Programming in C# Lab
BCA-DS-651

Manav Rachna International Institute of Research and Studies

School of Computer Applications

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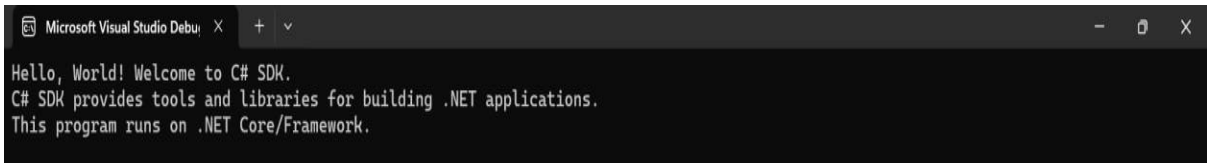
1. Write program to demonstrate the working of C# SDK.

```
using System;
class Program
{
static void Main()
{
Console.WriteLine("Hello, World! Welcome to C# SDK.");
Console.WriteLine("C# SDK provides tools and libraries for building .NET applications.");
Console.WriteLine("This program runs on .NET Core/Framework.");
}
}
```

Output:-



2. **Write program to show the use of various data types available in C#.**

```
using System;

class DataTypesExample

{

   static void Main()

   {

      int num = 10;

      float pi = 3.14f;

      double largeDecimal = 123.456;

      char letter = 'A';

      bool isTrue = true;

      string message = "Hello C#";

      Console.WriteLine($"Integer: {num}");

      Console.WriteLine($"Float: {pi}");

      Console.WriteLine($"Double: {largeDecimal}");

      Console.WriteLine($"Character: {letter}");

      Console.WriteLine($"Boolean: {isTrue}");

      Console.WriteLine($"String: {message}");

   }

}
```

Output:-

3. **Write programs to understand the use of Control statements.**

```
using System;

class ControlStatementsExample

{

   static void Main()

   {

      int num = 5;

      // If-else

      if (num % 2 == 0)

         Console.WriteLine("Even Number");

      else

         Console.WriteLine("Odd Number");

      // For loop

      Console.WriteLine("Numbers from 1 to 5:");

      for (int i = 1; i <= 5; i++)

         Console.Write(i + " ");

      Console.WriteLine();

      // While loop

      int count = 3;

      while (count > 0)

      {

         Console.WriteLine("Countdown: " + count);

         count--;

      }

   }

}
```

Output:-


Microsoft Visual Studio Debu
Odd Number
Numbers from 1 to 5:
1 2 3 4 5
Countdown: 3
Countdown: 2
Countdown: 1

4. Write programs to understand the use of library functions.

```
using System;

class LibraryFunctionsExample

{

   static void Main()

   {

      double sqrtValue = Math.Sqrt(25);

      string upperCase = "hello".ToUpper();

      string formatted = string.Format("Value: {0}, Square Root: {1}", 100, sqrtValue);

      Console.WriteLine($"Square Root of 25: {sqrtValue}");

      Console.WriteLine($"Uppercase String: {upperCase}");

      Console.WriteLine(formatted);

   }

}
```

Output:-

5. Write a program to demonstrate the use of various arithmetic, unary, logical, bit-wise, assignment and conditional operators.

```
using System;

class OperatorsExample

{

   static void Main()

   {

      int a = 10, b = 5;

      Console.WriteLine($"Arithmetic: {a} + {b} = {a + b}");

      Console.WriteLine($"Unary: -{a} = {-a}");

      Console.WriteLine($"Logical: {a > b && b < 15}");

      Console.WriteLine($"Bitwise: {a} & {b} = {a & b}");

      Console.WriteLine($"Assignment: a += b -> {a += b}");

      Console.WriteLine($"Conditional: {(a > b ? "A is greater" : "B is greater")}");

   }

}
```

Output:-

6. Write a program to store 10 elements in an array and display the array elements in increasing order.

```
using System;
class ArraySorting
{
   static void Main()
   {
      int[] arr = { 9, 5, 2, 8, 3, 7, 1, 6, 4, 0 };
      Array.Sort(arr);
      Console.WriteLine("Sorted Array:");
      foreach (int num in arr)
         Console.Write(num + " ");
   }
}
```

