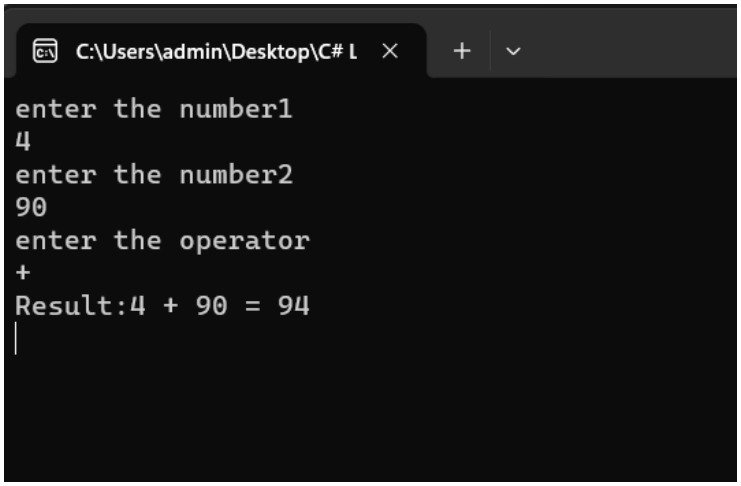
C# Lab Programs

1.Develop a C# program to simulate simple airthmetic calculator for addition, subtraction, multiplication, division and mod opertaions. Read the operator and operands through console.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace C__Program_1
{
   internal class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("enter the number1");

         float number1 = Convert.ToSingle(Console.ReadLine());

         Console.WriteLine("enter the number2");

         float number2 = Convert.ToSingle(Console.ReadLine());

         Console.WriteLine("enter the operator");

         char operation = char.Parse(Console.ReadLine());

         double result = 0;

         switch (operation)
         {
            case '+':
               result = number1 + number2;
               break;

            case '-':
               result = number1 - number2;
               break;

            case '*':
               result = number1 * number2;
               break;

            case '/':
               if (number2 != 0)
               {
                  result = number1 / number2;
               }
               else
               {
                  Console.WriteLine("division by zero is not allowed");
                  Console.ReadLine();
```

```
            }
            break;

        case '%':
            if (number2 != 0)
            {
                result = number1 % number2;
            }
            else
            {
                Console.WriteLine("Modulus by zero is not allowed");
                Console.ReadLine();

            }
            break;

        default:
            Console.WriteLine("invalid operator");
            Console.ReadLine();
            return;

    }

    Console.WriteLine("Result:" + number1 + " " + operation + " " + number2 + " = " + result);


    Console.ReadLine();

  }
 }
}
```

OUTPUT



```
C:\Users\admin\Desktop\C# L

enter the number1
6
enter the number2
90
enter the operator
-
Result:6 - 90 = -84
```

```
C:\Users\admin\Desktop\C# L

enter the number1
6
enter the number2
9
enter the operator
*
Result:6 * 9 = 54
```

```
C:\Users\admin\Desktop\C# L

enter the number1
10
enter the number2
5
enter the operator
/
Result:10 / 5 = 2
```

```
C:\Users\admin\Desktop\C# L
enter the number1
7
enter the number2
5
enter the operator
%
Result:7 % 5 = 2
```

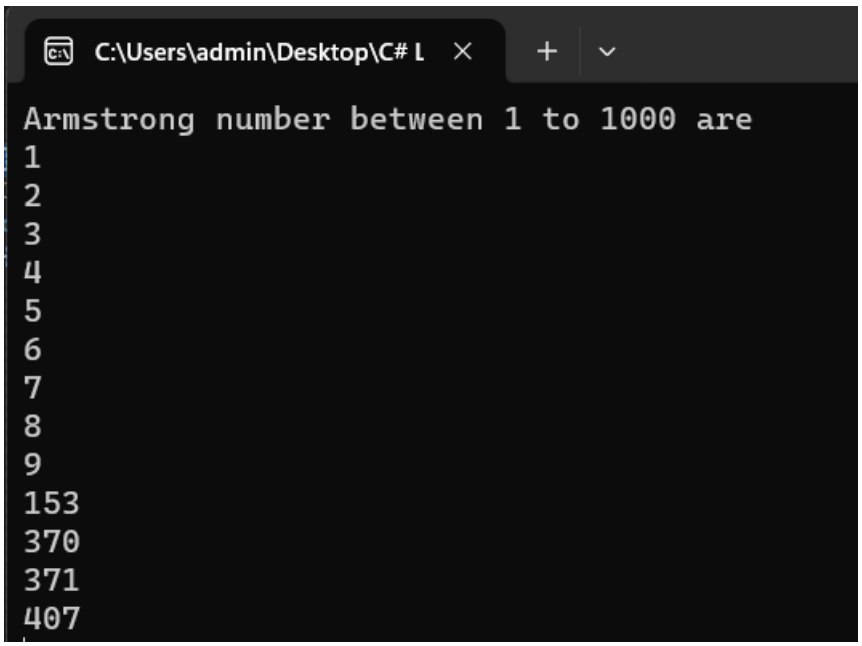
```
C:\Users\admin\Desktop\C# L
enter the number1
70
enter the number2
0
enter the operator
/
division by zero is not allowed
```

```
C:\Users\admin\Desktop\C# L
enter the number1
70
enter the number2
0
enter the operator
%
Modulus by zero is not allowed
```

2. Develop a C# program to print Armstrong number between 1 to 1000.

```
using ArmstrongNumber;
using System;

namespace ArmstrongNumber
{
    class Program
    {

        public void Check_ArmstrongNumber(int number)
        {
            int originalNumber = number;
            int n = CountDigit(number);
            int sum = 0;

            while (number > 0)
            {
                int digit = number % 10;
                sum = sum + (int)Math.Pow(digit, n);
                number = number / 10;
            }

            if (sum == originalNumber)
            {
                Console.WriteLine(originalNumber);
            }
        }

        public int CountDigit(int number)
        {
            int count = 0;
            while (number > 0)
            {
                count++;
                number = number / 10;
            }
            return count;
        }
    }
    class MainClass
    {
        static void Main(String[] args)
        {
            Program obj = new Program();

            Console.WriteLine("Armstrong number between 1 to 1000 are");

            for (int i = 1; i <= 1000; i++)
            {
                obj.Check_ArmstrongNumber(i);
            }

