NAME :SYED OBAID HASHMI

ROLLNUMBER:2020fCS-030

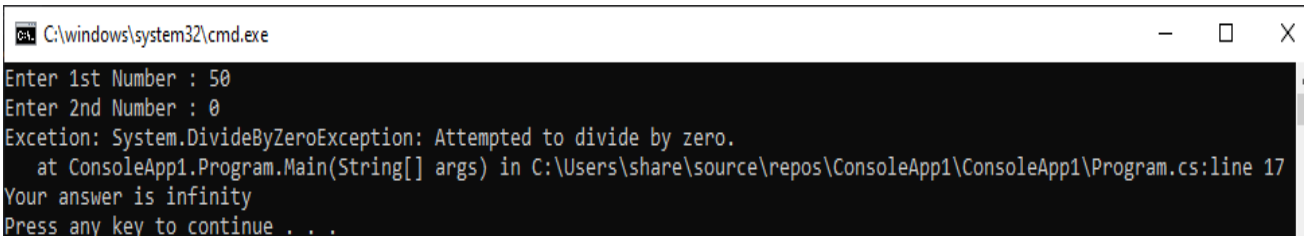
LAB TASK 9 and 12

CS127L Object Oriented Prog.

Tasks – Exception Handling:

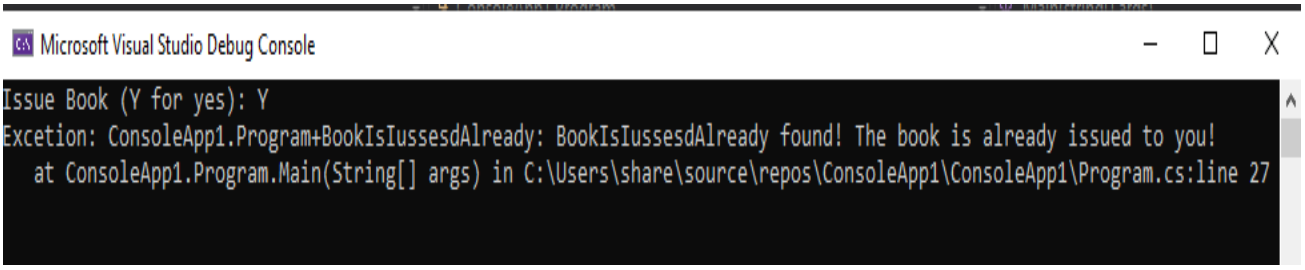
TASK 01: Write a program of throwing an exception when dividing by zero condition occurs?

```
using System;
namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            float div=0; int flag = 0, a, b;

            Console.Write("Enter 1st Number : ");
            a = Convert.ToInt32(Console.ReadLine());
            Console.Write("Enter 2nd Number : ");
            b = Convert.ToInt32(Console.ReadLine());

            try
            {
                div = a / b;
            }

            catch (DivideByZeroException ex)
            {
                Console.WriteLine("Excetion: " + ex);
                flag = 1;
            }
            finally
            {
                if (flag == 0)
                    Console.WriteLine("Result: " + div);

                else if (flag == 1)
                {
                    Console.WriteLine("Your answer is infinity");
                }
            }
            Console.ReadKey();
        }
    }
}
```



TASK 02: Write a program that if the user program wants to issue a book in library. The user program then can decide to generate a message and tell the user to check if the book is already issued etc?

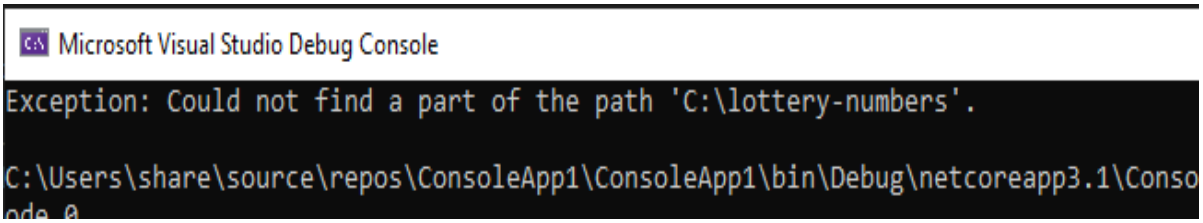
```
using System;
namespace ConsoleApp1
{
    class Program
    {
        public class BookIsIussesdAIready : Exception
        {
            public BookIsIussesdAIready(string mess) : base(mess) { }
        }

        static void Main(string[] args)
        {
            Console.Write("Issue Book (Y for yes): ");
            char ch = Convert.ToChar(Console.ReadLine());
            char issued = 'Y';
            int count = 0;
            try
            {
                if (issued != ch)
                {
                    Console.WriteLine("\nSince you don't want book.
Program will end here.");
                    count++;
                }

                if (issued == ch)
                    throw new BookIsIussesdAIready("BookIsIussesdAIready
found! The book is already issued to you!");
            }
            catch (BookIsIussesdAIready ex)
            {
                Console.WriteLine("Excetion: " + ex);
            }
            Console.ReadLine();
        }
    }
}
```



