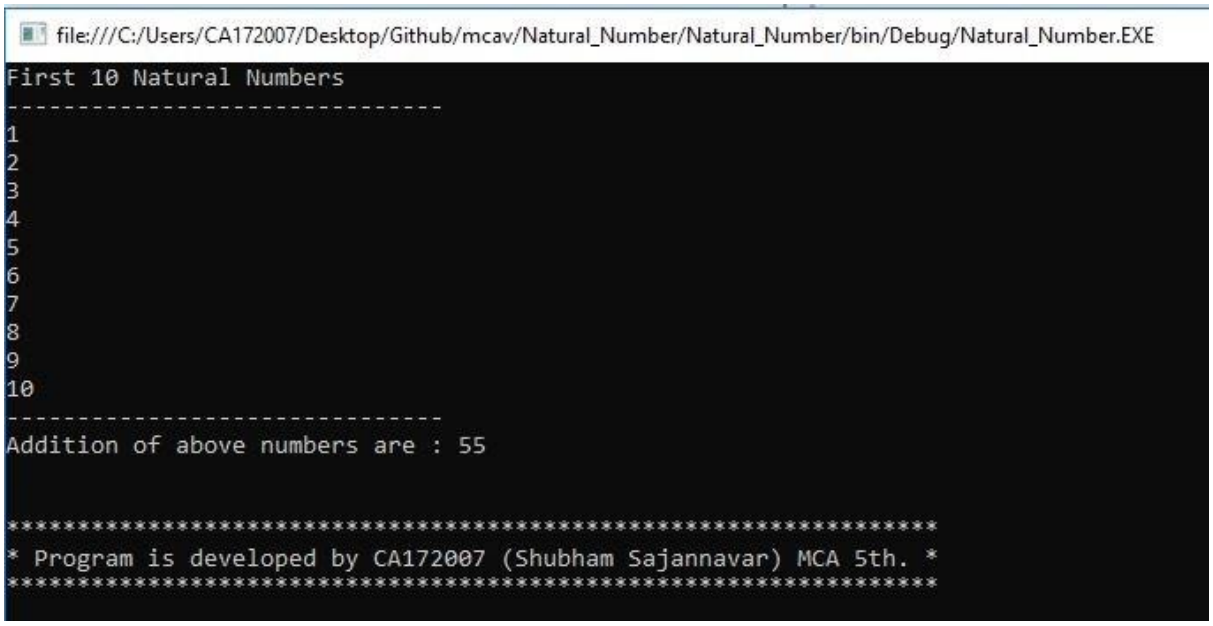
## 1) Program to display the first 10 natural numbers and their sum using console application.

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

namespace Natural_Number
{
   class Program
   {
      static void Main(string[] args)
      {
            int add=0;
            Console.WriteLine("First 10 Natural Numbers");
            Console.WriteLine("--------------------------------");
            for(int i=1; i<=10; i++){
                  Console.WriteLine(+i);
                  add = add + i;
                  if (i == 10) {
                        Console.WriteLine("--------------------------------");
                        Console.WriteLine("Addition of above numbers are : "+add);
            }
       }
       Console.WriteLine("Program is developed by CA172007 (Shubham Sajannavar)
     MCA 5th.");
       Console.ReadKey();
      }
   }
}
```

**OUTPUT**

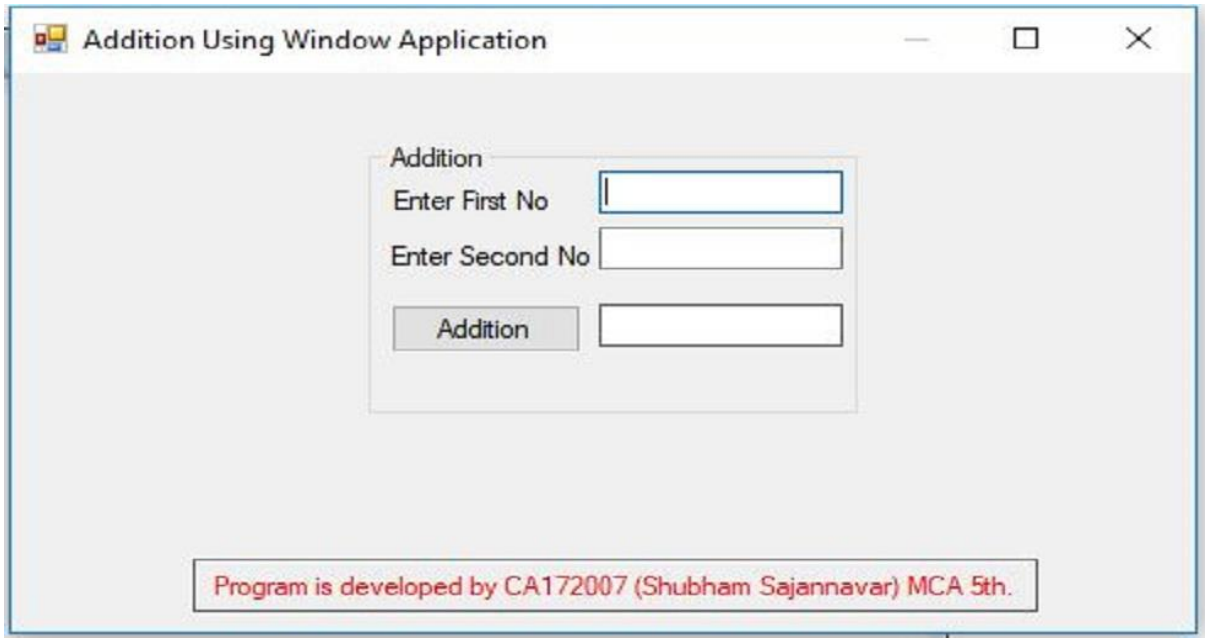

file:///C:/Users/CA172007/Desktop/Github/mcav/Natural_Number/Natural_Number/bin/Debug/Natural_Number.EXE
First 10 Natural Numbers
1
2
3
4
5
6
7
8
9
10
Addition of above numbers are : 55
* Program is developed by CA172007 (Shubham Sajannavar) MCA 5th. *

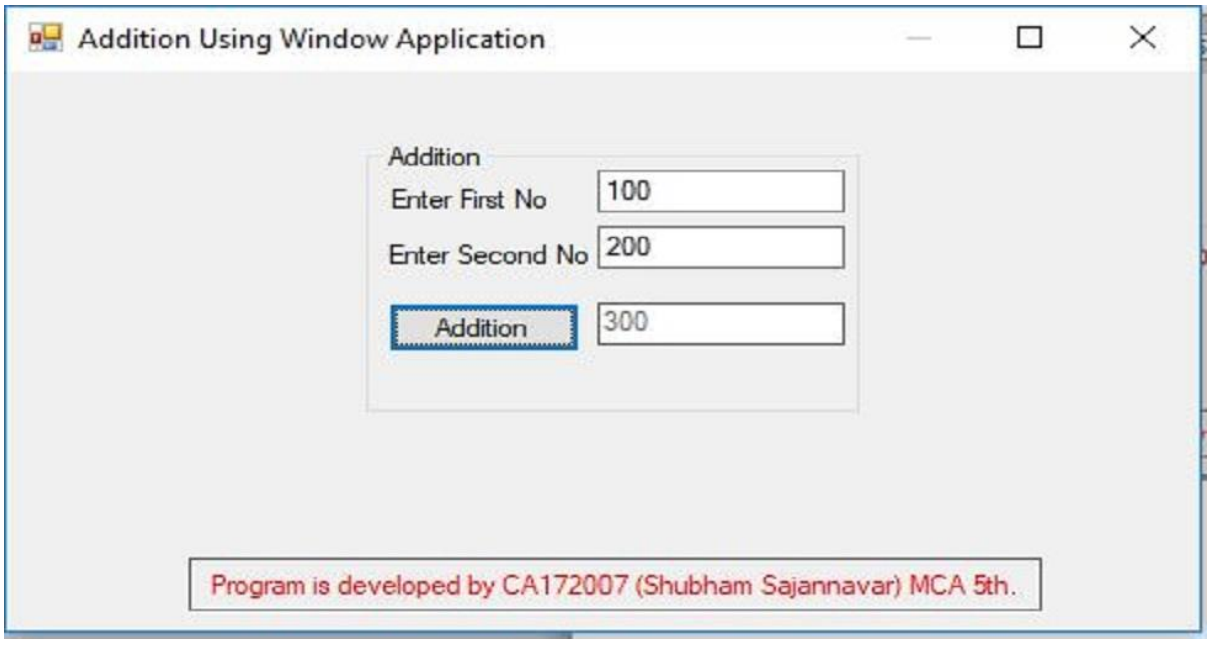
## 2) Program to display the addition using the windows application.

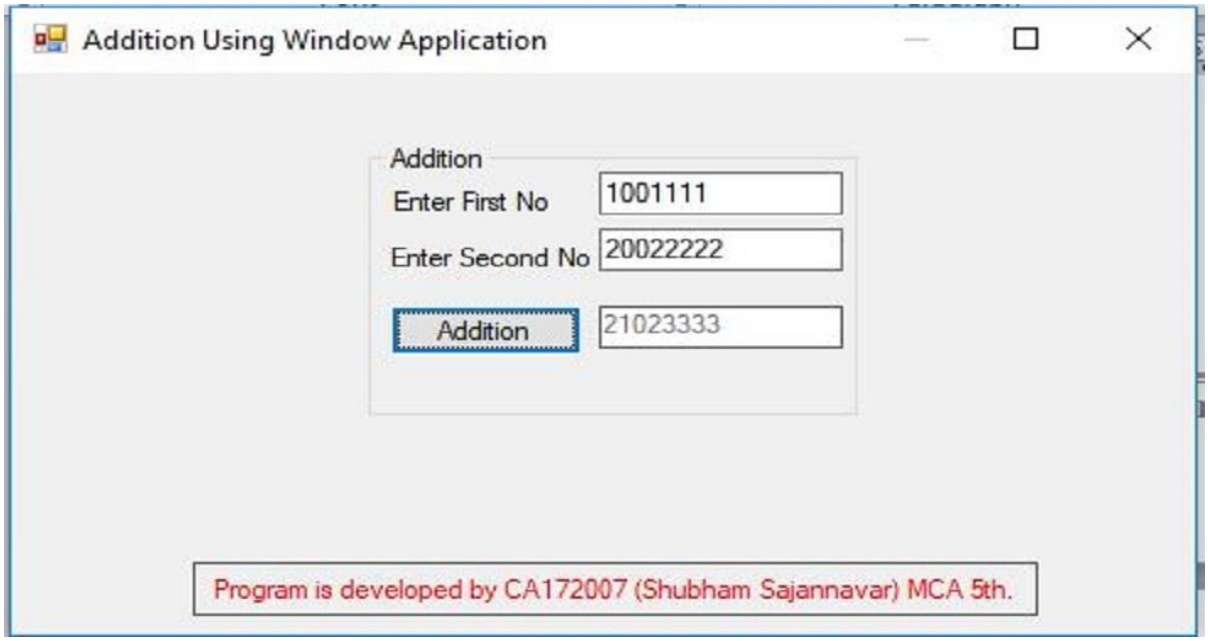
```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Windows.Forms;

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

      private void button1_Click(object sender, EventArgs e)
      {
         try
         {
            int a = Convert.ToInt32(textBox1.Text);
            int b = Convert.ToInt32(textBox2.Text);
            int c = a + b;
            label3.Text = ("Addition of " + a + " and " + b + " is " + c);
         }
         catch (Exception ex) {
            MessageBox.Show("Enter valid Numbers"+ex);
            label3.Text=("Enter valid Numbers");
         }
      }
```

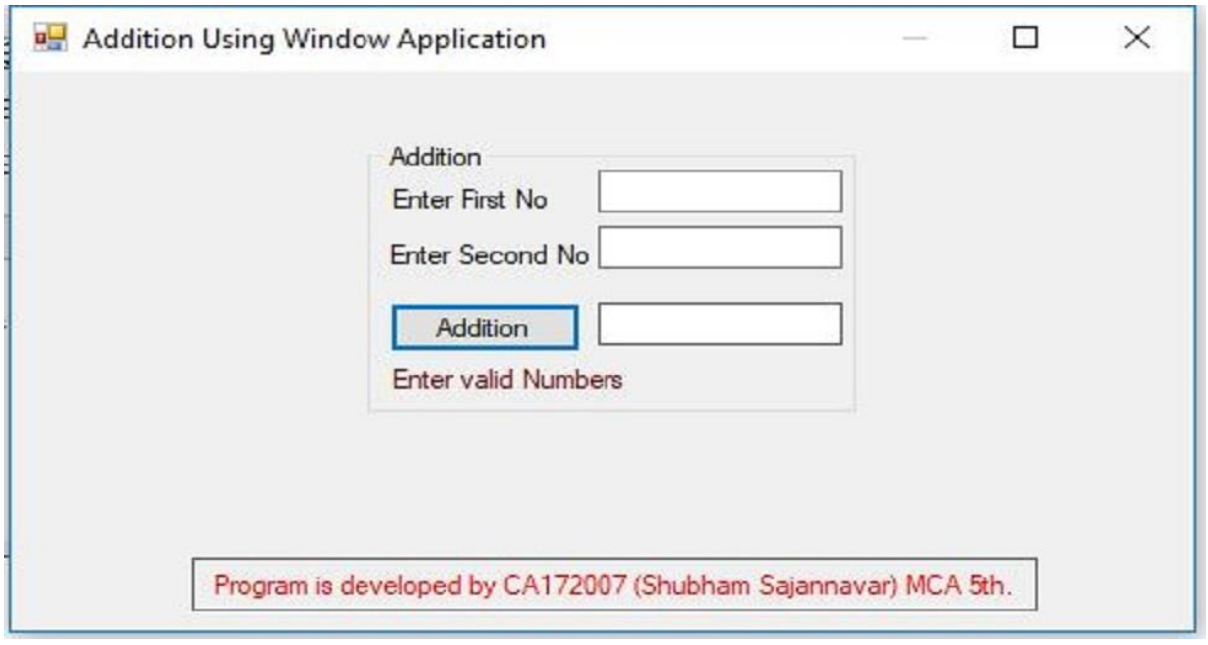
```
        private void Form1_Load(object sender, EventArgs e)
        {
            label3.ForeColor = Color.Maroon;
            label4.ForeColor = Color.Red;
            label3.Text = "Output will be display here";
            label4.Text = "Program is developed by CA172007 \n(Shubham Sajannavar) MCA 5th.";
        }
    }
}
```

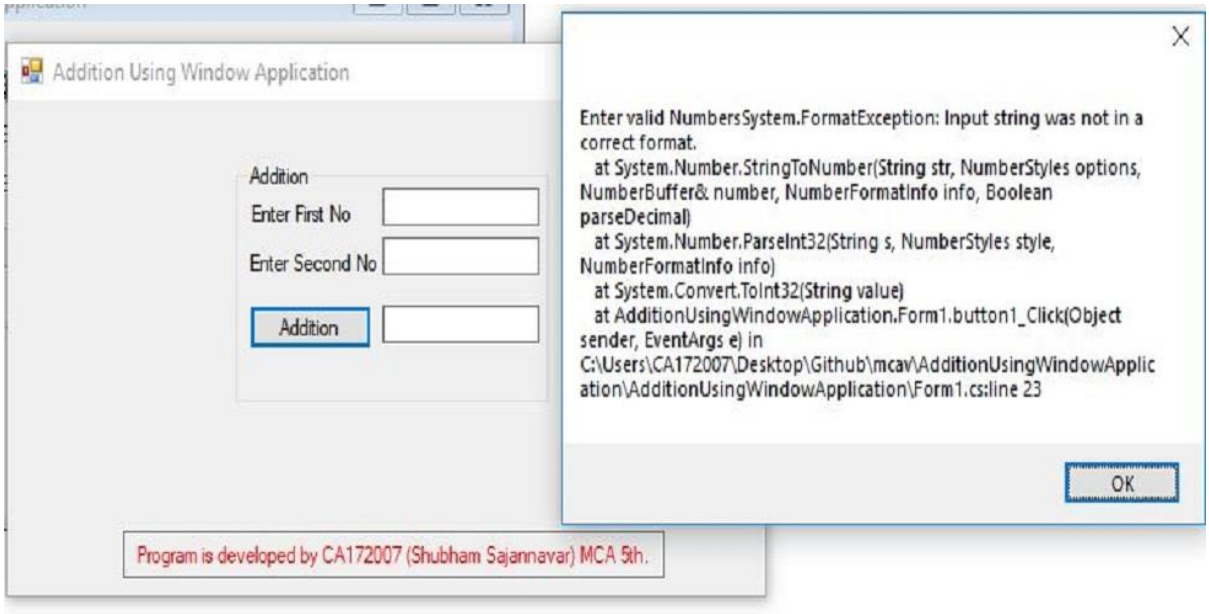
**OUTPUT**


Addition Using Window Application
Addition
Enter First No
Enter Second No
Addition
Program is developed by CA172007 (Shubham Sajannavar) MCA 5th.


Addition Using Window Application
Addition
Enter First No
100
Enter Second No
200
Addition
300
Program is developed by CA172007 (Shubham Sajannavar) MCA 5th.


Addition Using Window Application
Addition
Enter First No
1001111
Enter Second No
20022222
Addition
21023333
Program is developed by CA172007 (Shubham Sajannavar) MCA 5th.

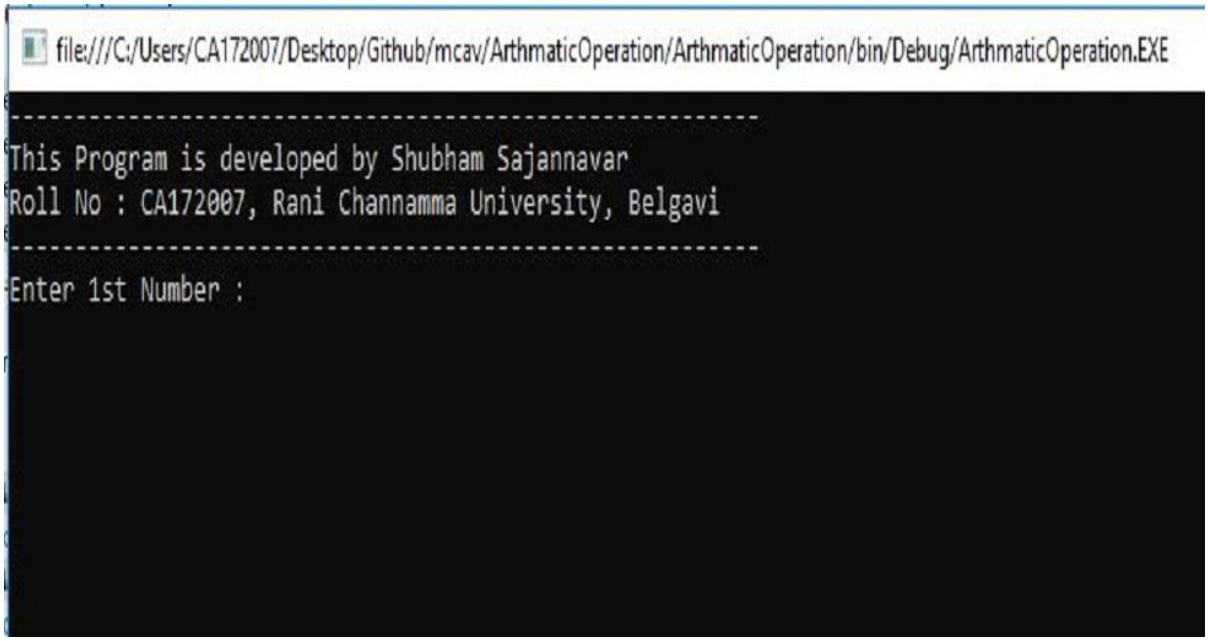

Addition Using Window Application
Addition
Enter First No
Enter Second No
Addition
Enter valid Numbers
Program is developed by CA172007 (Shubham Sajannavar) MCA 5th.

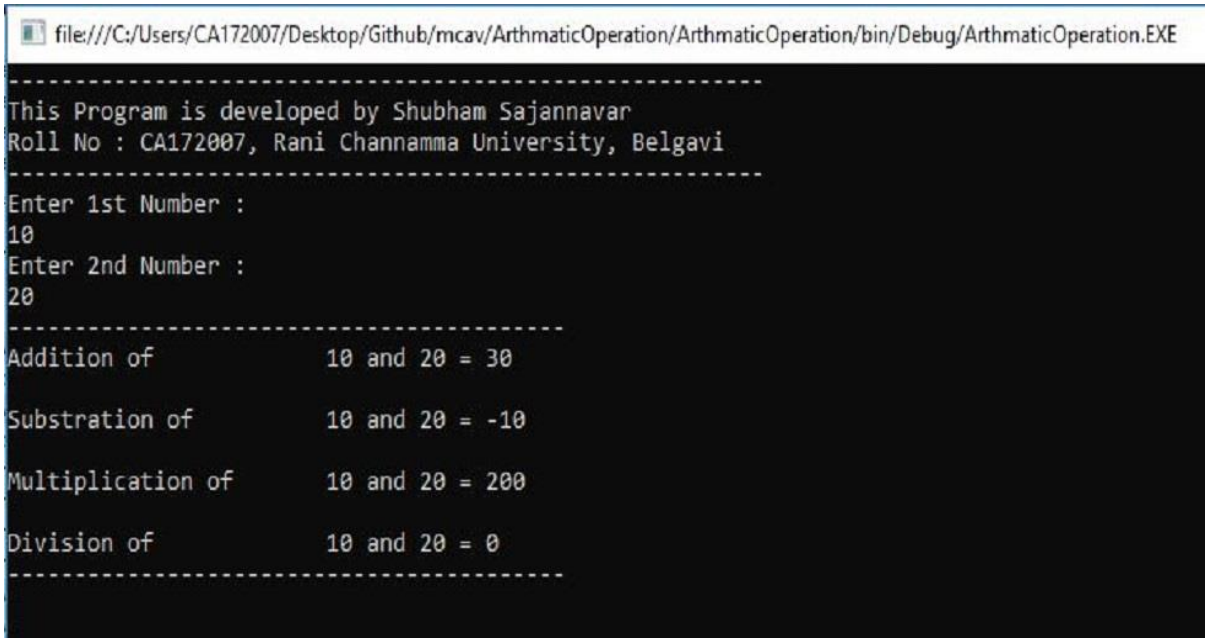

Addition Using Window Application
Addition
Enter First No
Enter Second No
Addition
Program is developed by CA172007 (Shubham Sajannavar) MCA 5th.
Enter valid NumbersSystem.FormatException: Input string was not in a correct format.
at System.Number.StringToNumber(String str, NumberStyles options, NumberBuffer& number, NumberFormatInfo info, Boolean parseDecimal)
at System.Number.ParseInt32(String s, NumberStyles style, NumberFormatInfo info)
at System.Convert.ToInt32(String value)
at AdditionUsingWindowApplication.Form1.button1_Click(Object sender, EventArgs e) in C:\Users\CA172007\Desktop\Github\mcav\AdditionUsingWindowApplication\AdditionUsingWindowApplication\Form1.cs:line 23
OK

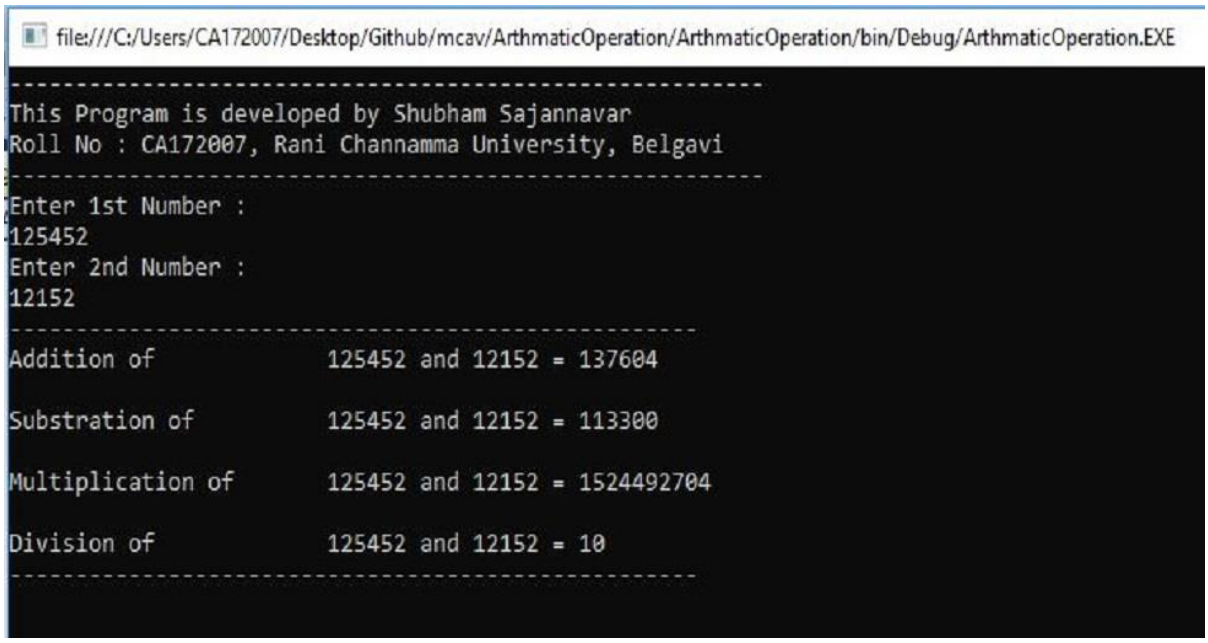
## 3) Program to display the addition, subtraction, multiplication and division of two number using console applications.

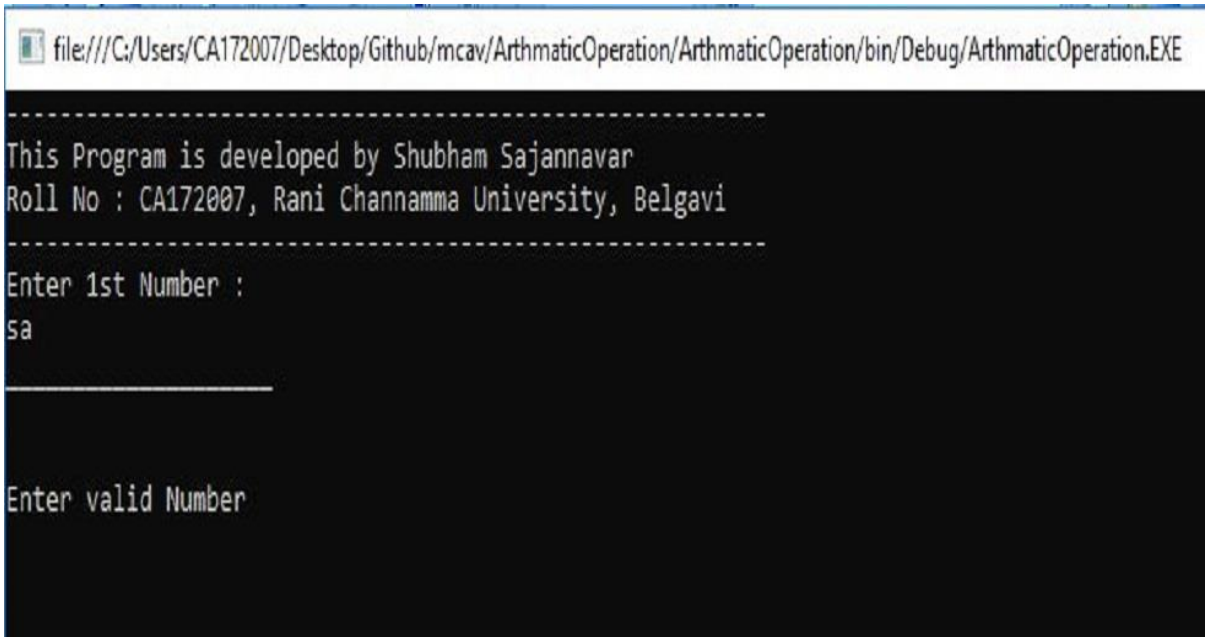
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

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  " +num1 + " and " + num2 + " = " + add);
            Console.WriteLine("\nSubstration of " + num1 + " and " + num2 + " = " + sub);
            Console.WriteLine("Multiplication of " +num1+ " and " + num2 + " = " + mul);
            Console.WriteLine("\nDivision of \t\t" + num1 + " and " + num2 + " = " + div);
         }
         catch (Exception ex) {
            Console.WriteLine("Enter valid Number");
         }
            Console.ReadKey();

      }
   }
}
```