            Console.ReadLine();
        }
    }
}
```

OUTPUT

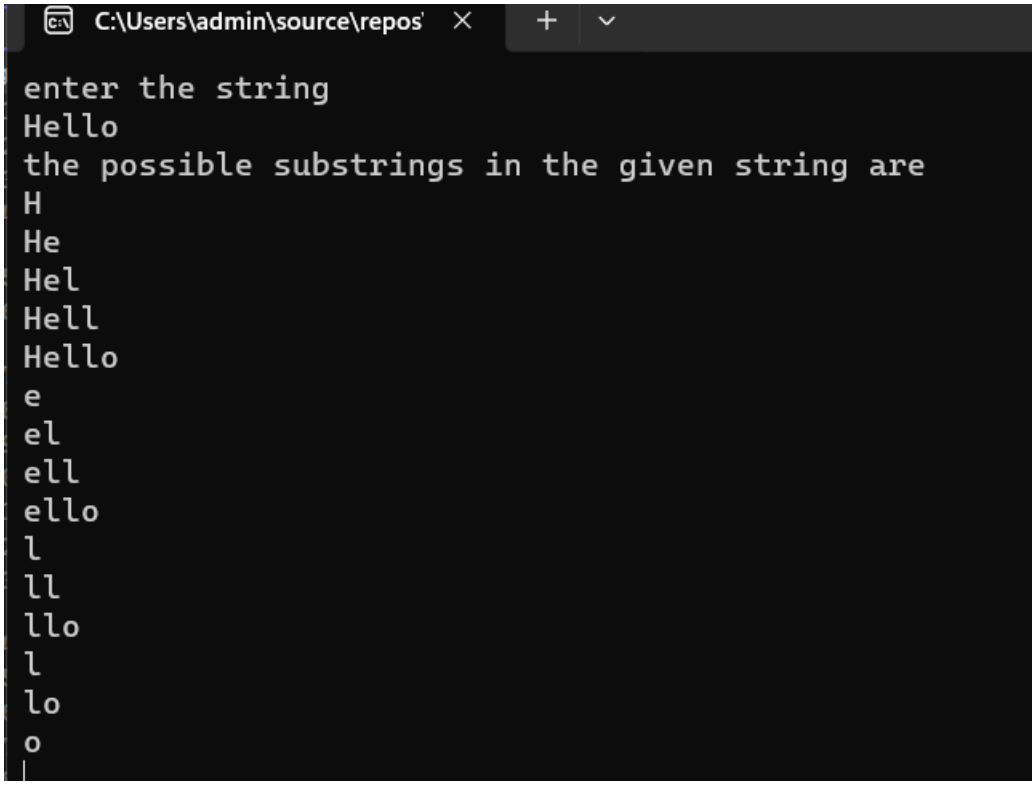


3. Develop a c# program to list all substring in a given string[Hint:use of Substring() method].

```
using System;

namespace Substrings
{
   internal class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("enter the string");
         string str=Console.ReadLine();
         Console.WriteLine("the possible substrings in the given string are");
         Getsubstring(str);
      }
      static void Getsubstring(string str)
      {
         for(int i=0; i<str.Length; i++)
         {
            for(int j=i+1; j<=str.Length; j++)
            {
               string substring=str.Substring(i,j-i);
               Console.WriteLine(substring);
```

```
            }

        }
        Console.ReadLine();
    }
  }
}
```

OUTPUT



4. Develop a C# program to demonstrate Diision by Zero and Index Out of Range exception.

```
using System;

namespace ExceptionHandling
{
class Program
{
 public static void Main(string[] args)
 {
 Console.WriteLine("Enter numerator:");
 float numerator = int.Parse(Console.ReadLine());

 Console.WriteLine("Enter denominator:");
 float denominator = int.Parse(Console.ReadLine());

 try
 {
 if (denominator == 0)
 {
  throw new DivideByZeroException("Cannot divide by zero.");
 }

  float result = numerator / denominator;
  Console.WriteLine("Result of division:"+result);
 }
  catch (DivideByZeroException ex)
 {
  Console.WriteLine("Divide by zero exception:"+ex.Message);
 }

  Console.WriteLine("Enter the array size:");
  int arraySize = Convert.ToInt32(Console.ReadLine());

  Console.WriteLine("Enter the array elements:");
  try
  {
  int[] array = new int[arraySize];  //creating an array

  for (int i = 0; i < arraySize; i++)
  {
  array[i] = Convert.ToInt32(Console.ReadLine());
  }

  Console.WriteLine("enter the array position to access value");
  int index = Convert.ToInt32(Console.ReadLine());
  Console.WriteLine("value in the givin position is:"+array[index]);
  }
  catch (IndexOutOfRangeException ex)
  {
  Console.WriteLine("Index out of range exception:" +ex.Message);
```

```
    }
    Console.ReadLine();
    }
   }
}
```

OUTPUT

```
C:\Users\admin\source\repos

Enter numerator:
10
Enter denominator:
5
Result of division:2
Enter the array size:
3
Enter the array elements:
10
9
7
enter the array position to access value
2
value in the givin position is:7
```

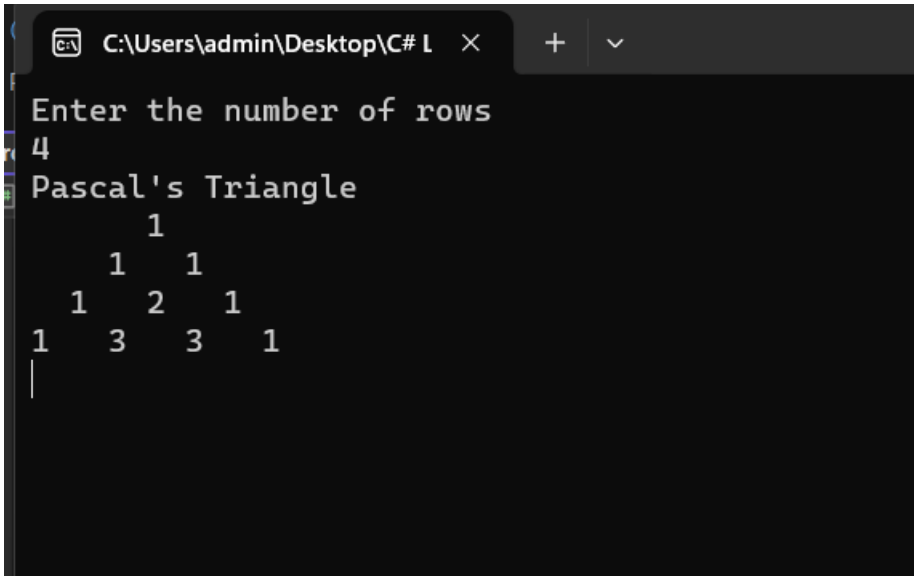
```
C:\Users\admin\source\repos

Enter numerator:
10
Enter denominator:
0
Divide by zero exception:Cannot divide by zero.
Enter the array size:
3
Enter the array elements:
13
3
4
enter the array position to access value
6
Index out of range exception:Index was outside the bounds of the array.
```

5. Develop a C# Program to Generate and Print Pascal Triangle using Two Dimensional Arrays.

```
using System;

class Program
{
public static void Main(String[] args)
{
Console.WriteLine("Enter the number of rows");
int Rows = int.Parse(Console.ReadLine());

int[,] pascalTriangle = Generate(Rows);

Print(pascalTriangle);

Console.ReadLine();
}

static int[,] Generate(int Rows)
{
int[,] triangle = new int[Rows, Rows];

for (int i = 0; i < Rows; i++)
{
triangle[i, 0] = 1;

for (int j = 1; j < i; j++)
{
triangle[i, j] = triangle[i - 1, j - 1] + triangle[i - 1, j];
}

triangle[i, i] = 1;
}

return triangle;
}


static void Print(int[,] triangle)
{
Console.WriteLine("Pascal's Triangle:");

 for (int i = 0; i < triangle.GetLength(0); i++)
 {
          // Add leading spaces for formatting
 for (int space = 0; space < triangle.GetLength(0) - i - 1; space++)
 {
  Console.Write("  ");
 }

