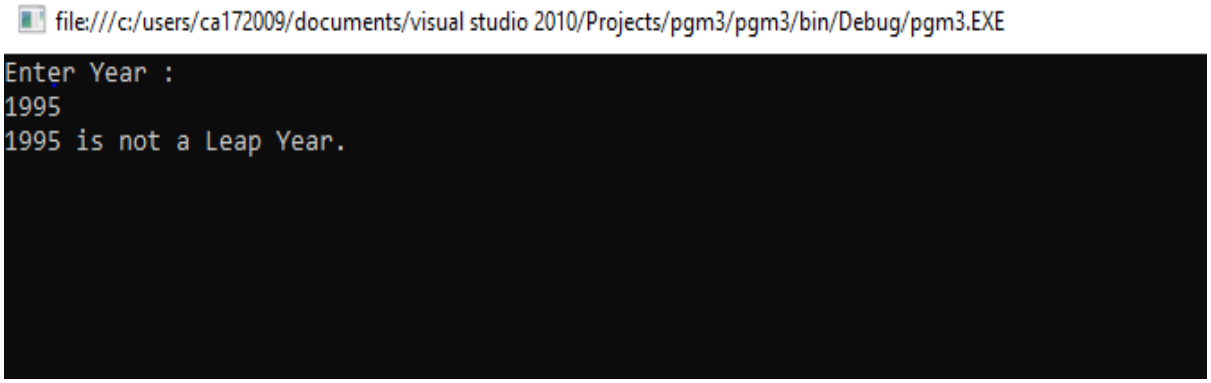
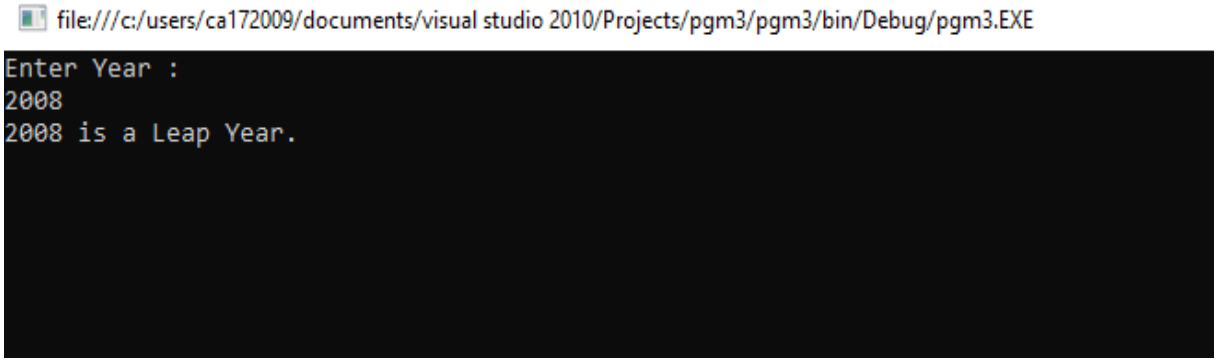
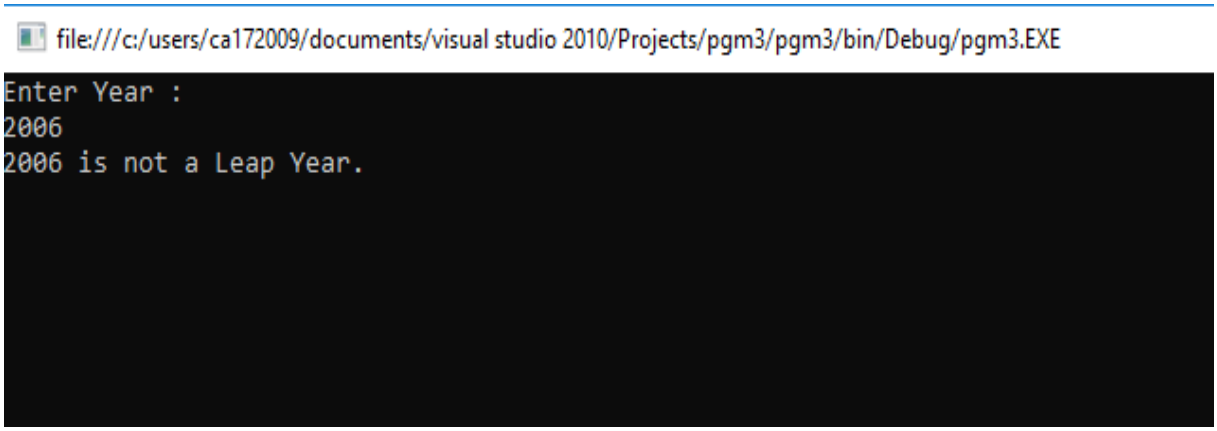
1) Check Whether the Entered Year is a Leap Year or No.

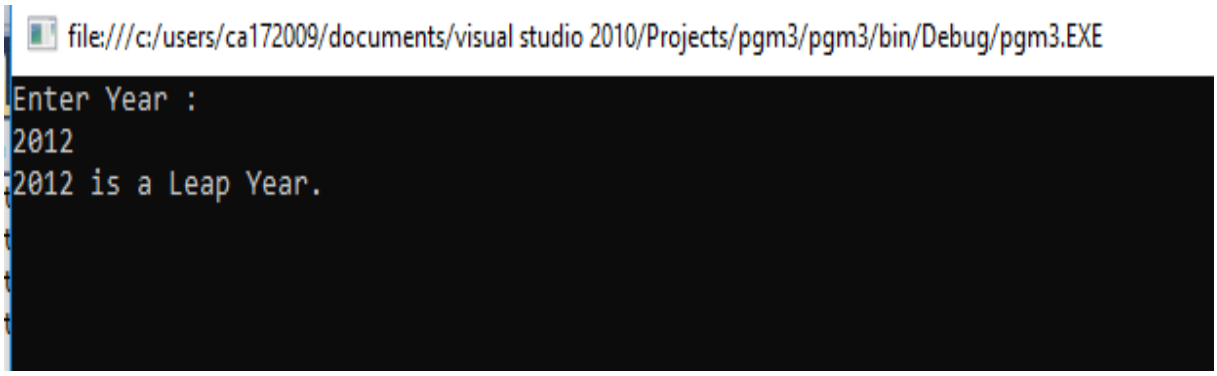
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace pgm3
{
   class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("Enter Year : ");
         int Year = int.Parse(Console.ReadLine());
         if (((Year % 4 == 0) && (Year % 100 != 0)) || (Year % 400 == 0))
            Console.WriteLine("{0} is a Leap Year.", Year);
         else Console.WriteLine("{0} is not a Leap Year.", Year);
         Console.ReadLine();
      }
   }
}
```

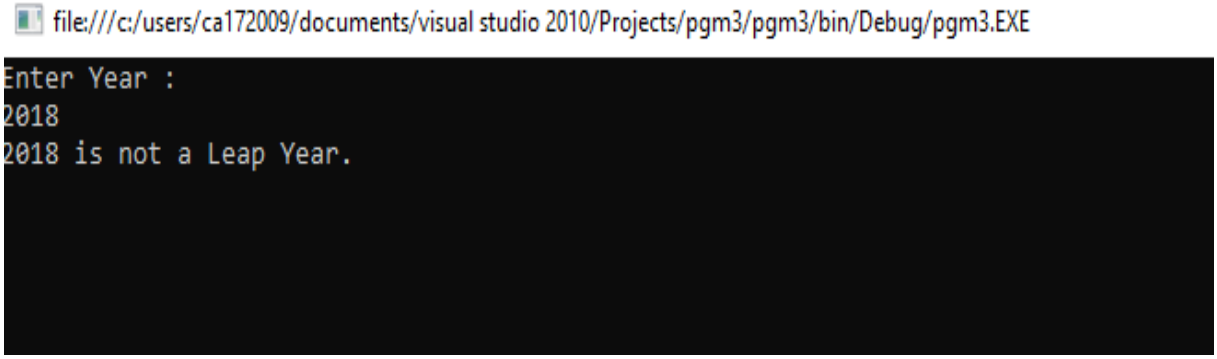
OUTPUT


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm3/pgm3/bin/Debug/pgm3.EXE
Enter Year :
1995
1995 is not a Leap Year.


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm3/pgm3/bin/Debug/pgm3.EXE
Enter Year :
2008
2008 is a Leap Year.


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm3/pgm3/bin/Debug/pgm3.EXE
Enter Year :
2006
2006 is not a Leap Year.

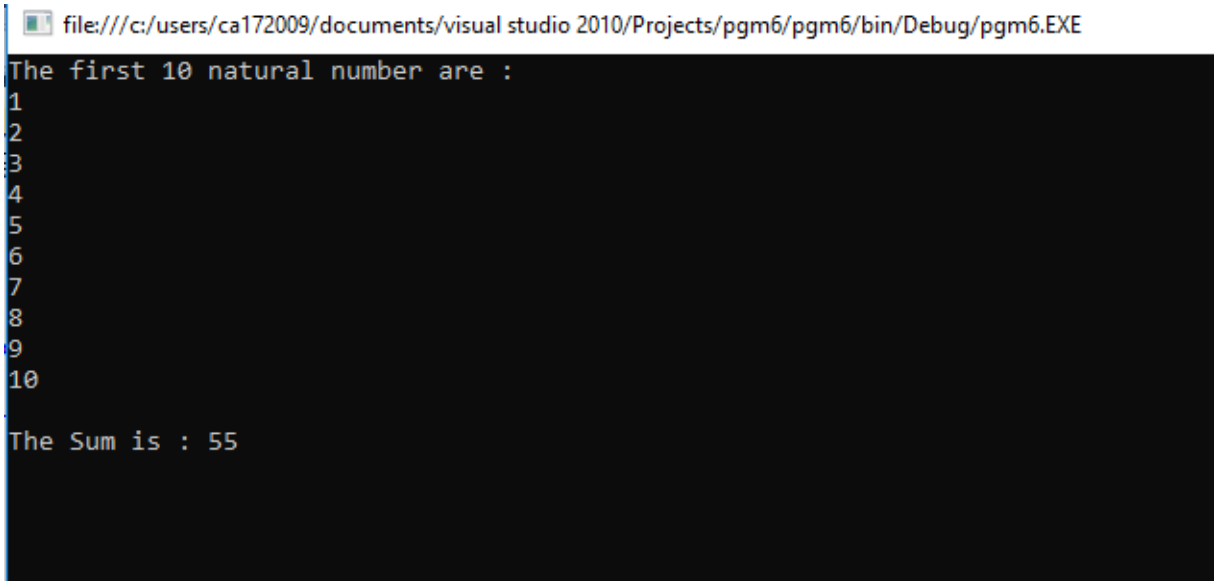

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm3/pgm3/bin/Debug/pgm3.EXE
Enter Year :
2012
2012 is a Leap Year.


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm3/pgm3/bin/Debug/pgm3.EXE
Enter Year :
2018
2018 is not a Leap Year.

2) Program to display the first 10 natural numbers and their sum using console application.

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

namespace pgm6
{
   class Program
   {
      static void Main(string[] args)
      {
         int  j, sum = 0;
         Console.Write("The first 10 natural number are :\n");
          for (j = 1; j <= 10; j++)
         {
            sum = sum + j;
            Console.Write("{0} ",j);
            Console.Write("\n");
         }
         Console.Write("\nThe Sum is : {0}\n", sum);
         Console.ReadLine();
       }
      }
   }
```

OUTPUT

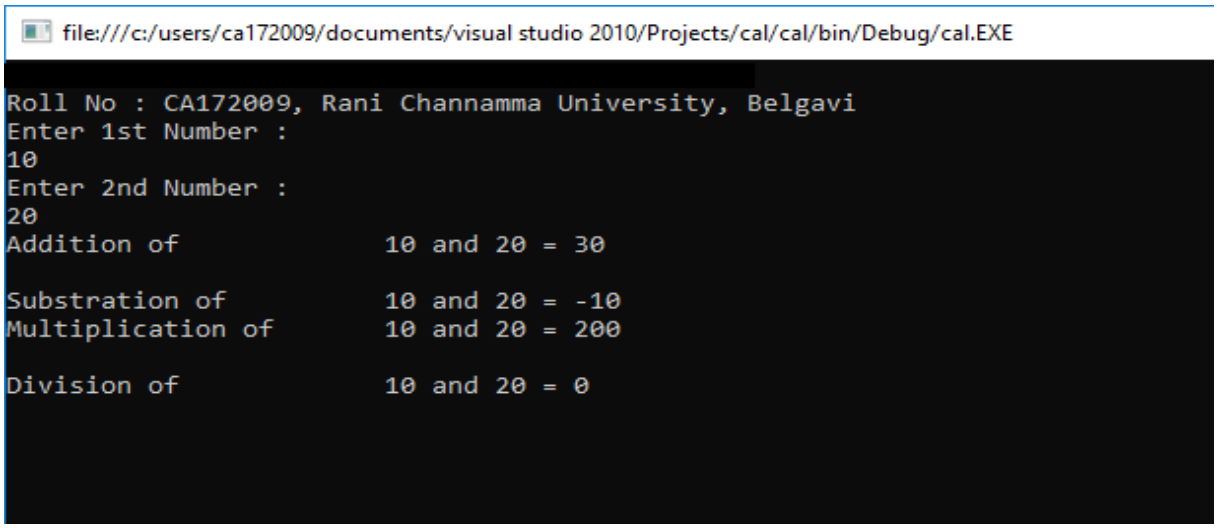

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm6/pgm6/bin/Debug/pgm6.EXE
The first 10 natural number are :
1
2
3
4
5
6
7
8
9
10
The Sum is : 55

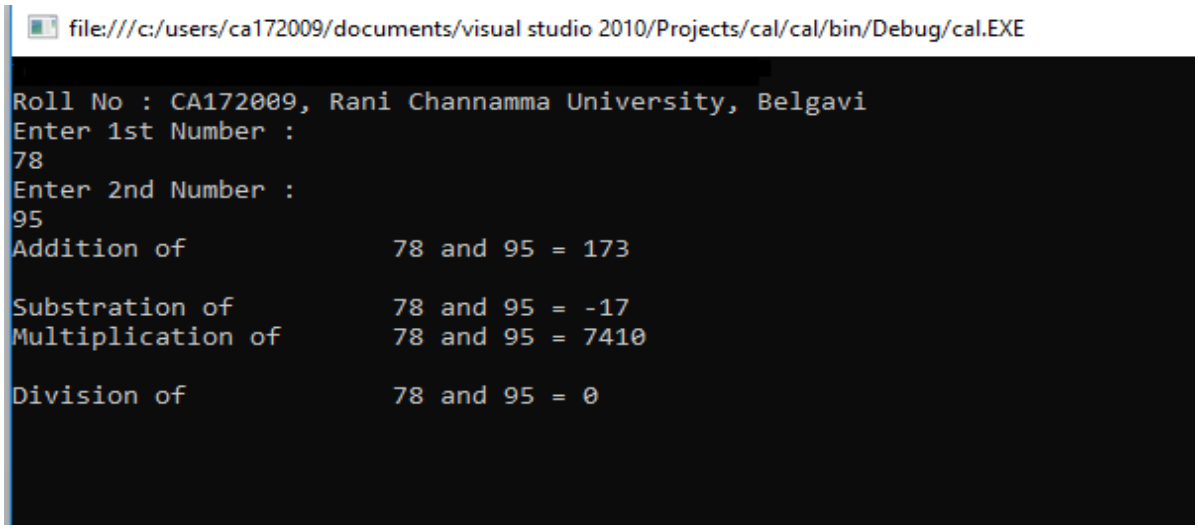
3) Program to display the addition, subtraction, multiplication and division of two number using console applications.

