Practical debugging with copilot

Problem statement

The Library Management System you created earlier works well, but the following version of the code has some errors that need to be fixed. These errors prevent the program from correctly adding, removing, and displaying books. Use Microsoft Copilot to help debug the program.

Starting Code with Errors

```
class LibraryManager
{
    static void Main()
    {
        string book1 = "";
        string book2 = "";
        string book3 = "";
        string book4 = "";
        string book5 = "";

        while (true)
        {
            Console.WriteLine("Would you like to add or remove a book?
(add/remove/exit)");
            string action = Console.ReadLine();

            if (action == "add")
            {
                Console.WriteLine("Enter the title of the book to
add:");
                string newBook = Console.ReadLine();

                if (string.IsNullOrEmpty(book1))
                {
                    book1 = newBook;
                }
                else if (string.IsNullOrEmpty(book2))
                {
                    book2 = newBook;
                }
                else if (string.IsNullOrEmpty(book3))
                {
                    book3 = newBook;
                }
                else if (string.IsNullOrEmpty(book4))
                {
                    book4 = newBook;
                }
                else if (string.IsNullOrEmpty(book5))
                {
                    book5 = newBook;
                }
                else
                {
```

```
                    Console.WriteLine("The library is full. No more
books can be added.");
                }
            }
            else if (action == "remove")
            {
                Console.WriteLine("Enter the title of the book to
remove:");
                string removeBook = Console.ReadLine();

                if (removeBook == book1)
                {
                    book1 = "";
                }
                else if (removeBook == book2)
                {
                    book2 = "";
                }
                else if (removeBook == book3)
                {
                    book3 = "";
                }
                else if (removeBook == book4)
                {
                    book4 = "";
                }
                else if (removeBook == book5)
                {
                    book5 = "";
                }
                else
                {
                    Console.WriteLine("Book not found.");
                }
            }
            else if (action == "exit")
            {
                break;
            }
            else
            {
                Console.WriteLine("Invalid action. Please type 'add',
'remove', or 'exit'.");
            }

            // Display the list of books
            Console.WriteLine("Available books:");
            Console.WriteLine(book1);
            Console.WriteLine(book2);
            Console.WriteLine(book3);
            Console.WriteLine(book4);
            Console.WriteLine(book5);
        }
    }
}
```

Steps to Complete the Task

1. **Identify the Errors**Use the Visual Studio Code console application you created at the start of the course. Remove any existing code in the Program.cs file of your console application and create all the code in each step in that file. Run the **Starting Code with Errors** code and observe the issues:
    - Adding books without checking if the library is full first. This can lead to books being added even when the library is full, causing confusion.
    - Not checking for null or empty strings when displaying books: This can result in empty lines being printed, which can be confusing for the user.
    - The action variable comparison will only work if the user types a string with all lowercase letters. For example, if the user types “Add” the program will interpret this as an invalid command.
2. **Use Copilot to Debug**
    - Use Microsoft Copilot to identify and suggest fixes for the errors.
    - Apply the necessary corrections to ensure the program works as intended.
3. **Test the Debugged Program**
    - After making the necessary corrections, test the program by adding, removing, and displaying books.

Code:

```
class LibraryManager
{
    static void Main()
    {
        string[] books = new string[5];

        while (true)
        {
            Console.WriteLine("Would you like to add or remove a book?
(add/remove/exit)");
            string action = Console.ReadLine()?.Trim().ToLower();

            if (action == "add")
            {
                bool hasSpace = false;
                foreach (var book in books)
                {
                    if (string.IsNullOrEmpty(book))
                    {
                        hasSpace = true;
```

```
                    break;
                }
            }

            if (!hasSpace)
            {
                Console.WriteLine("The library is full. No more
books can be added.");
                continue;
            }

            Console.WriteLine("Enter the title of the book to
add:");
            string newBook = Console.ReadLine()?.Trim();

            for (int i = 0; i < books.Length; i++)
            {
                if (string.IsNullOrEmpty(books[i]))
                {
                    books[i] = newBook;
                    Console.WriteLine($"Book \"{newBook}\" added.");
                    break;
                }
            }
        }
        else if (action == "remove")
        {
            Console.WriteLine("Enter the title of the book to
remove:");
            string removeBook = Console.ReadLine()?.Trim();

            bool found = false;
            for (int i = 0; i < books.Length; i++)
            {
                if (books[i] == removeBook)
                {
                    books[i] = "";
                    Console.WriteLine($"Book \"{removeBook}\"
removed.");
                    found = true;
                    break;
                }
            }

            if (!found)
            {
                Console.WriteLine("Book not found.");
            }
        }
        else if (action == "exit")
        {
            Console.WriteLine("Exiting program...");
            break;
        }
        else
        {
            Console.WriteLine("Invalid action. Please type 'add',
'remove', or 'exit'.");
        }
```

```
            // Display the list of books
            Console.WriteLine("\nAvailable books:");
            foreach (var book in books)
            {
                if (!string.IsNullOrEmpty(book))
                {
                    Console.WriteLine($"- {book}");
                }
            }
            Console.WriteLine();
        }
    }
}
```