 for (int j = 0; j <= i; j++)
```

```
{
Console.Write(triangle[i, j] + "   ");
}

Console.WriteLine();
}
}
}
```

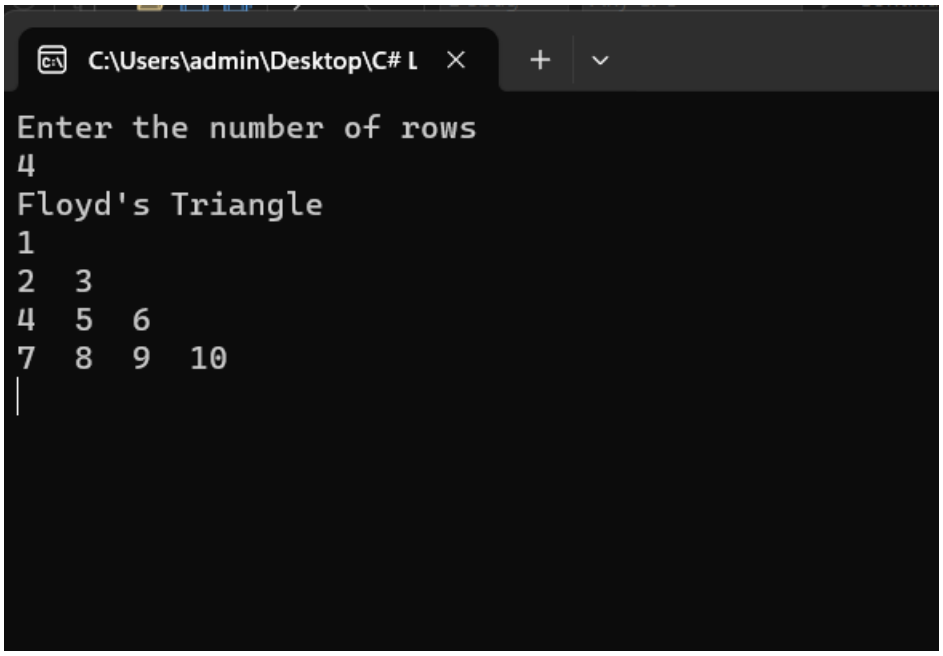
OUTPUT



6. Develop a C# Program to Generate and Print Floyds Triangle using Jagged arrays.

```
using System;

class Program
{
   public static void Main(String[] args)
   {
      Console.WriteLine("Enter the number of rows");

      int Rows = int.Parse(Console.ReadLine());

      Console.WriteLine("Floyd's Triangle");


      Print(Rows);

      Console.ReadLine();
   }

   static void Print(int Rows)
   {
      int[][] triangle = new int[Rows][];

      int value = 1;

      for (int i = 0; i < Rows; i++)
      {
         triangle[i] = new int[i + 1];

         for (int j = 0; j <= i; j++)
         {
           Console.Write(triangle[i][j]+ value++ +"  ");
         }
         Console.WriteLine();
      }

   }

}
```

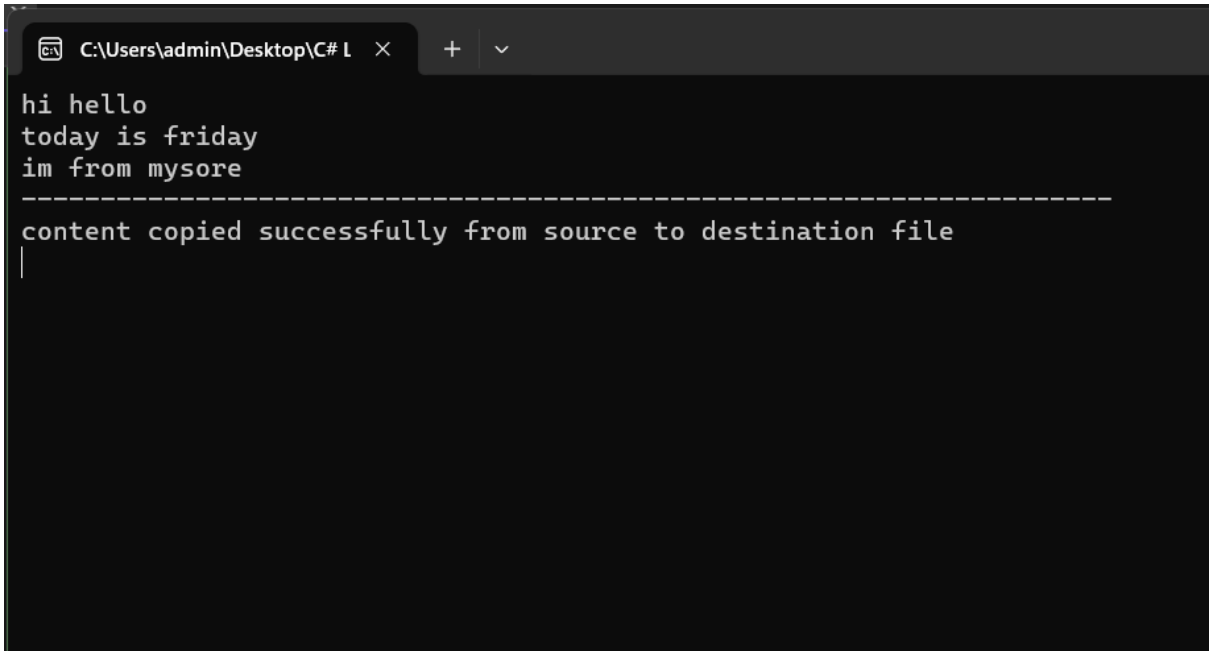
OUTPUT


C:\Users\admin\Desktop\C# L
Enter the number of rows
4
Floyd's Triangle
1
2 3
4 5 6
7 8 9 10

7. Develop a C# Program to read a text file and Copy the file content s to another text file.

```
using System;
using System.IO;


namespace FileHandling
{
class Program
{
 static void Main(string[] args)
 {
 try
 {
 string sourceFile = @"D:\test.text";  //source file creation
 string destinationFile = @"D:\dest.text";  //destination file creation


 if (File.Exists(sourceFile))
 {
string[] array = new string[] //writing multiple lines to the source file
{
"hi hello",
"today is friday",
"im from mysore"
};

File.WriteAllLines(sourceFile, array);

string[] lines = File.ReadAllLines(sourceFile); //reading the content of the source file
foreach (string line in lines)
{
Console.WriteLine(line); //display the multiple line content of source file
}

File.WriteAllLines(destinationFile, array); //copying the source file content to destination file

Console.WriteLine("------------------------------------------------------------");

Console.WriteLine("content copied successfully from source to destination file");

 }
 }

 catch (Exception e)
 {
 Console.WriteLine(e);
 }

 Console.ReadLine();