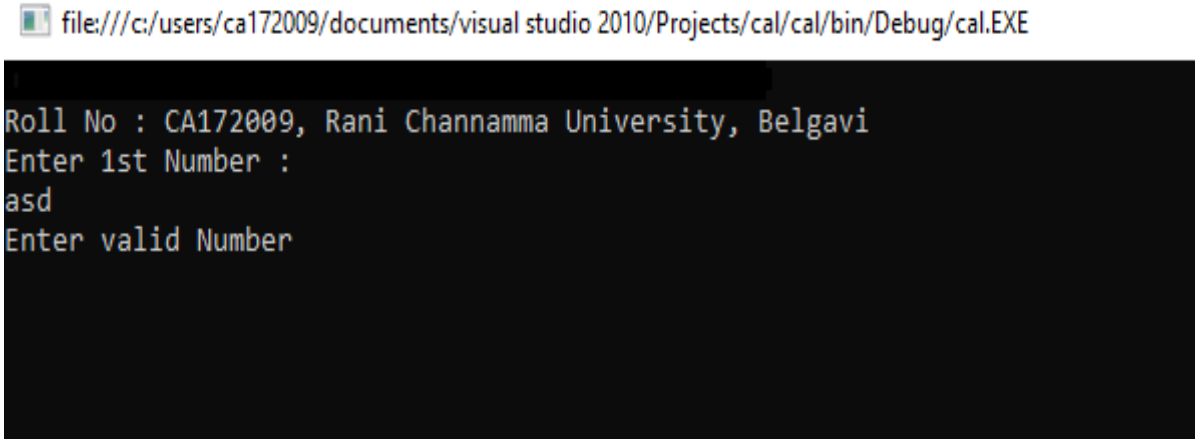
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ArthmaticOperation
{
   class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("This Program is developed by Shubham Sajannavar");
         Console.WriteLine("Roll No : CA172007, Rani Channamma University, Belgavi");
         int add, sub, mul, num1, num2;
         float div;
         Try
         {
            Console.WriteLine("Enter 1st Number : ");
            num1 = Convert.ToInt32(Console.ReadLine());
            Console.WriteLine("Enter 2nd Number : ");
            num2 = Convert.ToInt32(Console.ReadLine());
            add = num1 + num2;
            sub = num1 - num2;
            mul = num1 * num2;
            div = num1 / num2;
            Console.WriteLine("Addition of\t\t"+num1+"and" + num2 + " = " + add);
            Console.WriteLine("\nSubstration of \t\t"+num1+"and"+num2 + " = " + sub);
            Console.WriteLine("Multiplication of \t"+num1+"and"+ num2 + " = " + mul);
            Console.WriteLine("\nDivision of \t\t" +num1+"and"+num2 + " = " + div);
         }
```

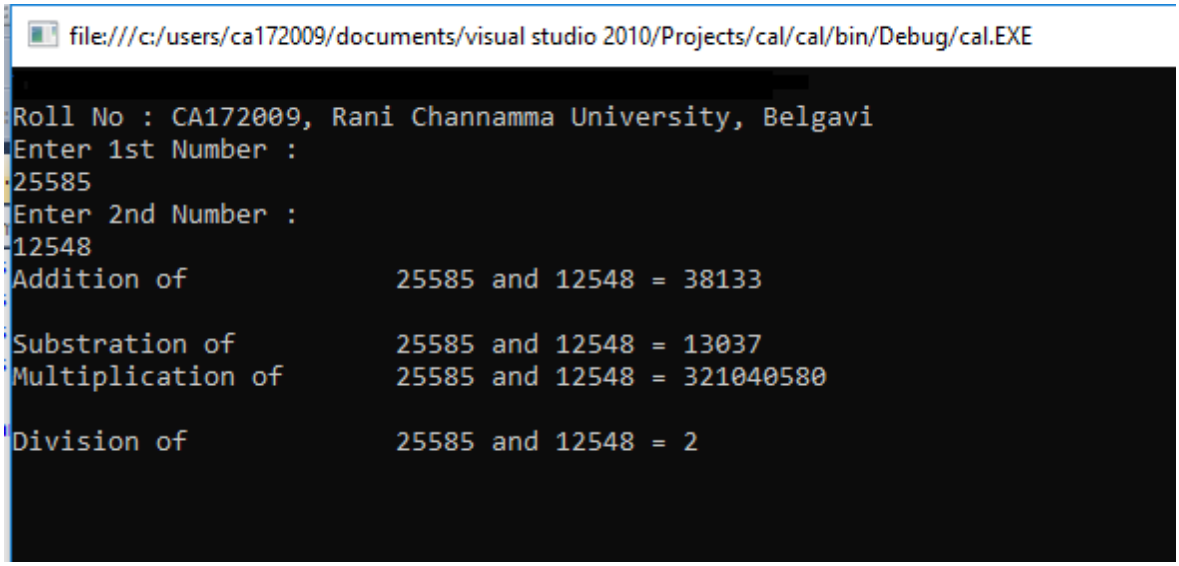
```
catch (Exception ex)
{
   Console.WriteLine("Enter valid Number");
}
Console.ReadKey();
      }
   }
}
```

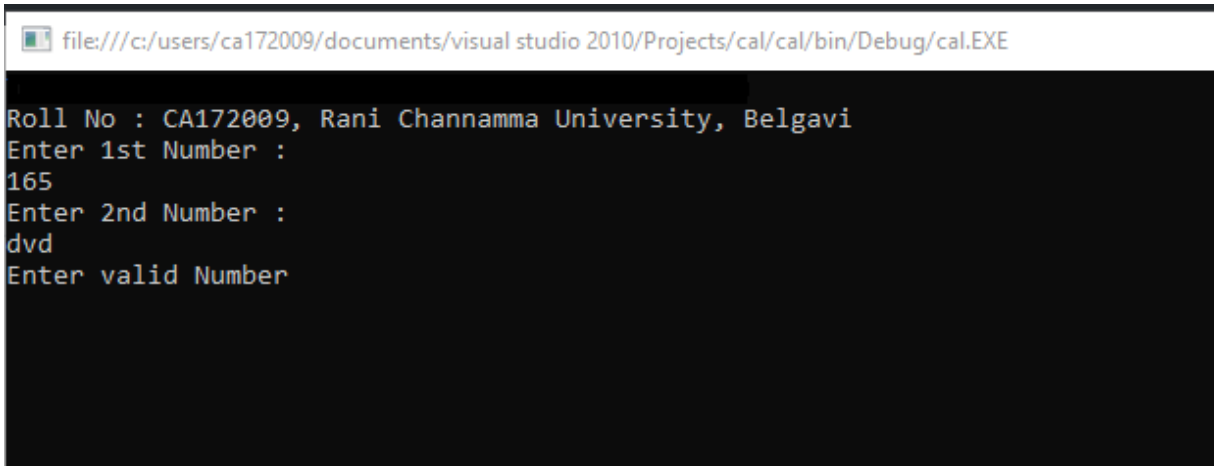
OUTPUT


file:///c:/users/ca172009/documents/visual studio 2010/Projects/cal/cal/bin/Debug/cal.EXE
Roll No : CA172009, Rani Channamma University, Belgavi
Enter 1st Number :
10
Enter 2nd Number :
20
Addition of 10 and 20 = 30
Substration of 10 and 20 = -10
Multiplication of 10 and 20 = 200
Division of 10 and 20 = 0


file:///c:/users/ca172009/documents/visual studio 2010/Projects/cal/cal/bin/Debug/cal.EXE
Roll No : CA172009, Rani Channamma University, Belgavi
Enter 1st Number :
78
Enter 2nd Number :
95
Addition of 78 and 95 = 173
Substration of 78 and 95 = -17
Multiplication of 78 and 95 = 7410
Division of 78 and 95 = 0


file:///c:/users/ca172009/documents/visual studio 2010/Projects/cal/cal/bin/Debug/cal.EXE
Roll No : CA172009, Rani Channamma University, Belgavi
Enter 1st Number :
asd
Enter valid Number


file:///c:/users/ca172009/documents/visual studio 2010/Projects/cal/cal/bin/Debug/cal.EXE
Roll No : CA172009, Rani Channamma University, Belgavi
Enter 1st Number :
25585
Enter 2nd Number :
12548
Addition of 25585 and 12548 = 38133
Substration of 25585 and 12548 = 13037
Multiplication of 25585 and 12548 = 321040580
Division of 25585 and 12548 = 2


file:///c:/users/ca172009/documents/visual studio 2010/Projects/cal/cal/bin/Debug/cal.EXE
Roll No : CA172009, Rani Channamma University, Belgavi
Enter 1st Number :
165
Enter 2nd Number :
dvd
Enter valid Number

4) Describe the enumerations programming constructs, which provides a human-readable form of a series of related constant values in C#.

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

namespace EnumerationDemo
{
   class ProgramOne
   {
      enum CollegeDays
      {
         MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY,
SATURDAY
      }
      static void Main(string[] args)
      {
         foreach (var day in Enum.GetValues(typeof(CollegeDays)))
         {
            Console.WriteLine("{0} : {1}", day, (int)day);
         }
         Console.Read();
      }
   }
}
```

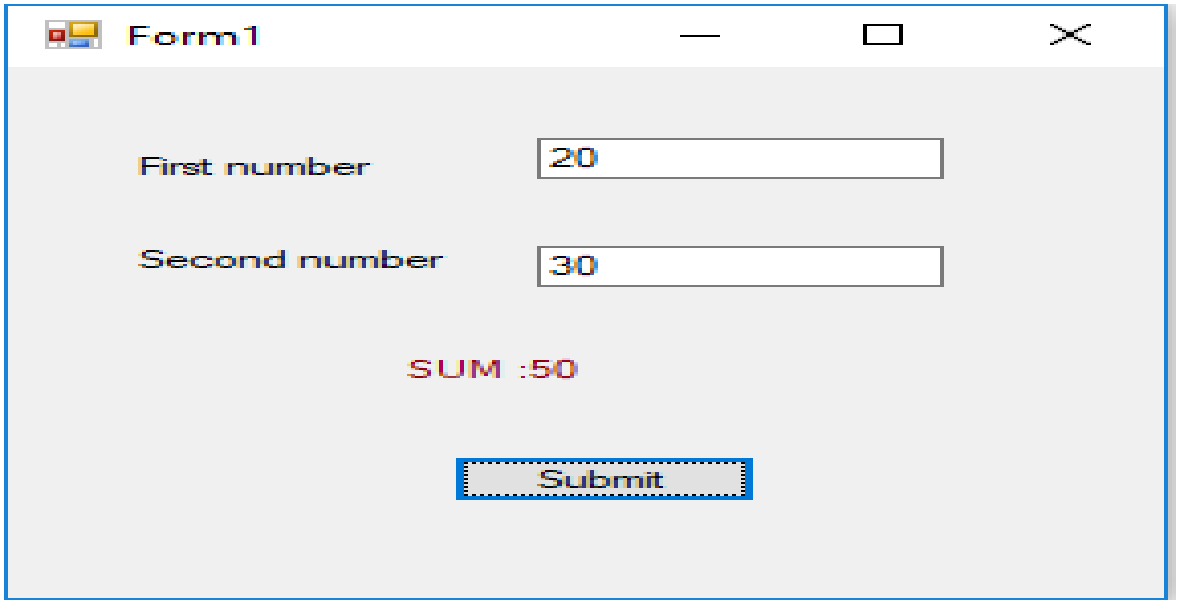
OUTPUT

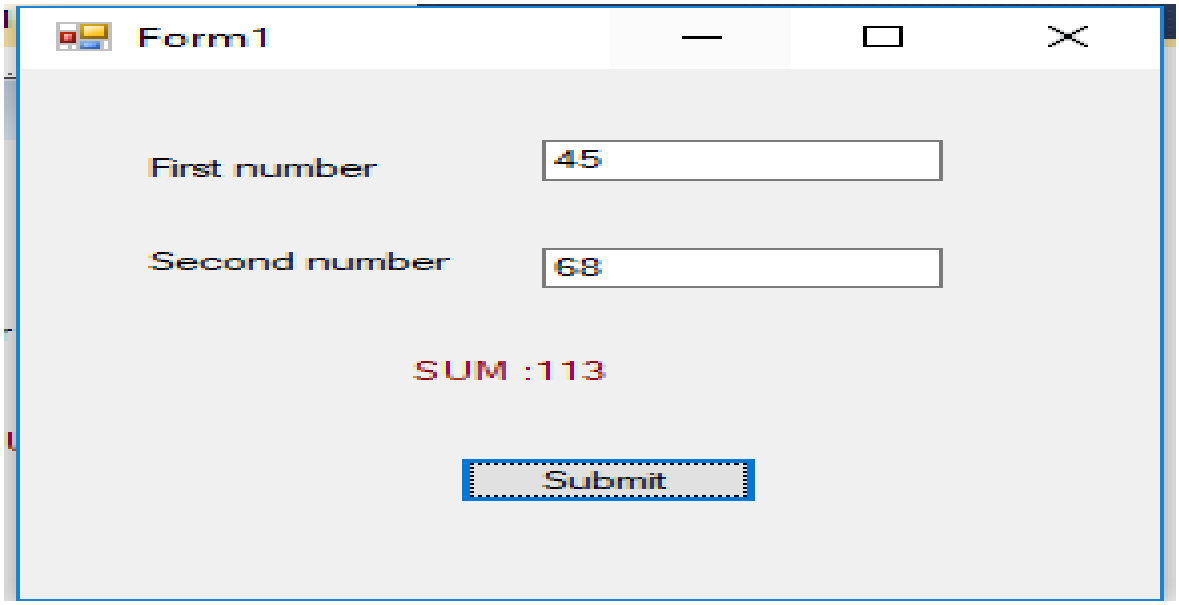

file:///C:/Users/Ca172009/Documents/Visual Studio 2010/Projects/pgm1/pgm1/bin/Debug/pgm1.EXE
MONDAY : 0
TUESDAY : 1
WEDNESDAY : 2
THURSDAY : 3
FRIDAY : 4
SATURDAY : 5

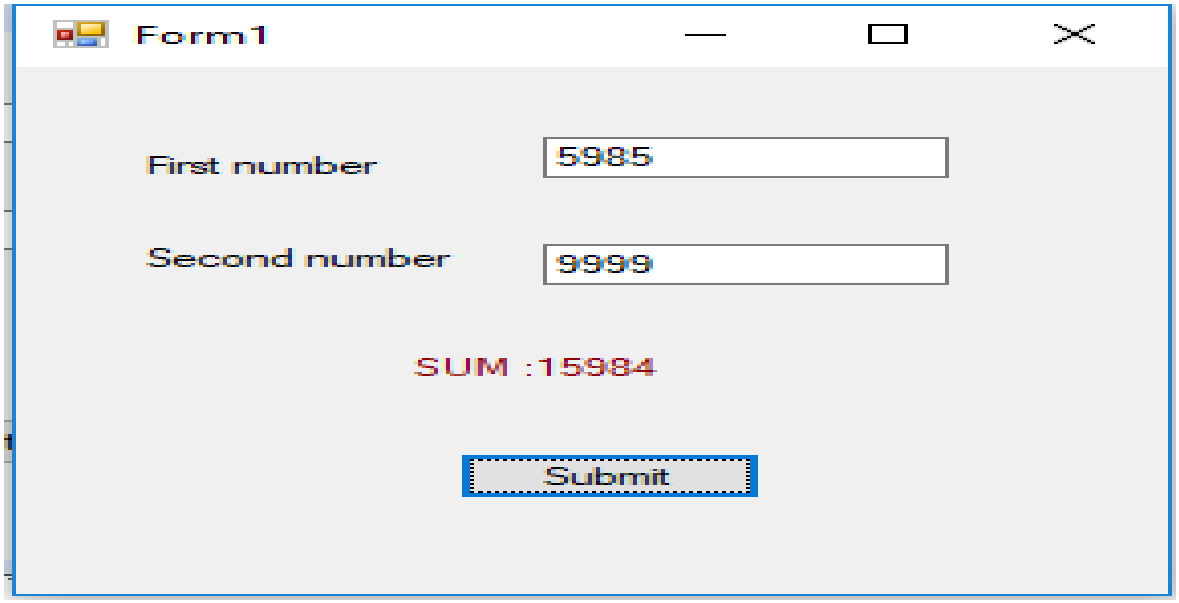
5) Program to display the addition using the windows application.