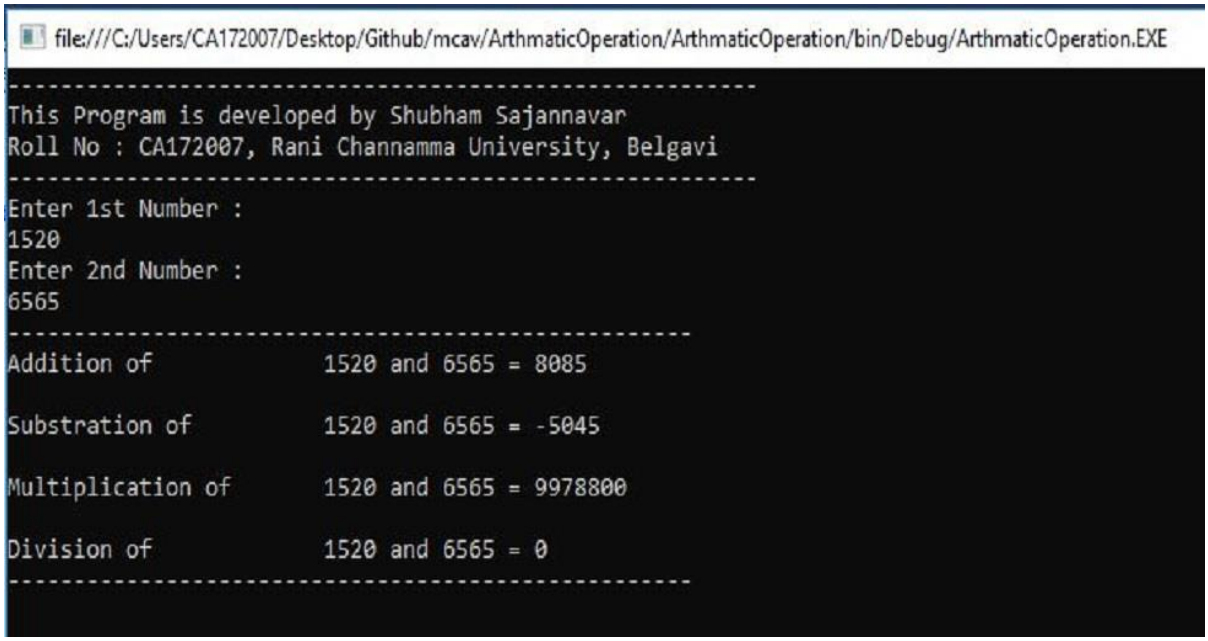
**OUTPUT**


file:///C:/Users/CA172007/Desktop/Github/mcav/ArthmaticOperation/ArthmaticOperation/bin/Debug/ArthmaticOperation.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 1st Number :


file:///C:/Users/CA172007/Desktop/Github/mcav/ArthmaticOperation/ArthmaticOperation/bin/Debug/ArthmaticOperation.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, 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/CA172007/Desktop/Github/mcav/ArthmaticOperation/ArthmaticOperation/bin/Debug/ArthmaticOperation.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 1st Number :
125452
Enter 2nd Number :
12152
Addition of 125452 and 12152 = 137604
Substration of 125452 and 12152 = 113300
Multiplication of 125452 and 12152 = 1524492704
Division of 125452 and 12152 = 10

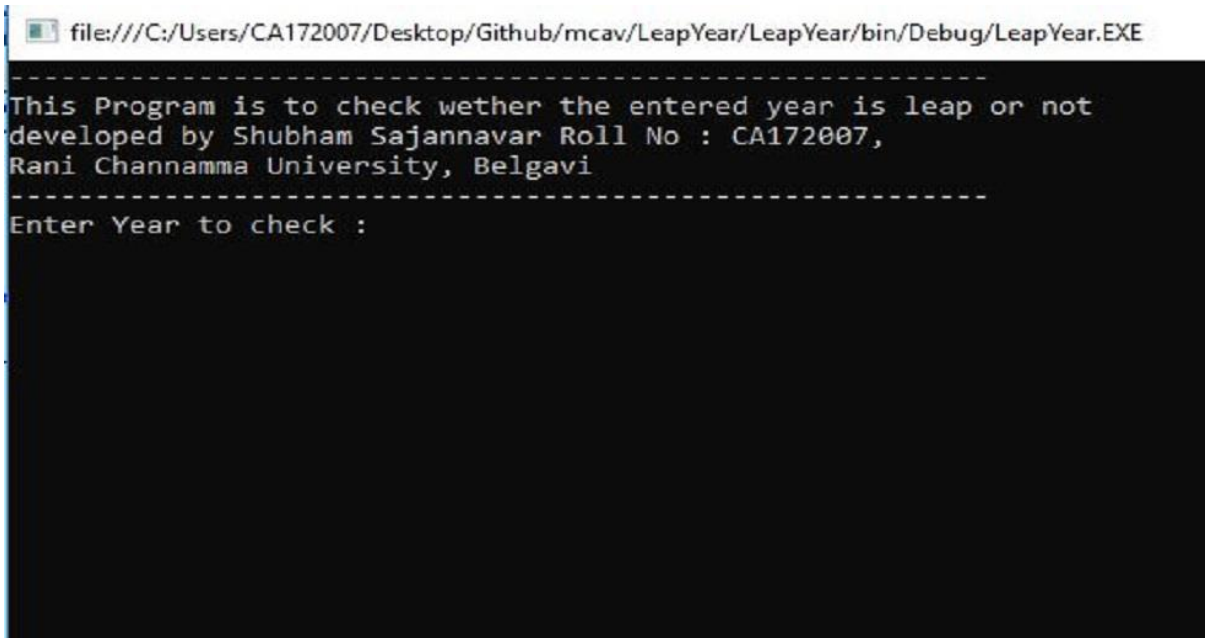

file:///C:/Users/CA172007/Desktop/Github/mcav/ArthmaticOperation/ArthmaticOperation/bin/Debug/ArthmaticOperation.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 1st Number :
sa
Enter valid Number

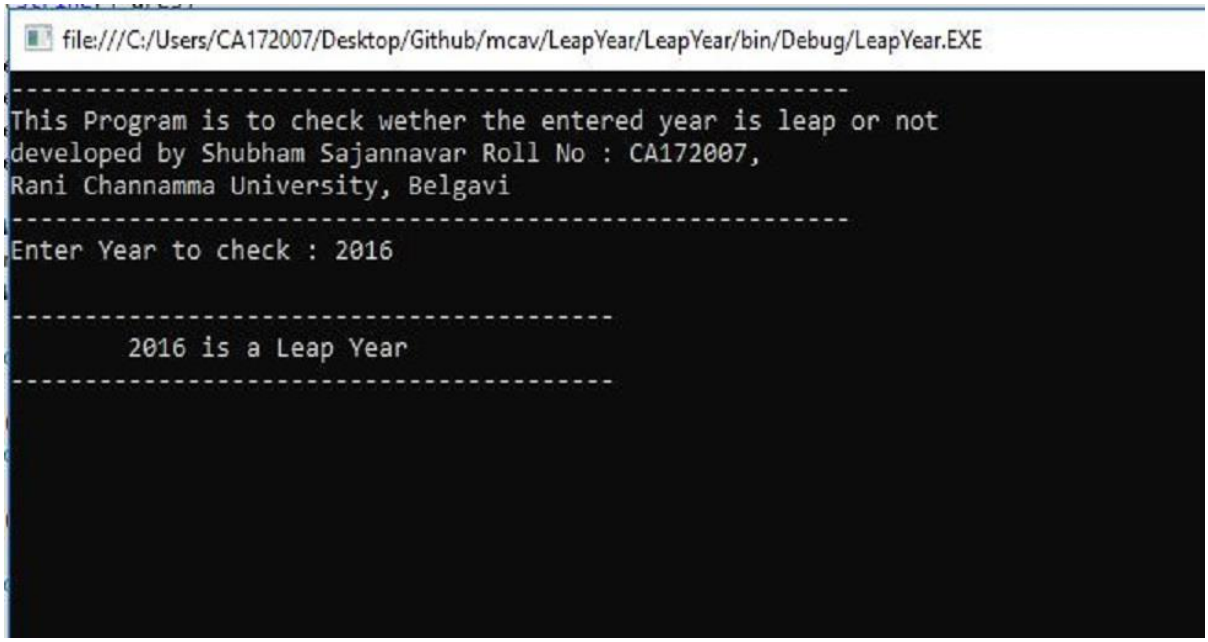

file:///C:/Users/CA172007/Desktop/Github/mcav/ArthmaticOperation/ArthmaticOperation/bin/Debug/ArthmaticOperation.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 1st Number :
1520
Enter 2nd Number :
6565
Addition of 1520 and 6565 = 8085
Substration of 1520 and 6565 = -5045
Multiplication of 1520 and 6565 = 9978800
Division of 1520 and 6565 = 0

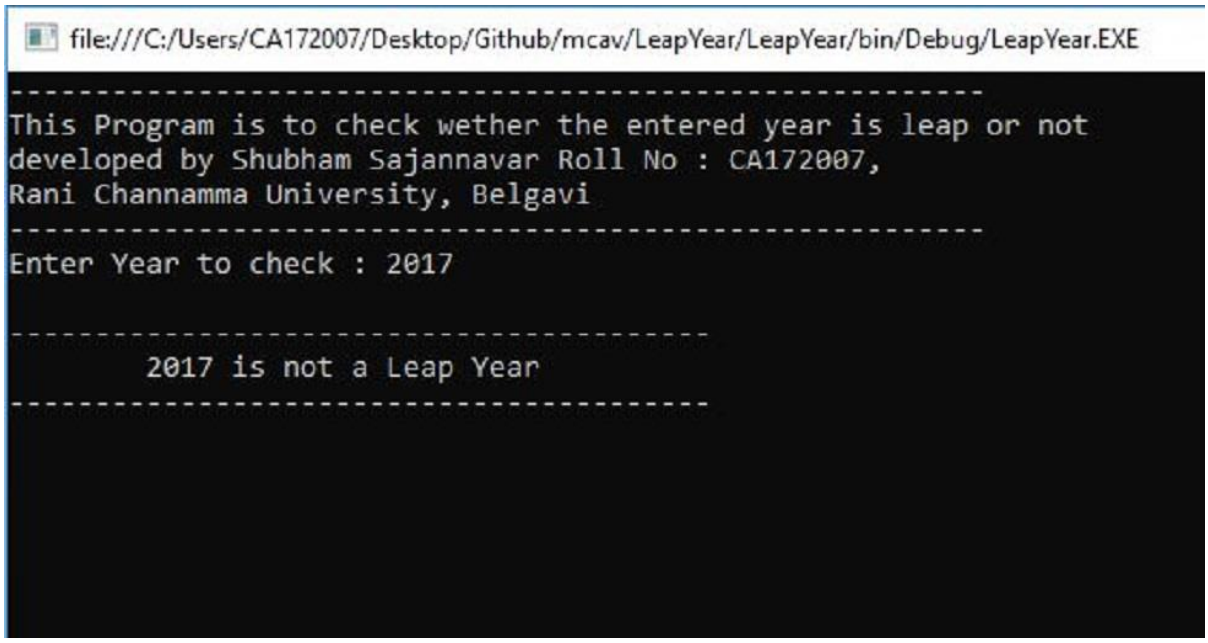
## 4) Check whether the Entered Year is a Leap or Not.