  }
 }
}
```

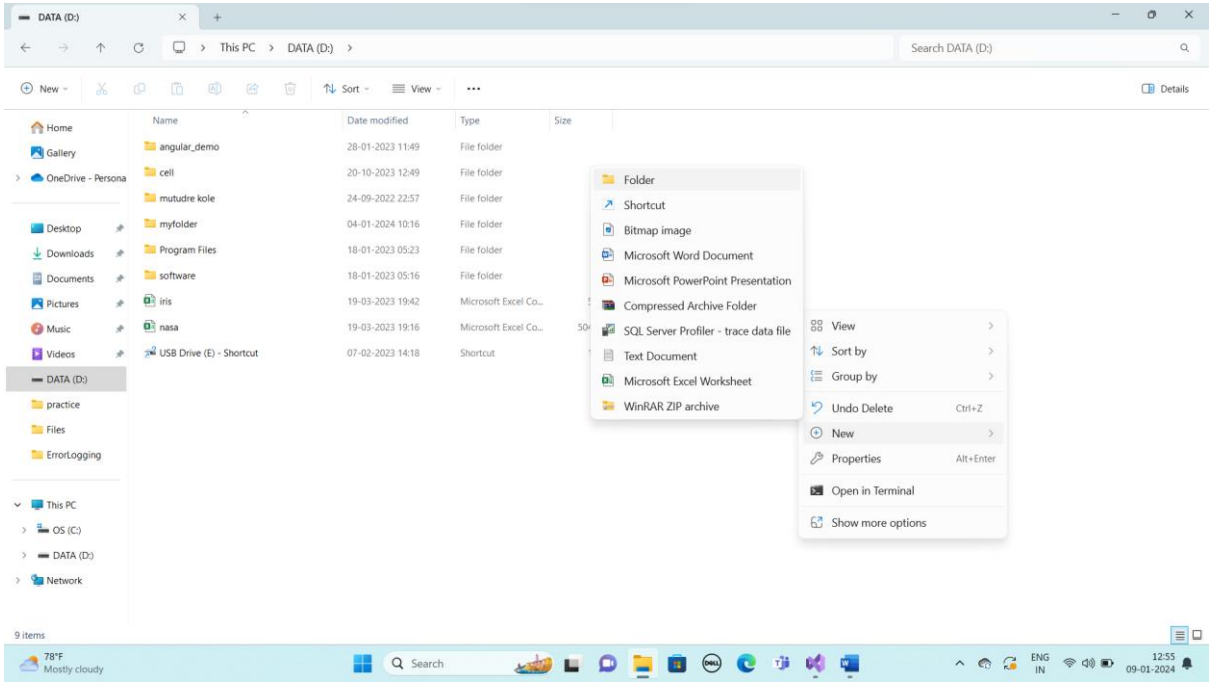
OUTPUT



7th program (File Handling) with steps

Step1: create a folder in D drive

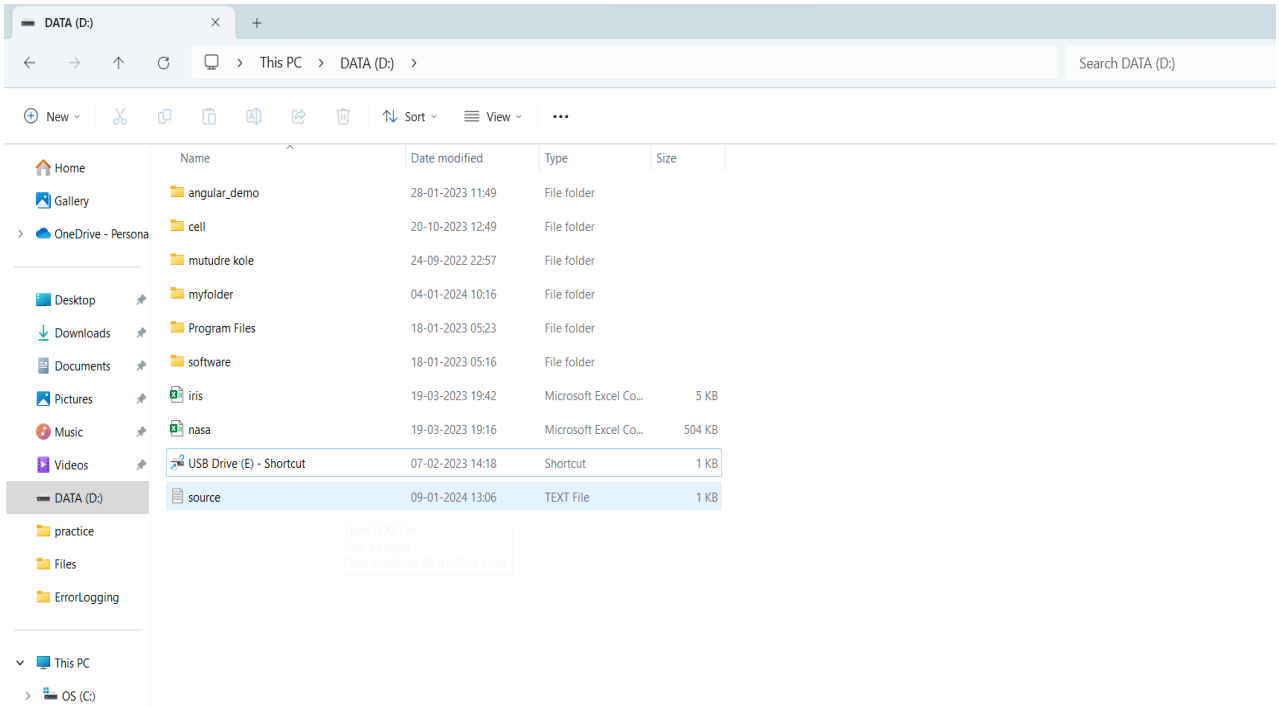
Right click->new->Folder->Folder Name



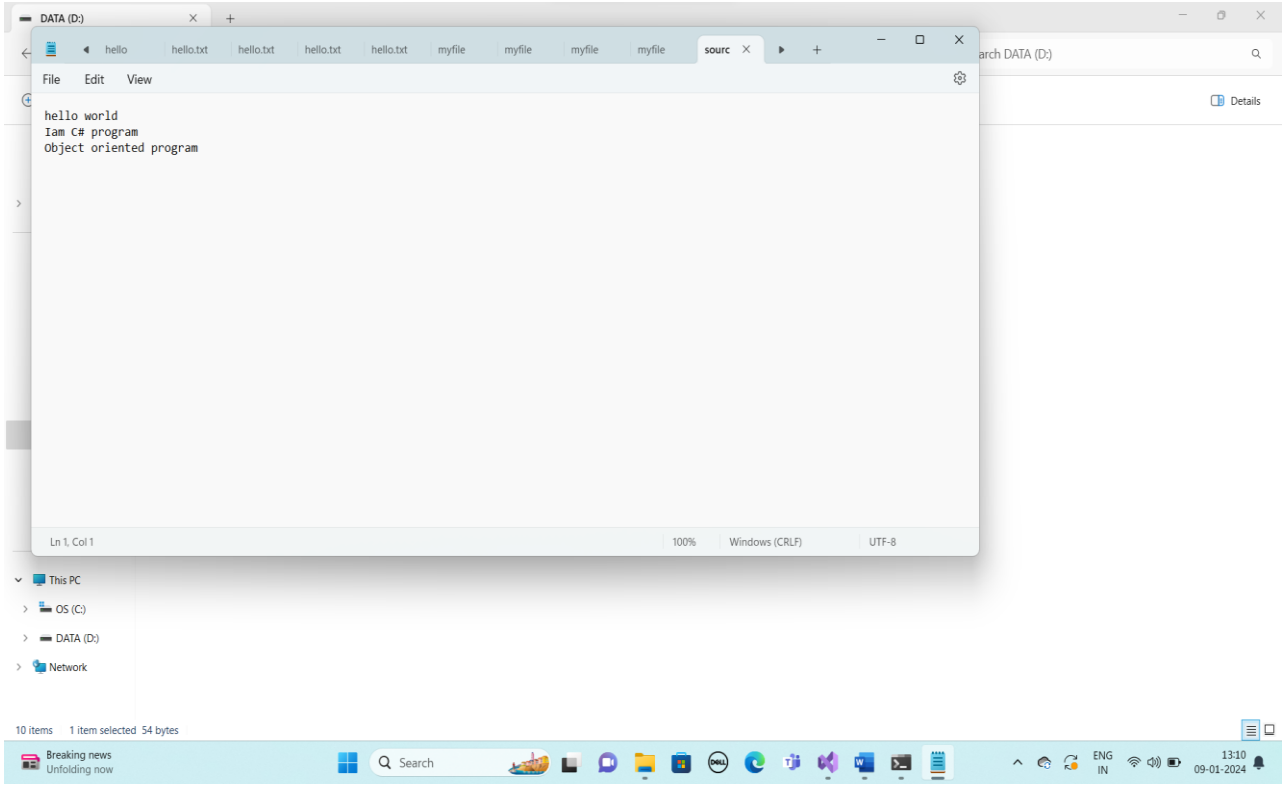
Step2:in Visiual studio create file inside the created folder and write the content and execute