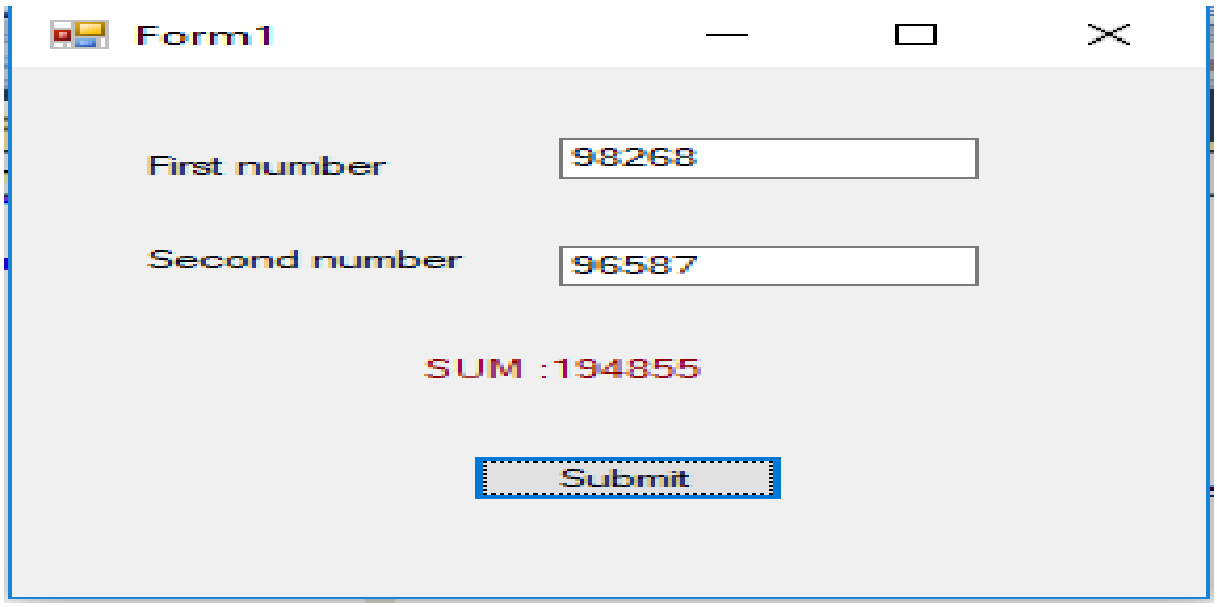
```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Windows.Forms;

namespace pgm7
{
   public partial class Form1 : Form
   {
      public Form1()
      {
         InitializeComponent();
      }

      private void button1_Click(object sender, EventArgs e)
      {
         float a;
         float b;
         float c;
         a = Convert.ToInt32(textBox1.Text);
         b = Convert.ToInt32(textBox2.Text);
         c = a + b;
         label3.Text = "SUM :" + c;
      }
   }
}
```

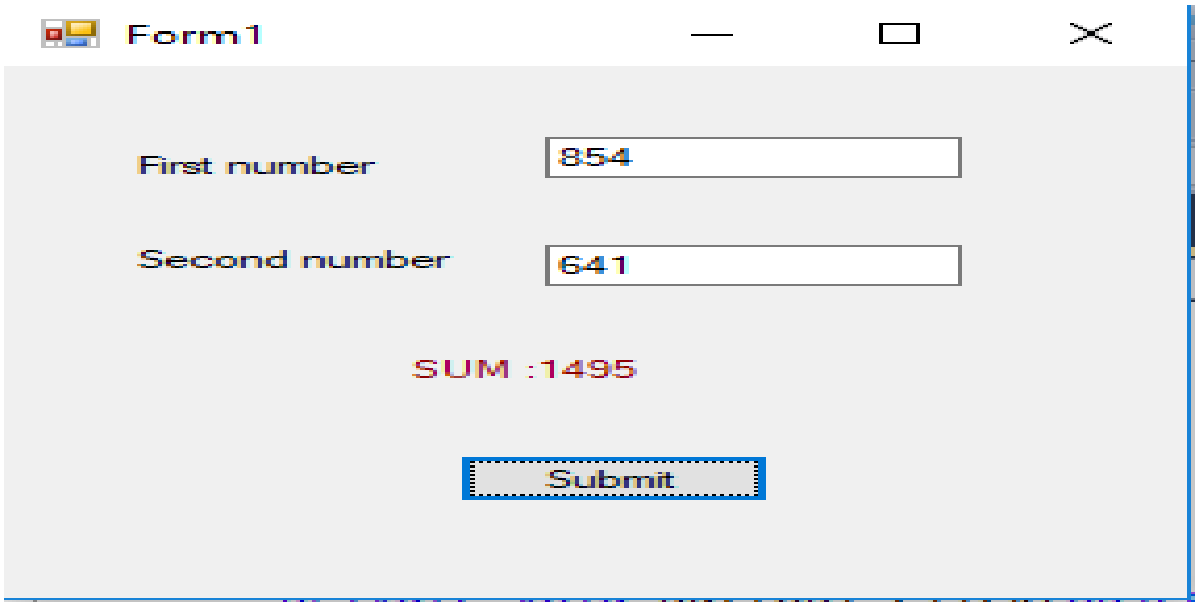
OUTPUT


Form1
First number
20
Second number
30
SUM :50
Submit


Form1
First number
45
Second number
68
SUM :113
Submit


Form1
First number
5985
Second number
9999
SUM :15984
Submit


Form1
First number
98268
Second number
96587
SUM :194855
Submit

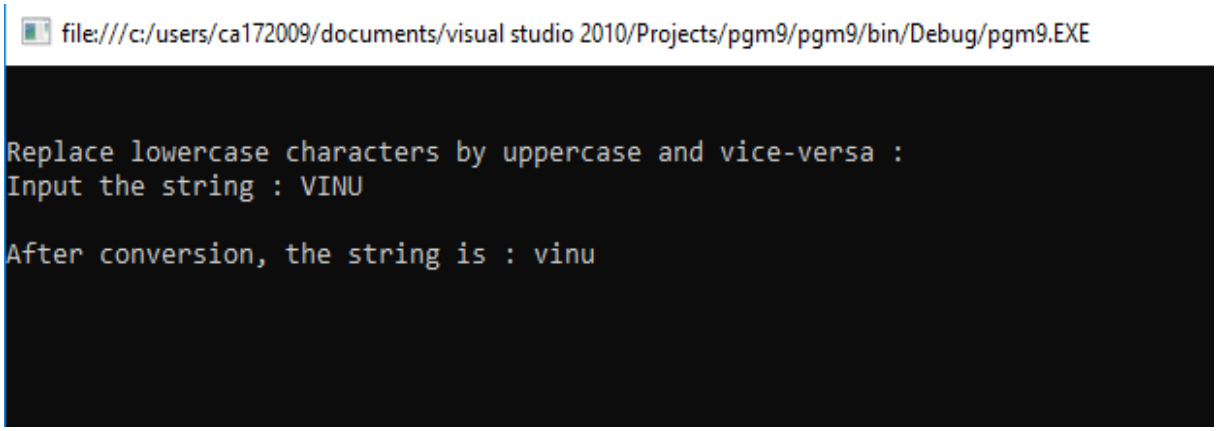

Form1
First number
854
Second number
641
SUM :1495
Submit

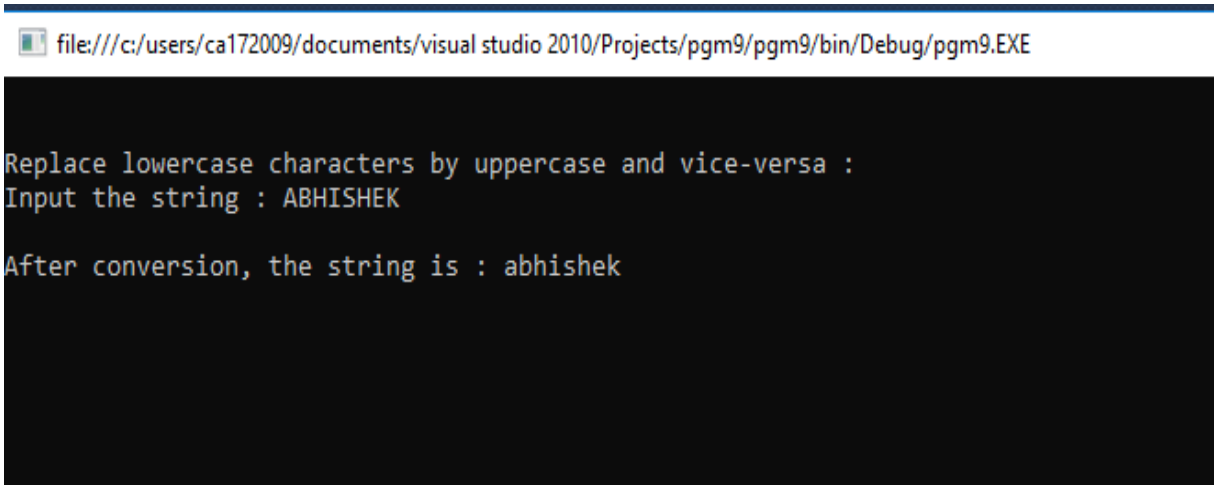
6) Write a program to convert input string from lower to upper and upper to lower case.

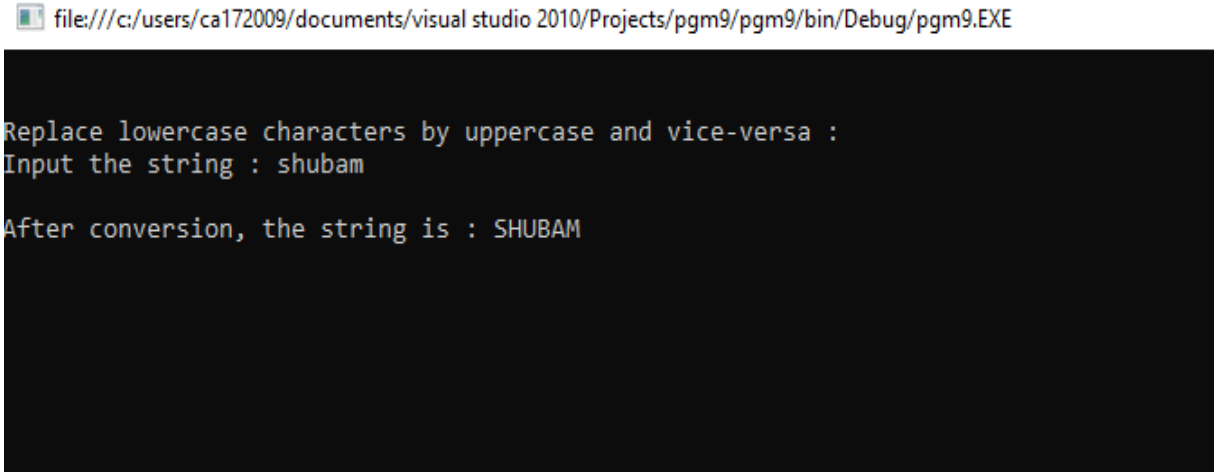
```
using System;

using System.Collections.Generic;
using System.Linq;
using System.Text;
namespace LowUpp
{
   public class Exercise15
   {
      public static void Main()
      {
         string str1;
         char[] arr1;
         int l, i;
         l = 0;
         char ch;
         Console.Write("\n\nReplace lowercase characters by uppercase and vice-versa :\n");
         Console.Write("Input the string : ");
         str1 = Console.ReadLine();
         l = str1.Length;
         arr1 = str1.ToCharArray(0, l);
         Console.Write("\nAfter conversion, the string is : ");
         for (i = 0; i < l; i++)
         {
            ch = arr1[i];
            if (Char.IsLower(ch))
               Console.Write(Char.ToUpper(ch));
            else
               Console.Write(Char.ToLower(ch));
         }
```

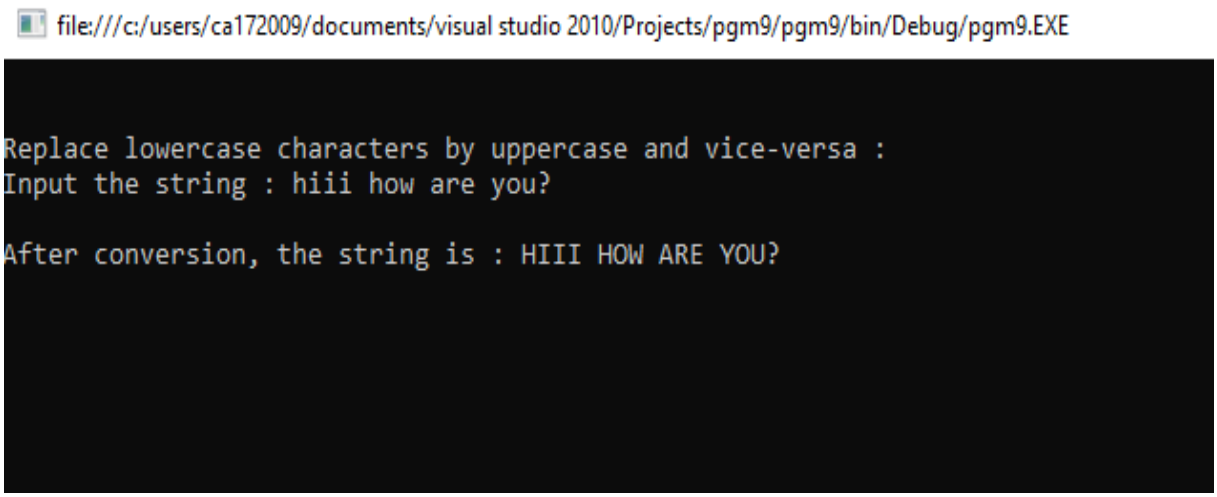
```
            Console.Write("\n\n");

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

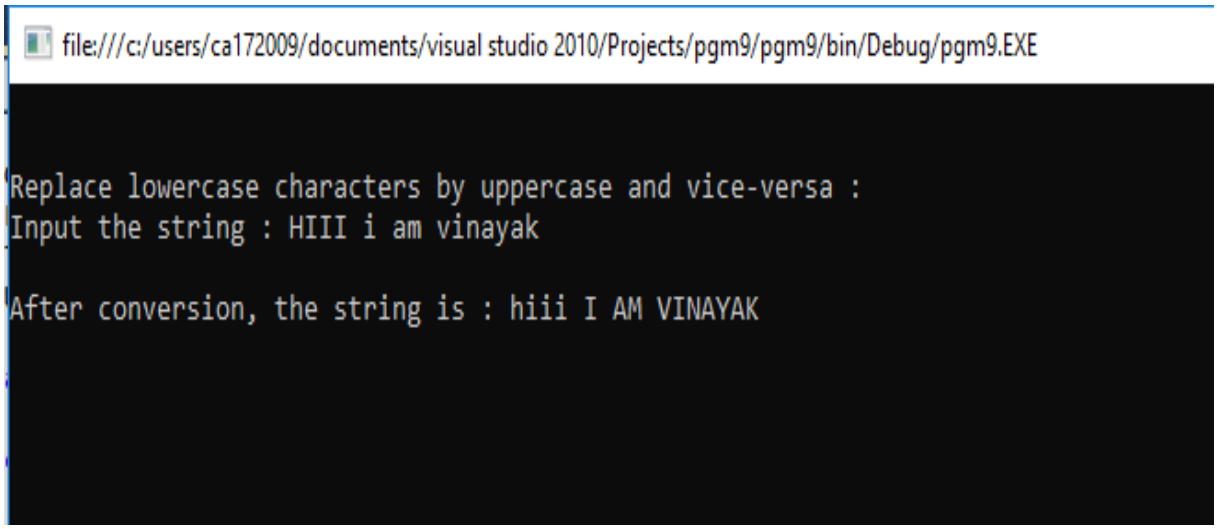
OUTPUT


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm9/pgm9/bin/Debug/pgm9.EXE
Replace lowercase characters by uppercase and vice-versa :
Input the string : VINU
After conversion, the string is : vinu


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm9/pgm9/bin/Debug/pgm9.EXE
Replace lowercase characters by uppercase and vice-versa :
Input the string : ABHISHEK
After conversion, the string is : abhishek


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm9/pgm9/bin/Debug/pgm9.EXE
Replace lowercase characters by uppercase and vice-versa :
Input the string : shubam
After conversion, the string is : SHUBAM

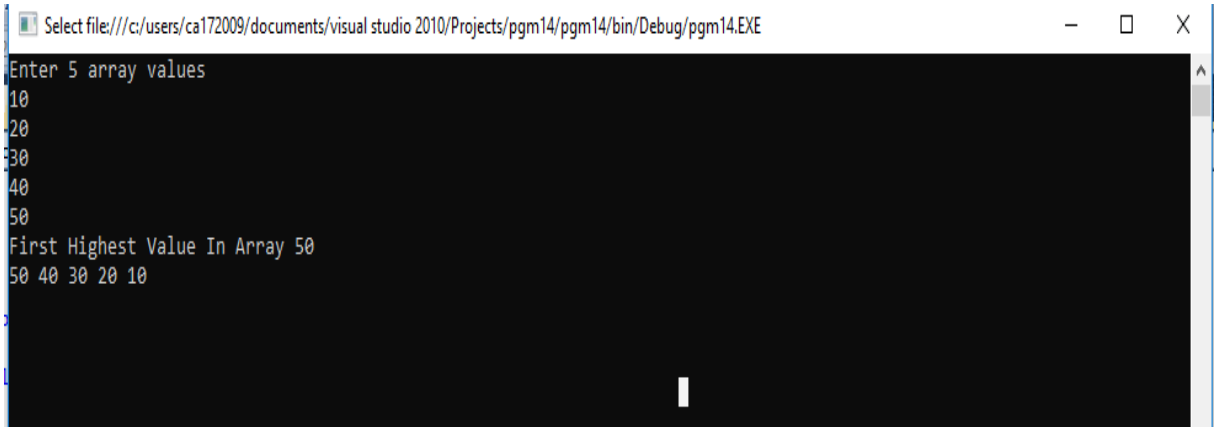

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm9/pgm9/bin/Debug/pgm9.EXE
Replace lowercase characters by uppercase and vice-versa :
Input the string : hiii how are you?
After conversion, the string is : HIII HOW ARE YOU?

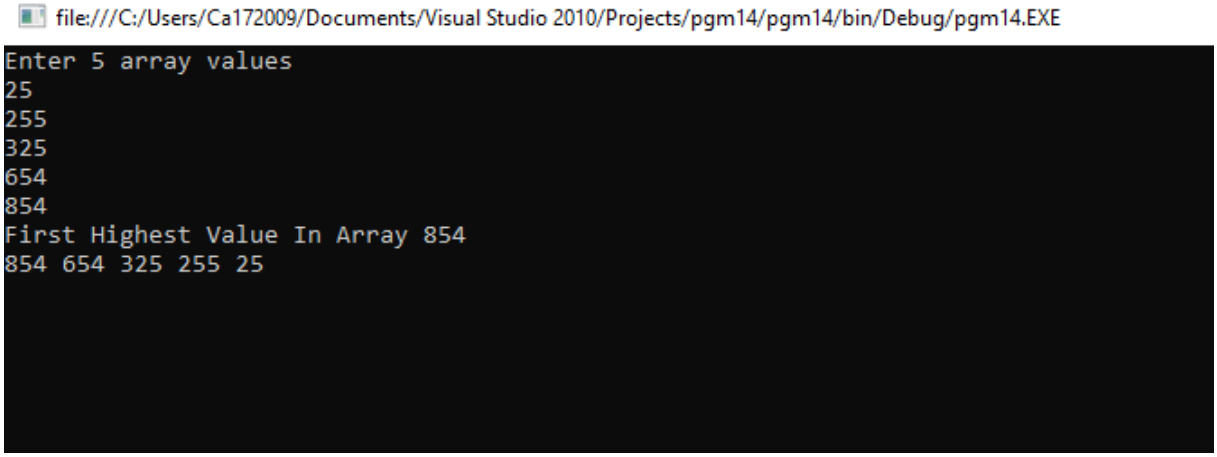

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm9/pgm9/bin/Debug/pgm9.EXE
Replace lowercase characters by uppercase and vice-versa :
Input the string : HIII i am vinayak
After conversion, the string is : hiii I AM VINAYAK

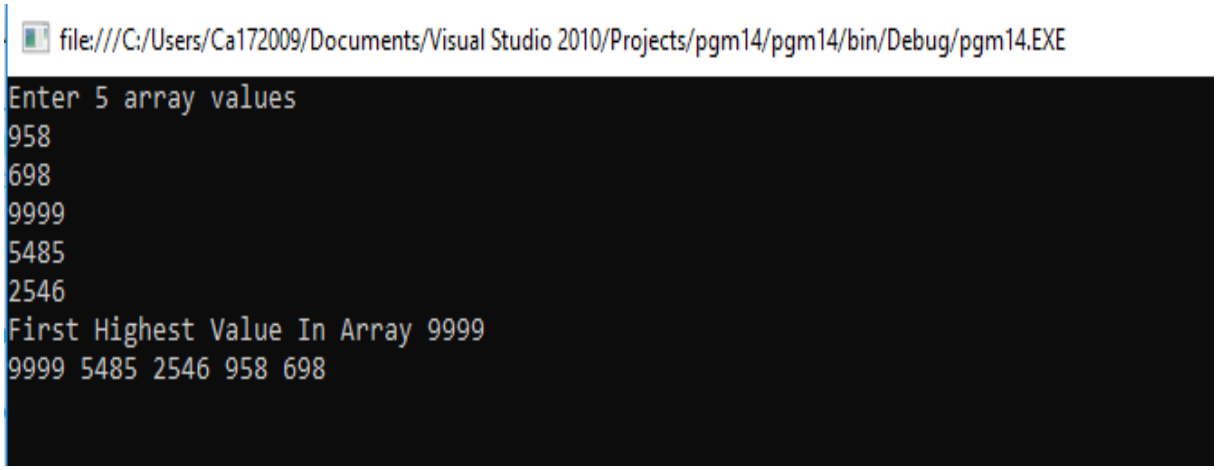
7) Find the second largest element in a single dimensional array.

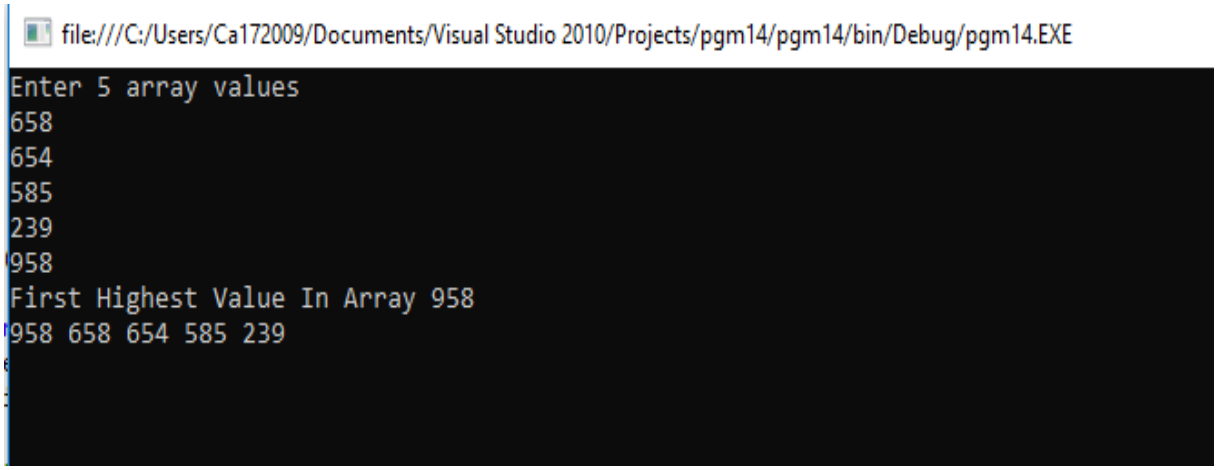
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace pgm14
{
   class Program
   {
      static void Main(string[] args)
      {
         int[] arr = new int[5];
         Console.WriteLine("Enter 5 array values");
         for(int i=0;i<5;i++)
         {
            //Console.WriteLine(i);
            arr[i] = int.Parse(Console.ReadLine());
         }
         Array.Sort(arr);
         Array.Reverse(arr);
         Console.WriteLine("Second Highest Value In Array " + arr[1]);

         foreach (var result in arr)
         {
            Console.Write(result + " ");
         }
         Console.ReadLine();
      }
   }
}
```