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

namespace LeapYear
{
   class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("------------------------------------------------------------");
         Console.WriteLine("This Program is to check for the leap year");
         Console.WriteLine("Developed by Shubham Sajannavar Roll No : CA172007,");
         Console.WriteLine("Rani Channamma University, Belgavi");
         Console.WriteLine("------------------------------------------------------------");
         try {
            Console.Write("Enter Year to check : ");
            long year = Convert.ToInt64(Console.ReadLine());
            Console.WriteLine("\n----------------------------------------");
            if (year % 400 == 0) {
               Console.WriteLine("\t{0} is a Leap Year",year);
            }
            else if (year % 100 == 0) {
               Console.WriteLine("\t{0} is not a Leap Year", year);
            }
            else if (year % 4 == 0)
            {
               Console.WriteLine("\t{0} is a Leap Year", year);
            }
            else {
               Console.WriteLine("\t{0} is not a Leap Year", year);
            }
         }
         catch(Exception ex) {
            Console.WriteLine("Enter valid year");
         }
         Console.WriteLine("----------------------------------------");
         Console.ReadKey();
      }
   }
}
```

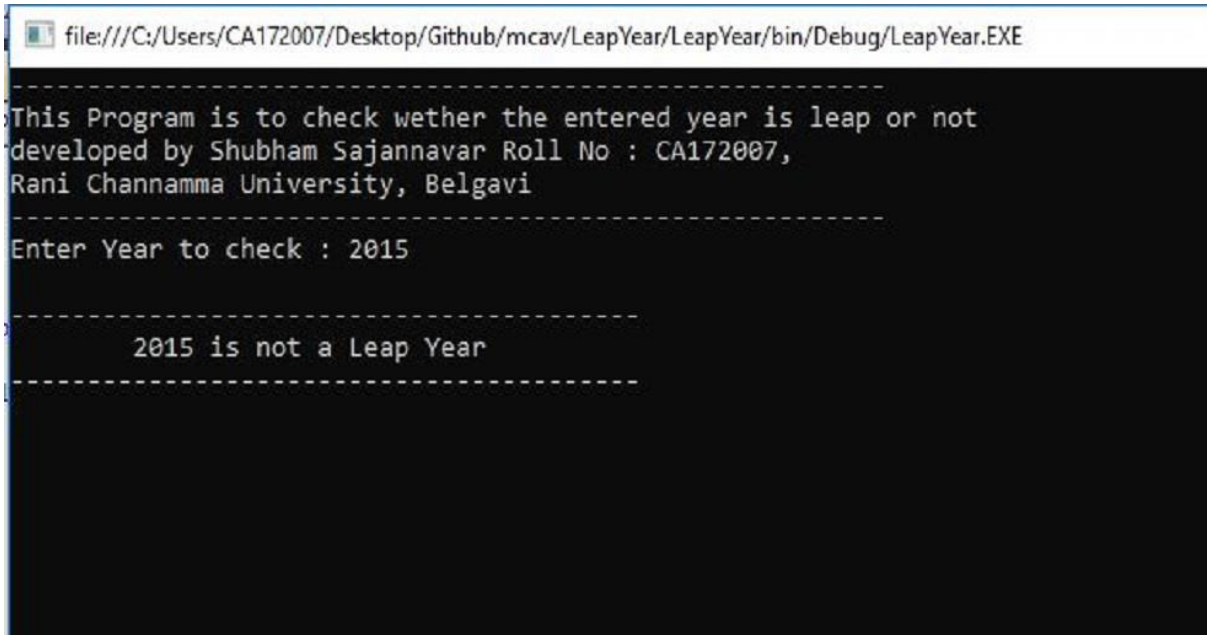
**OUTPUT**


file:///C:/Users/CA172007/Desktop/Github/mcav/LeapYear/LeapYear/bin/Debug/LeapYear.EXE
This Program is to check wether the entered year is leap or not
developed by Shubham Sajannavar Roll No : CA172007,
Rani Channamma University, Belgavi
Enter Year to check :


file:///C:/Users/CA172007/Desktop/Github/mcav/LeapYear/LeapYear/bin/Debug/LeapYear.EXE
This Program is to check wether the entered year is leap or not
developed by Shubham Sajannavar Roll No : CA172007,
Rani Channamma University, Belgavi
Enter Year to check : 2016
2016 is a Leap Year


file:///C:/Users/CA172007/Desktop/Github/mcav/LeapYear/LeapYear/bin/Debug/LeapYear.EXE
This Program is to check wether the entered year is leap or not
developed by Shubham Sajannavar Roll No : CA172007,
Rani Channamma University, Belgavi
Enter Year to check : 2017
2017 is not a Leap Year


file:///C:/Users/CA172007/Desktop/Github/mcav/LeapYear/LeapYear/bin/Debug/LeapYear.EXE
This Program is to check wether the entered year is leap or not
developed by Shubham Sajannavar Roll No : CA172007,
Rani Channamma University, Belgavi
Enter Year to check : asdf
Enter valid year

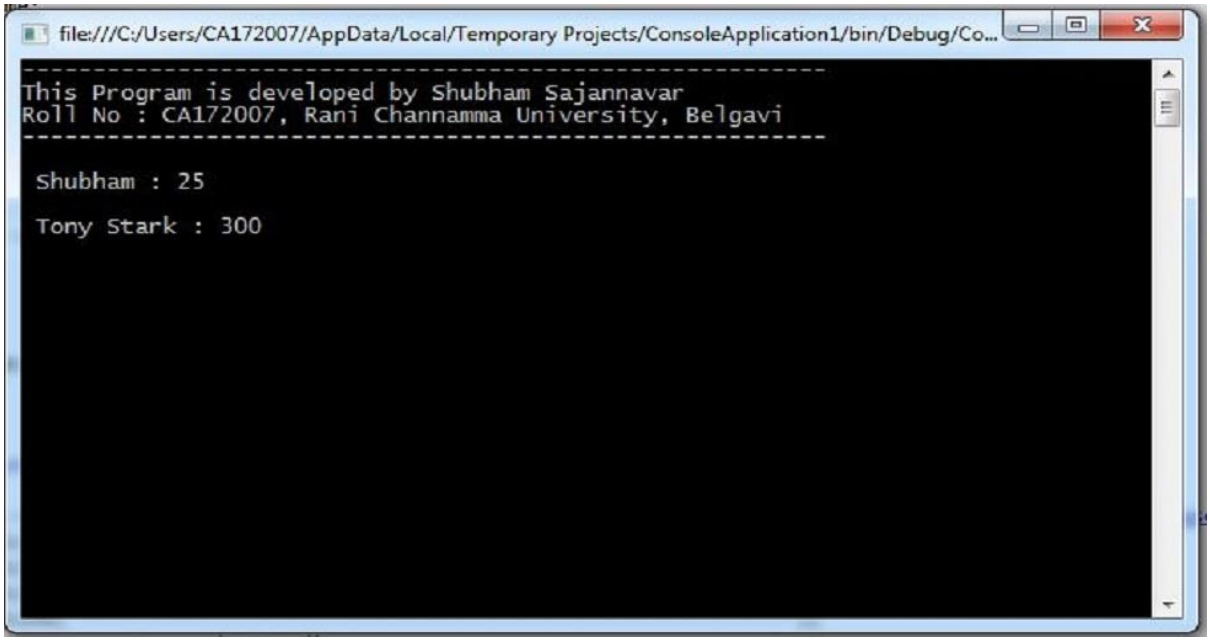

file:///C:/Users/CA172007/Desktop/Github/mcav/LeapYear/LeapYear/bin/Debug/LeapYear.EXE
This Program is to check wether the entered year is leap or not
developed by Shubham Sajannavar Roll No : CA172007,
Rani Channamma University, Belgavi
Enter Year to check : 2015
2015 is not a Leap Year

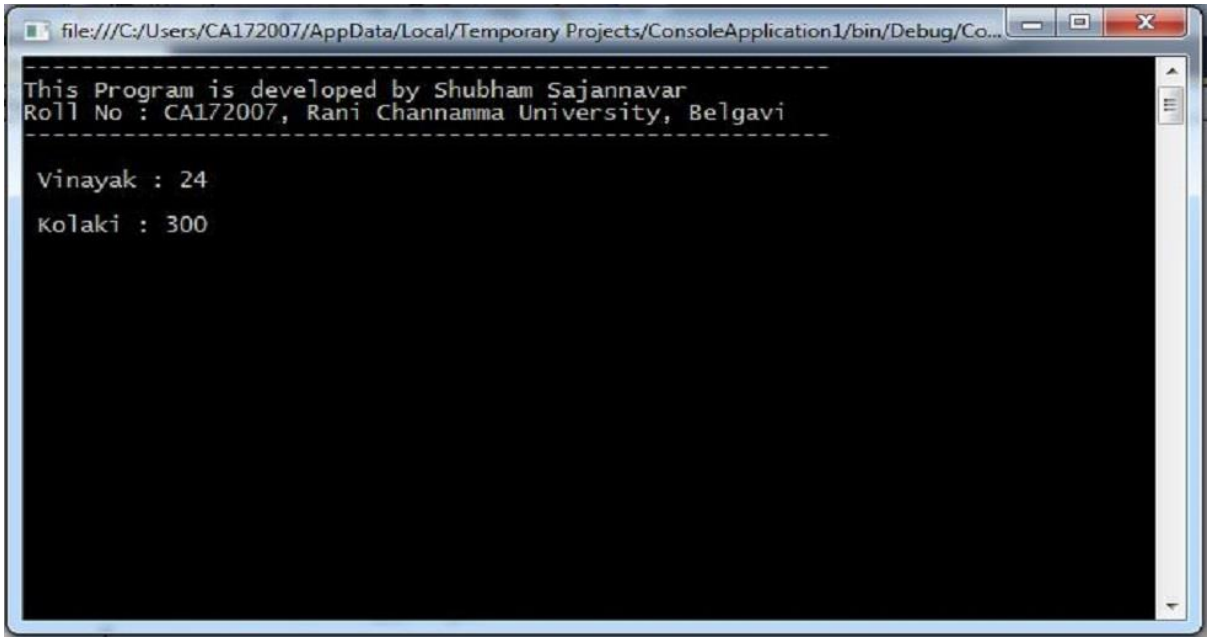
## 5) Program to illustrate the use of different properties in C#.

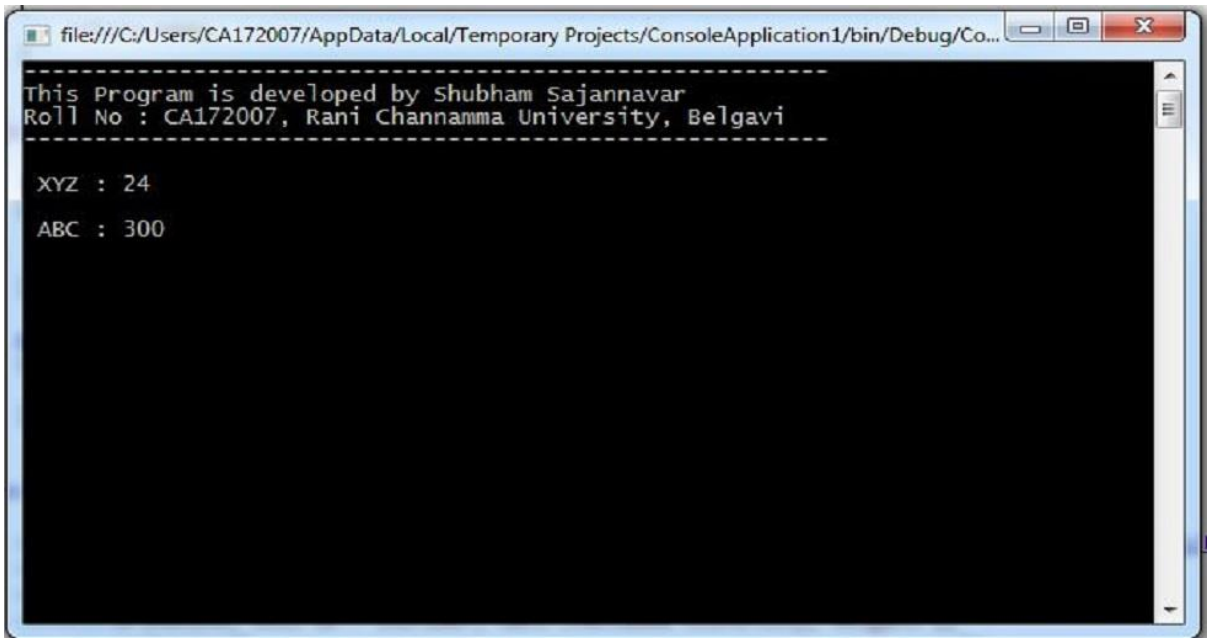
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ConsoleApplication1
{
   class Program
   {
      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;
            }
         }
```

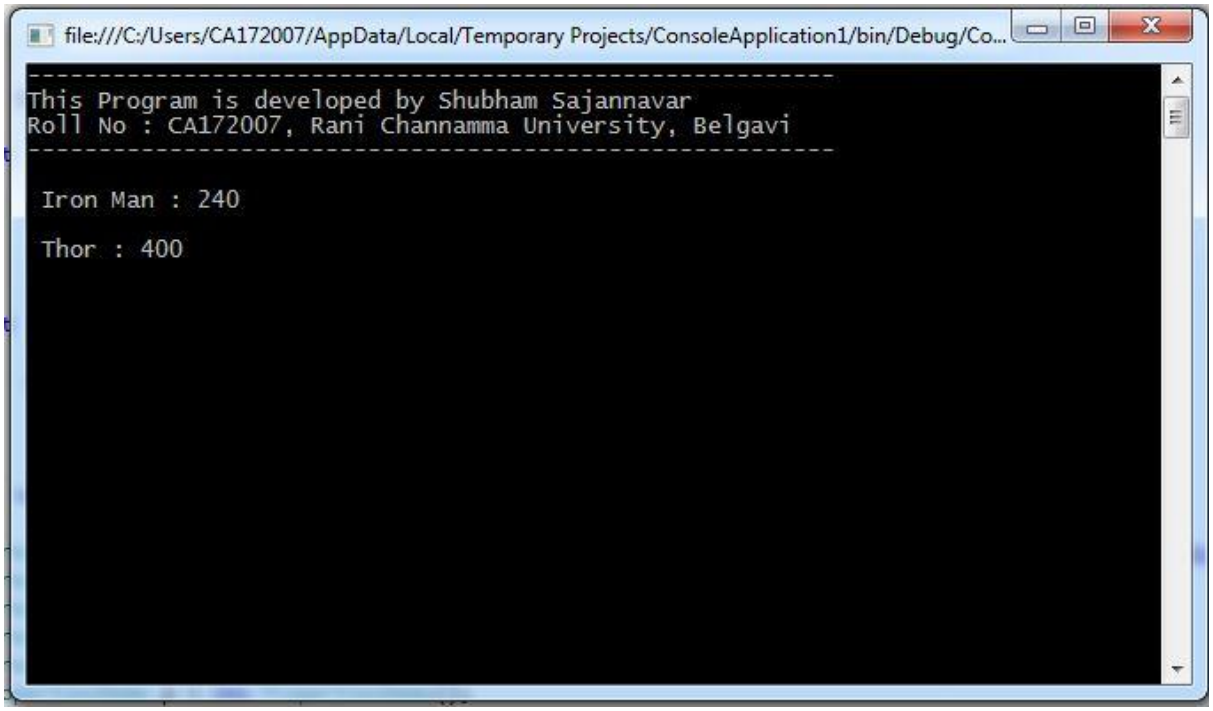
```
        static void Main(string[] args)
        {
            Console.WriteLine("-----------------------------------------------------------");
            Console.WriteLine("This Program is developed by Shubham Sajannavar");
            Console.WriteLine("Roll No : CA172007, Rani Channamma University,
            Belgavi");
            Console.WriteLine("-----------------------------------------------------------");
            PropertiesDemo p = new PropertiesDemo();
            p.Name = "John";
            p.Age = 12;

            PropertiesDemo d = new PropertiesDemo();
            d.Name = "Rohn";
            d.Age = 14;

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

            Console.ReadLine();

        }
    }
  }
}
```

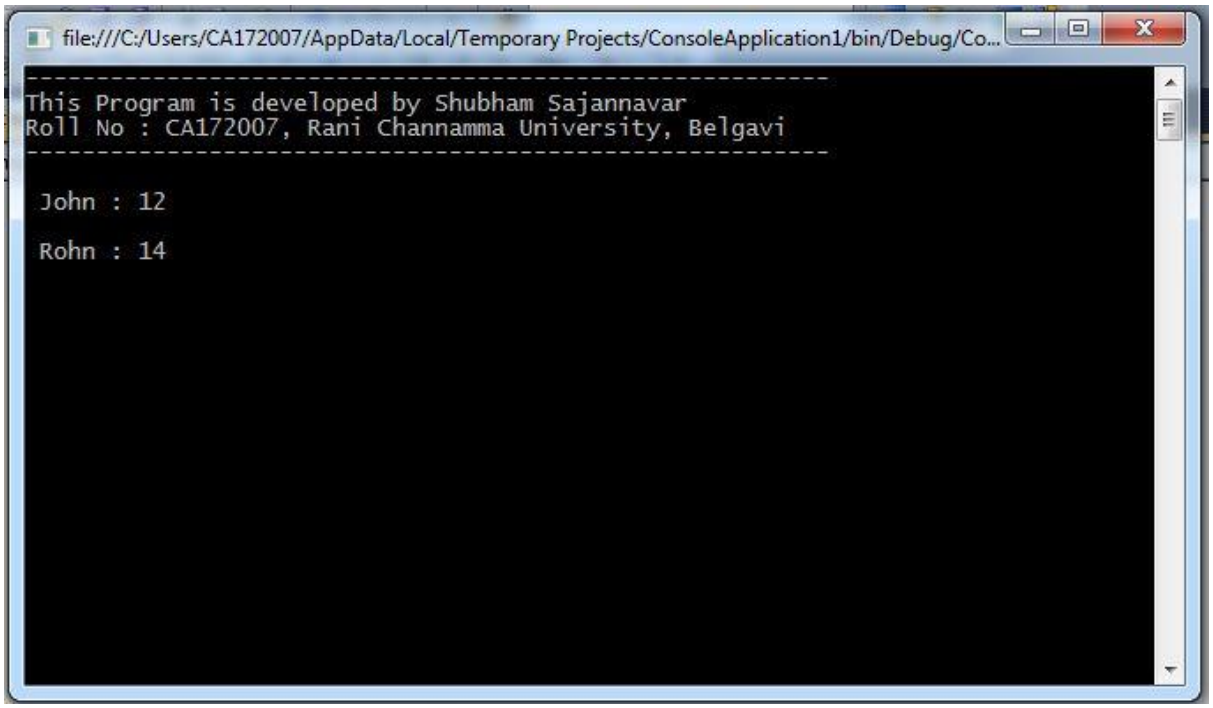
**OUTPUT**


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Shubham : 25
Tony Stark : 300


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Vinayak : 24
Kolaki : 300


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
XYZ : 24
ABC : 300

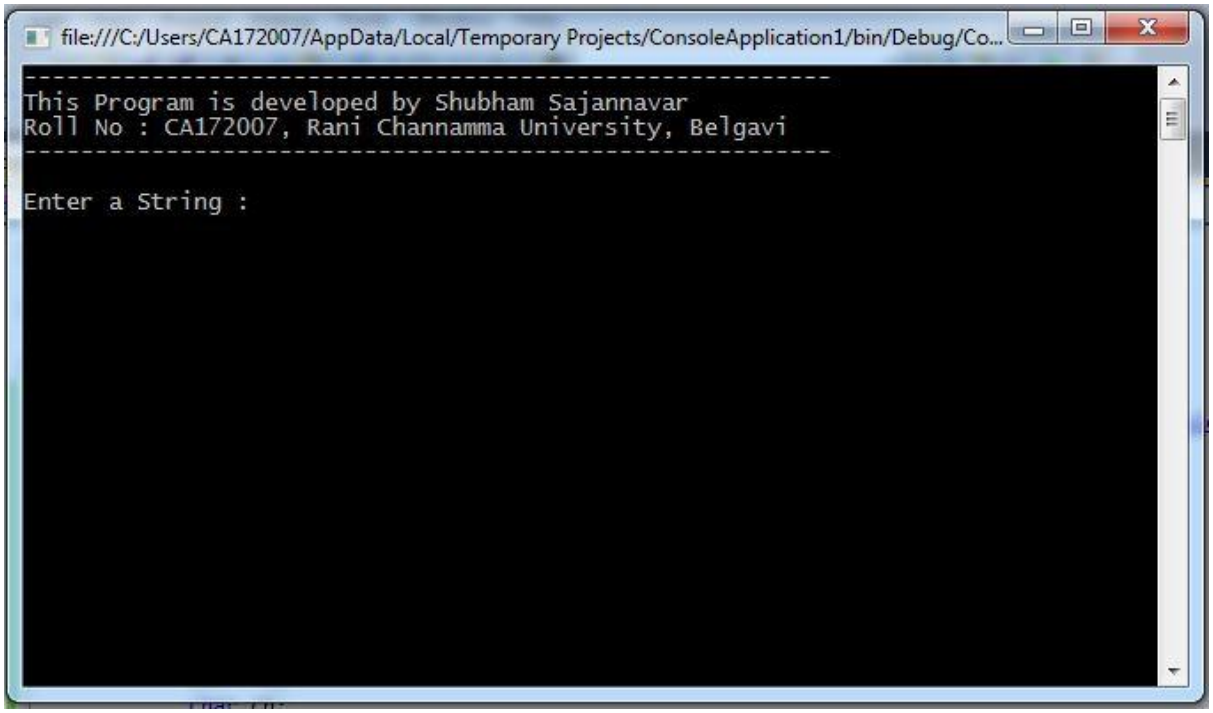

file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Iron Man : 240
Thor : 400