```
namespace Files
{
    0 references
    class Program
    {
        0 references
        public static void Main(string[] args)
        {
            string source_FilePath = @"D:source.text";  //declaring the Filepath
            string[] FileContent = new string[]
            {
                "hello world",
                "Iam C# program",
                "Object oriented program"
            };

            File.WriteAllLines(source_FilePath, FileContent);  //writing a content which is stored inside the stri
            Console.ReadLine();


        }
    }
}
```

Check whether given file is created and content is stored inside the file in Ddrive->folder->file



File is created

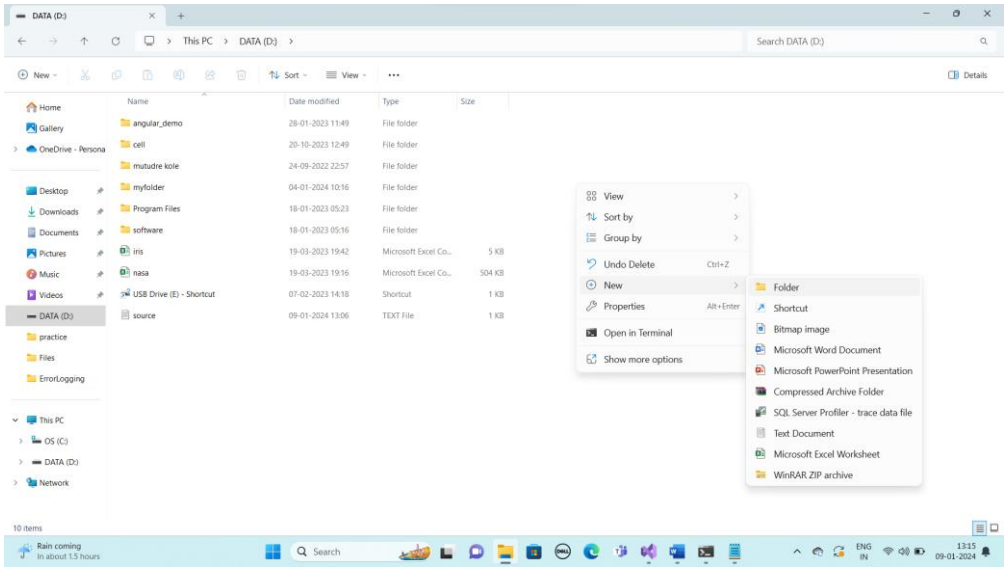


Content stored successfully

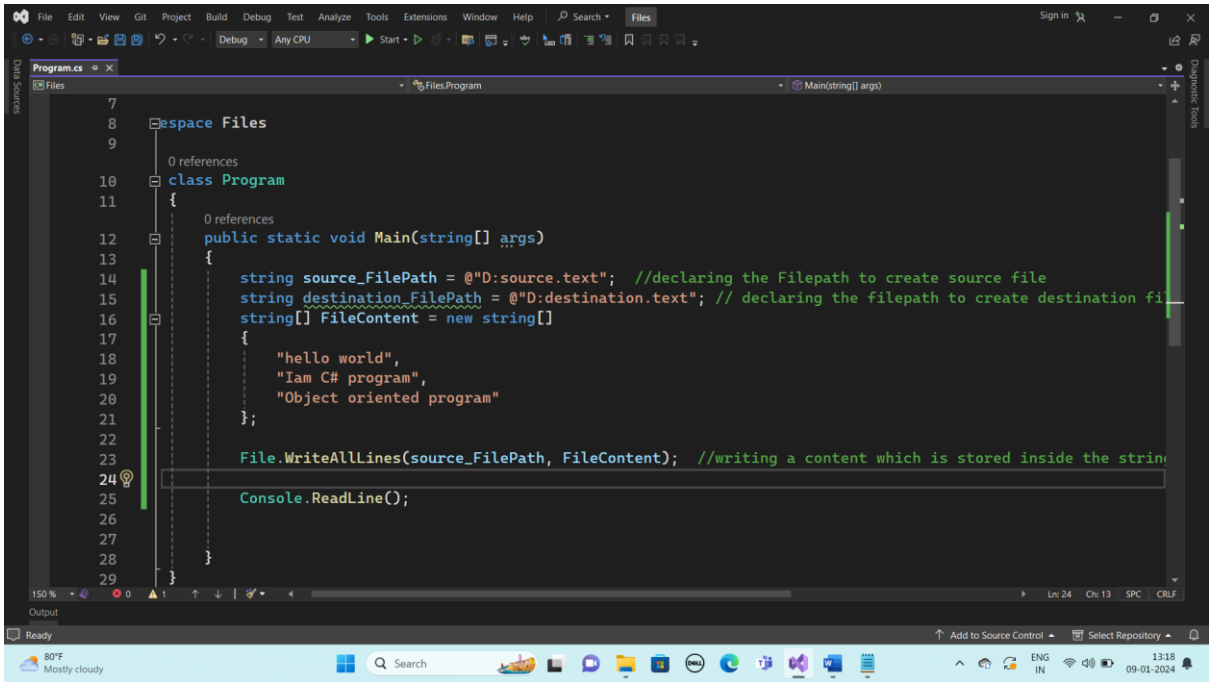
Step3: display the content of the file using foreach Loop

(given in below program)

Step4: create another separate folder in D drive



Step 5: in visual studio create destination file path and execute



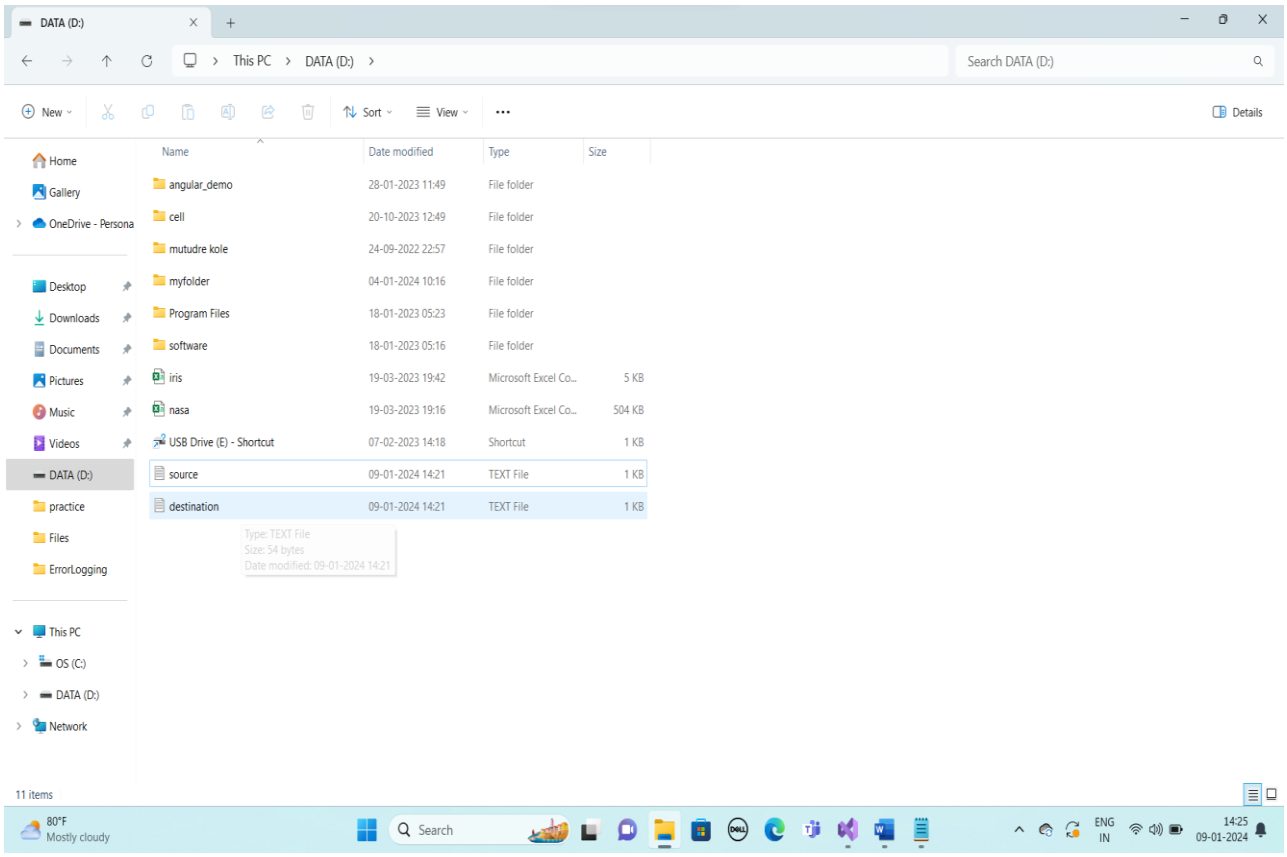
Step6: then copy the source file content to destination file (code given below)

