop leads to O(n^2) time complexity due to repeated linear searches. A better approach is to use a HashSet<int> for O(1) lookups. The chatbot also provided a completely refactored version of the method using this approach.

**Implementation Details:**

The code was modified to create a HashSet from the input array and then loop from 1 to nums.Length. Each number is checked for presence in the HashSet, and missing numbers are added to a result list.

## 2. SortArrayByParity Complexity Analysis

**Prompt:** What is the time space complexity of my SortArrayByParity code?

**Response Summary:**

Two loops (one for evens, one for odds) each iterate through the array. This results in:

* Time Complexity: O(n)
* Space Complexity: O(n)

## 3. TwoSum Complexity Analysis

**Prompt:** What is the time space complexity of TwoSum?

**Response Summary:**

Original implementation uses nested loops, leading to O(n^2) time and O(1) space. Copilot suggested using a Dictionary to reduce the time complexity.

**Implementation Details:**

I chose not to implement the dictionary-based solution, as it changed the structure and logic of my original code.

## 4. IsPalindrome Edge Case Enhancement

**Prompt:** Does my IsPalindrome method cover all edge cases for a palindrome integer checker?

**Response Summary:**

Copilot identified that my method handled most cases but claimed it did not handle numbers ending with zero properly.  
However, this was incorrect, as my code already handles that case correctly (e.g., 10 returns false).

**Implementation Details:**

Did not implement any changes.

**Conclusion:** Overall, what I observed was, most of the time, Copilot responds to prompts with fully corrected codes. This is not helpful when one is trying to learn from errors while coding.