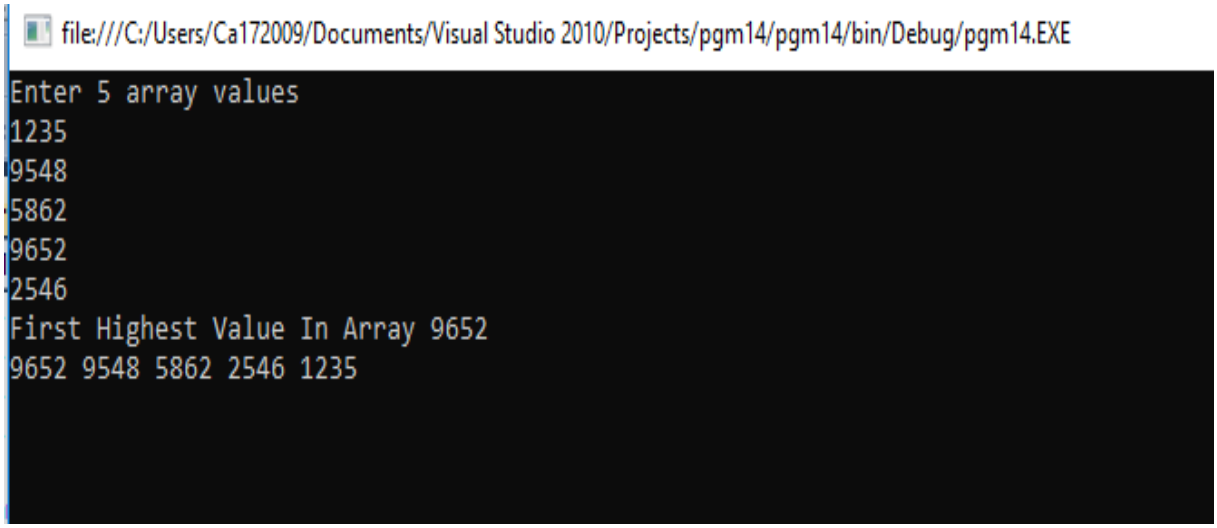
OUTPUT


Select file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm14/pgm14/bin/Debug/pgm14.EXE
Enter 5 array values
10
20
30
40
50
First Highest Value In Array 50
50 40 30 20 10


file:///C:/Users/Ca172009/Documents/Visual Studio 2010/Projects/pgm14/pgm14/bin/Debug/pgm14.EXE
Enter 5 array values
25
255
325
654
854
First Highest Value In Array 854
854 654 325 255 25


file:///C:/Users/Ca172009/Documents/Visual Studio 2010/Projects/pgm14/pgm14/bin/Debug/pgm14.EXE
Enter 5 array values
958
698
9999
5485
2546
First Highest Value In Array 9999
9999 5485 2546 958 698


file:///C:/Users/Ca172009/Documents/Visual Studio 2010/Projects/pgm14/pgm14/bin/Debug/pgm14.EXE
Enter 5 array values
658
654
585
239
958
First Highest Value In Array 958
958 658 654 585 239

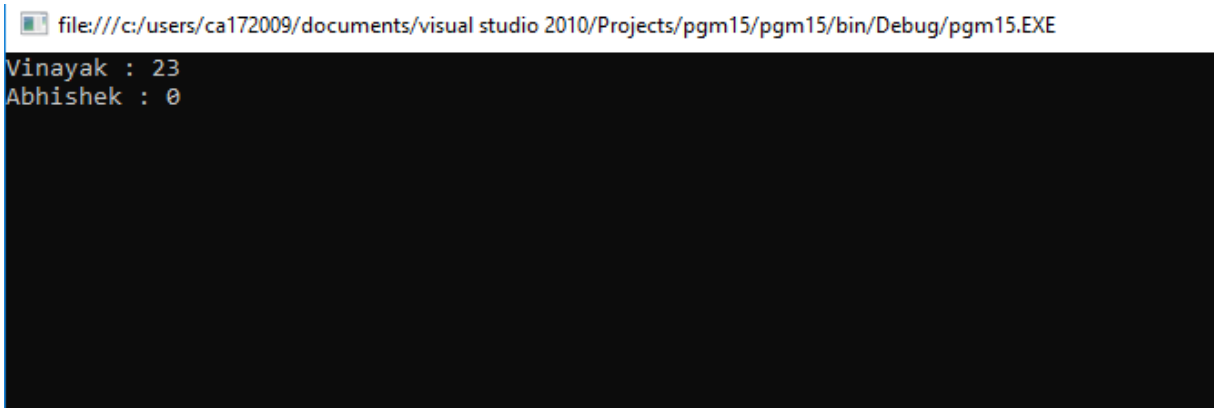

file:///C:/Users/Ca172009/Documents/Visual Studio 2010/Projects/pgm14/pgm14/bin/Debug/pgm14.EXE
Enter 5 array values
1235
9548
5862
9652
2546
First Highest Value In Array 9652
9652 9548 5862 2546 1235

8) Program to illustrate the use of different properties in C#.

```
using System;
namespace ProgramFifteen
{
   class PropertiesDemo
   {
      private string name;
      private int age;

      public string Name
      {
         set
         {
            name = value;
         }
         get
         {
            return name;
         }
      }

      public int Age
      {
         set
         {
            if (value > 0)
               age = value;
         }
```

```
        get
        {
            return age;
        }
    }
    static void Main(string[] args)
    {
        PropertiesDemo p = new PropertiesDemo();
        p.Name = "Vinayak";
        p.Age = 23;

        PropertiesDemo d = new PropertiesDemo();
        d.Name = "Abhishek";
        d.Age = -1;

        Console.WriteLine("{0} : {1}", p.Name, p.Age);
        Console.WriteLine("{0} : {1}", d.Name, d.Age);
        Console.ReadLine();
    }
  }
}
```

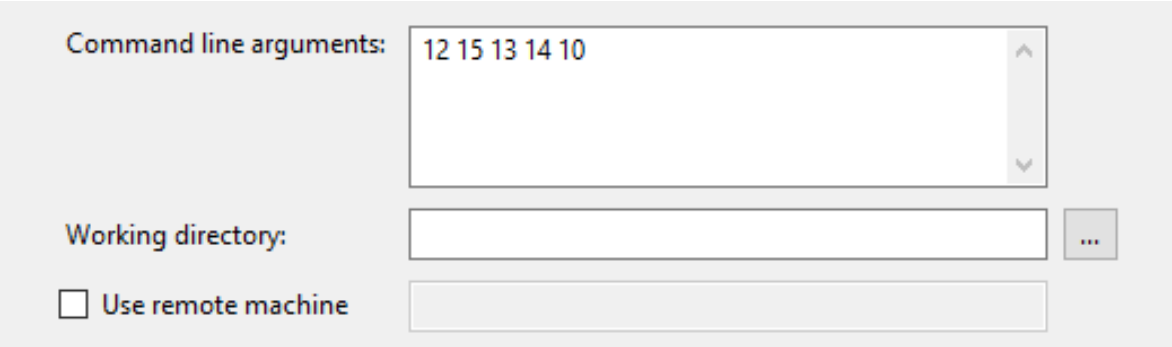
OUTPUT

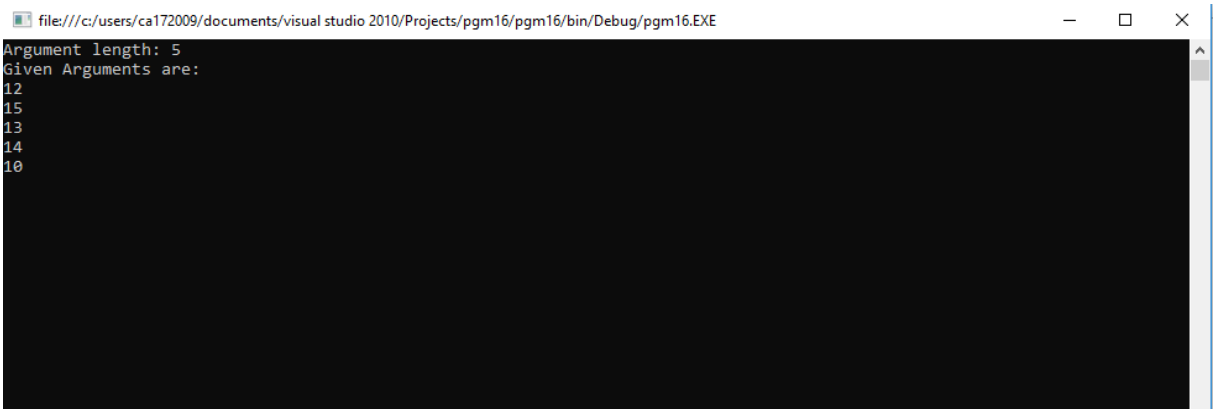

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm15/pgm15/bin/Debug/pgm15.EXE
Vinayak : 23
Abhishek : 0

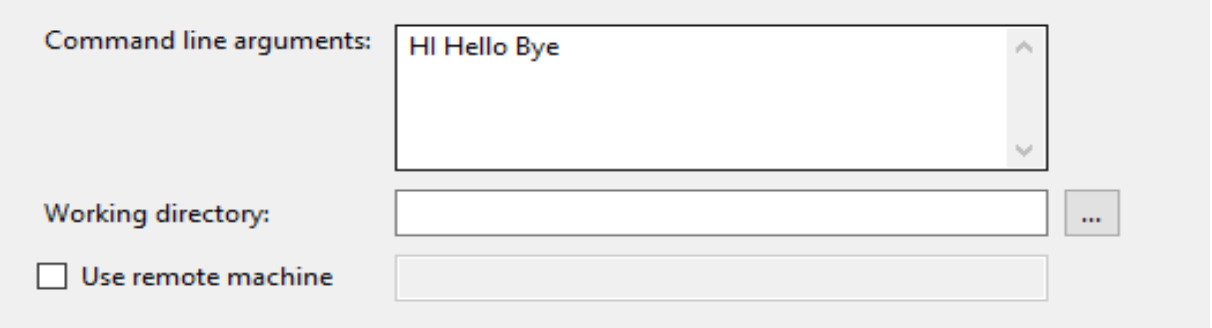
9) Demonstrate Command line arguments processing.