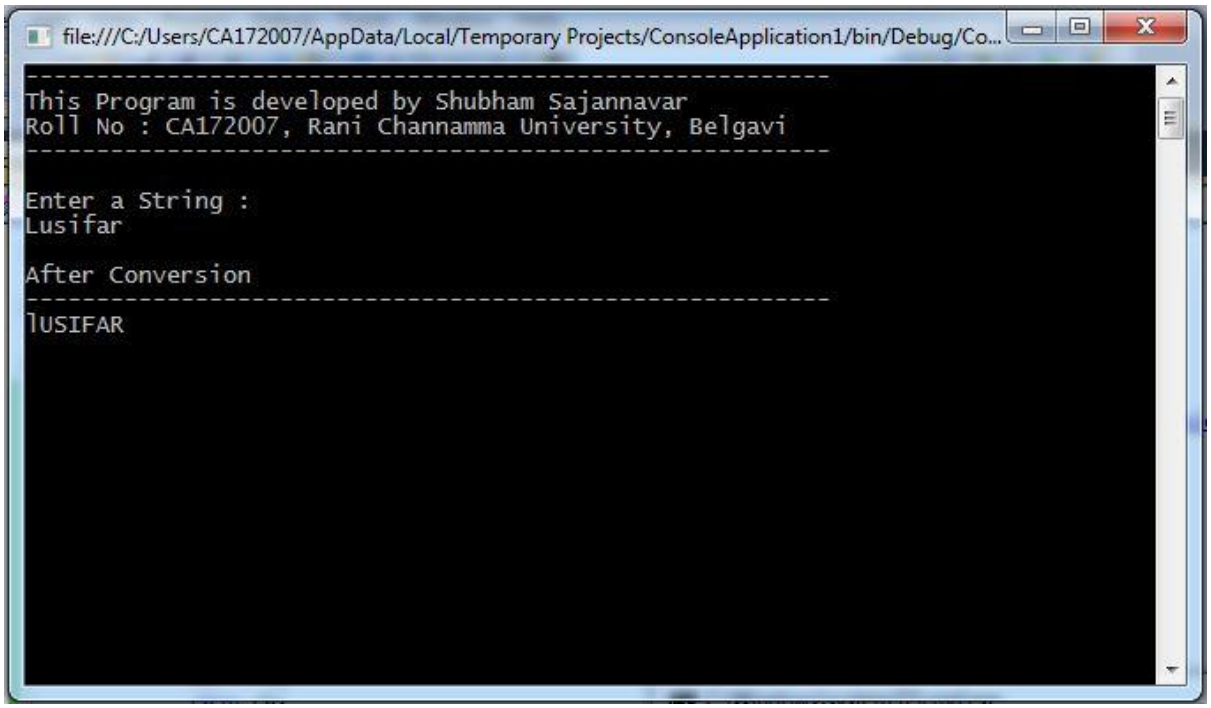

file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
John : 12
Rohn : 14

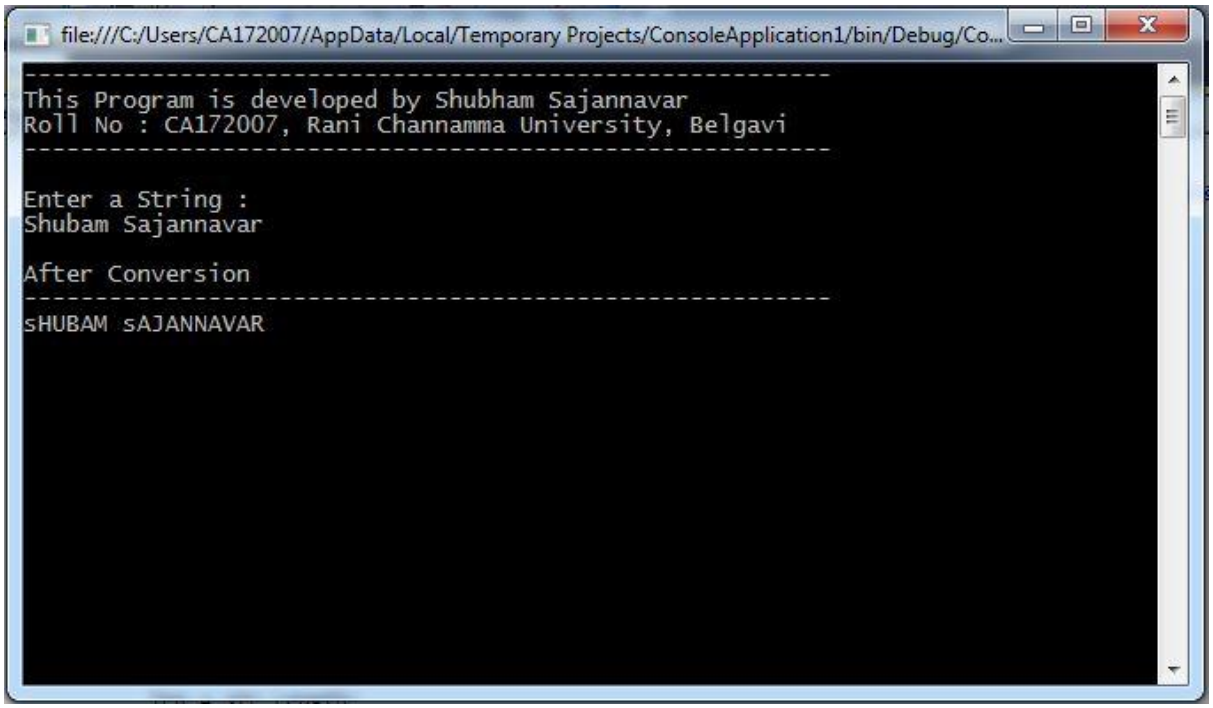
## 6) Write a program to convert input string from lower to upper and upper to lower case.

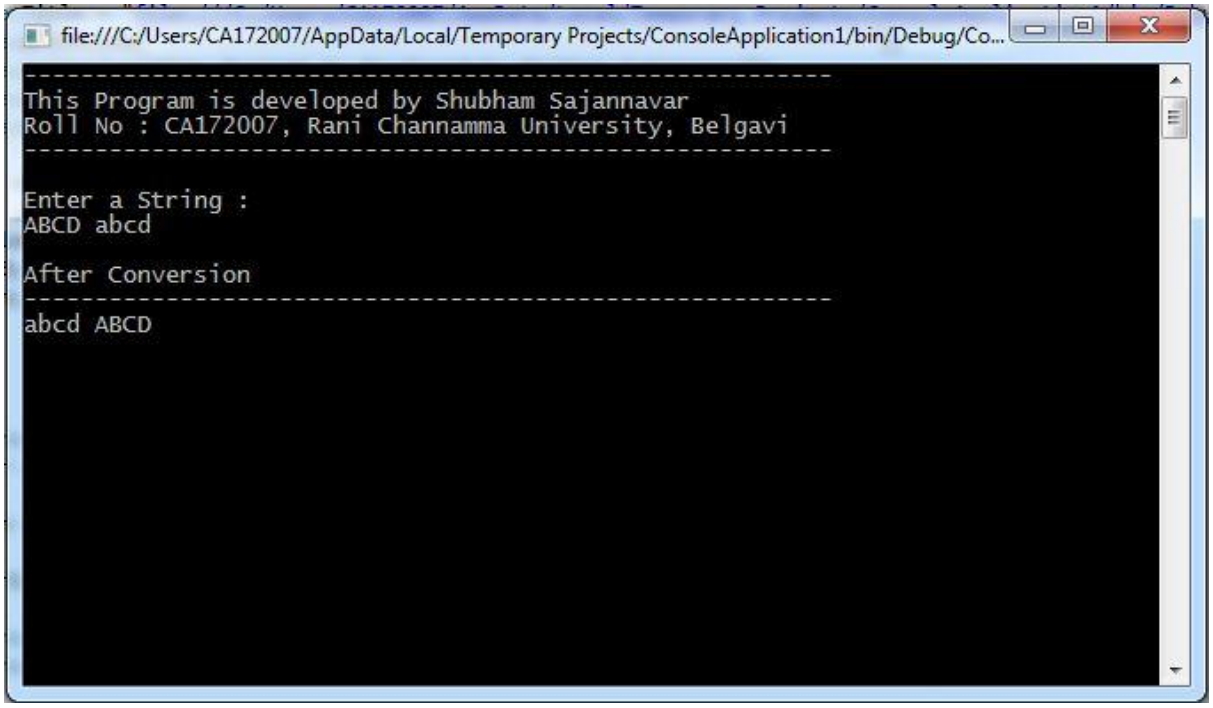
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ConsoleApplication1
{
   class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("------------------------------------------------------------");
         Console.WriteLine("This Program is developed by Shubham Sajannavar");
         Console.WriteLine("Roll No : CA172007, Rani Channamma University,
         Belgavi");
         Console.WriteLine("------------------------------------------------------------");

         string str;
         char[] arr1;
         int i,len=0;
         char ch;

         Console.WriteLine("\nEnter a String :");
         str = Console.ReadLine();
         len = str.Length;
         arr1 = str.ToCharArray(0,len);
         Console.WriteLine("\nAfter Conversion");

         for (i = 0; i < len; i++) {
            ch=arr1[i];
            if(Char.IsLower(ch)){
               Console.Write(Char.ToUpper(ch));
            }else{
               Console.Write(Char.ToLower(ch));
            }
         }
         Console.ReadKey();
      }
   }
}
```

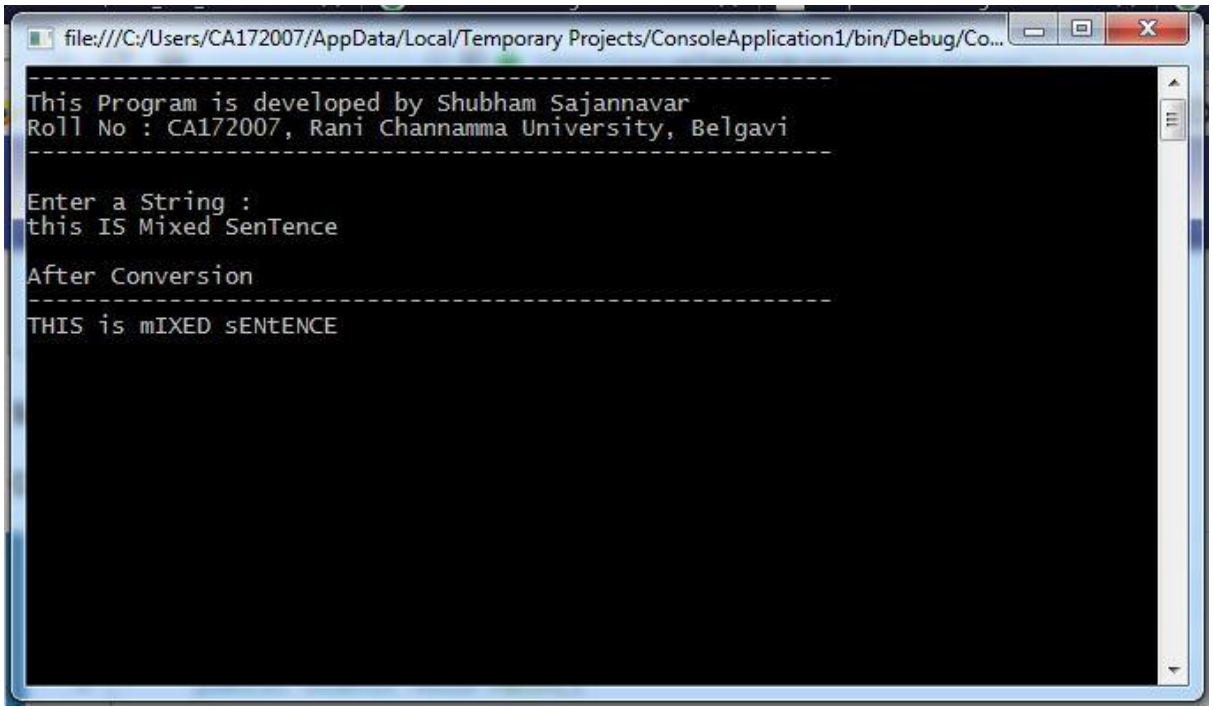
**OUTPUT**


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter a String :


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter a String :
Lusifar
After Conversion
lUSIFAR


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter a String :
Shubam Sajannavar
After Conversion
sHUBAM sAJANNAVAR

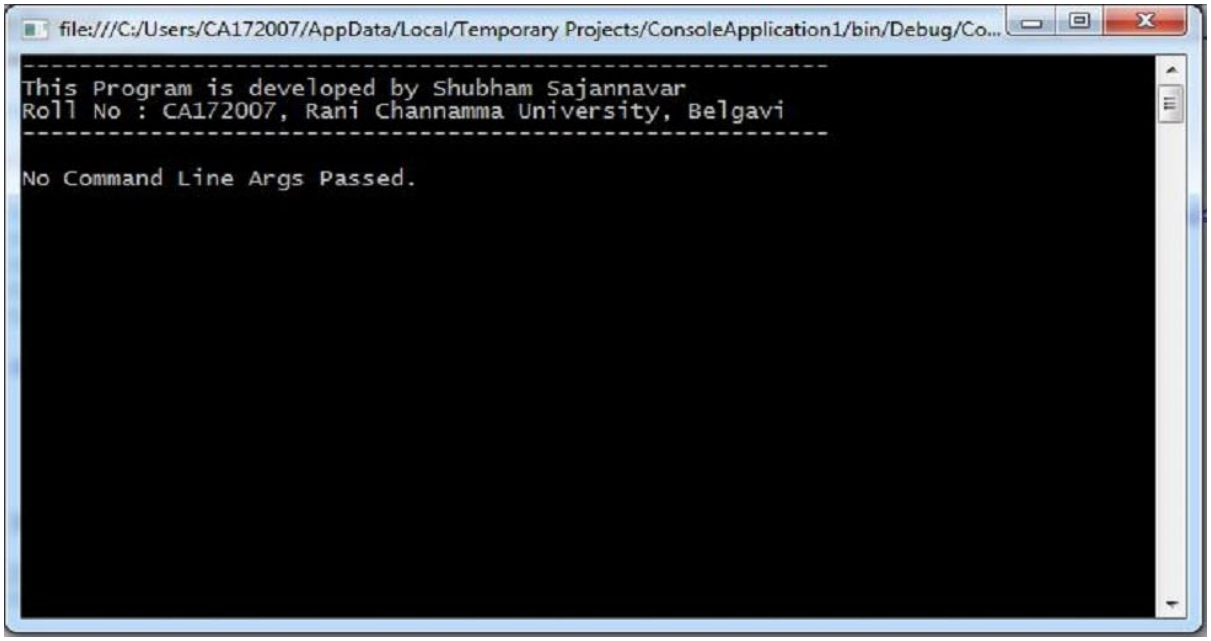

file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter a String :
ABCD abcd
After Conversion
abcd ABCD

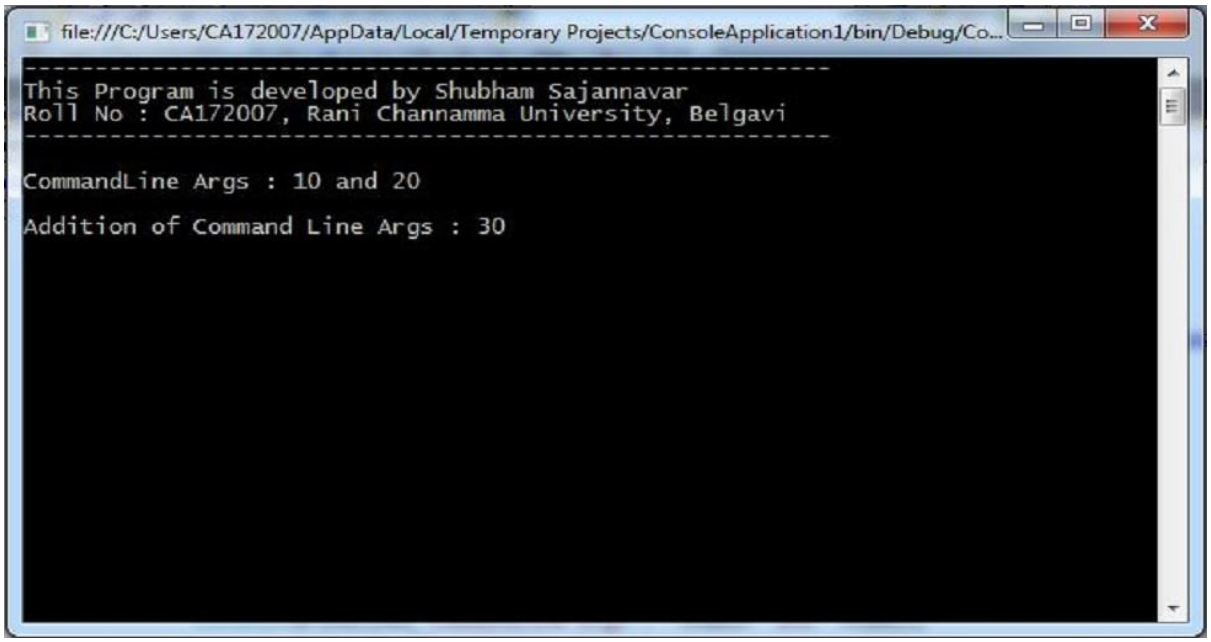

file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter a String :
this IS Mixed SenTence
After Conversion
THIS is mIXED sENtENCE

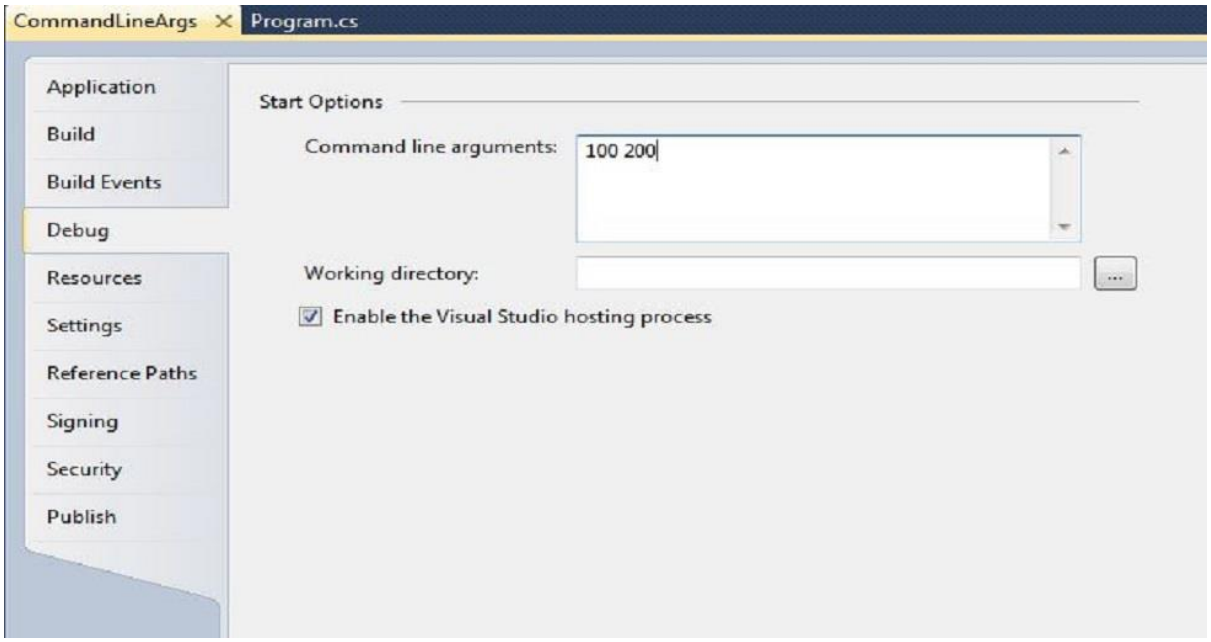
## 7) Demonstrate Command line arguments processing.

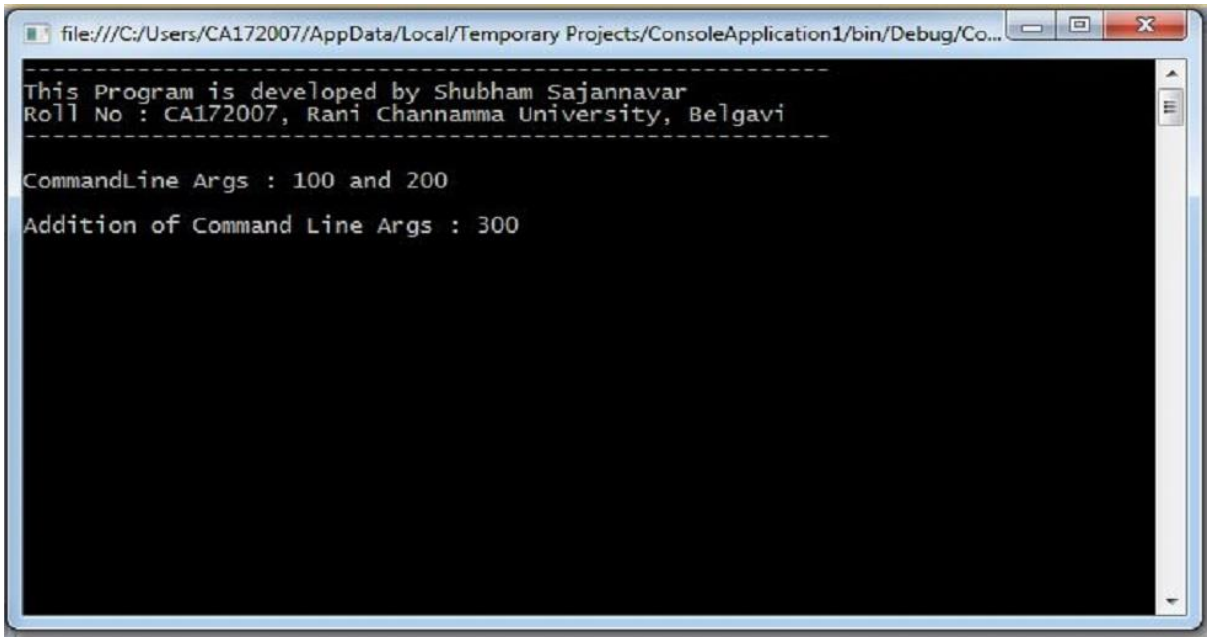
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace CommandLineArgs
{
   class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("------------------------------------------------------------");
         Console.WriteLine("This Program is developed by Shubham Sajannavar");
         Console.WriteLine("Roll No : CA172007, Rani Channamma University,
         Belgavi");
         Console.WriteLine("------------------------------------------------------------\n");
         try
         {
            if (args.Length >= 2)
            {
               int num1 = Int32.Parse(args[0]);
               int num2 = Int32.Parse(args[1]);
               int sum = num1 + num2;

               Console.WriteLine("CommandLine Args : " + num1 + " and " + num2);
               Console.WriteLine("\nAddition of Command Line Args : {0}", sum);
            }
            else
            {
               Console.WriteLine("No Command Line Args Passed.");
            }
         }
         catch (Exception ex) {
            Console.WriteLine("Invalid Args Passwd");
         }
         Console.ReadKey();
      }
   }
}
```