TASK 03: Refer to the Table 1 at Page 3 and write individual C# programs to show the working of below given built-in exception.

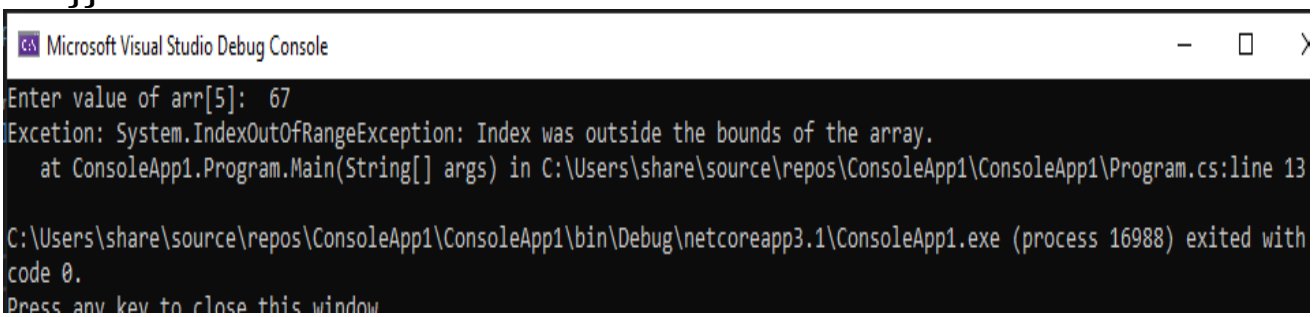
01. System.IO.IOException

```
using System;
using System.IO;
namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            try
            {
                Directory.GetDirectories("C:\\lottery-numbers\\");
            }

            catch (IOException e)
            {
                Console.WriteLine("Exception: " + e.Message);
            }
        }
    }
}
```



02. System.IndexOutOfRangeException

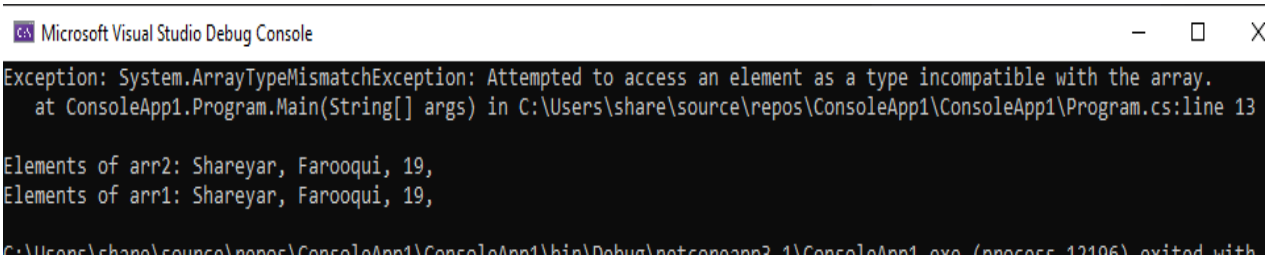
```
using System;
namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            Console.Write("Enter value of arr[5]:  ");
            int val = Convert.ToInt32(Console.ReadLine());
            int[] arr = new int[5] {22,66,44,33,99};
            try
            {
                arr[5] = val;
            }
            catch (IndexOutOfRangeException ex)
            {
                Console.WriteLine("Excetion: " + ex);
            }
            Console.ReadKey();
        }
    }}
```



03. System.ArrayTypeMismatchException

```
using System;
namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            string[] arr1 = { "Shareyar", "Farooqui", "19" };
            object[] arr2 = arr1;
            try
            {
                arr2[2] = 100; // trying to replace value of arr2[2]
            }
            catch (ArrayTypeMismatchException ex)
            {
                Console.WriteLine("Exception: " + ex);
            }
            finally
            {
                Console.Write("\nElements of arr2: ");
```