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

namespace pgm16
{
   class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("Argument length: " + args.Length);
         Console.WriteLine("Given Arguments are:");
         foreach (Object obj in args)
         {
            Console.WriteLine(obj);
         }
         Console.ReadLine();
      }
   }
}
```

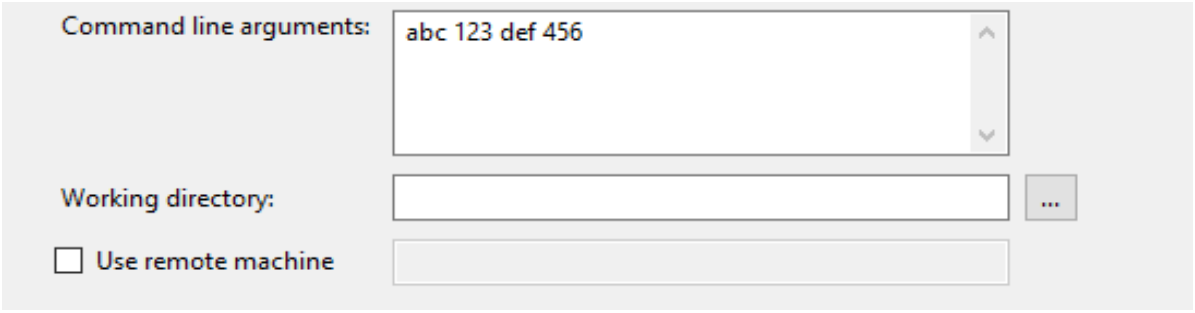
OUTPUT

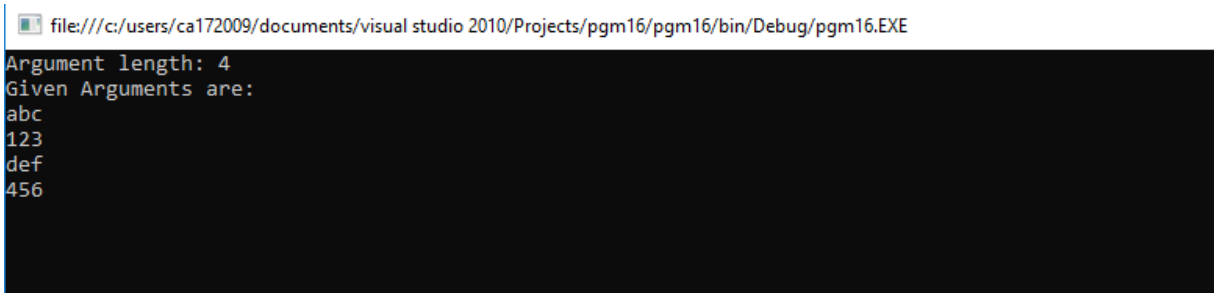

Command line arguments:
12 15 13 14 10
Working directory:
...
Use remote machine

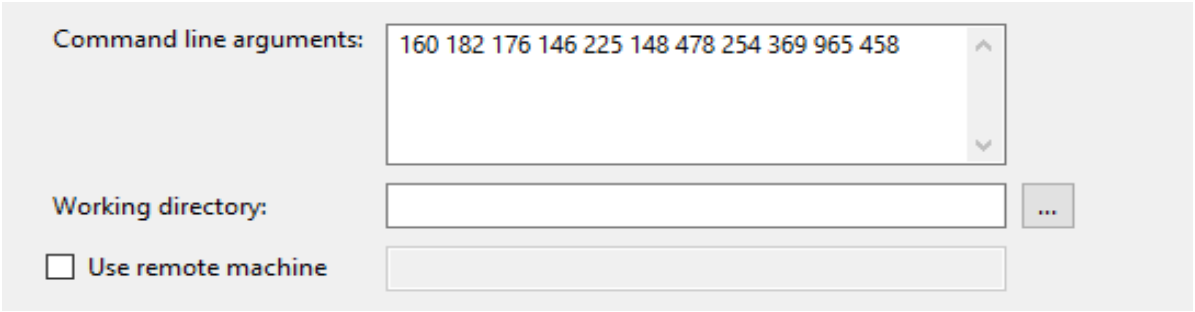

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm16/pgm16/bin/Debug/pgm16.EXE
Argument length: 5
Given Arguments are:
12
15
13
14
10


Command line arguments:
HI Hello Bye
Working directory:
...
Use remote machine

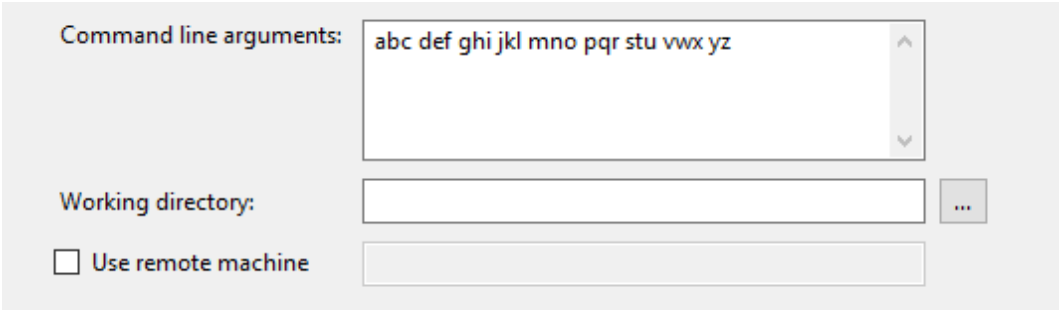

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm16/pgm16/bin/Debug/pgm16.EXE
Argument length: 3
Given Arguments are:
HI
Hello
Bye

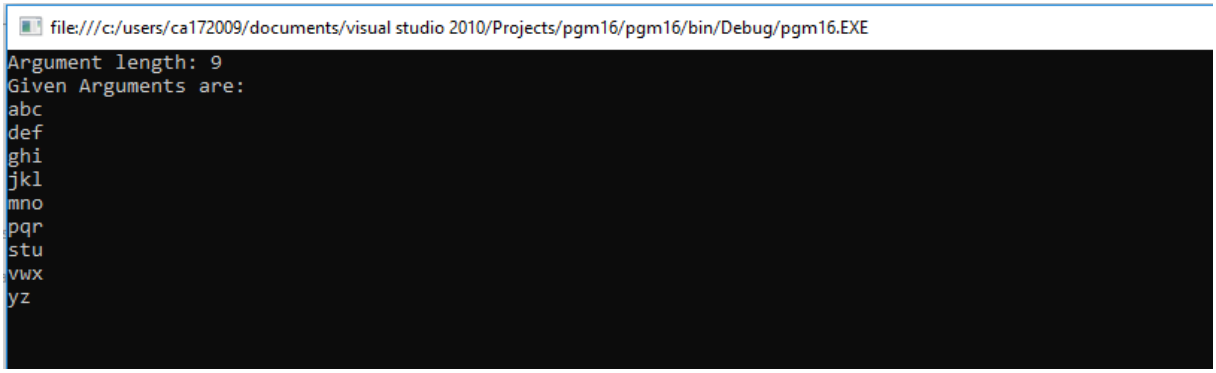

Command line arguments:
abc 123 def 456
Working directory:
...
Use remote machine


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm16/pgm16/bin/Debug/pgm16.EXE
Argument length: 4
Given Arguments are:
abc
123
def
456


Command line arguments:
160 182 176 146 225 148 478 254 369 965 458
Working directory:
...
Use remote machine


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm16/pgm16/bin/Debug/pgm16.EXE
Argument length: 11
Given Arguments are:
160
182
176
146
225
148
478
254
369
965
458


Command line arguments:
abc def ghi jkl mno pqr stu vwx yz
Working directory:
...
Use remote machine

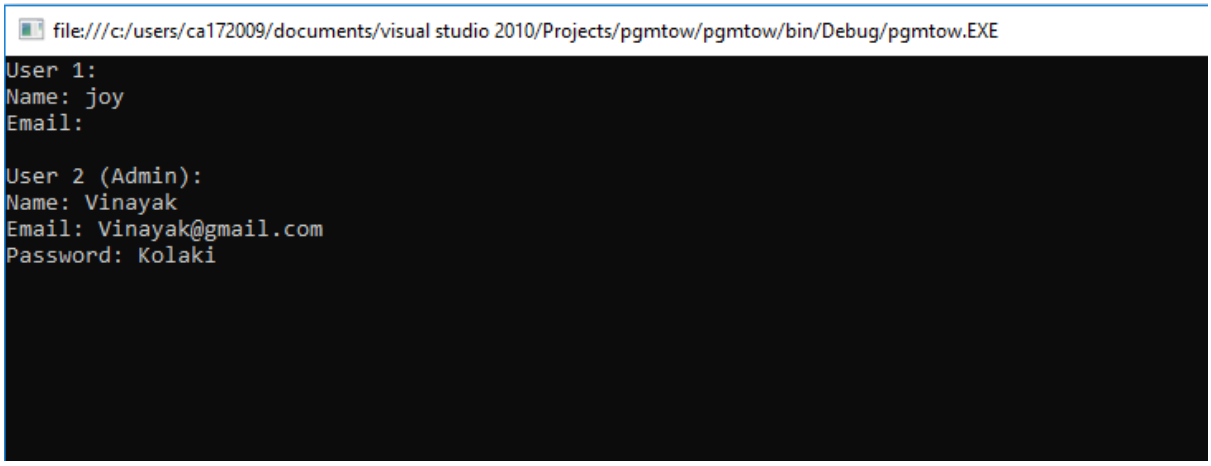

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm16/pgm16/bin/Debug/pgm16.EXE
Argument length: 9
Given Arguments are:
abc
def
ghi
jkl
mno
pqr
stu
vwx
yz

10) Create classes, they are reference type in C# and hence are allocated on the heap. Classes provide object-oriented constructs such as encapsulation, Polymorphism, and inheritance. For instance, the program should print john. doe twice, illustrating that objects are reference types, allocated on the heap implement the same using C#.

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

namespace pgmtow
{
   class Program
   {
      static void Main(string[] args)
      {
         User user1 = new User("joy");
         Admin user2 = new Admin("Vinayak", "Vinayak@gmail.com", "Kolaki");

         Console.WriteLine("User 1:");
         Console.WriteLine("Name: {0}", user1.getName());
         Console.WriteLine("Email: {0}", user1.getEmail());

         Console.WriteLine();

         Console.WriteLine("User 2 (Admin):");
         Console.WriteLine("Name: {0}", user2.getName());
         Console.WriteLine("Email: {0}", user2.getEmail());
         Console.WriteLine("Password: {0}", user2.getPassword());

         Console.Read();
      }
   }
}

class User {
      private string name;
      private string email;

      public User(String name) {
         this.name = name;
      }

      public User(String name, String email)
      {
         this.name = name;
         this.email = email;
      }
```

```
    public string getName() {
        return name;
    }

    public string getEmail()
    {
        return email;
    }

    public void setName(string name)
    {
        this.name = name;
    }

    public void setEmail(string email)
    {
        this.email = email;
    }
}

class Admin : User {
    private string password;
    public Admin(string name, string email, string password): base(name, email)
    {
        this.password = password;
    }

    public void setPassword(string password) {
        this.password = password;
    }

    public string getPassword() {
        return password;
    }
}
```

OUTPUT

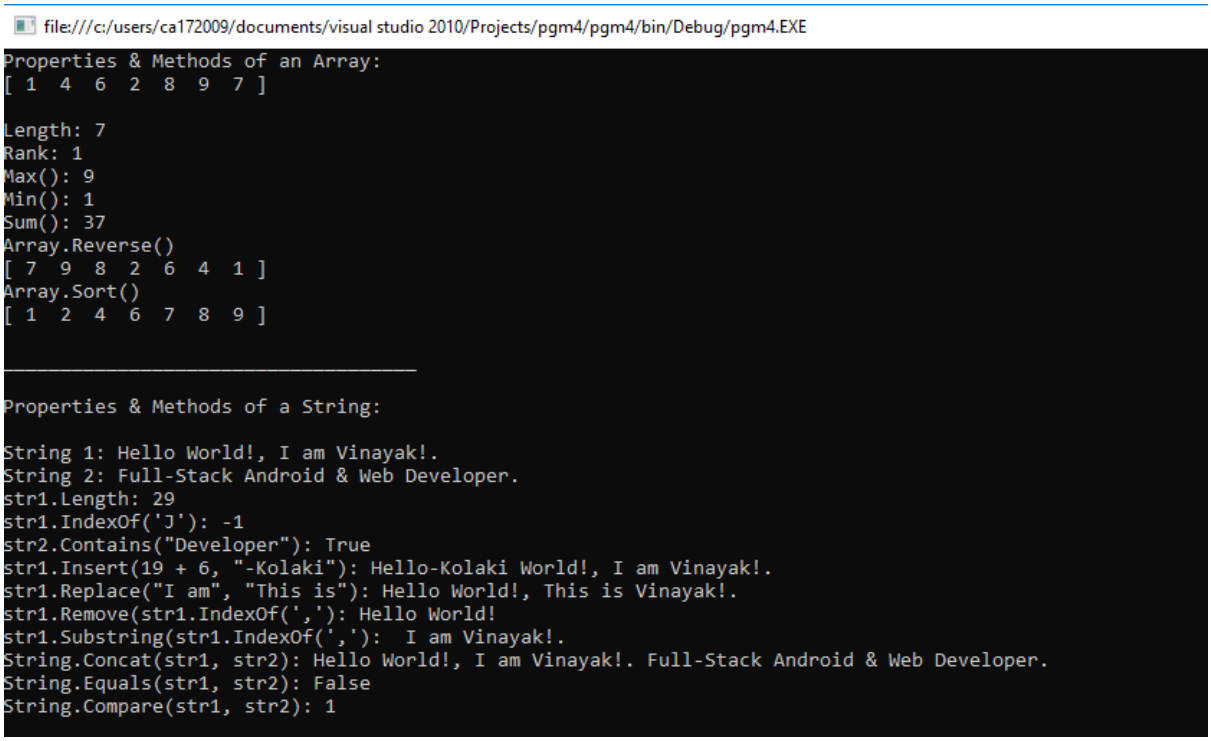

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgmtow/pgmtow/bin/Debug/pgmtow.EXE
User 1:
Name: joy
Email:
User 2 (Admin):
Name: Vinayak
Email: Vinayak@gmail.com
Password: Kolaki

11) Describe Arrays and Strings methods with suitable C# program.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
namespace pgm4
{
   class Program
   {
      static void Main(string[] args)
      {
         int[] array = { 1, 4, 6, 2, 8, 9, 7 };
         Console.WriteLine("Properties & Methods of an Array: ");
         displayArray(array);
         Console.WriteLine();
         Console.WriteLine("Length: {0}", array.Length);
         Console.WriteLine("Rank: {0}", array.Rank);
         Console.WriteLine("Max(): {0}", array.Max());
         Console.WriteLine("Min(): {0}", array.Min());
         Console.WriteLine("Sum(): {0}", array.Sum());
         Console.WriteLine("Array.Reverse()");
         Array.Reverse(array);
         displayArray(array);
         Console.WriteLine("Array.Sort()");
         Array.Sort(array);
         displayArray(array);
         Console.WriteLine();
         Console.WriteLine("Properties & Methods of a String: ");
         String str1 = "Hello World!, I am Vinayak!. ";
```

