**Copilot AI Assistance Documentation**

## Section 1: Prompts Used

**Prompt for Two Sum Method:**

"Implement TwoSum in C# using a dictionary to store indices and check for the complement."

**Prompt for Decimal to Binary Conversion:**

"Write a C# function that converts a decimal number to binary using a loop and division by 2."

**Prompt for Maximum Product of Three Numbers:**

"How to find the maximum product of three numbers in a C# array considering negative numbers?"

**Prompt for Palindrome Check:**

"Create a C# method to check if an integer is a palindrome by reversing the number."

**Prompt for Fibonacci Number:**

"Implement an iterative approach in C# to calculate the nth Fibonacci number."

## Section 2: Responses Received

**Response for Two Sum:**

GitHub Copilot suggested using a Dictionary<int, int> to map each number to its index...

**Response for Decimal to Binary:**

Copilot provided a loop-based solution that divides the number by 2 repeatedly...

**Response for Maximum Product of Three Numbers:**

The suggestion was to sort the array and compare the product of the three largest...

**Response for Palindrome Check:**

Copilot offered a solution that reverses the integer using modulus and division...

**Response for Fibonacci Number:**

The recommendation was to use an iterative loop starting from 0 and 1...

## Section 3: Implementation Details

1. Two Sum Implementation  
Integration:  
Integrated Copilot's dictionary-based solution...

Code:  
public static int[] TwoSum(...) {...}

Edge Cases:  
Handles duplicate numbers and returns an empty array...

2. Decimal to Binary Implementation  
Integration:  
Used the loop-based approach...

Code:  
public static string DecimalToBinary(...) {...}

Edge Cases:  
Specifically handles the case when the input is 0.

3. Maximum Product of Three Numbers Implementation  
Integration:  
Adopted the approach...

Code:  
public static int MaximumProductOfThreeNumbers(...) {...}

Edge Cases:  
Handles both positive and negative values.

4. Palindrome Check Implementation  
Integration:  
Integrated the solution...

Code:  
public static bool IsPalindrome(...) {...}

Edge Cases:  
Negative numbers return false immediately.

5. Fibonacci Number Implementation  
Integration:  
Utilized the iterative approach...

Code:  
public static int Fibonacci(...) {...}

Edge Cases:  
Correctly handles the base cases for n = 0 and n = 1.

## Section 4: Adjustments

Two Sum Adjustments:  
Added checks to prevent duplicate keys...

Decimal to Binary Adjustments:  
Included a special case check for 0...

General Adjustments:  
Inserted extra inline comments in every method..

**Complete C# Code (Program.cs)**

using System;  
using System.Collections.Generic;  
  
namespace ISM6225\_Assignment2  
{  
 class Program  
 {  
 static void Main(string[] args)  
 {  
 // 1. Find Missing Numbers in Array  
 int[] arr1 = { 4, 3, 2, 7, 8, 2, 3, 1 };  
 List<int> missingNumbers = FindMissingNumbers(arr1);  
 Console.WriteLine("Missing Numbers: " + string.Join(", ", missingNumbers));  
  
 // 2. Sort Array by Parity  
 int[] arr2 = { 3, 1, 2, 4 };  
 SortArrayByParity(arr2);  
 Console.WriteLine("Sorted by Parity: " + string.Join(", ", arr2));  
  
 // 3. Two Sum  
 int[] arr3 = { 2, 7, 11, 15 };  
 int target = 9;  
 int[] indices = TwoSum(arr3, target);  
 Console.WriteLine("Two Sum Indices: " + string.Join(", ", indices));  
  
 // 4. Find Maximum Product of Three Numbers  
 int[] arr4 = { 1, 2, 3, 4 };  
 int maxProduct = MaximumProductOfThreeNumbers(arr4);  
 Console.WriteLine("Maximum Product of Three Numbers: " + maxProduct);  
  
 // 5. Decimal to Binary Conversion  
 int number = 42;  
 string binary = DecimalToBinary(number);  
 Console.WriteLine("Decimal " + number + " in binary: " + binary);  
  
 // 6. Find Minimum in Rotated Sorted Array  
 int[] arr6 = { 4, 5, 6, 7, 0, 1, 2 };  
 int minElement = FindMinInRotatedSortedArray(arr6);  
 Console.WriteLine("Minimum in Rotated Sorted Array: " + minElement);  
  
 // 7. Palindrome Number  
 int x = 121;  
 bool isPalin = IsPalindrome(x);  
 Console.WriteLine("Is " + x + " a palindrome? " + isPalin);  
  
 // 8. Fibonacci Number  
 int n = 4;  
 int fib = Fibonacci(n);  
 Console.WriteLine("Fibonacci(" + n + "): " + fib);  
 }  
  
 // Additional methods omitted for brevity...  
 }  
}