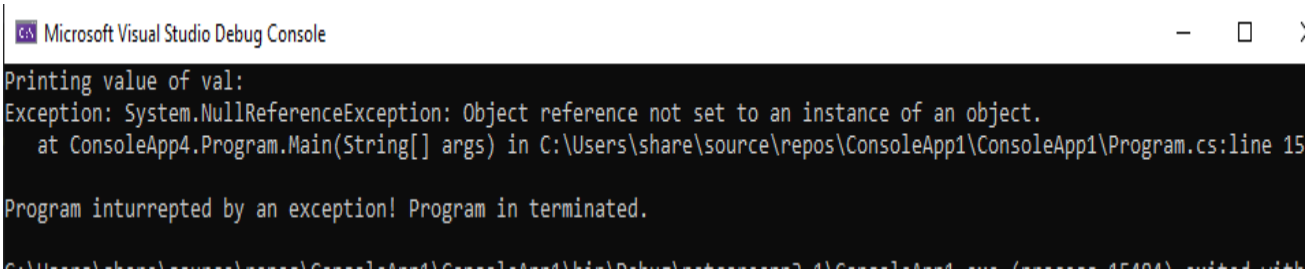
```
                for (int sf = 0; sf < 3; sf++)
                {
                    Console.Write(arr1[sf] + ", ");
                }
                Console.Write("\nElements of arr1: ");
                for (int sf = 0; sf < 3; sf++)
                {
                    Console.Write(arr1[sf] + ", ");
                }
                Console.WriteLine();
            }
            Console.ReadKey();
        }
    }

}
```



04. System.NullReferenceException

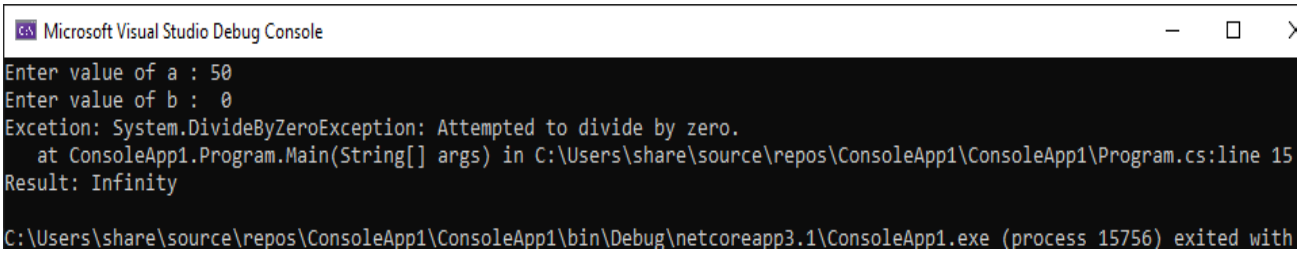
```
using System;
namespace ConsoleApp4
{
    class Program
    {
        static void Main(string[] args)
        {
            string val = null;
            int flag = 0;
            try
            {
                Console.WriteLine("Printing value of val:");
                if (val.Length == 0)
                    Console.WriteLine(val);
            }
            catch (NullReferenceException ex)
            {
                Console.WriteLine("Exception: " + ex);
                flag = 1;
            }
            finally
            {
                if (flag == 0)
                Console.WriteLine("Program ended! ");

                else if (flag == 1)
```

```
                    Console.WriteLine("\nProgram inturrepted by an
exception! Program in terminated. ");
                }

            }
        }
}
```



05. System.DivideByZeroException

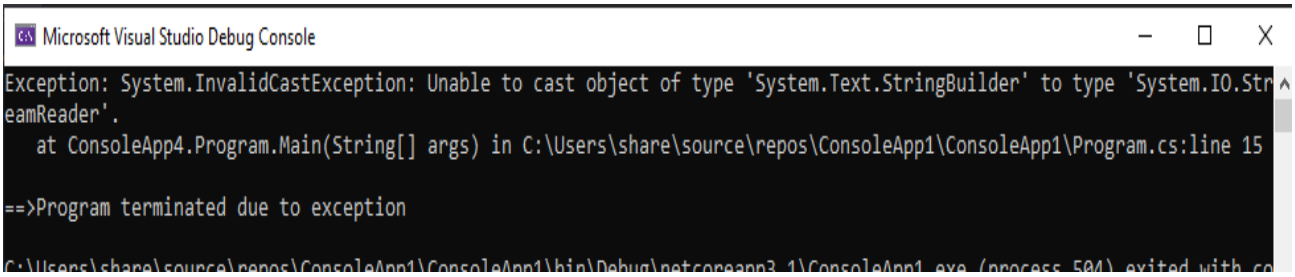
```
using System;
namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            string div = "Infinity"; int  s, f;
            Console.Write("Enter value of a : ");
            s = Convert.ToInt32(Console.ReadLine());
            Console.Write("Enter value of b :  ");
            f = Convert.ToInt32(Console.ReadLine());
            try
            {
                div = Convert.ToString(s / f);
            }
            catch (DivideByZeroException ex)
            {
                Console.WriteLine("Excetion: " + ex);
            }
            finally
            {
                    Console.WriteLine("Result: " + div);
            }

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



06. System.InvalidCastException