```
            Console.WriteLine();
            String str2 = "Full-Stack Android & Web Developer.";
            Console.WriteLine("String 1: {0}", str1);
            Console.WriteLine("String 2: {0}", str2);
            Console.WriteLine("str1.Length: {0}", str1.Length);
            Console.WriteLine("str1.IndexOf('J'): {0}", str1.IndexOf('J'));
            Console.WriteLine("str2.Contains(\"Developer\"): {0}", str2.Contains("Developer"));
            Console.WriteLine("str1.Insert(19 + 6, \"-Kolaki\"): {0}", str1.Insert(str1.IndexOf('J')
+ 6, "-Kolaki"));
            Console.WriteLine("str1.Replace(\"I am\", \"This is\"): {0}", str1.Replace("I am",
"This is"));
            Console.WriteLine("str1.Remove(str1.IndexOf(','): {0}",
str1.Remove(str1.IndexOf(',')));
            Console.WriteLine("str1.Substring(str1.IndexOf(','): {0}",
str1.Substring(str1.IndexOf(',') + 1));
            Console.WriteLine("String.Concat(str1, str2): {0}", String.Concat(str1, str2));
            Console.WriteLine("String.Equals(str1, str2): {0}", String.Equals(str1, str2));
            Console.WriteLine("String.Compare(str1, str2): {0}", String.Compare(str1, str2));
            Console.ReadLine();
        }
        static void displayArray(int[] a)        {
            Console.Write("[");
            for (int i = 0; i < a.Length; i++)
            {
                Console.Write(" {0} ", a[i]);
            }
            Console.WriteLine("]");
        }
    }
}
```

OUTPUT


file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm4/pgm4/bin/Debug/pgm4.EXE
Properties & Methods of an Array:
[1 4 6 2 8 9 7]
Length: 7
Rank: 1
Max(): 9
Min(): 1
Sum(): 37
Array.Reverse()
[7 9 8 2 6 4 1]
Array.Sort()
[1 2 4 6 7 8 9]
Properties & Methods of a String:
String 1: Hello World!, I am Vinayak!.
String 2: Full-Stack Android & Web Developer.
str1.Length: 29
str1.IndexOf('J'): -1
str2.Contains("Developer"): True
str1.Insert(19 + 6, "-Kolaki"): Hello-Kolaki World!, I am Vinayak!.
str1.Replace("I am", "This is"): Hello World!, This is Vinayak!.
str1.Remove(str1.IndexOf(','): Hello World!
str1.Substring(str1.IndexOf(',': I am Vinayak!.
String.Concat(str1, str2): Hello World!, I am Vinayak!. Full-Stack Android & Web Developer.
String.Equals(str1, str2): False
String.Compare(str1, str2): 1

12) Work with page using ASP.Net

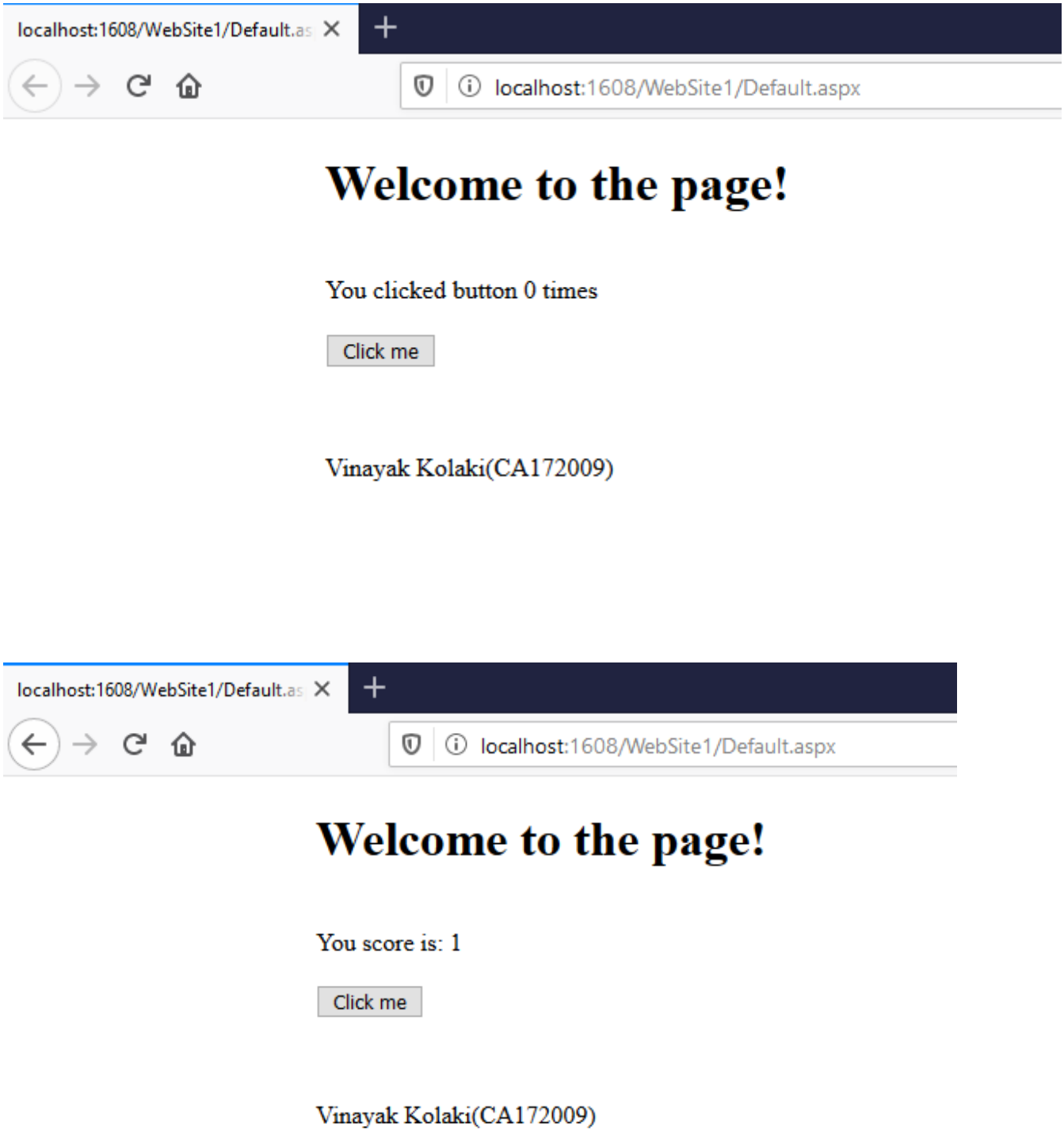
C#.net page

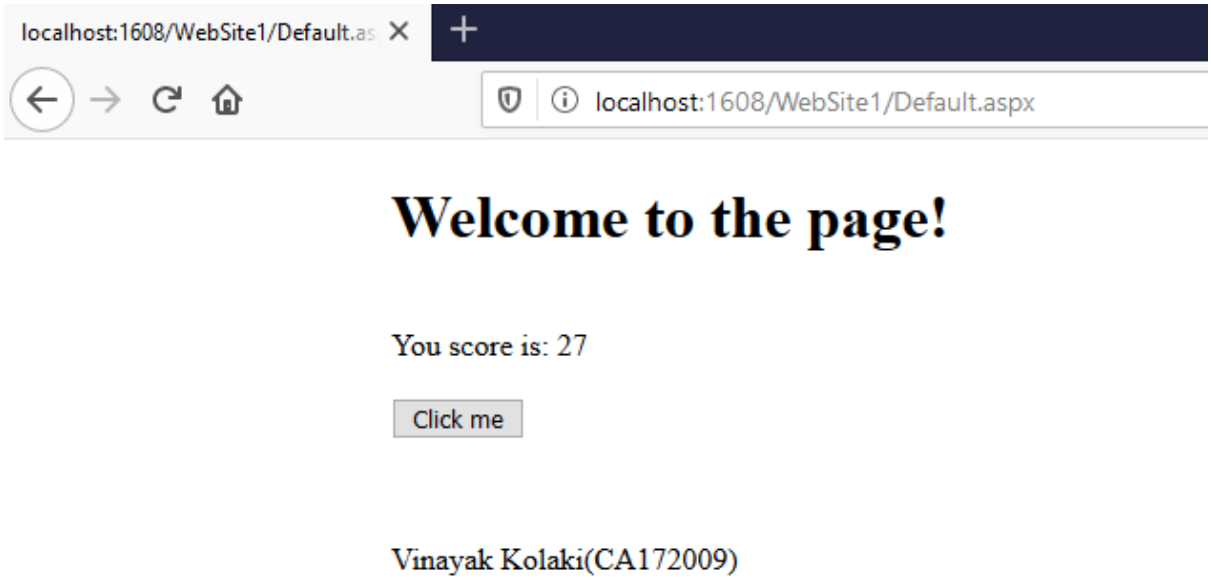
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Web;
using System.Web.UI;
using System.Web.UI.WebControls;

public partial class _Default : System.Web.UI.Page
{
   protected void Page_Load(object sender, EventArgs e)
   {

   }
   protected void Button1_Click(object sender, EventArgs e)
   {
      object value = ViewState["HitCount"];
      int i = (value == null) ? 1 : (int)value + 1;
      Label1.Text = string.Format("You score is: {0}", i);
      ViewState["HitCount"] = i;
   }
}
```

ASP.net Page

```
<%@ Page Language="C#" AutoEventWireup="true" CodeFile="Default.aspx.cs"
Inherits="_Default" %>

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">
<head runat="server">
   <title></title>
   </head>
<body style="width: 625px; margin-left: 203px">
         <form id="form1" runat="server">
   <div class="container">
      <h1>Welcome to the page!</h1>
      <br />
      <asp:Label ID="Label1" Text="You clicked button 0 times" runat="server" />
      <br />
      <br />
      <asp:button id="clickMeButton" runat="server" text="Click me"
         onClick="Button1_Click" />
      <div class="space"> <br /> <footer>
         <br />
         <br />
         Vinayak Kolaki(CA172009)</footer></div>

   </div>
   </form>

   </body>
</html>
```

Output


localhost:1608/WebSite1/Default.as
localhost:1608/WebSite1/Default.aspx
Welcome to the page!
You clicked button 0 times
Click me
Vinayak Kolaki(CA172009)
localhost:1608/WebSite1/Default.as
localhost:1608/WebSite1/Default.aspx
Welcome to the page!
You score is: 1
Click me
Vinayak Kolaki(CA172009)

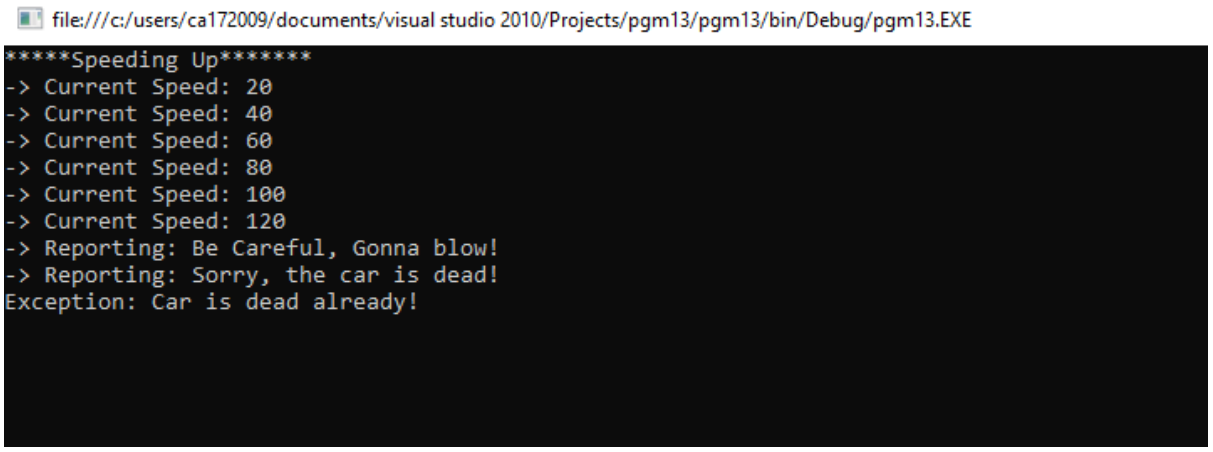

localhost:1608/WebSite1/Default.as
localhost:1608/WebSite1/Default.aspx
Welcome to the page!
You score is: 27
Click me
Vinayak Kolaki(CA172009)

13) Describe delegates, events, errors and exceptions.

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

namespace pgm13
{
   class Car
   {
      public delegate void EventHandler(string msg);

      public event EventHandler exploadListener;
      public event EventHandler aboutToBlowListener;

      private string name;
      private bool isExhausted;
      private int currentSpeed;
      private const int maxSpeed = 140;

      public Car(String name)
      {
         this.name = name;
      }
      public void accelerate(int delta)
      {
         if (isExhausted)
         {
            if (exploadListener != null)
               exploadListener("Sorry, the car is dead!");
         }
         else
         {
            currentSpeed += delta;

            if (10 >= maxSpeed - currentSpeed && aboutToBlowListener != null)
            {
               aboutToBlowListener("Be Careful, Gonna blow!");
            }

            if (currentSpeed >= maxSpeed)
               isExhausted = true;
            else
               Console.WriteLine("-> Current Speed: {0}", currentSpeed);
         }
      }
   }
   class Program
   {
```

```
        static void Main(string[] args)
        {
            Car car = new Car("Tesla");
            car.aboutToBlowListener += new Car.EventHandler(aboutToBlow);

            car.exploadListener += new Car.EventHandler(exploded);
            Console.WriteLine("*****Speeding Up*******");

            try
            {
                for (int i = 0; i < 20; i++)
                {
                    car.accelerate(20);
                }
            }
            catch (Exception e)
            {
                Console.WriteLine("Exception: Car is dead already!");
            }
            Console.ReadLine();
        }
        public static void aboutToBlow(string msg)
        {
            Console.WriteLine("-> Reporting: {0}", msg);
        }
        public static void exploded(string msg)
        {
            Console.WriteLine("-> Reporting: {0}", msg);
            throw new Exception("Car dead");
        }
    }
}
```

Output

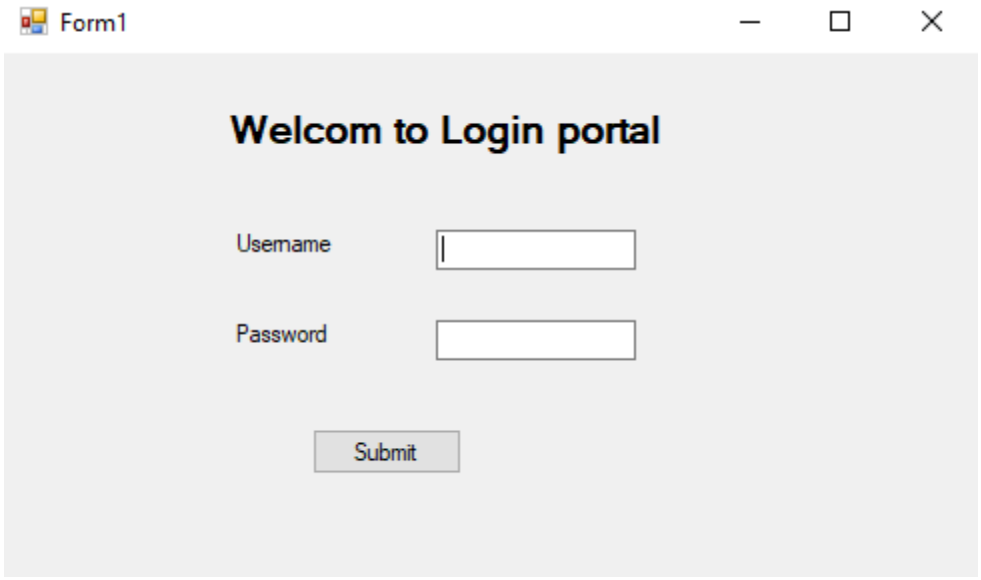

file:///c:/users/ca172009/documents/visual studio 2010/Projects/pgm13/pgm13/bin/Debug/pgm13.EXE
*****Speeding Up*******
-> Current Speed: 20
-> Current Speed: 40
-> Current Speed: 60
-> Current Speed: 80
-> Current Speed: 100
-> Current Speed: 120
-> Reporting: Be Careful, Gonna blow!
-> Reporting: Sorry, the car is dead!
Exception: Car is dead already!

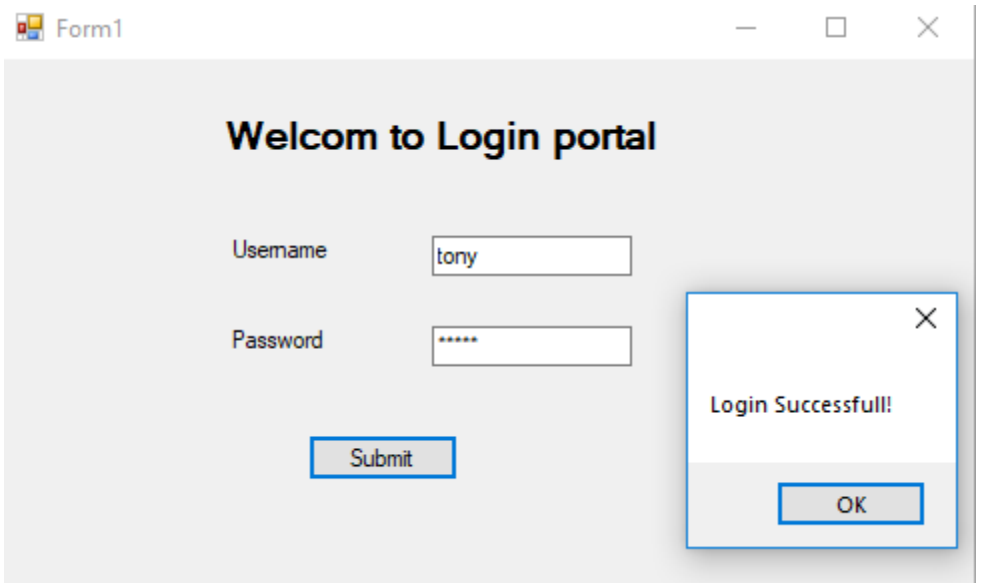
14) Work with forms using ASP.Net.

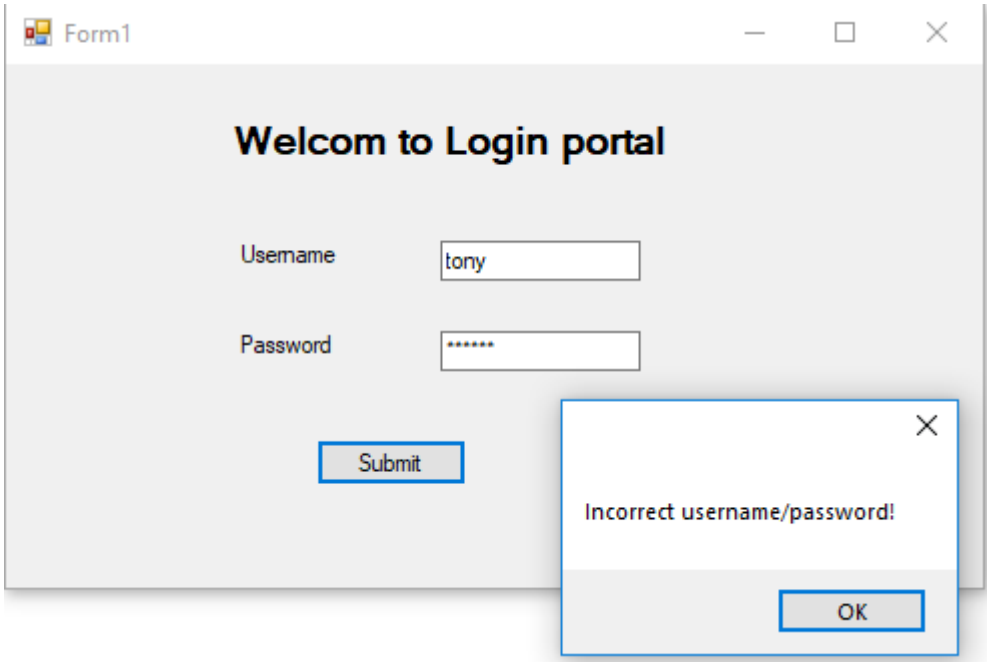
```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Windows.Forms;

namespace pgm1011
{
   public partial class Form1 : Form
   {
      string[] names;
      string[] passs;
      int rows;

      public Form1()
      {
         InitializeComponent();

         names = new string[10];
         passs = new string[10];

         names[0] = "admin";
         names[1] = "user";
         names[2] = "tony";

         passs[0] = "admin";
         passs[1] = "user";
         passs[2] = "stark";
         rows = 3;
      }
      private void button1_Click(object sender, EventArgs e)
      {
         string username = textBox1.Text.Trim();
         string password = textBox2.Text.Trim();

         if (username.Equals("") || password.Equals(""))
         {
            MessageBox.Show("Fields cannot be empty!");
            return;
         }
         for (int i = 0; i < rows; i++)
         {
            if (names[i].Equals(username) && passs[i].Equals(password))
            {
               MessageBox.Show("Login Successfull!");
```