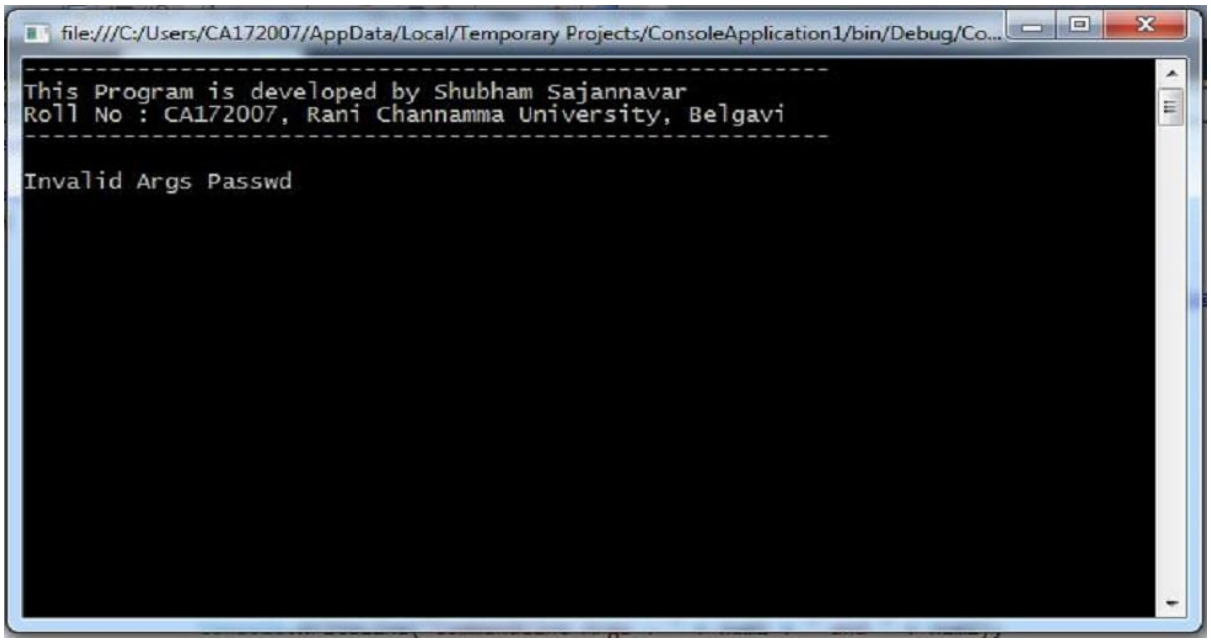
**OUTPUT**


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
No Command Line Args Passed.


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
CommandLine Args : 10 and 20
Addition of Command Line Args : 30


CommandLineArgs
Program.cs
Application
Build
Build Events
Debug
Resources
Settings
Reference Paths
Signing
Security
Publish
Start Options
Command line arguments:
100 200
Working directory:
...
Enable the Visual Studio hosting process

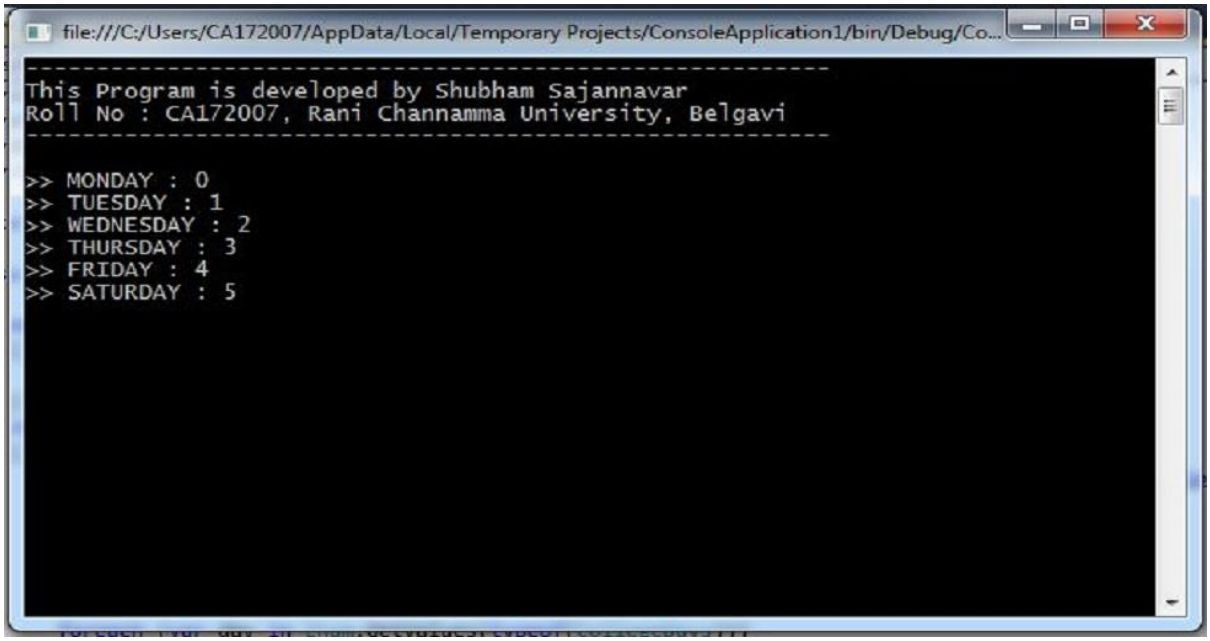

file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
CommandLine Args : 100 and 200
Addition of Command Line Args : 300


file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Invalid Args Passwd

**8) 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 Enumerations
{
   class Program
   {
      enum CollegeDays
      {
         MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY, SATURDAY
      }
      static void Main(string[] args)
      {
         Console.WriteLine("------------------------------------------------------------");
         Console.WriteLine("This Program is developed by Shubham Sajannavar");
         Console.WriteLine("Roll No : CA172007, Rani Channamma University,
         Belgavi");
         Console.WriteLine("------------------------------------------------------------\n");

         foreach (var day in Enum.GetValues(typeof(CollegeDays)))
         {
            Console.WriteLine(">> {0} : {1}", day, (int)day);
         }
         Console.ReadKey();
      }
   }
}
```

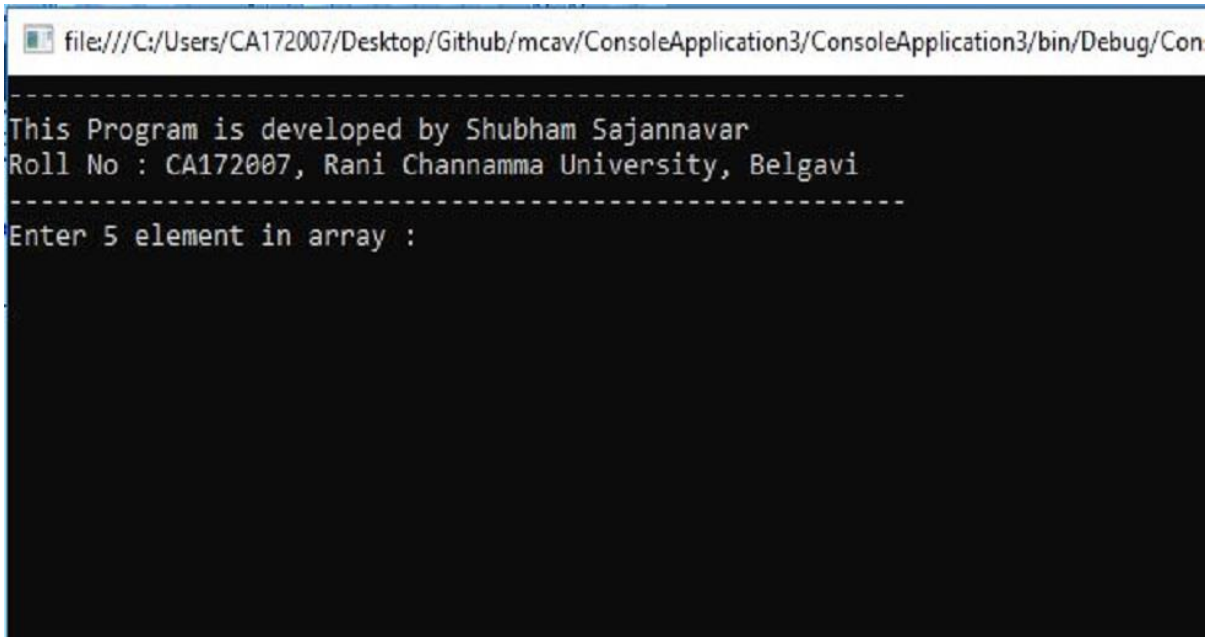
**OUTPUT**

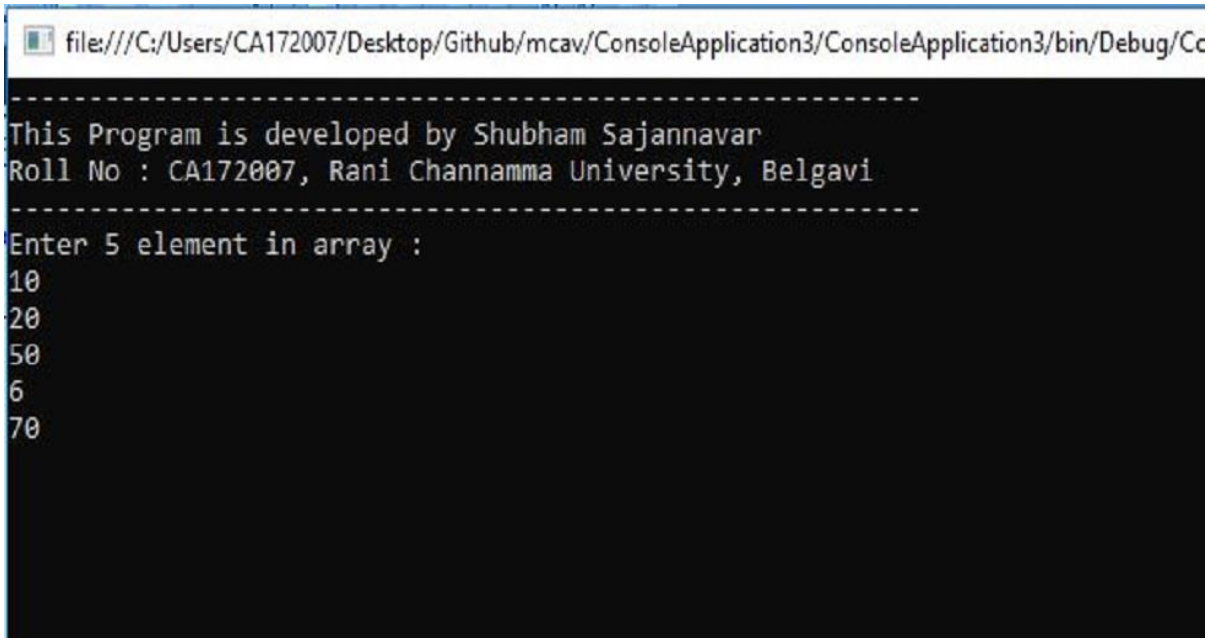

file:///C:/Users/CA172007/AppData/Local/Temporary Projects/ConsoleApplication1/bin/Debug/Co...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
>> MONDAY : 0
>> TUESDAY : 1
>> WEDNESDAY : 2
>> THURSDAY : 3
>> FRIDAY : 4
>> SATURDAY : 5

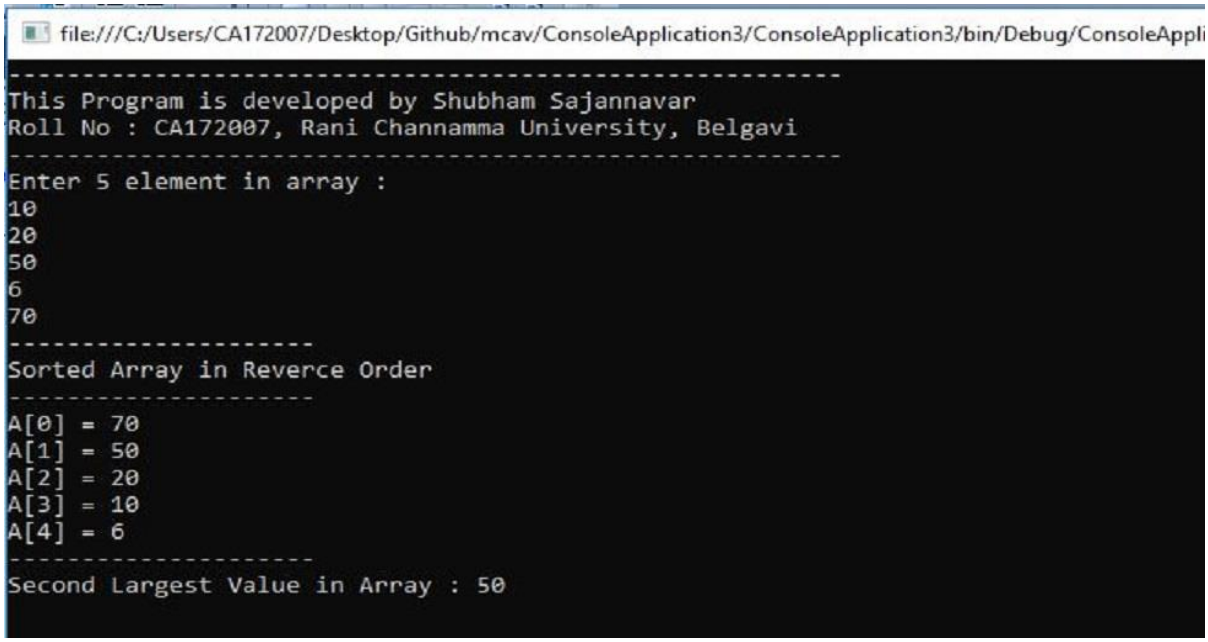
## 9) Find the second largest element in single dimensional array.

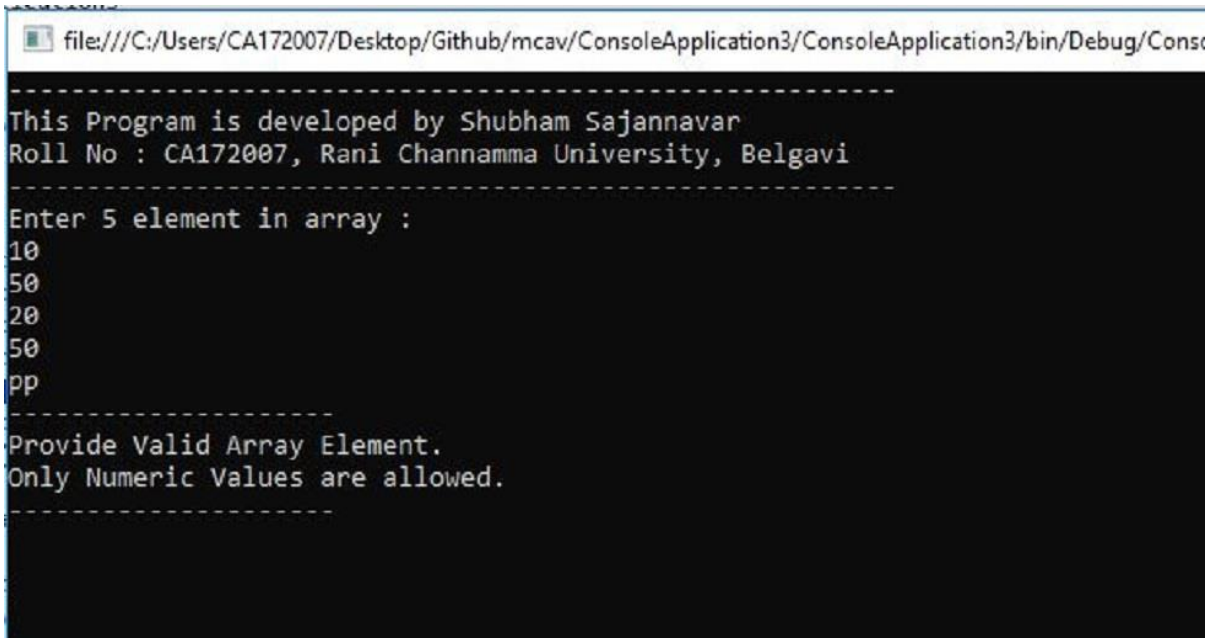
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ConsoleApplication3
{
   class Program
   {
      static void Main(string[] args)
      {
         try
         {
            Console.WriteLine("------------------------------------------------------------");
            Console.WriteLine("This Program is developed by Shubham Sajannavar");
            Console.WriteLine("Roll No : CA172007, Rani Channamma University,
            Belgavi");
            Console.WriteLine("------------------------------------------------------------");
            int[] arr = new int[5];
            Console.WriteLine("Enter 5 element in array : ");
            for (int i = 0; i < 5; i++)
            {
               arr[i] = int.Parse(Console.ReadLine());
            }
            Console.WriteLine("---------------------");
            Array.Sort(arr);
            Array.Reverse(arr);
            Console.WriteLine("Sorted Array in Reverce Order");
            for (int i = 0; i < 5; i++)
            {
               Console.WriteLine("A[" + i + "] = " + arr[i]);
            }
            Console.WriteLine("Second Largest Value in Array : " + arr[1]);
         }
         catch (Exception ex) {
            Console.WriteLine("Provide Valid Array Element.\nOnly Numeric Values are
            allowed.");
         }
         Console.ReadKey();
      }
   }
}
```

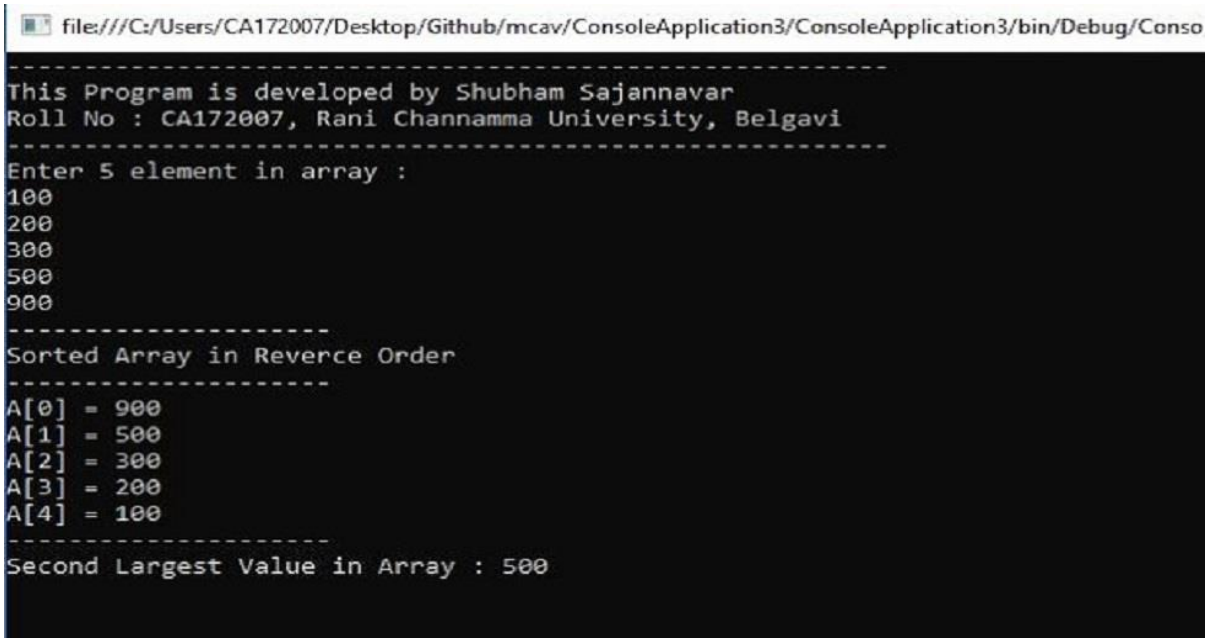
**OUTPUT**


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication3/ConsoleApplication3/bin/Debug/Con
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 5 element in array :


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication3/ConsoleApplication3/bin/Debug/Cc
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 5 element in array :
10
20
50
6
70


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication3/ConsoleApplication3/bin/Debug/ConsoleAppli
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 5 element in array :
10
20
50
6
70
Sorted Array in Reverce Order
A[0] = 70
A[1] = 50
A[2] = 20
A[3] = 10
A[4] = 6
Second Largest Value in Array : 50


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication3/ConsoleApplication3/bin/Debug/Conso
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 5 element in array :
10
50
20
50
pp
Provide Valid Array Element.
Only Numeric Values are allowed.