```
using System;
```

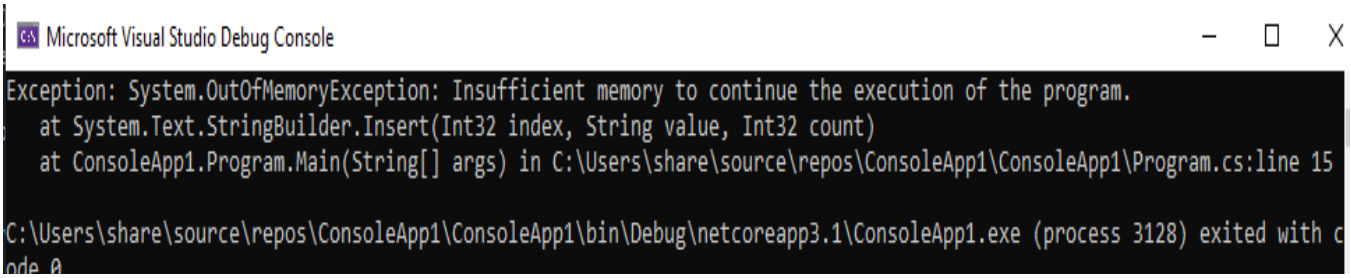
```
using System.IO;
using System.Text;

namespace ConsoleApp4
{
    class Program
    {
        static void Main(string[] args)
        {
            try
            {
                StringBuilder str01 = new StringBuilder();
                object str02 = str01;
                StreamReader str3 = (StreamReader)str02;
                Console.WriteLine(str3);
            }

            catch (InvalidCastException ex)
            {
                Console.WriteLine("Exception: " + ex);
                Console.WriteLine("\n==>Program terminated due to
exception");
            }

        }
    }
}
```



07. System.OutOfMemoryException

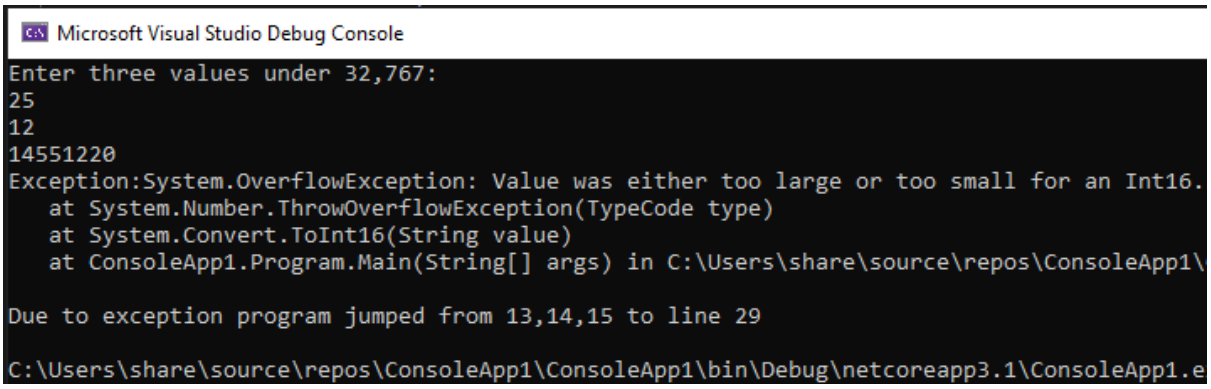
```
using System;
using System.IO;
using System.Text;

namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            StringBuilder str1 = new StringBuilder(15, 15);
            str1.Append("Hello World! ");
            try
            {
                str1.Insert(0, "Hello Pakistan! ", 1);
            }
            catch (OutOfMemoryException e)
            {
```