```
class Program
{
    public static void Main(string[] args)
    {
        string source_FilePath = @"D:source.text";  //declaring the Filepath to create source file
        string destination_FilePath = @"D:destination.text"; // declaring the filepath to create destination
        string[] FileContent = new string[]
        {
            "hello world",
            "Iam C# program",
            "Object oriented program"
        };

        File.WriteAllLines(source_FilePath, FileContent);  //writing a content which is stored inside the st

        File.WriteAllLines(destination_FilePath, FileContent); //copy the source file content to the destina


        Console.ReadLine();



    }
}
```

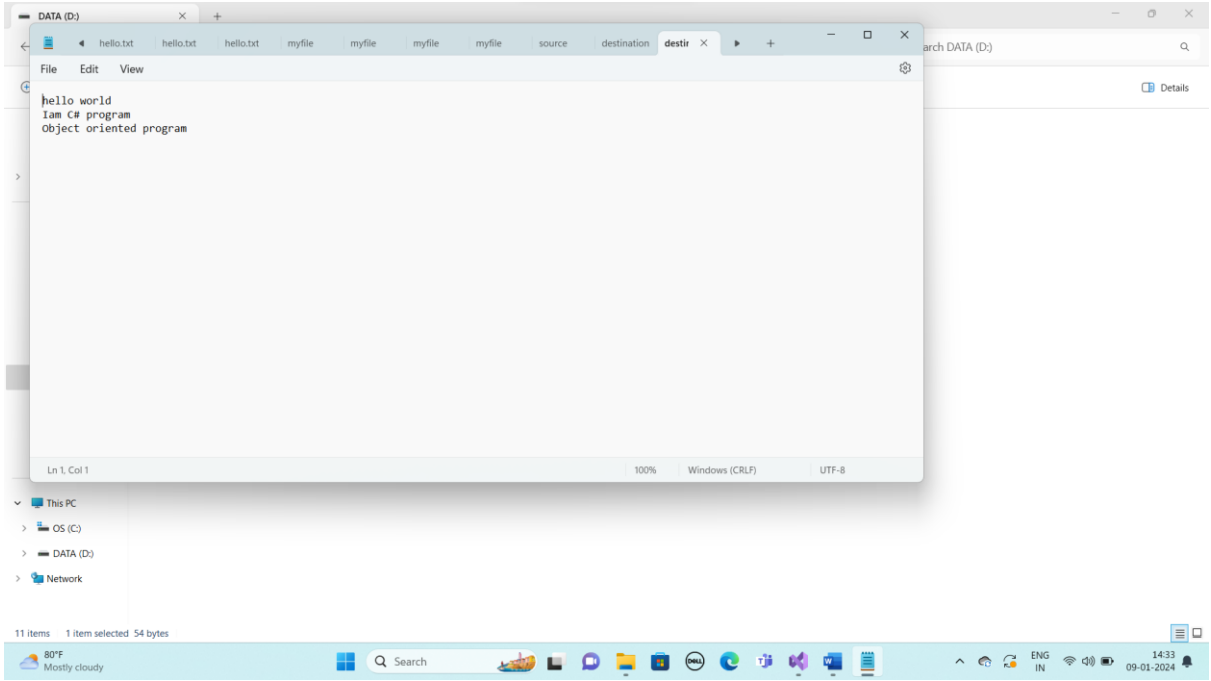
Step7: after copy print output statement “content copied successfully” and execute

```
        File.ReadAllLines(source_FilePath);
        foreach (string line in FileContent)
        {
            Console.WriteLine(line);  // displaying the source file content
        }


        File.WriteAllLines(destination_FilePath, FileContent); //copy the source file content to the destina

        Console.WriteLine("content copied successfully to the destination file");


        Console.ReadLine();



    }
}
}
```

Step 8: check whether the content is copied to the destination file in Ddrive->destinationFolder->destinationFile



File created



Content copied successfully from source to destination file

7th program code

```
using System;
using System.IO;

namespace Files
{
   class Program
   {
   public static void Main(string[] args)
   {
   string source_FilePath = @"D:source.text";  //declaring the Filepath to create source file
   string destination_FilePath = @"D:destination.text"; // declaring the filepath to create destination
file
   string[] FileContent = new string[]
   {
    "hello world",
    "Iam C# program",
    "Object oriented program"
    };

    File.WriteAllLines(source_FilePath, FileContent); //writing a content which is stored inside the
string array to the source file

    Console.WriteLine("souce file content:");

    File.ReadAllLines(source_FilePath);
    foreach (string line in FileContent)
    {
     Console.WriteLine(line); // displaying the source file content
    }

   Console.WriteLine("-------------------------------------------");

   File.WriteAllLines(destination_FilePath, FileContent); //copy the source file content to the
destinatination file

   Console.WriteLine("content copied successfully to the destination file");


   Console.ReadLine();


      }
   }
}
```

Output

```
C:\Users\admin\Desktop\C# L

souce file content:
hello world
Iam C# program
Object oriented program
-------------------------------------------------------------------
content copied successfully to the destination file
```

8.Develop a C# program to implement stackwith push pop operations (use class, methods for push and pop and main method).

