Loop-Based Programming for Repetitive Tasks

Objective:

By the end of this activity, you will be able to write simple loop-based programs using **for** and **while** loops. You will also combine loops with control structures like **if-else** and **switch** statements to automate repetitive tasks.

Step 1: Using a For Loop to Calculate Total Scores

You are developing a program for a quiz system to calculate the total score of a student based on individual quiz scores. The scores are stored in an array, and you need to use a **for** loop to sum them up.

Instructions:

1. Define an array named **scores** containing the integers 85, 90, 78, 92, and 88.
2. Use a **for** loop to iterate over each element in the array and calculate the total score.
3. Print the total score using **Console.WriteLine()**.

Code:

```
namespace Loop_Based
{
    public class Step1TotalScore
    {
        public static void Run()
        {
            int[] scores = [85, 90, 78, 92, 88];
            int totalScore = 0;

            for (int i = 0; i < scores.Length; i++)
            {
                totalScore += scores[i];
            }

            Console.WriteLine($"Total Score: {totalScore}");
        }
    }
}
```

Step 2: Using a While Loop to Calculate Factorials

Create a program that calculates the factorial of a given number using a while loop. The program should ask the user for an integer and then calculate its factorial.

Instructions:

1. Declare an integer variable number and set its value to 5.
2. Use a while loop to calculate the factorial of the number.
3. After each iteration, decrement the value of number.
4. Print the factorial using Console.WriteLine().

Code:

```
namespace Loop_Based
{
    public class Step2CalcFactorials
    {
        public static void Run()
        {
            int number = 5;
            int factorial = 1;

            while (number > 0)
            {
                factorial *= number;
                number--;
            }

            Console.WriteLine($"Factorial: {factorial}");
        }
    }
}
```

Step 3: Combining Loops and If-Else to Determine Pass or Fail

Write a program that uses a for loop with an if-else structure to check if each student's score meets the passing criteria. A student passes if their score is 50 or above.

Instructions:

1. Define an array named studentScores containing the integers 45, 60, 72, 38, and 55.
2. Use a for loop to iterate over each element in the array.
3. Inside the loop, use an if-else statement to check if the score is 50 or above.
4. Print "Pass" if the score is 50 or above; otherwise, print "Fail."

Code:

```
   namespace Loop_Based
      {
            public class Step3PassOrFail
    {
        public static void Run()
        {
            int[] studentScores = { 45, 60, 72, 38, 55 };

            for (int i = 0; i < studentScores.Length; i++)
            {
                if (studentScores[i] >= 50)
                {
                    Console.WriteLine($"Score: {studentScores[i]} - Pass");
                }
                else
                {
                    Console.WriteLine($"Score: {studentScores[i]} - Fail");
                }
            }
        }
    }
}
```

Step 4: Combining Loops and Switch Statements for Task Scheduling

Create a program that schedules weekly tasks using a switch statement inside a for loop to assign a task for each day.

Instructions:

1. Define an array named weekDays containing the strings "Monday," "Tuesday," "Wednesday," "Thursday," "Friday."
2. Use a for loop to iterate over each element in the array.
3. Inside the loop, use a switch statement to assign a task to each day:
    - If it's "Monday," print "Team Meeting."
    - If it's "Tuesday," print "Code Review."
    - If it's "Wednesday," print "Development."
    - If it's "Thursday," print "Testing."
    - If it's "Friday," print "Deployment."

Code:

```
namespace Loop_Based
{
    public class Step4ComboLoopsSwitch
    {
        public static void Run()
        {
            string[] weekDays = { "Monday", "Tuesday", "Wednesday", "Thursday", "Friday" };

            for (int i = 0; i < weekDays.Length; i++)
            {
                string day = weekDays[i];

                Console.Write($"{day}: ");

                switch (day)
                {
                    case "Monday":
                        Console.WriteLine("Team Meeting");
                        break;
                    case "Tuesday":
                        Console.WriteLine("Code Review");
                        break;
                    case "Wednesday":
                        Console.WriteLine("Development");
                        break;
                    case "Thursday":
                        Console.WriteLine("Testing");
                        break;
                    case "Friday":
                        Console.WriteLine("Deployment");
                        break;
                    default:
                        Console.WriteLine("No task assigned.");
                        break;
                }
            }
        }
    }
}
```

Main:

```
namespace Loop_Based
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.WriteLine("Running Task 1: Total Score");
            Step1TotalScore.Run();

            Console.WriteLine("\nRunning Task 2: Factorial");
            Step2CalcFactorials.Run();

            Console.WriteLine("\nRunning Task 3: Pass or Fail");
            Step3PassOrFail.Run();

            Console.WriteLine("\nRunning Task 4: Weekly Task
Scheduler");
            Step4ComboLoopsSwitch.Run();
        }
    }
}
```