```
                Console.WriteLine("Exception: " + e);
            }
        }
    }
}
```



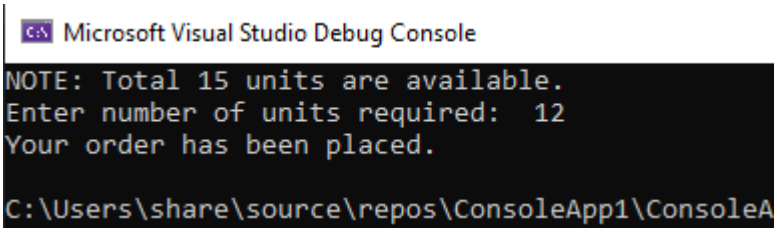
08. System.StackOverflowException

```
using System;
namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            int a, b, c, multi = 0, excep = 0;

            try
            {
                Console.WriteLine("Enter three values under 32,767:");
                a = Convert.ToInt16(Console.ReadLine());
                b = Convert.ToInt16(Console.ReadLine());
                c = Convert.ToInt16(Console.ReadLine());
                multi = a * b * c;
            }

            catch(Exception e)
            {
                Console.WriteLine("Exception:" + e);
                excep = 1;
            }
            finally
            {
                if (excep == 0)
                    Console.WriteLine("Multi: " + multi);

                else if (excep == 1)
                    Console.WriteLine("\nDue to exception program jumped
from 13,14,15 to line 29");
            }
            Console.ReadKey();
        }
    }
}
```



TASK 04: Write a user defined exception which indicates an out of stock exception when user enters the larger number than the stock available.

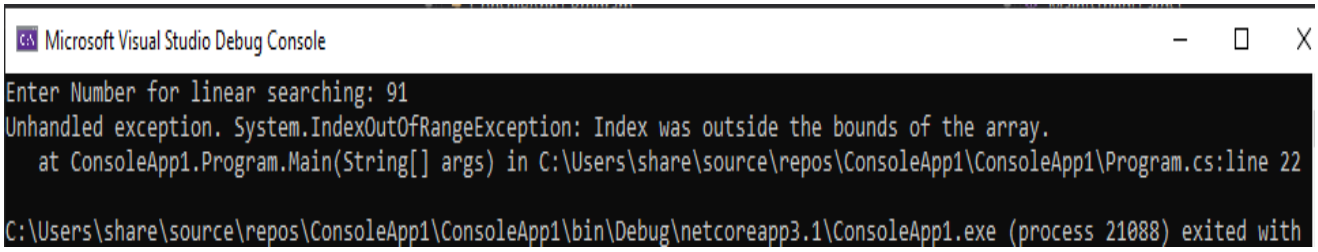
```
using System;
namespace ConsoleApp1
{
    class Program
    {
        public class OutOfStockException : Exception
        {
            public OutOfStockException(string mess) : base(mess) { }

        }
        static void Main(string[] args)
        {
            int units;
            Console.WriteLine("NOTE: Total 15 units are available.");
            Console.Write("Enter number of units required:  ");
            units = Convert.ToInt32(Console.ReadLine());

            try
            {
                    if (units <= 15)
                    {
                        Console.WriteLine("Your order has been placed.");
                    }

                else if (units >= 15)
                    throw new OutOfStockException("OutOfStockException !!
The number of units are limited please try again.");

            }
            catch (OutOfStockException ex)
            {
                Console.WriteLine("Exception: " + ex);
            }
            Console.ReadKey();
        }
    }
}
```



TASK 05: Write a custom exception "NumberNotFoundException" which will be caught when a number could not be found in the array while searching.

```
using System;
namespace ConsoleApp1
{
    class Program
    {
        public class NumberNotFoundException : Exception
        {
            public NumberNotFoundException(string mess) : base(mess) { }

        }

        static void Main(string[] args)
        {
            Console.Write("Enter Number for linear searching: ");
            int num = Convert.ToInt32(Console.ReadLine());
            int[] arr = new int[10] { 10, 50, 30, 44, 90, 69, 77, 40, 54,
66 };
            int count = 0;
            try
            {
                for (int i = 0; i <= arr.Length; i++)
                {
                    if (arr[i] == num)
                    {
                        Console.WriteLine(num + " found in index " + i +
".");
                        count++;
                        break;
                    }
                }

                if (count == 0)
```

```
                throw new
NumberNotFoundException("NumberNotFoundException found! The number that
user entered is not present in built-in array! please try again.");
            }


            catch (NumberNotFoundException ex)
            {
                Console.WriteLine("Excetion: " + ex);
            }
            Console.ReadLine();
        }
    }
}
```



Tasks - Searching Algorithms:

TASK 01: Write a C# program to implement linear search algorithm in an array of size 10. Array values and value to be search must be entered by user at run time. Your program must show the index and number of comparisons after which desired value has been found.