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication3/ConsoleApplication3/bin/Debug/Conso
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Enter 5 element in array :
100
200
300
500
900
Sorted Array in Reverce Order
A[0] = 900
A[1] = 500
A[2] = 300
A[3] = 200
A[4] = 100
Second Largest Value in Array : 500

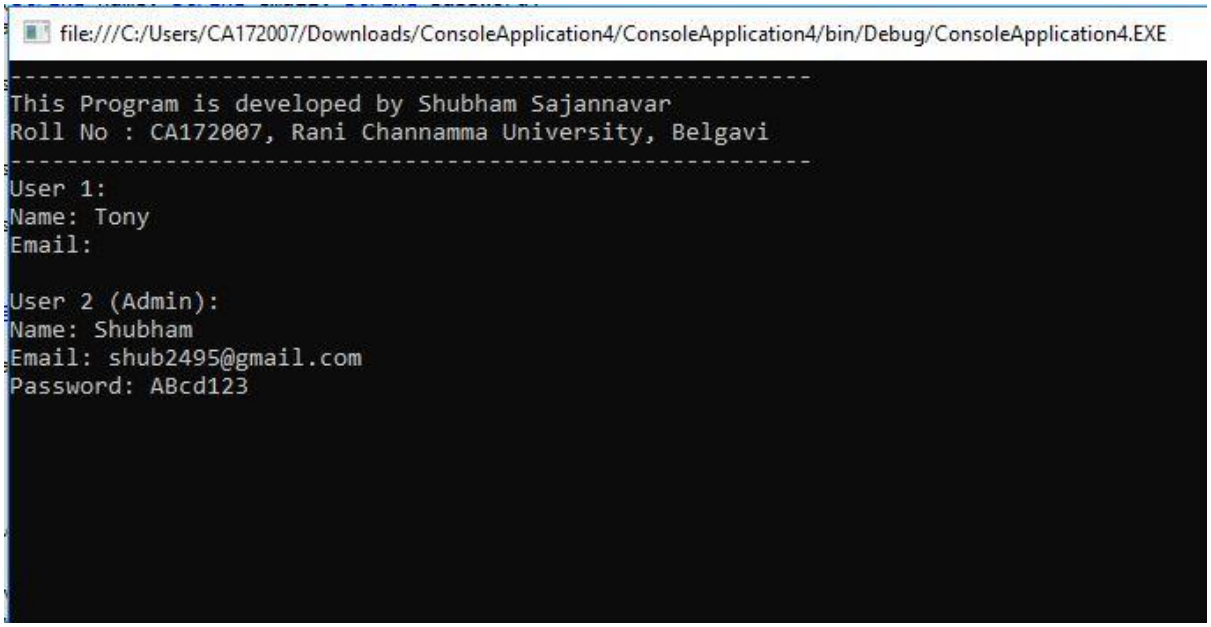
**10) Create classes, they are reference types in C# and hence are allocated on the heap. Classes provide object-oriented constructs such as encapsulation, polymorphism, and inheritance. For instance, the program should print John. Doe twice, illustrating that objects are reference types, allocated on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

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

namespace ConsoleApplication4
{
   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;
    }
}

class Program
{
    static void Main(string[] args)
    {
        Console.WriteLine("-----------------------------------------------------------");
        Console.WriteLine("This Program is developed by Shubham Sajannavar");
        Console.WriteLine("Roll No : CA172007, Rani Channamma University,
        Belgavi");

        User user1 = new User("Tony");
        Admin user2 = new Admin("Shubham", "shub2495@gmail.com", "Abcd123");

        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();
        }
    }
}
```

**OUTPUT**

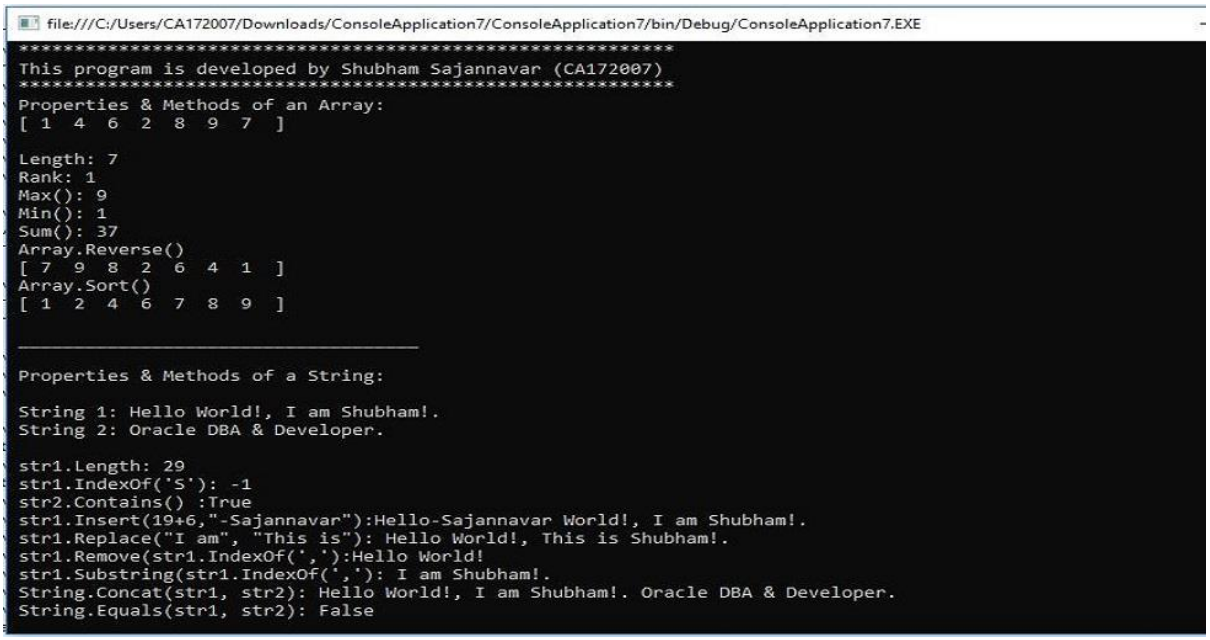

file:///C:/Users/CA172007/Downloads/ConsoleApplication4/ConsoleApplication4/bin/Debug/ConsoleApplication4.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
User 1:
Name: Tony
Email:
User 2 (Admin):
Name: Shubham
Email: shub2495@gmail.com
Password: ABcd123

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

```
using System;

namespace ProgramFour
{
   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("_____");
         Console.WriteLine();

         Console.WriteLine("Properties & Methods of a String: ");
         String str1 = "Hello World!, I am Shubham!. ";
         Console.WriteLine();
         String str2 = "Oracle DBA & Developer.";
         Console.WriteLine("String 1: {0}", str1);
         Console.WriteLine("String 2: {0}", str2);
         Console.WriteLine("str1.Length: {0}", str1.Length);
         Console.WriteLine("str1.IndexOf('S'): {0}", str1.IndexOf('B'));
         Console.WriteLine("str2.Contains() :{0}",str2.Contains("Developer"));
         Console.WriteLine("str1.Insert(19+6,\"-Sajannavar\"):{0}",
         str1.Insert(str1.IndexOf('J') + 6, "-Sajannavar"));
```

```
            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/CA172007/Downloads/ConsoleApplication7/ConsoleApplication7/bin/Debug/ConsoleApplication7.EXE
This program is developed by Shubham Sajannavar (CA172007)
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 Shubham!.
String 2: Oracle DBA & Developer.
str1.Length: 29
str1.IndexOf('S'): -1
str2.Contains() :True
str1.Insert(19+6,"-Sajannavar"):Hello-Sajannavar World!, I am Shubham!.
str1.Replace("I am", "This is"): Hello World!, This is Shubham!.
str1.Remove(str1.IndexOf(','):Hello World!
str1.Substring(str1.IndexOf(',') : I am Shubham!.
String.Concat(str1, str2): Hello World!, I am Shubham!. Oracle DBA & Developer.
String.Equals(str1, str2): False

## 12) Work with page using ASP.NET.

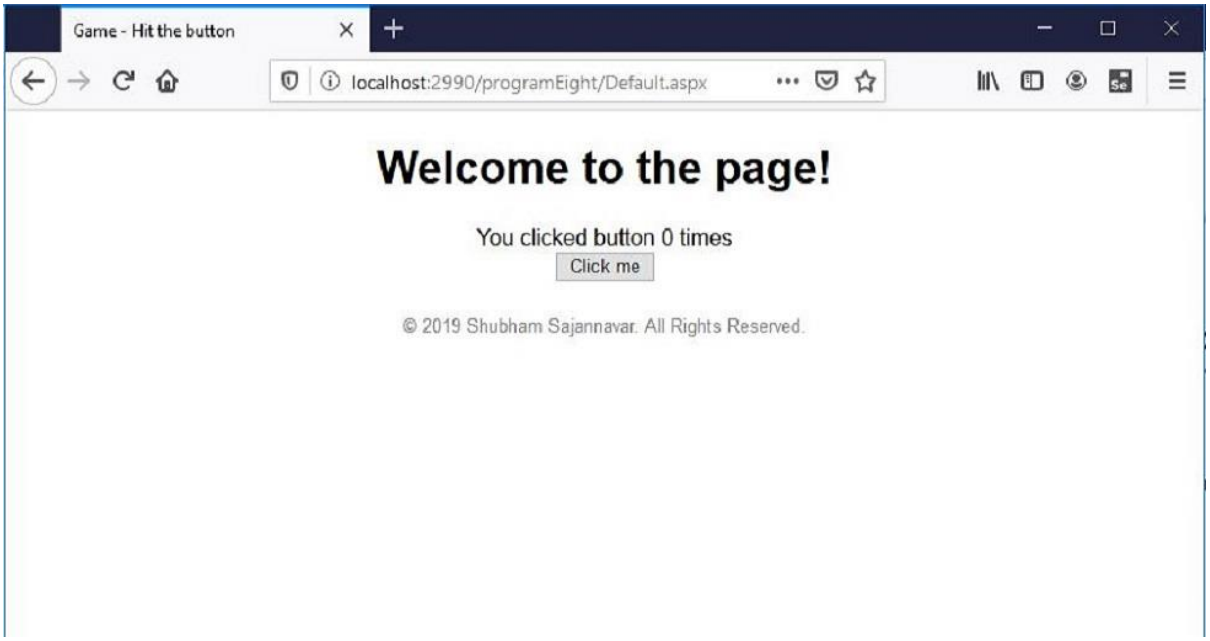
**ASP.NET Page**

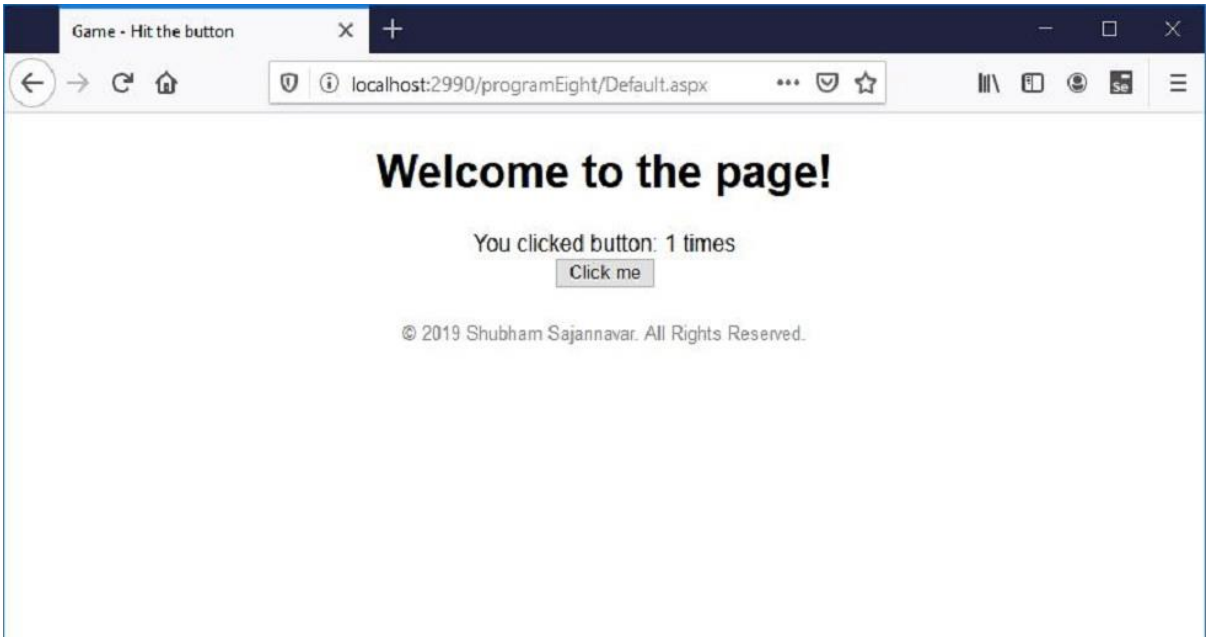
```
<%@ Page Language="C#" AutoEventWireup="true" CodeFile="Default.aspx.cs" Inherits="_Default" %>

<!DOCTYPE html>

<html xmlns="http://www.w3.org/1999/xhtml">

<head runat="server">

   <title>Game - Hit the button</title>

</head>

<body>

   <form id="form1" runat="server">

   <div class="container">

      <h1>Welcome to the page!</h1>

      <asp:Label ID="lblOutput" Text="You clicked button 0 times" runat="server" />

      <asp:button id="clickMeButton" runat="server" text="Click me"

         onClick="clickMeButton_Click" />

      <div class="space"> <br /> <footer>&copy; 2019 Shubham Sajannavar. All Rights Reserved.</footer></div>


   </div>

   </form>

</body>

</html>
```

**C#.NET Page**

```
using System;
using System.Web;


public partial class _Default : System.Web.UI.Page
{
    protected void Page_Load(object sender, EventArgs e)
    {
    }
    protected void clickMeButton_Click(object sender, EventArgs e)
    {
        object value = ViewState["HitCount"];
        int i = (value == null) ? 1 : (int)value + 1;
        lblOutput.Text = string.Format("You clicked button: {0} times", i);
        ViewState["HitCount"] = i;
    }
}
```

**OUTPUT**


Game - Hit the button
localhost:2990/programEight/Default.aspx
Welcome to the page!
You clicked button 0 times
Click me
© 2019 Shubham Sajannavar. All Rights Reserved.


Game - Hit the button
localhost:2990/programEight/Default.aspx
Welcome to the page!
You clicked button: 1 times
Click me
© 2019 Shubham Sajannavar. All Rights Reserved.

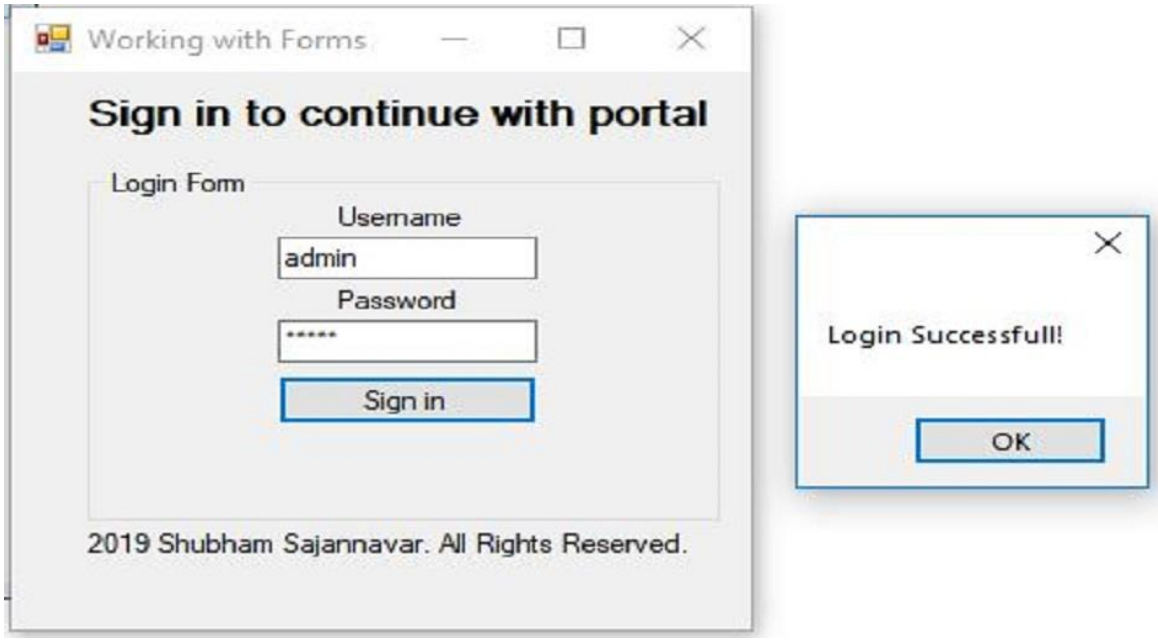
## 13) Work with forms using ASP.NET.