```
                return;
            }
        }
        MessageBox.Show("Incorrect username/password!");
    }
  }
}
```

Output


Form1
Welcom to Login portal
Username
Password
Submit


Form1
Welcom to Login portal
Username
tony
Password
*****
Submit
Login Successfull!
OK

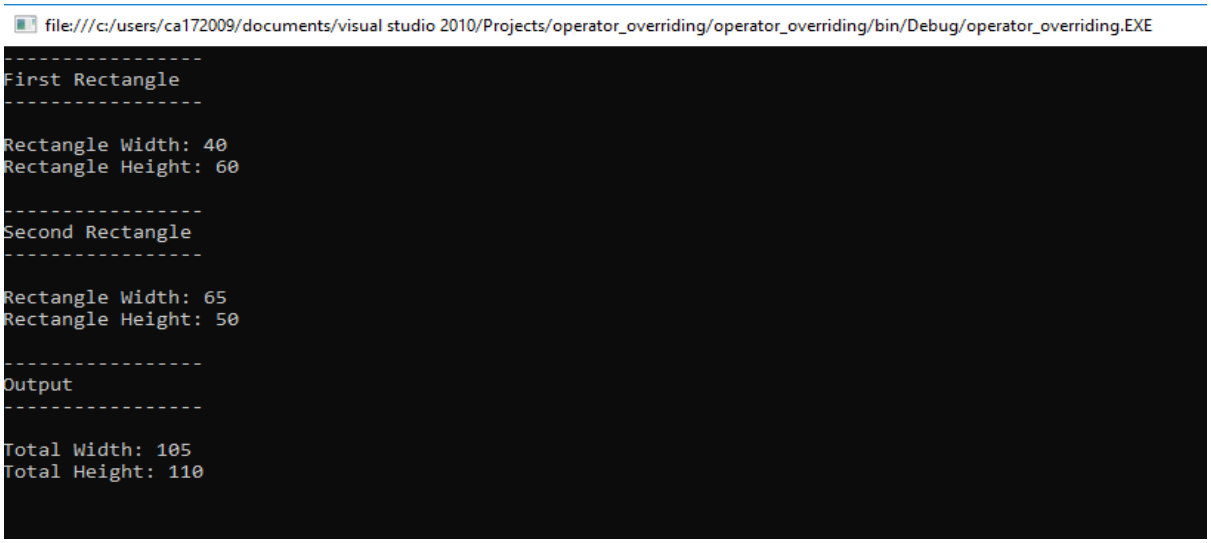

Form1
Welcom to Login portal
Username
tony
Password
Submit
Incorrect username/password!
OK

15) Perform Operator Overloading.

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

namespace operator_overriding
{
   class Rectangle
   {
      int width;
      int height;

      Rectangle(int width, int height)
      {
         this.width = width;
         this.height = height;
      }

      public static Rectangle operator +(Rectangle a, Rectangle b)
      {
         int totalWidth = a.width + b.width;
         int totalHeight = a.height + b.height;
         return new Rectangle(totalWidth, totalHeight);

      }

      static void Main(string[] args)
      {

         Rectangle r1 = new Rectangle(95, 54);
         Rectangle r2 = new Rectangle(53, 90);
         Console.WriteLine("------------------");
         Console.WriteLine("First Rectangle");
         Console.WriteLine("------------------");
         Console.WriteLine("");
         Console.WriteLine("Rectangle Width: {0}", r1.width);
         Console.WriteLine("Rectangle Height: {0}", r1.height);

         Console.WriteLine();

         Console.WriteLine("------------------");
         Console.WriteLine("Second Rectangle");
         Console.WriteLine("------------------");
         Console.WriteLine("");
         Console.WriteLine("Rectangle Width: {0}", r2.width);
         Console.WriteLine("Rectangle Height: {0}", r2.height);

         Console.WriteLine();
```

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

            Rectangle r3 = r1 + r2;
            Console.WriteLine("Total Width: {0}", r3.width);
            Console.WriteLine("Total Height: {0}", r3.height);
            Console.ReadKey();
        }
    }
}
```

Output


file:///c:/users/ca172009/documents/visual studio 2010/Projects/operator_overriding/operator_overriding/bin/Debug/operator_overriding.EXE

First Rectangle

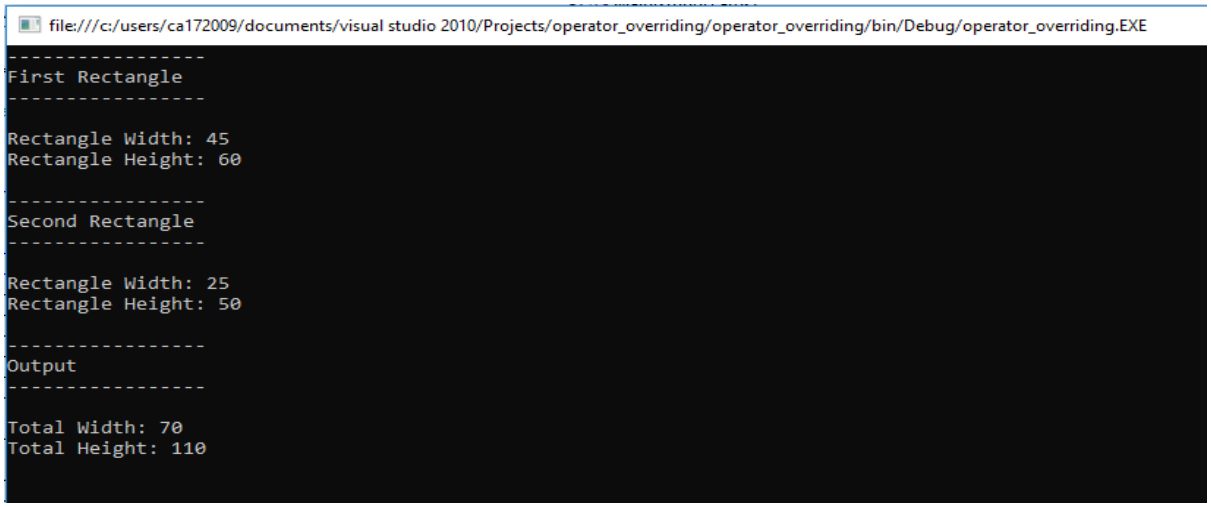
Rectangle Width: 40
Rectangle Height: 60

Second Rectangle

Rectangle Width: 65
Rectangle Height: 50

Output

Total Width: 105
Total Height: 110


file:///c:/users/ca172009/documents/visual studio 2010/Projects/operator_overriding/operator_overriding/bin/Debug/operator_overriding.EXE

First Rectangle

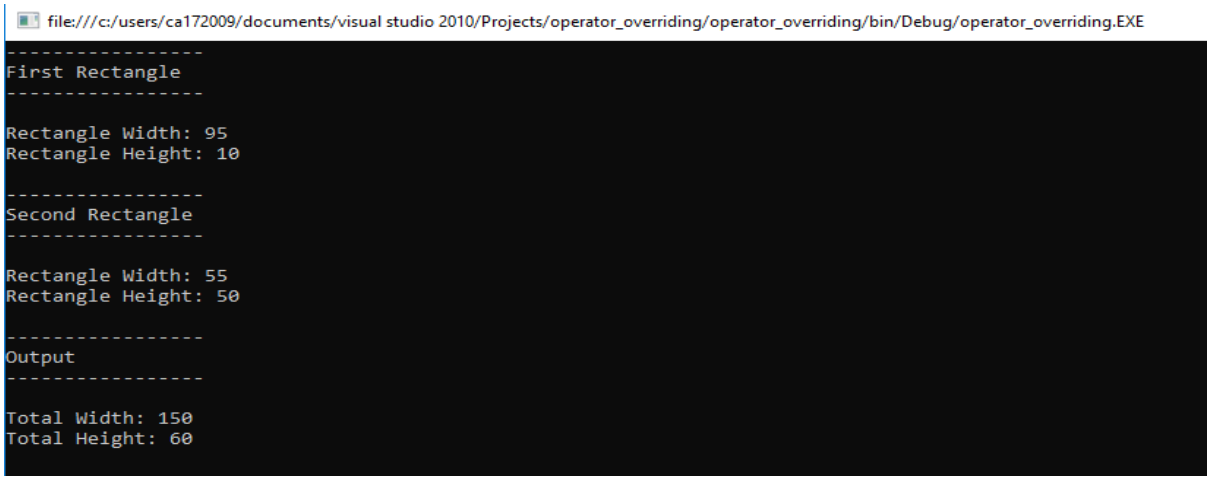
Rectangle Width: 45
Rectangle Height: 60

Second Rectangle

Rectangle Width: 25
Rectangle Height: 50

Output

Total Width: 70
Total Height: 110


file:///c:/users/ca172009/documents/visual studio 2010/Projects/operator_overriding/operator_overriding/bin/Debug/operator_overriding.EXE

First Rectangle

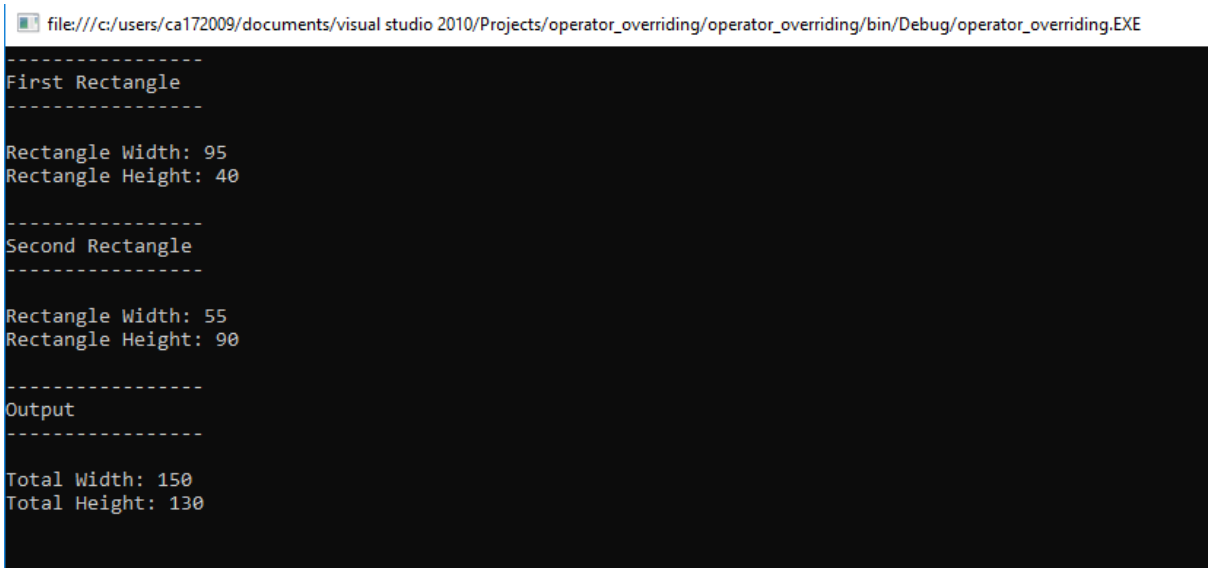
Rectangle Width: 95
Rectangle Height: 10

Second Rectangle

Rectangle Width: 55
Rectangle Height: 50

Output

Total Width: 150
Total Height: 60


file:///c:/users/ca172009/documents/visual studio 2010/Projects/operator_overriding/operator_overriding/bin/Debug/operator_overriding.EXE

First Rectangle

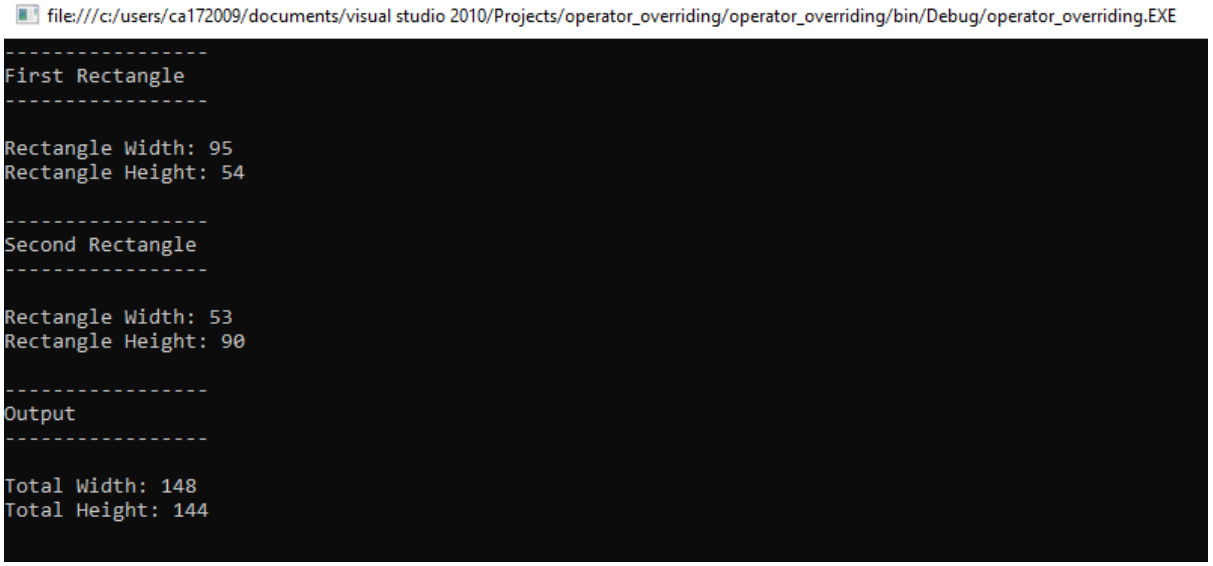
Rectangle Width: 95
Rectangle Height: 40

Second Rectangle

Rectangle Width: 55
Rectangle Height: 90

Output

Total Width: 150
Total Height: 130


file:///c:/users/ca172009/documents/visual studio 2010/Projects/operator_overriding/operator_overriding/bin/Debug/operator_overriding.EXE

First Rectangle

Rectangle Width: 95
Rectangle Height: 54

Second Rectangle

Rectangle Width: 53
Rectangle Height: 90

Output

Total Width: 148
Total Height: 144

16) Program to Multiply to matrices using Rectangle arrays.

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

namespace Matricies_Multiplication
{
   class Program
   {
      static void Main(string[] args)
      {
         Console.Title = ("Matix Multiplication");
         int[,] mat1 = new int[2, 2];
         int[,] mat2 = new int[2, 2];
         int[,] mat3 = new int[2, 2];

         Console.WriteLine("Enter Element for 1st Array ");
         for (int i = 0; i < 2; i++)
         {
            for (int j = 0; j < 2; j++)
            {
               mat1[i, j] = Convert.ToInt32(Console.ReadLine());
            }
         }
         Console.WriteLine("Matrix one element are stored.\n");
         Console.WriteLine("Enter Element for 2nd Array.");
         for (int i = 0; i < 2; i++)
         {
            for (int j = 0; j < 2; j++)
            {
               mat2[i, j] = Convert.ToInt32(Console.ReadLine());
            }
         }
         int r1 = mat1.GetLength(0);
         int c1 = mat1.GetLength(1);
         int r2 = mat2.GetLength(0);
         int c2 = mat1.GetLength(1);

         //Console.WriteLine("\n\t\tRows \tColumn");
         //Console.WriteLine("Matrix 1\t" + r1.ToString() + "\t" + c1.ToString());
         //Console.WriteLine("Matrix 2\t" + r2.ToString() + "\t" + c2.ToString());
         //Console.WriteLine("\n");

         Console.WriteLine("Matrix two element are stored.");
         Console.WriteLine("First Array");
         for (int i = 0; i < 2; i++)
         {
            for (int j = 0; j < 2; j++)
```

```
            {
                Console.Write("\t" + mat1[i, j]);
            }
            Console.WriteLine();
        }
        Console.WriteLine("Second Array");

        for (int i = 0; i < 2; i++)
        {
            for (int j = 0; j < 2; j++)
            {
                Console.Write("\t" + mat2[i, j]);
            }
            Console.WriteLine();
        }
        Console.WriteLine("\n");

        Console.WriteLine("Multiplication of two matrix");

        for (int i = 0; i < r1; i++)
        {
            for (int j = 0; j < c2; j++)
            {
                for (int k = 0; k < c1; k++)
                {
                    mat3[i, j] += mat1[i, k] * mat2[k, j];
                }
            }
        }
        for (int i = 0; i < 2; i++)
        {
            for (int j = 0; j < 2; j++)
            {
                Console.Write("\t" + mat3[i, j]);
            }
            Console.WriteLine();
        }
        Console.ReadKey();
    }
  }
}
```