```
using System;

namespace StackDemo2
{
class Stack
{

 public int top = -1;
 int[] mystack = new int[5];

 public void push(int value)
 {
 if (top < 4)
 {
  top++;
  mystack[top] = value;
 }
 else
 {
 Console.WriteLine("overflow condition cannot insert element");
 }
 }

  public void pop()
  {
  if (top > -1)
  {
  int popedItem = mystack[top];
  top--;
  Console.WriteLine("the item poped " + popedItem);

  }
  else
  {
  Console.WriteLine("underflow condition cannot delete element");
  }
  }
  public void display()
  {
  Console.WriteLine("stack contains below elements");
  for(int i=0; i<=top; i++)
  {
   Console.WriteLine(mystack[i]);
  }
  }
```

```
  }
  class Program
  {
     static void Main(string[] args)
     {


      Stack s = new Stack();


     while (true)
     {
     Console.WriteLine("\n1.push\n2.pop\n3.Display");
     Console.WriteLine("enter the choice");
     int choice = Convert.ToInt32(Console.ReadLine());

     switch (choice)
     {
     case 1:
     Console.WriteLine("enter element to insert");
     int value = Convert.ToInt32(Console.ReadLine());
     s.push(value);
     break;

     case 2:
     s.pop();
     break;

     case 3:
     s.display();
     break;

      default:
      Console.WriteLine("wrong choice bye");
      break;
      }

     }
     Console.ReadLine();

    }

  }
}
```

Output

1.push elements

```
C:\Users\admin\Desktop\C# L

1.push
2.pop
3.Display
enter the choice
1
enter element to insert
10

1.push
2.pop
3.Display
enter the choice
1
enter element to insert
20

1.push
2.pop
3.Display
enter the choice
1
enter element to insert
30
```

2.display stack elements

```
1.push
2.pop
3.Display
enter the choice
3
stack contains below elements
10
20
30
```

3.pop elements

```
1.push
2.pop
3.Display
enter the choice
2
the item poped 20

1.push
2.pop
3.Display
enter the choice
2
the item poped 10

1.push
2.pop
3.Display
enter the choice
```

4.underflow condition

```
1.push
2.pop
3.Display
enter the choice
2
the item poped 20

1.push
2.pop
3.Display
enter the choice
2
the item poped 10

1.push
2.pop
3.Display
enter the choice
2
underflow condition cannot delete element
```

5.overflow condition

```
1.push
2.pop
3.Display
enter the choice
1
enter element to insert
55

1.push
2.pop
3.Display
enter the choice
1
enter element to insert
66

1.push
2.pop
3.Display
enter the choice
1
enter element to insert
88
overflow condition cannot insert element
```

6.Wrong choice

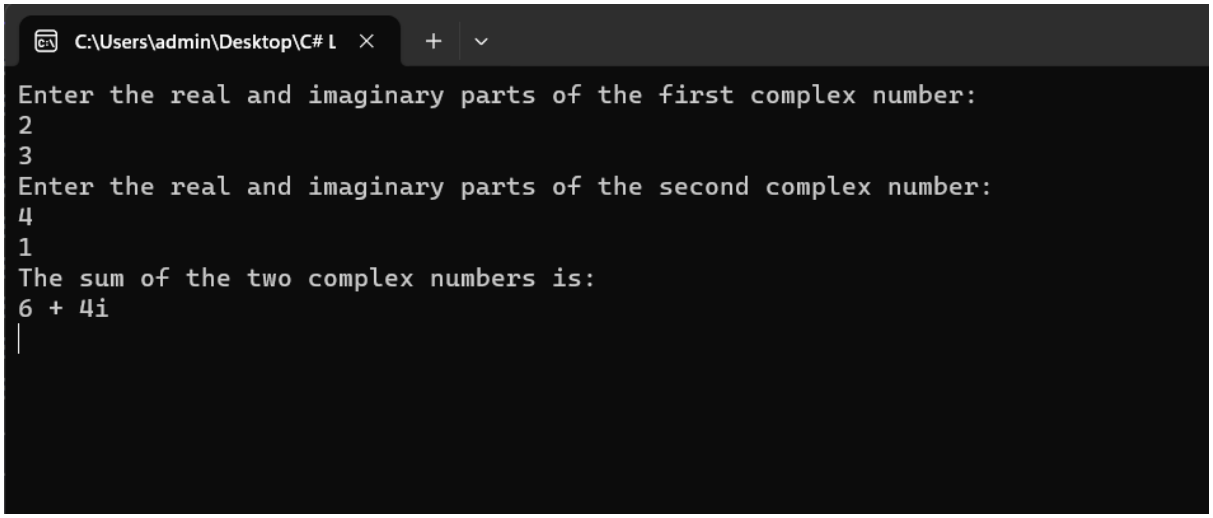
```
C:\Users\admin\Desktop\C# L

1.push
2.pop
3.Display
enter the choice
666
wrong choice bye,, your choice should be from 1 to 3
```

9. Design a class Complex with Data members, Constructor and method to overloading a binary operator '+' Deelop a C# program to read two complex numbers and print the result of addition.

```
using System;

namespace Program_9
{
class Complex
{

public double real;
public double imaginary;

// Constructor
public Complex(double r, double i)
{
 real = r;
 imaginary = i;
}

// Method for overloading the + operator
public static Complex operator +(Complex complex1, Complex complex2)
{
double realPart = complex1.real + complex2.real;
double imaginaryPart = complex1.imaginary + complex2.imaginary;
return new Complex(realPart, imaginaryPart);
}
}

class Program
{
public static void Main(string[] args)
{
Console.WriteLine("Enter the real and imaginary parts of the first complex number:");
double real1 = Convert.ToDouble(Console.ReadLine());
double imaginary1 = Convert.ToDouble(Console.ReadLine());

Console.WriteLine("Enter the real and imaginary parts of the second complex number:");
double real2 = Convert.ToDouble(Console.ReadLine());
double imaginary2 = Convert.ToDouble(Console.ReadLine());

Complex complex1 = new Complex(real1, imaginary1);
Complex complex2 = new Complex(real2, imaginary2);

 Complex sum = complex1 + complex2;
```

```
Console.WriteLine("The sum of the two complex numbers is:");
Console.WriteLine(sum.real + " + " + sum.imaginary + "i");


Console.ReadLine();
}

}
}
```

OUTPUT



10. Develop a C# program to create a class named Shape create three sub classes namely Circle, Triangle, Square Each class has 2 member function named draw() and Erase().

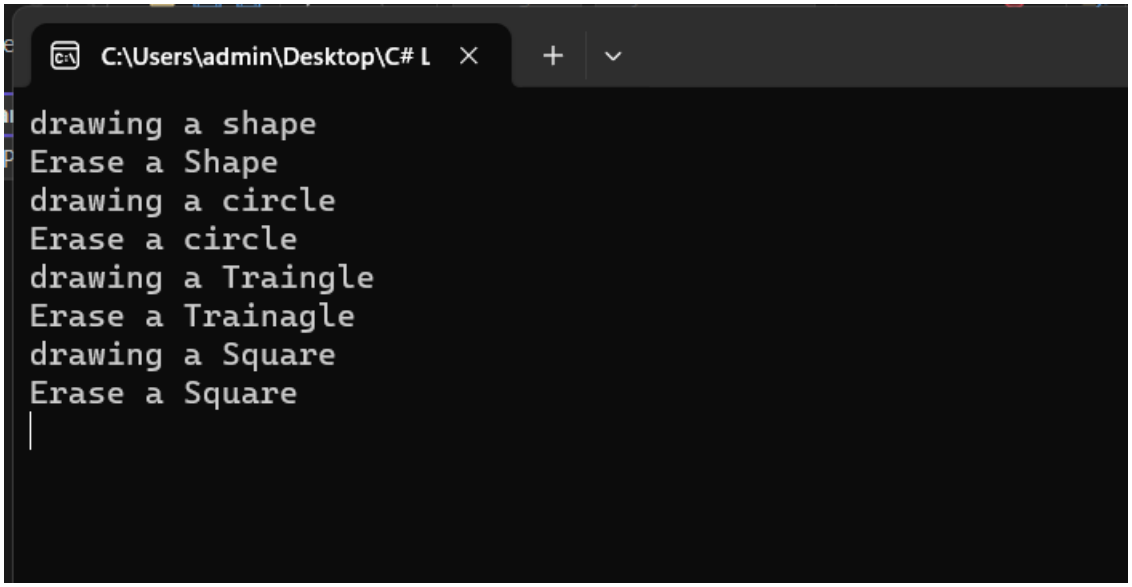
Demonstrate a Polymorphism concept by developing suitable methods, defining member data and main program.

