Debugging code

Objective:

Demonstrate how to use basic debugging techniques and tools, such as setting breakpoints, inspecting variable values, and stepping through code to identify and fix errors.

Description:

This activity will guide participants through debugging C# code, including identifying errors, understanding their causes, and applying fixes. It will start with two fully debugged examples and then provide two additional debugging problems for learners to solve. Common error types, such as syntax, runtime, and logical errors, will be addressed.

Set Up Your Environment

- 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.
- Copy and edit the code in this activity into the Program.cs file to complete the steps.

Problem 1: Calculating Discounts

Problem Description:

The code below is meant to calculate the final price after applying a discount to a product. However, it does not produce the correct output due to a logical error.

```
public class Program
{
// Method to calculate the final price after a discount
public static double ApplyDiscount(double price, double
discountPercentage)
{
    return price - discountPercentage;
}

public static void Main()
{
    double finalPrice = ApplyDiscount(1000, 15);
    Console.WriteLine("The final price is: " + finalPrice);
}
}
```

Code:

```
public class Program
{
    // Method to calculate the final price after applying a percentage
discount
    public static double ApplyDiscount(double price, double
discountPercentage)
    {
        // Error checks
        if (price < 0)
        {
            throw new ArgumentException("Price cannot be negative.");
        }

        if (discountPercentage < 0 || discountPercentage > 100)
        {
            throw new ArgumentException("Discount percentage must be
between 0 and 100.");
        }

        // Calculate the discount
        double discountAmount = price * (discountPercentage / 100);
        return price - discountAmount;
    }

    public static void Main()
    {
        try
        {
            double finalPrice = ApplyDiscount(1000, 15); // Valid input
            Console.WriteLine("The final price is: " + finalPrice);

            // Uncomment to test error handling:
            // double invalid = ApplyDiscount(-200, 10);   // Negative
price
            // double invalid = ApplyDiscount(500, 150);   // Invalid
discount percentage
        }
        catch (ArgumentException ex)
        {
            Console.WriteLine("Error: " + ex.Message);
        }
    }
}
```