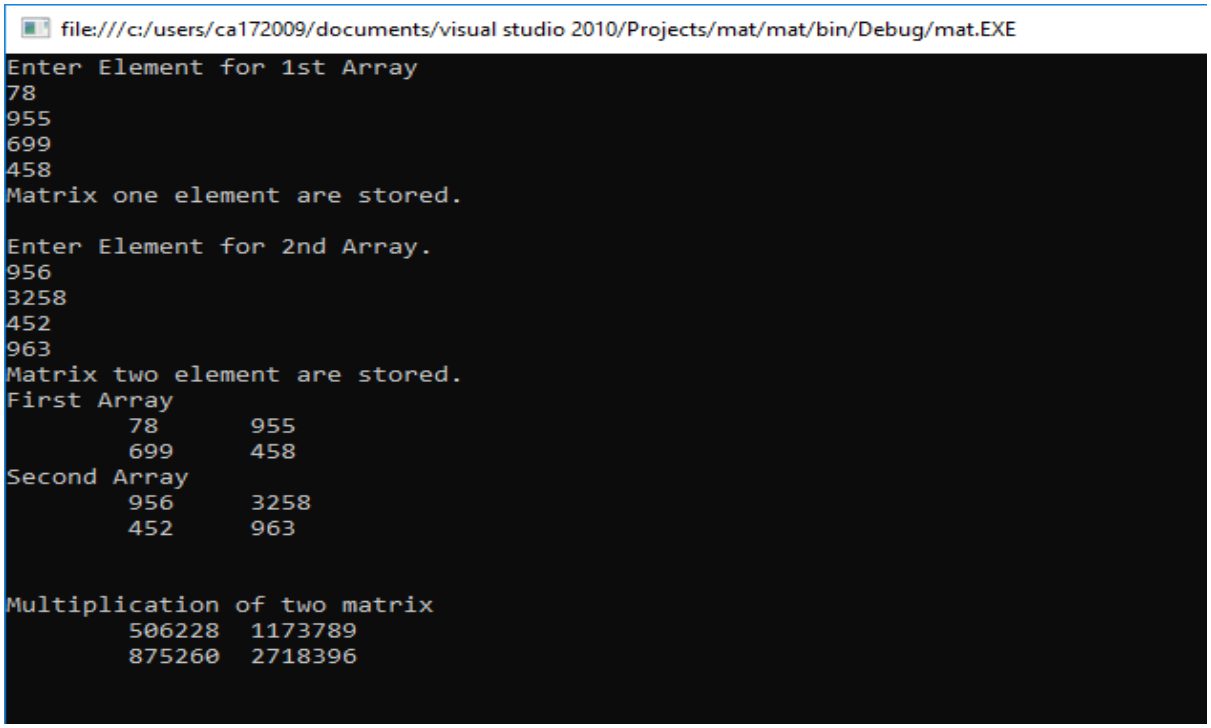
Output

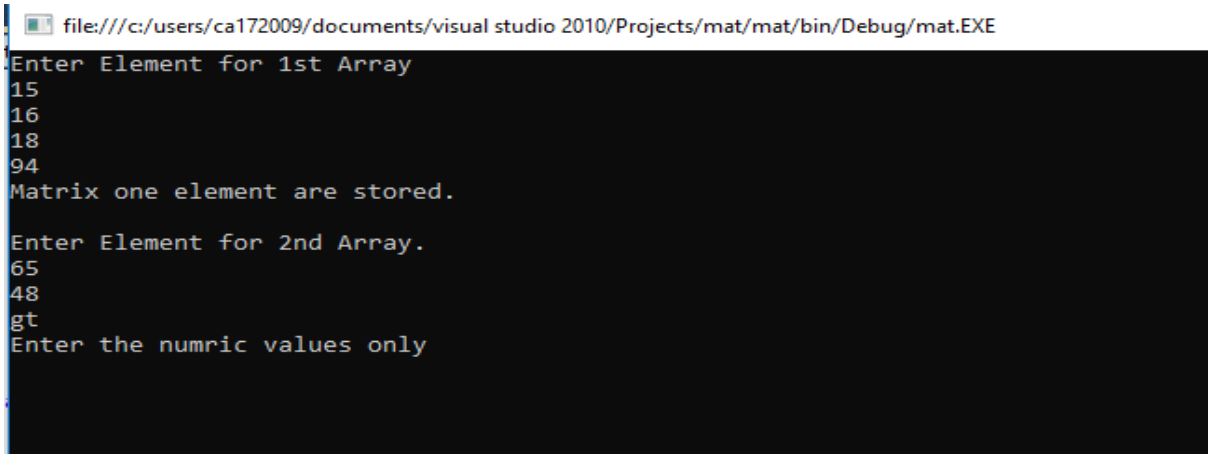
file:///c:/users/ca172009/documents/visual studio 2010/Projects/mat/mat/bin/Debug/mat.EXE

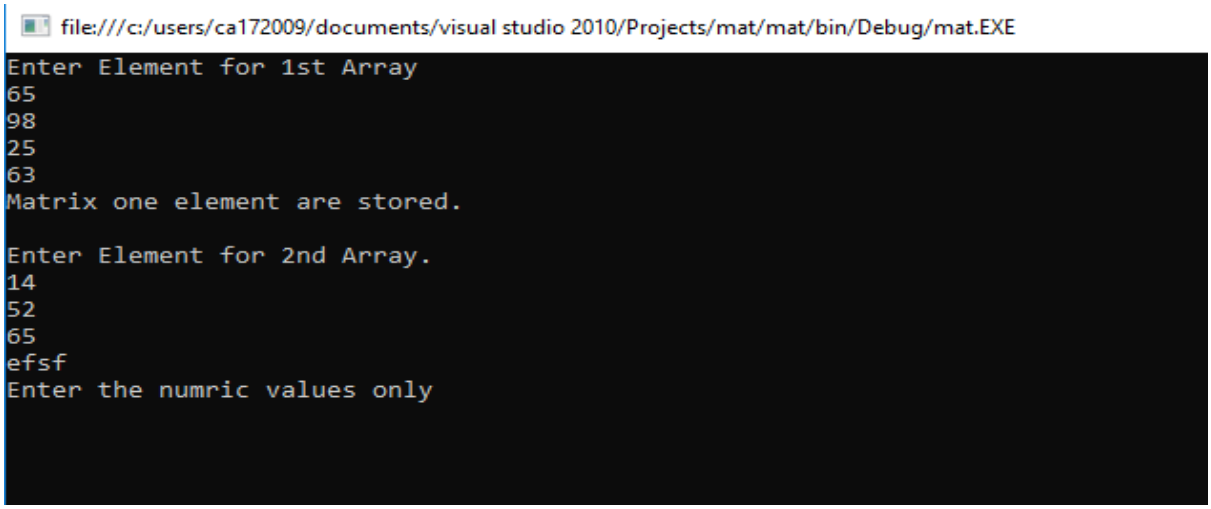
```
Enter Element for 1st Array
10
20
30
40
Matrix one element are stored.

Enter Element for 2nd Array.
50
60
70
80
Matrix two element are stored.
First Array
        10      20
        30      40
Second Array
        50      60
        70      80


Multiplication of two matrix
        1900    2200
        4300    5000
```

file:///c:/users/ca172009/documents/visual studio 2010/Projects/mat/mat/bin/Debug/mat.EXE

```
Enter Element for 1st Array
15
16
18
17
Matrix one element are stored.

Enter Element for 2nd Array.
18
19
17
13
Matrix two element are stored.
First Array
        15      16
        18      17
Second Array
        18      19
        17      13


Multiplication of two matrix
        542     493
        613     563
```


file:///c:/users/ca172009/documents/visual studio 2010/Projects/mat/mat/bin/Debug/mat.EXE
Enter Element for 1st Array
78
955
699
458
Matrix one element are stored.
Enter Element for 2nd Array.
956
3258
452
963
Matrix two element are stored.
First Array
78 955
699 458
Second Array
956 3258
452 963
Multiplication of two matrix
506228 1173789
875260 2718396


file:///c:/users/ca172009/documents/visual studio 2010/Projects/mat/mat/bin/Debug/mat.EXE
Enter Element for 1st Array
15
16
18
94
Matrix one element are stored.
Enter Element for 2nd Array.
65
48
gt
Enter the numric values only


file:///c:/users/ca172009/documents/visual studio 2010/Projects/mat/mat/bin/Debug/mat.EXE
Enter Element for 1st Array
65
98
25
63
Matrix one element are stored.
Enter Element for 2nd Array.
14
52
65
efsf
Enter the numric values only

17) Demonstrate Use of Virtual and Override keyword in C# with a simple Program.

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

namespace va
{
    class A
   {
       public virtual void show()
       {
           Console.WriteLine("Hello: Base Class!");
           Console.Write("\nPress Enter...");
           Console.ReadLine();
       }
   }
    class B : A
    {
        public override void show()
        {
            Console.WriteLine("Hello: Derived Class!");
            Console.Write("\nPress Enter...");
            Console.ReadLine();
        }
    }
   class Program
   {
       static void Main(string[] args)
       {

           Console.WriteLine("\nClass A is Base Class & Class B is derived from A.\n");
           Console.WriteLine("Creating Object of Class A.");
           A a1 = new A();
           a1.show();
           Console.WriteLine("------------------------------------------------------\n");
           Console.WriteLine("Creating Object of Class B.");
           B b1 = new B();
           b1.show();
           Console.WriteLine("------------------------------------------------------\n");
           Console.WriteLine("Creating Object of Class A and Calling Method of Class B.");
           A a2 = new B();
           a2.show();

           Console.ReadKey();
       }
   }
}
```

Output

file:///c:/users/ca172009/documents/visual studio 2010/Projects/virtual/virtual/bin/Debug/@virtual.EXE

```
Class A is Base Class & Class B is derived from A.

Creating Object of Class A.
Hello: Base Class!

Press Enter...
```

file:///c:/users/ca172009/documents/visual studio 2010/Projects/virtual/virtual/bin/Debug/@virtual.EXE

```
Class A is Base Class & Class B is derived from A.

Creating Object of Class A.
Hello: Base Class!

Press Enter...
------------------------------------------------------------

Creating Object of Class B.
Hello: Derived Class!

Press Enter...
```

file:///c:/users/ca172009/documents/visual studio 2010/Projects/virtual/virtual/bin/Debug/@virtual.EXE

```
Class A is Base Class & Class B is derived from A.

Creating Object of Class A.
Hello: Base Class!

Press Enter...
------------------------------------------------------------

Creating Object of Class B.
Hello: Derived Class!

Press Enter...
------------------------------------------------------------

Creating Object of Class A and Calling Method of Class B.
Hello: Derived Class!

Press Enter...
```

18) Describe access data source through ADO.NET.

Form.cs

```
using System;
using System.Collections.Generic;
using System.Data;
using System.Windows.Forms;
namespace ProgramEleven
{
 public partial class Form1 : Form
 {
 public Form1()
 {
 InitializeComponent();
 }
 private void btnFetch_Click(object sender, EventArgs e)
 {
 UserAccessLayer uAL = new UserAccessLayer();
 List<User> users = uAL.getAllUsers();
 if(users.Count == 0)
 lblStatus.Text = "No data!";
 else
 lblStatus.Text = "Data Fetched!";
 dGV.DataSource = users;
 }
 }
}
```

Users.cs

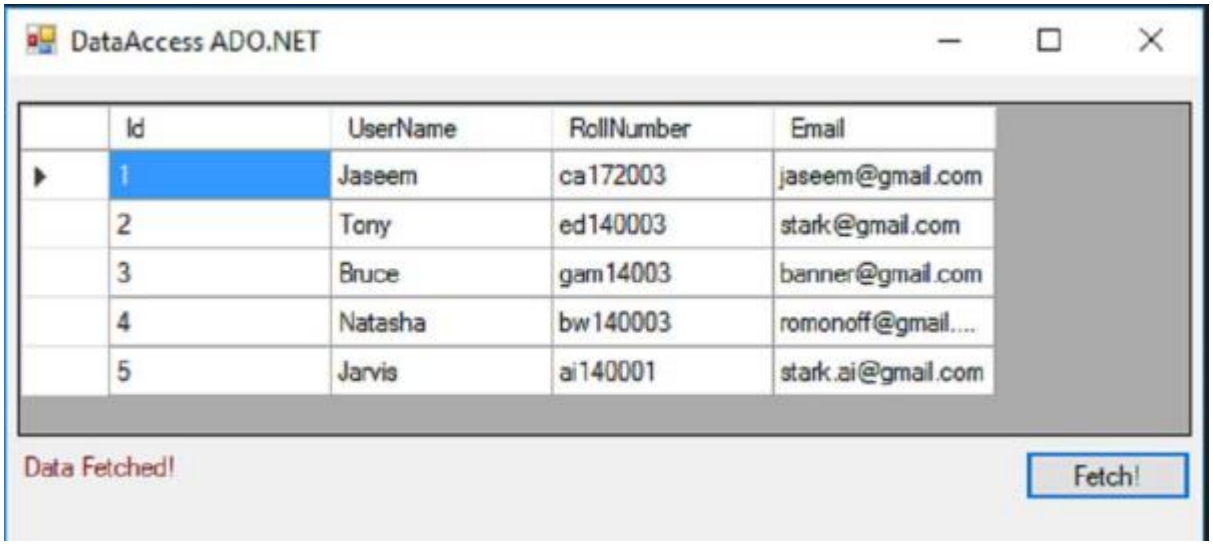
```
using System;
namespace ProgramEleven
{
 class User
 {
 public int Id
 {
 get;
 set;
 }
 public string UserName
 {
 get;
 set;
 }
 public string RollNumber
 {
 get;
 set;
 }
 public string Email
 {
 get;
 set;
 }
 }
}
```

UserAccessLayer.cs

```
using System;
using System.Data;
using System.Data.SqlClient;
namespace ProgramEleven
{
 class UserAccessLayer
 {
 private List<User> users;
 private string connectionString = @"Data Source=.\SQLEXPRESS/PSELF;Initial
 Catalog=TestDB; Integrated Security=True";
 private SqlConnection connection;
 private SqlCommand command;
 private string query;

 public List<User> getAllUsers()
 {
 users = new List<User>();
 try
 {
 connection = new SqlConnection(connectionString);
 connection.Open();
 query = "SELECT * FROM user";
 command = new SqlCommand(query, connection);
 SqlDataReader reader = command.ExecuteReader();
 while (reader.Read())
 {
 User user = new User();
 user.Id = Convert.ToInt16(reader.GetValue(0));
 user.UserName = reader.GetValue(1).ToString();
 user.Email = reader.GetValue(2).ToString();
 user.RollNumber = reader.GetValue(3).ToString();
 users.Add(user);
 }
 }
 catch (SqlException ex)
 {
 Console.WriteLine("Error in fetching database!: " + ex.Message);
 }
 return users;
 }
 }
}
```

Output


DataAccess ADO.NET
Fetch!


DataAccess ADO.NET
Id
UserName
RollNumber
Email
1
Jaseem
ca172003
jaseem@gmail.com
2
Tony
ed140003
stark@gmail.com
3
Bruce
gam14003
banner@gmail.com
4
Natasha
bw140003
romonoff@gmail....
5
Jarvis
ai140001
stark.ai@gmail.com
Data Fetched!
Fetch!


DataAccess ADO.NET
Id
UserName
RollNumber
Email
No data!
Fetch!