```
using System;
namespace _10_Program
{
class Shape
{
public virtual void draw()
{
Console.WriteLine("drawing a shape");
}
public virtual void Erase()
{
Console.WriteLine("Erase a Shape");
}
}
class Circle : Shape
{
public override void draw()
{
Console.WriteLine("drawing a circle");
}
public override void Erase()
{
Console.WriteLine("Erase a circle");
}
}
class Triangle : Shape
```

```
{
public override void draw()
{
Console.WriteLine("drawing a Traingle");
}
public override void Erase()
{
Console.WriteLine("Erase a Trainagle");
}
}
class Square : Shape
{
public override void draw()
{
Console.WriteLine("drawing a Square");
}
public override void Erase()
{
Console.WriteLine("Erase a Square");
}
}
class MainClass
{
static void Main(string[] args)
{
Shape s= new Shape();
s.draw();
s.Erase();
Circle c = new Circle();
```

```
c.draw();
c.Erase();
Triangle t = new Triangle();
t.draw();
t.Erase();
Square sq = new Square();
sq.draw();
sq.Erase();
Console.ReadLine();
}
}
}
```

OUTPUT



11. Develop a C# Program to Create an abstract class Shape with abstract method CalculateArea() and CalculatePeremeter() create subclasses Circle and Triangle

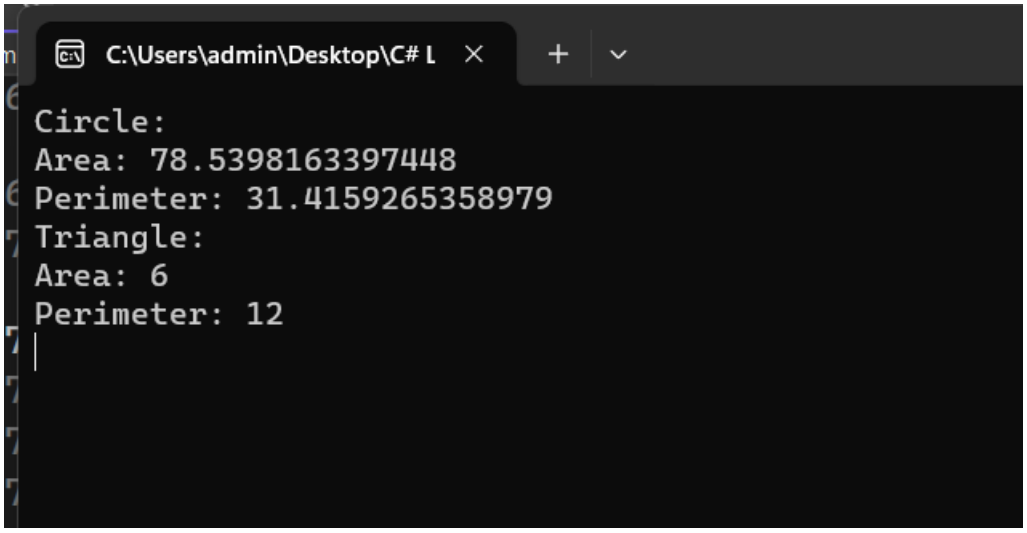
that extend the Shape Class and implement the respectie methods to Calculate the area and perimeter of each shape.

```
using System;
namespace _11th_Program
{
abstract class Shape
{
public abstract void CalculateArea();
public abstract void CalculatePerimeter();
}
class Circle : Shape
{
private double radius;
public Circle(double r)
{
radius = r;
}
public override void CalculateArea()
{
double Area = Math.PI * radius * radius;
Console.WriteLine("Area: " +Area);
}
public override void CalculatePerimeter()
{
double perimeter = 2 * Math.PI * radius;
Console.WriteLine("Perimeter: " +perimeter);
}
}
class Triangle : Shape
```

```
{
private float side1;
private float side2;
private float side3;
public Triangle(float s1, float s2, float s3)
{
side1 = s1;
side2 = s2;
side3 = s3;
}
public override void CalculateArea()
{
float s = (side1 + side2 + side3) / 2;
double Area = Math.Sqrt(s * (s - side1) * (s-side2) * (s-side3));
Console.WriteLine("Area: " +Area);
}
public override void CalculatePerimeter()
{
double perimeter = side1 + side2 + side3;
Console.WriteLine("Perimeter: " + perimeter);
}
}
class PrograM
{
static void Main(string[] args)
{
Circle c = new Circle(5);
Console.WriteLine("Circle:");
c.CalculateArea();
c.CalculatePerimeter();
```

```
Triangle t = new Triangle(3, 4, 5);
Console.WriteLine("Triangle:");
t.CalculateArea();
t.CalculatePerimeter();
Console.ReadLine();
}
}
}
```

OUTPUT



12.Develop a C# Program to create an interface Resiazble with methods resizeWidth(int width) and resizeHeigh(int Height) that allow an object

to be resized. Create a class Rectabgle that implements the Resizable interface and implement the resize methods.

```
using System;


namespace _12th_program
{

 public interface Iresizeable
 {
 void Resizewidth(int width);
 void Resizeheight(int height);
 }

 public class Rectangle : Iresizeable
 {
 public int width;
 public int height;
 public Rectangle(int Rwidth, int Rheight)
 {
  width = Rwidth;
  height = Rheight;
Console.WriteLine("Current Width value is" + " " + Rwidth + " " + "Current Height value is"
+ " " + Rheight);

 }

 public void Resizewidth(int newWidth)
 {
 if (newWidth > 0)
 {
 Console.WriteLine("Width is Resized to default width to newWidth " + newWidth);
 }
 else
 {
 Console.WriteLine("Width should be Greater than zero");
 }
 }
 }





public void Resizeheight(int newheight)
 {
```

```
if (newheight > 0)
{
Console.WriteLine("Height is Resized to default height to newheight " + newheight);
}
else
{
Console.WriteLine("should be Greater than zero");
}
}
}
class Program
{
 public static void Main(string[] args)
{
        Rectangle r = new Rectangle (100, 50);
        Console.WriteLine("Enter the Resize Width");
        int newWidth=int.Parse(Console.ReadLine());

        Console.WriteLine("Enter the Resize height");
        int newheight = int.Parse(Console.ReadLine());

        r.Resizewidth(newWidth);
        r.Resizeheight(newheight);

        Console.ReadLine();

    }
  }
}
```

OUTPUT

C:\Users\admin\Desktop\C# L

```
Current Width value is 100 Current Height value is 50
Enter the Resize Width
45
Enter the Resize height
30
Width is Resized to newWidth 45
Height is Resized to newheight 30
```