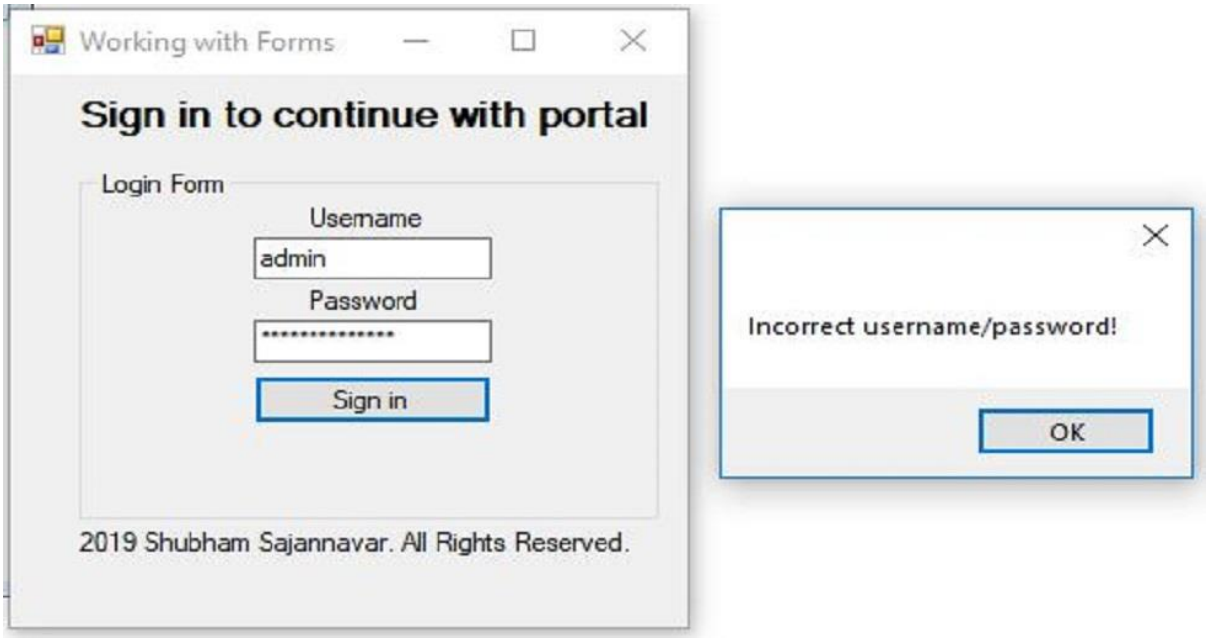
```
using System;
namespace WindowsFormsApplication1
{
   public partial class Form1 : Form
   {
      string[] names;
      string[] passs;
      int rows;

      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**


Working with Forms
Sign in to continue with portal
Login Form
Username
Password
Sign in
2019 Shubham Sajannavar. All Rights Reserved.


Working with Forms
Sign in to continue with portal
Login Form
Username
admin
Password
Sign in
2019 Shubham Sajannavar. All Rights Reserved.
Login Successfull!
OK


Working with Forms
Sign in to continue with portal
Login Form
Username
admin
Password
Sign in
2019 Shubham Sajannavar. All Rights Reserved.
Incorrect username/password!
OK

## 14) Describe access data source through ADO.NET.

**Form1.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**

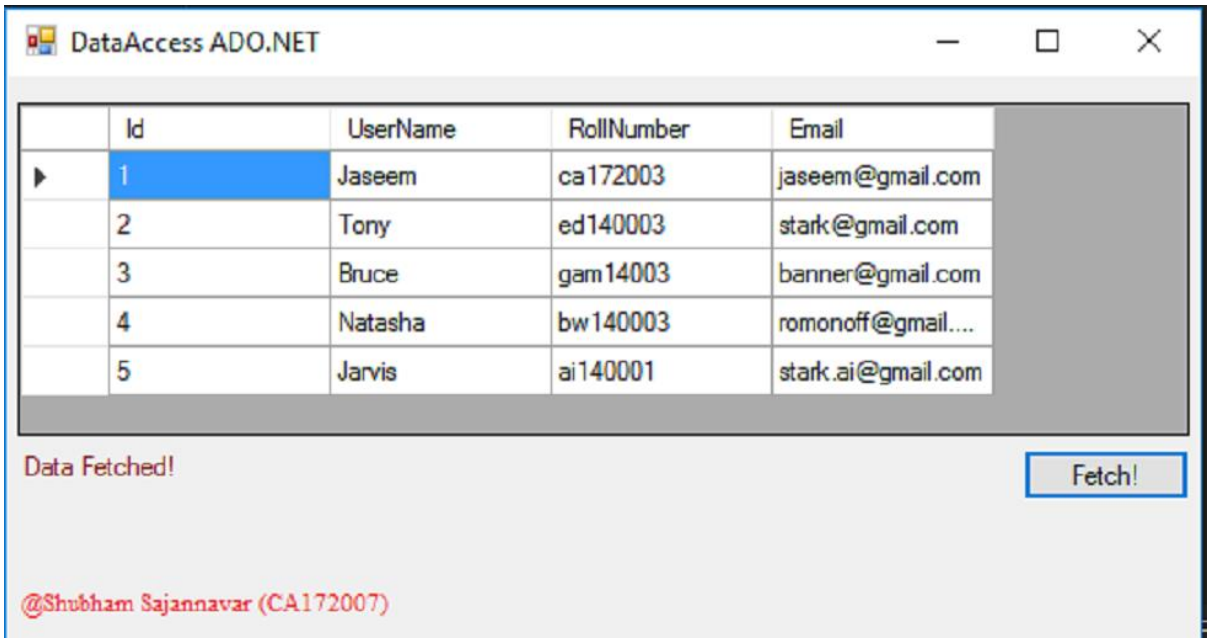
```
using System;

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

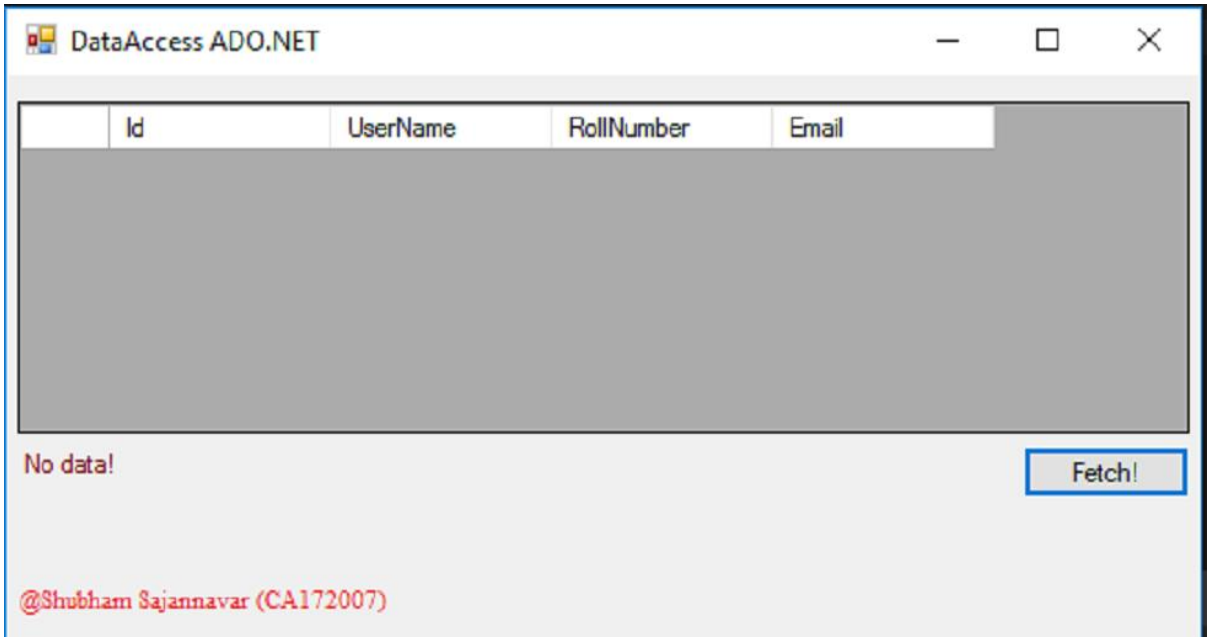
**UserAccessLayer.cs**

```
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!
@Shubham Sajannavar (CA172007)


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!
@Shubham Sajannavar (CA172007)

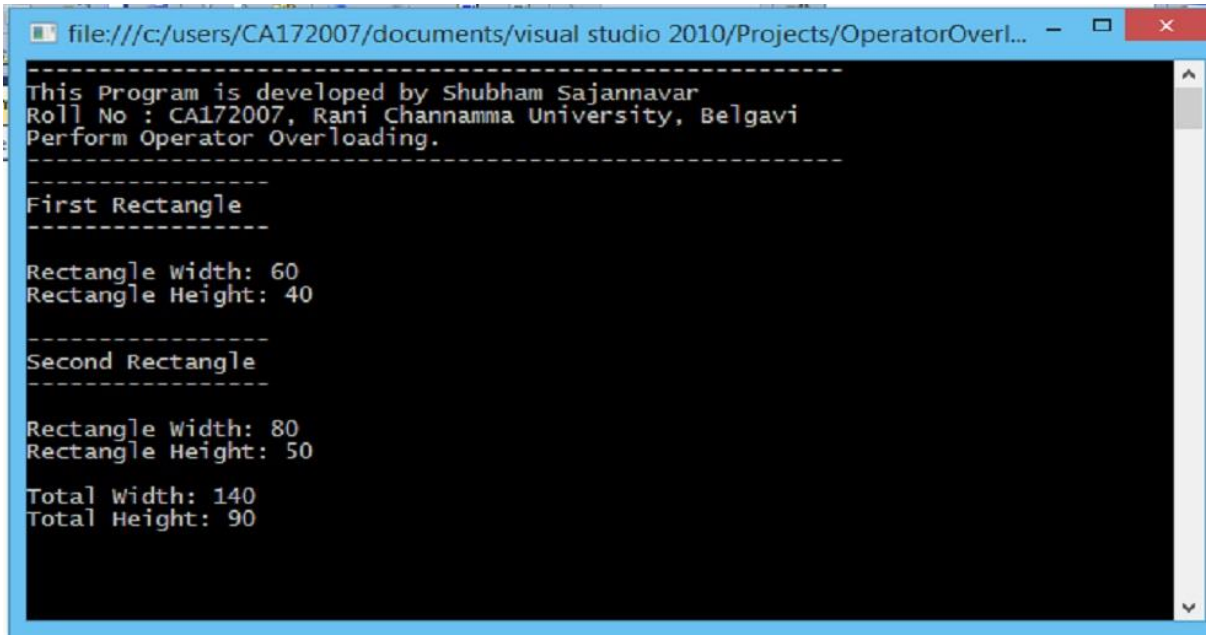

DataAccess ADO.NET
Id
UserName
RollNumber
Email
No data!
Fetch!
@Shubham Sajannavar (CA172007)

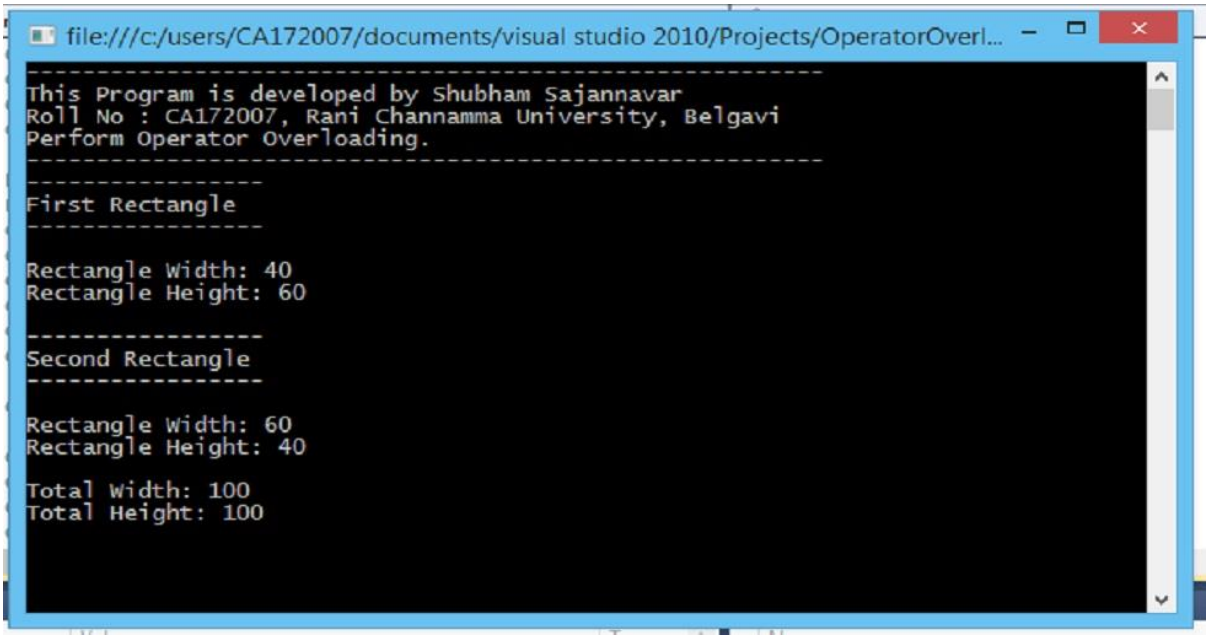
## 15) Perform operator overloading.

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

namespace OperatorOverloading
{
   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)
      {
         Console.WriteLine("------------------------------------------------------------");
         Console.WriteLine("This Program is developed by Shubham Sajannavar");
         Console.WriteLine("Roll No : CA172007, Rani Channamma University,
         Belgavi");
         Console.WriteLine("Perform Operator Overloading.");
         Console.WriteLine("------------------------------------------------------------");

         Rectangle r1 = new Rectangle(40, 60);
         Rectangle r2 = new Rectangle(60, 40);
         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();

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

**OUTPUT**


file:///c:/users/CA172007/documents/visual studio 2010/Projects/OperatorOverl...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Perform Operator Overloading.
First Rectangle
Rectangle Width: 60
Rectangle Height: 40
Second Rectangle
Rectangle Width: 80
Rectangle Height: 50
Total Width: 140
Total Height: 90


file:///c:/users/CA172007/documents/visual studio 2010/Projects/OperatorOverl...
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Perform Operator Overloading.
First Rectangle
Rectangle Width: 40
Rectangle Height: 60
Second Rectangle
Rectangle Width: 60
Rectangle Height: 40
Total Width: 100
Total Height: 100

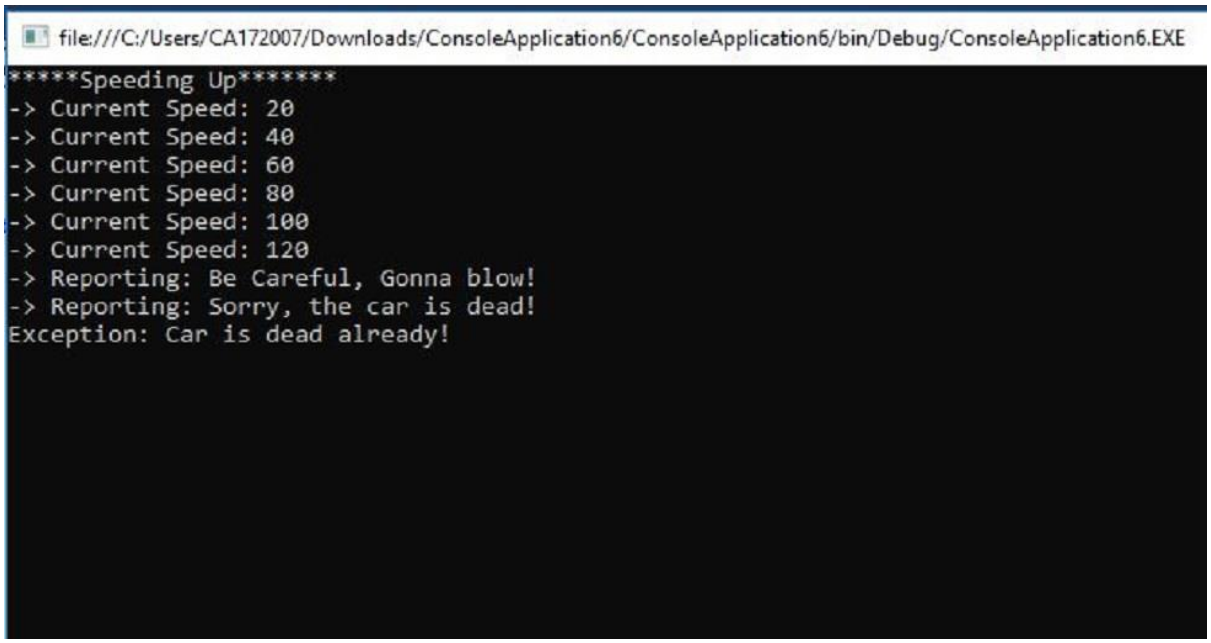
## 16) Describe delegates, events, errors and exceptions.

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

namespace ConsoleApplication6
{
   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/CA172007/Downloads/ConsoleApplication6/ConsoleApplication6/bin/Debug/ConsoleApplication6.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!

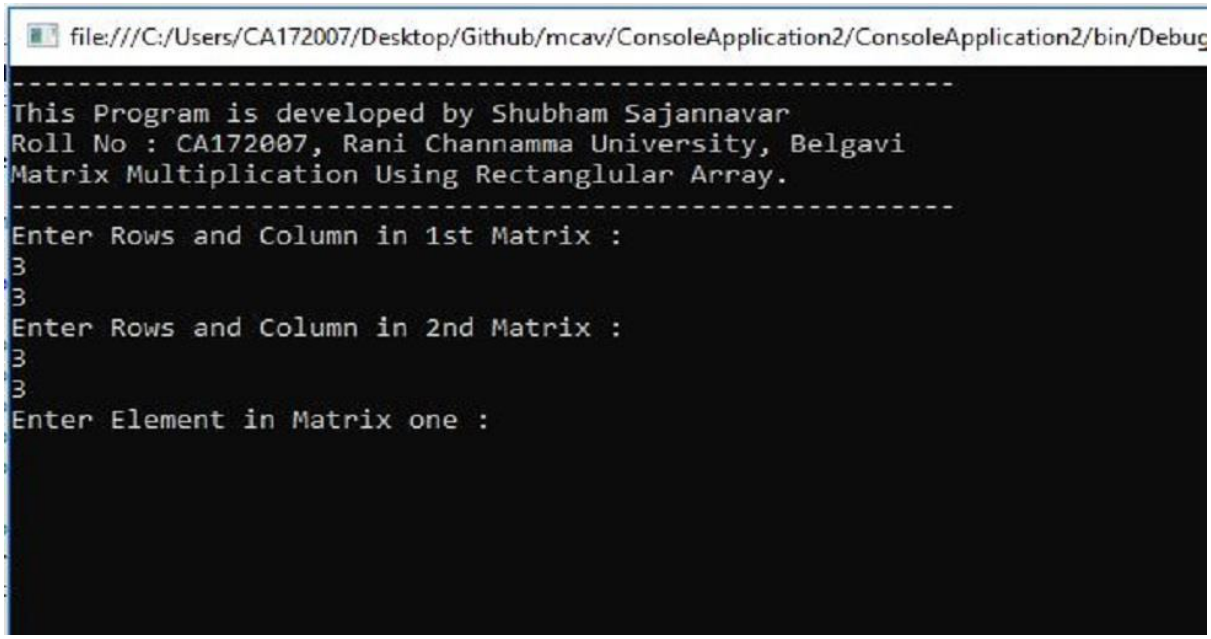
## 17) Program to multiply to matrices using Rectangular array.

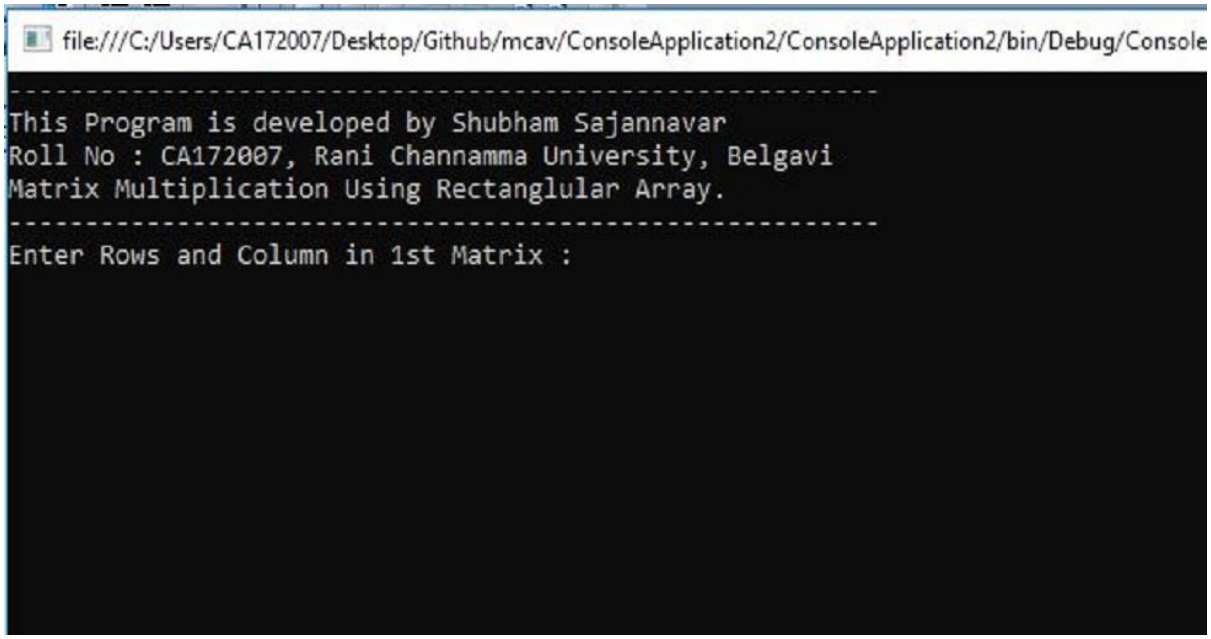
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ConsoleApplication2
{
   class Program
   {
      static void Main(string[] args)
      {
         Console.WriteLine("------------------------------------------------------------");
         Console.WriteLine("This Program is developed by Shubham Sajannavar");
         Console.WriteLine("Roll No : CA172007, Rani Channamma University,
         Belgavi");
         Console.WriteLine("Matrix Multiplication Using Rectanglular Array.");
         Console.WriteLine("------------------------------------------------------------");

         try
         {
            Console.WriteLine("Enter Rows and Column in 1st Matrix : ");
            int r1 = Convert.ToInt16(Console.ReadLine());
            int c1 = Convert.ToInt16(Console.ReadLine());

            Console.WriteLine("Enter Rows and Column in 2nd Matrix : ");
            int r2 = Convert.ToInt16(Console.ReadLine());
            int c2 = Convert.ToInt16(Console.ReadLine());

            if (r1 != c2)
            {
               Console.WriteLine("Matrix Multiplication Row Column Rule Violated.");
            }
            else
            {
               int[,] mat1 = new int[r1, c1];
               int[,] mat2 = new int[r2, c2];
               int[,] mat3 = new int[r1, c2];

               Console.WriteLine("Enter Element in Matrix one : ");
               for (int i = 0; i < r1; i++)
               {
                  for (int j = 0; j < c1; j++)
```