Output:-

7. Demonstrate the use of pass by value and pass by reference by writing a program.

```
using System;
class PassExample
{
   static void IncrementByValue(int num)
   {
      num++;
   }
   static void IncrementByReference(ref int num)
   {
      num++;
   }
   static void Main()
   {
      int val = 10;
      IncrementByValue(val);
      Console.WriteLine("After Pass by Value: " + val);
      IncrementByReference(ref val);
      Console.WriteLine("After Pass by Reference: " + val);
   }
}
```

Output:-

8. Write a program to implement recursion.

```
using System;
class RecursionExample
{
   static int Factorial(int n)
   {
      if (n == 1) return 1;
      return n * Factorial(n - 1);
   }
   static void Main()
   {
      int num = 5;
      Console.WriteLine($"Factorial of {num} is {Factorial(num)}");
   }
}
```

Output:-

9. Write programs to implement one dimensional and two dimensional arrays.

1-D Array

```
using System;
class OneDArrayExample
{
   static void Main()
   {
      int[] numbers = { 10, 20, 30, 40, 50 };
      Console.WriteLine("One-Dimensional Array Elements:");
      for (int i = 0; i < numbers.Length; i++)
      {
         Console.Write(numbers[i] + " ");
      }
   }
}
```

Output:-

2-D Array

```
using System;
class TwoDArrayExample
{
   static void Main()
   {
      int[,] matrix = { { 1, 2, 3 }, { 4, 5, 6 } };
      Console.WriteLine("Two-Dimensional Array Elements:");
      for (int i = 0; i < 2; i++)
      {
         for (int j = 0; j < 3; j++)
         {
            Console.Write(matrix[i, j] + " ");
         }
         Console.WriteLine();
      }
   }
}
```

Output:-

10. Write programs to understand the working of predefined string functions like Compare( ), CompareTo( ),

Concat( ),

a. **Copy( ) and Join().**

```
using System;
class StringFunctions
{
   static void Main()
   {
      string str1 = "Hello";
      string str2 = "World";
      // Compare()
      int result = string.Compare(str1, str2);
      Console.WriteLine("Compare(): " + result); // Returns -1, 0, or 1
      // CompareTo()
      int result2 = str1.CompareTo(str2);
      Console.WriteLine("CompareTo(): " + result2); // Similar to Compare()
      // Concat()
      string concatenated = string.Concat(str1, " ", str2);
      Console.WriteLine("Concat(): " + concatenated);
      // Copy()
      string copiedString = string.Copy(str1);
      Console.WriteLine("Copy(): " + copiedString);
      // Join()
      string[] words = { "C#", "is", "awesome" };
      string joinedString = string.Join(" ", words);
      Console.WriteLine("Join(): " + joinedString);
   }
```

}

Output:-


Microsoft Visual Studio Debu
Compare(): -1
CompareTo(): -1
Concat(): Hello World
Copy(): Hello
Join(): C# is awesome

11. Write a program to implement class and its objects.

```
using System;
class Car
{
   // Fields (Attributes)
   public string Brand;
   public string Model;
   public int Year;
   // Constructor to initialize values
   public Car(string brand, string model, int year)
   {
      Brand = brand;
      Model = model;
      Year = year;
   }
   // Method to Display Car Information
   public void DisplayCarInfo()
   {
      Console.WriteLine("Car Brand: " + Brand);
      Console.WriteLine("Car Model: " + Model);
      Console.WriteLine("Manufacturing Year: " + Year);
   }
}
class Program
{
   static void Main()
   {
      // Creating objects of the Car class
```

```
        Car car1 = new Car("Toyota", "Corolla", 2022);
        Car car2 = new Car("Honda", "Civic", 2023);
        // Displaying car details
        Console.WriteLine("Car 1 Details:");
        car1.DisplayCarInfo();
        Console.WriteLine("\nCar 2 Details:");
        car2.DisplayCarInfo();
    }
}
```

Output:-

12. Write a program to implement constructors.

```
using System;
class Student
{
   public string Name;
   public int Age;
   // Constructor
   public Student(string name, int age)
   {
      Name = name;
      Age = age;
   }
   public void Display()
   {
      Console.WriteLine("Student Name: " + Name);
      Console.WriteLine("Student Age: " + Age);
   }
}
class Program
{
   static void Main()
   {
      Student student1 = new Student("Ram", 20);
      student1.Display();
   }
}
```

Output:-


Microsoft Visual Studio Debu
Student Name: Ram
Student Age: 20