```
using System;
namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            int[] arr = new int[10];
            int val, count = 0, flag = 0;

            Console.WriteLine("Enter values of array: ");

            for (int sf = 0; sf <= arr.Length - 1; sf++)        // sf
trademark
```

```
            {
                arr[sf] = Convert.ToInt32(Console.ReadLine());

            }
            Console.Write("Enter value for binary searching: ");
            val = Convert.ToInt32(Console.ReadLine());
            for (int sf = 0; sf <= arr.Length - 1; sf++)       // sf
trademark
            {
                if (val == arr[sf])
                {
                    Console.WriteLine("\n\nValue " + val + " found!");
                    Console.WriteLine("Index number = " + sf);
                    count++;
                    flag = 1;
                    break;
                }
                else
                    count++;
            }
            Console.WriteLine("Number of comparsions = " + count+"\n");
            if (flag == 0)
            {
                Console.WriteLine("Value is not present in array.");
            }

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

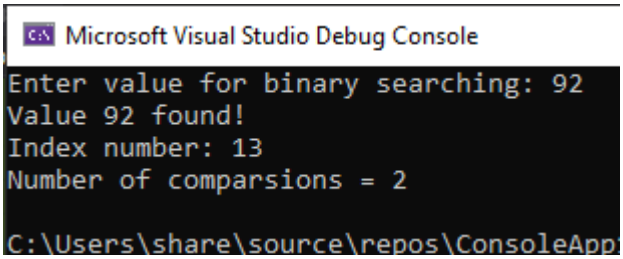
Microsoft Visual Studio Debug Console

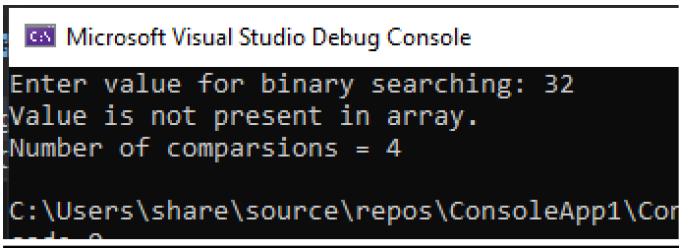
```
Enter values of array:
20
2113
14
47
87
85
86
82
02
13
Enter value for binary searching: 2


Value 2 found!
Index number = 8
Number of comparsions = 9


C:\Users\share\source\repos\ConsoleApp
```

TASK 02: Write a C# program to implement binary search algorithm on below given integer array of 15 elements. Array Values -> 5, 12, 16, 21, 25, 28, 37, 46, 57, 59, 74, 82, 87, 92, 99 Value to be searched should be entered by user. Your program must display the index and number of comparisons after which desired value has been found.

```
using System;
namespace ConsoleApp1
{
    class Program
    {
        static void Main(string[] args)
        {
            int[] arr = new int[15] { 5, 12, 16, 21, 25, 28, 37, 46, 57,
59, 74, 82, 87, 92, 99 };
            int str, mid, end, size ,val, count=0;

            Console.Write("Enter value for binary searching: ");
            val = Convert.ToInt32(Console.ReadLine());
            str = 0; end = (arr.Length - 1);

            while (str <= end)
            {
                mid = (str + end) / 2;
                if (val == arr[mid])
                {
                    Console.WriteLine("Value " + val + " found at index
!") ;

                    for (int sf = 0; sf <= arr.Length-1; sf++)       // sf
trademark
                    {
                        if (val == arr[sf])
                        {
                            Console.WriteLine("Index number: " +sf);
                        }

                    }
                    break;
                }

                else if (val <= arr[mid])
                {
                    end = mid - 1;
                }
                else if (val >= arr[mid])
                {
                    str = mid + 1;
                }
                count++;
            }

            Console.WriteLine("Number of comparsions = " +count);
            Console.ReadKey();
```

```
        }
    }
}
```


Microsoft Visual Studio Debug Console
Enter value for binary searching: 92
Value 92 found!
Index number: 13
Number of comparsions = 2
C:\Users\share\source\repos\ConsoleApp


Microsoft Visual Studio Debug Console
Enter value for binary searching: 32
Value is not present in array.
Number of comparsions = 4
C:\Users\share\source\repos\ConsoleApp1\Cor