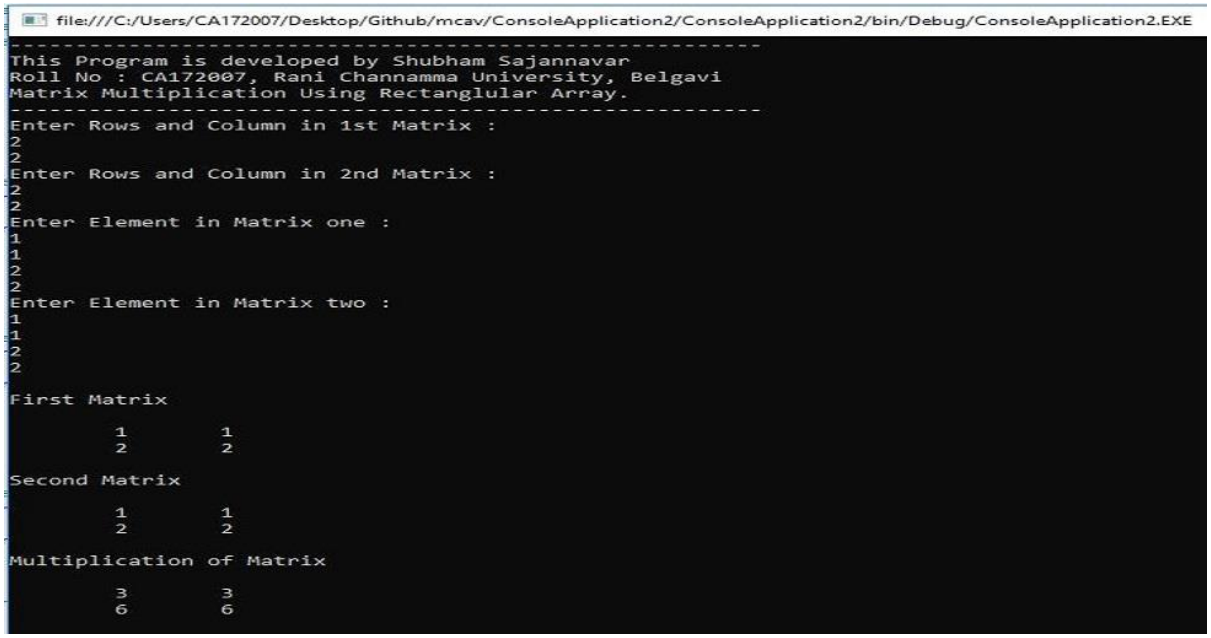
```
    {
        mat1[i, j] = (Convert.ToInt16(Console.ReadLine()));
    }
}
Console.WriteLine("Enter Element in Matrix two : ");
for (int i = 0; i < r2; i++)
{
    for (int j = 0; j < c2; j++)
    {
        mat2[i, j] = (Convert.ToInt16(Console.ReadLine()));
    }
}
Console.WriteLine("\nFirst Matrix\n");
for (int i = 0; i < r1; i++)
{
    for (int j = 0; j < c1; j++)
    {
        Console.Write("\t" + mat1[i, j]);
    }
    Console.WriteLine();
}
Console.WriteLine("\nSecond Matrix\n");
for (int i = 0; i < r2; i++)
{
    for (int j = 0; j < c2; j++)
    {
        Console.Write("\t" + mat2[i, j]);
    }
    Console.WriteLine();
}
Console.WriteLine("\nMultiplication of Matrix\n");
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 < r2; i++)
{
    for (int j = 0; j < c2; j++)
```

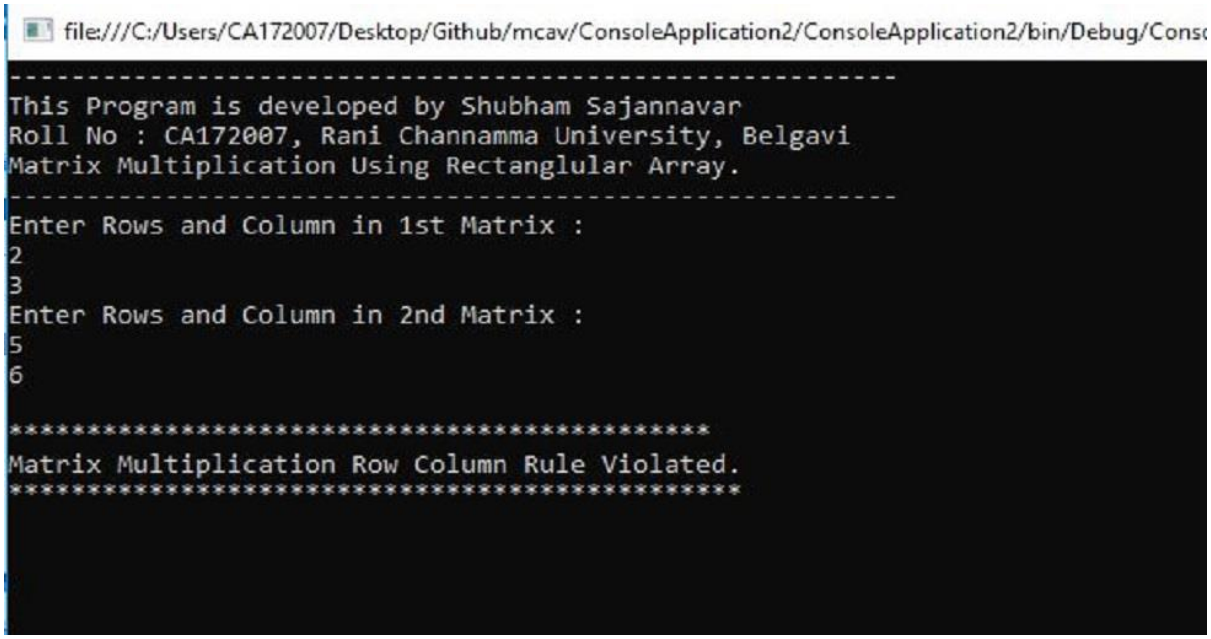
```
                {
                    Console.Write("\t" + mat3[i, j]);
                }
                Console.WriteLine();
            }
        }
    }
    catch (Exception ex) {
        Console.WriteLine("\n*****************************");
        Console.WriteLine("Please Enter Numaric value.");
        Console.WriteLine("\n*****************************");
    }
    Console.ReadKey();

  }
 }
}
```

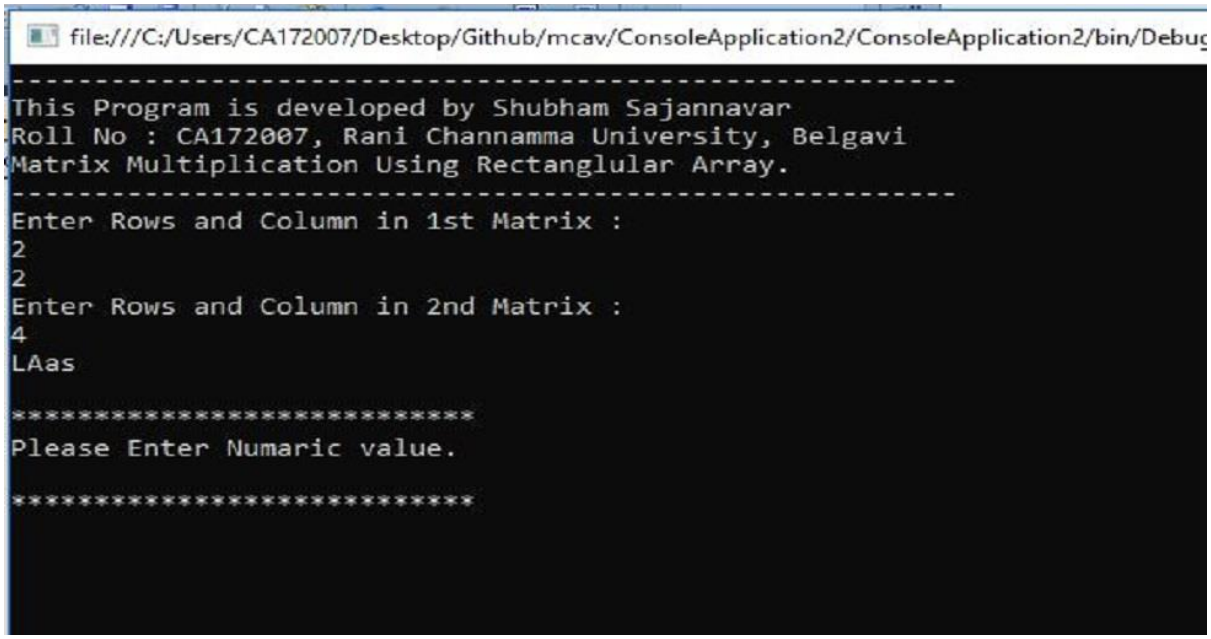
**OUTPUT**


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication2/ConsoleApplication2/bin/Debug
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Matrix Multiplication Using Rectanglular Array.
Enter Rows and Column in 1st Matrix :
3
3
Enter Rows and Column in 2nd Matrix :
3
3
Enter Element in Matrix one :


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication2/ConsoleApplication2/bin/Debug/Console
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Matrix Multiplication Using Rectanglular Array.
Enter Rows and Column in 1st Matrix :


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication2/ConsoleApplication2/bin/Debug/ConsoleApplication2.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Matrix Multiplication Using Rectanglular Array.
Enter Rows and Column in 1st Matrix :
2
2
Enter Rows and Column in 2nd Matrix :
2
2
Enter Element in Matrix one :
1
1
2
2
Enter Element in Matrix two :
1
1
2
2
First Matrix
1 1
2 2
Second Matrix
1 1
2 2
Multiplication of Matrix
3 3
6 6


file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication2/ConsoleApplication2/bin/Debug/Conso
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Matrix Multiplication Using Rectanglular Array.
Enter Rows and Column in 1st Matrix :
2
3
Enter Rows and Column in 2nd Matrix :
5
6
Matrix Multiplication Row Column Rule Violated.

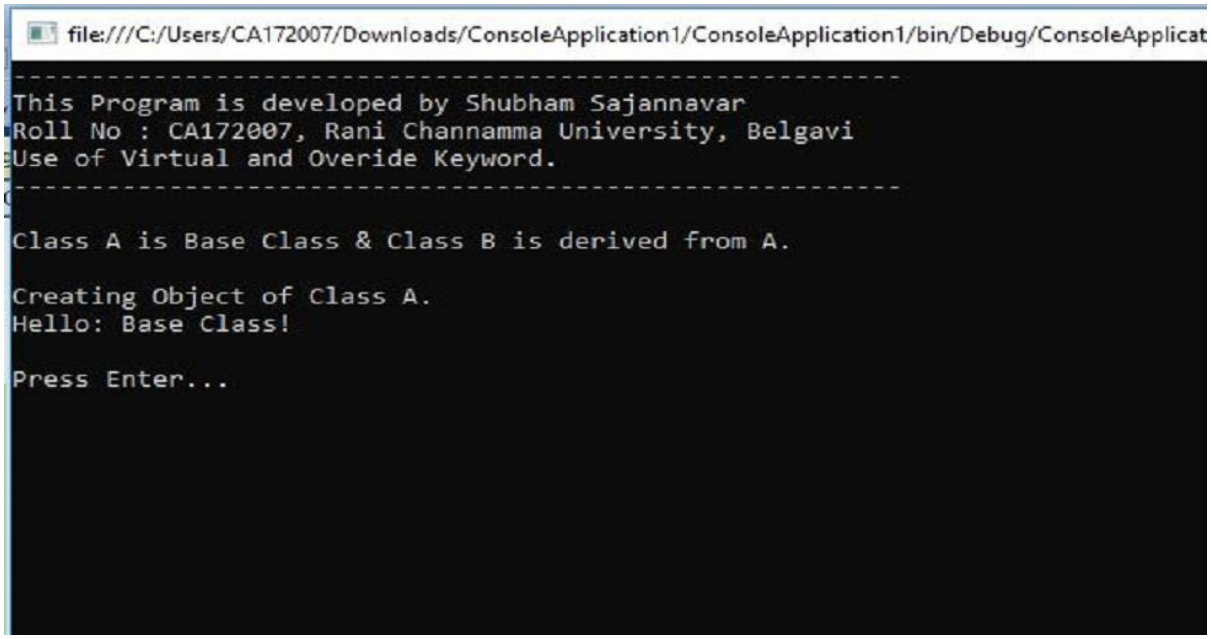

file:///C:/Users/CA172007/Desktop/Github/mcav/ConsoleApplication2/ConsoleApplication2/bin/Debug
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Matrix Multiplication Using Rectanglular Array.
Enter Rows and Column in 1st Matrix :
2
2
Enter Rows and Column in 2nd Matrix :
4
LAas
Please Enter Numaric value.

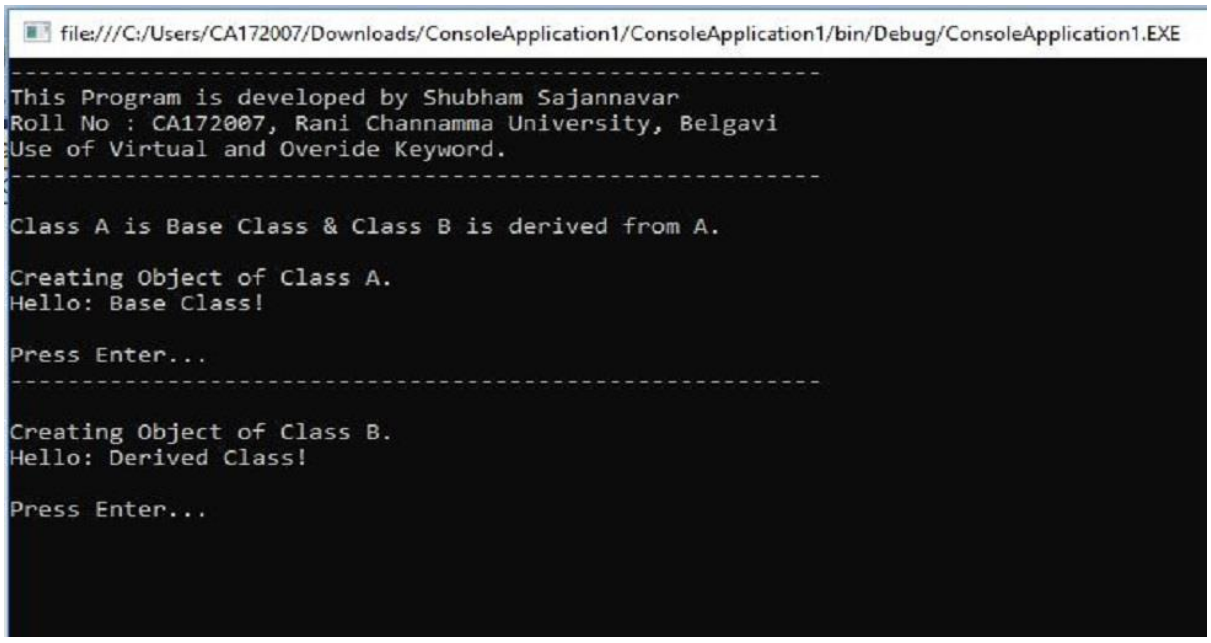
## 18) Demonstrate Use of Virtual and override keyword in C# with a simple Program.

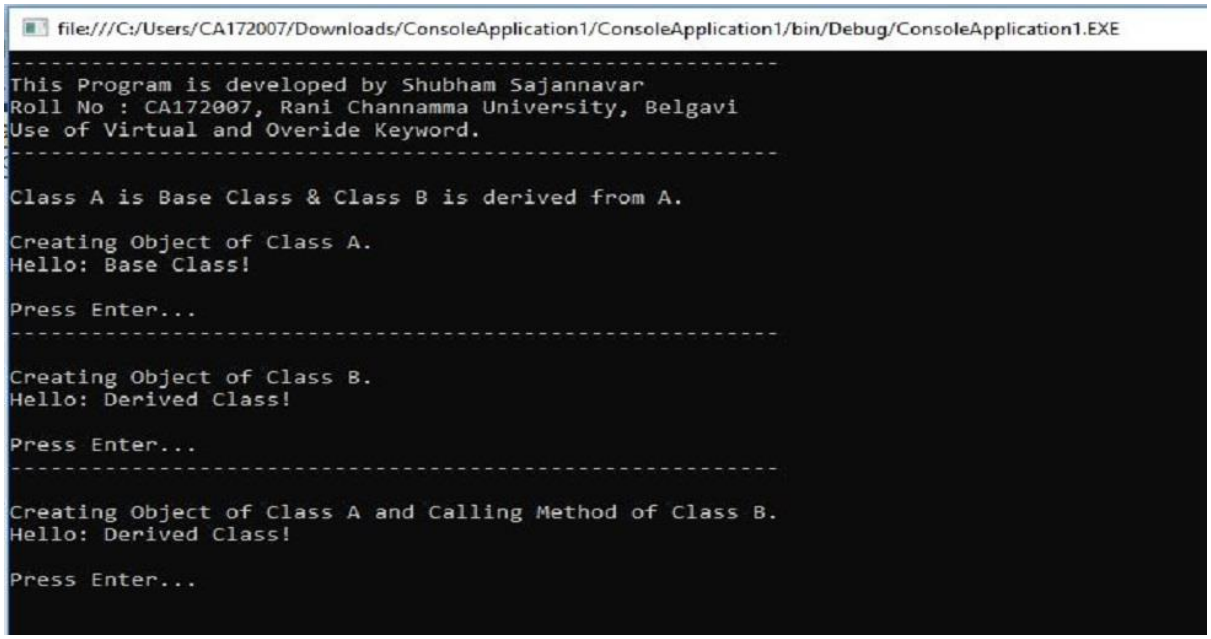
```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace ConsoleApplication1
{
   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("------------------------------------------------------------");
         Console.WriteLine("This Program is developed by Shubham Sajannavar");
         Console.WriteLine("Roll No : CA172007, Rani Channamma University,
         Belgavi");
         Console.WriteLine("Use of Virtual and Overide Keyword.");
         Console.WriteLine("------------------------------------------------------------");
         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 & Calling Method of Class B.");
            A a2 = new B();
            a2.show();

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

**OUTPUT**


file:///C:/Users/CA172007/Downloads/ConsoleApplication1/ConsoleApplication1/bin/Debug/ConsoleApplicat
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Use of Virtual and Overide Keyword.
Class A is Base Class & Class B is derived from A.
Creating Object of Class A.
Hello: Base Class!
Press Enter...


file:///C:/Users/CA172007/Downloads/ConsoleApplication1/ConsoleApplication1/bin/Debug/ConsoleApplication1.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Use of Virtual and Overide Keyword.
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/CA172007/Downloads/ConsoleApplication1/ConsoleApplication1/bin/Debug/ConsoleApplication1.EXE
This Program is developed by Shubham Sajannavar
Roll No : CA172007, Rani Channamma University, Belgavi
Use of Virtual and Overide Keyword.
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...