Name: Abhinna Ojha

TU roll number: 20788/075

Lab Number: 01

Submission date: 16th May, 2022

Contents:

SN	Title
1	Program that places double quotation around each word on a string
2	Implementation of array of structures
3	Implementation of class
4	Implementation of function overloading
5	Implementation of constructor method of a class
6	Implementation of single inheritance
7	Implementation of multiple inheritance using interface
8	Implementation of multilevel inheritance

Instructor: Dipendra KM

Remarks:

C#

C# (C-Sharp) is a programming language developed by Microsoft that runs on the .NET Framework. It is used to develop web apps, desktop apps, mobile apps, games and much more.

String

In C#, string is a sequence of Unicode characters or array of characters. The range of Unicode characters will be U+0000 to U+FFFF. The array of characters is also termed as the text. A string is represented by class System.String. So string is an object of System.String class.

Array

An array is a group of like-typed variables that are referred to by a common name. And each data item is called an element of the array. An array of structures means each array index contains structure as a value.

Class and Object

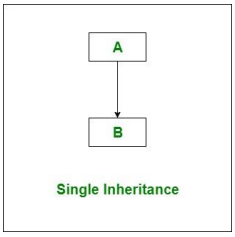
Class and Object are the basic concepts of Object-Oriented Programming which revolve around the real-life entities. A class is a user-defined blueprint or prototype from which objects are created. Basically, a class combines the fields and methods(member function which defines actions) into a single unit. In C#, classes support polymorphism, inheritance and also provide the concept of derived classes and base classes.

Inheritance

Inheritance is an important pillar of OOP(Object Oriented Programming). It is the mechanism in C# by which one class is allowed to inherit the features(fields and methods) of another class. The class whose features are inherited is known as super class(or a base class or a parent class). The class that inherits the other class is known as subclass(or a derived class, extended class, or child class). The subclass can add its own fields and methods in addition to the superclass fields and methods.

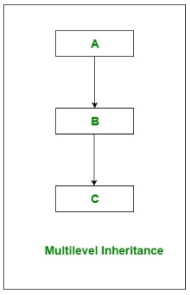
Types of Inheritance

1. Single Inheritance: In single inheritance, subclasses inherit the features of one superclass. In image below, the class A serves as a base class for the derived class B.

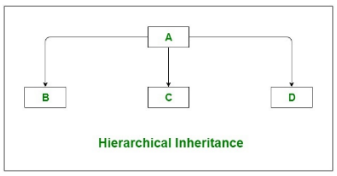


2. Multilevel Inheritance: In Multilevel Inheritance, a derived class will be inheriting a base class and as well as the derived class also act as the base class to other class. In

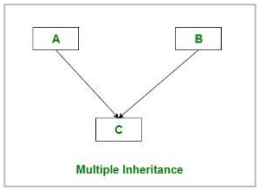
below image, class A serves as a base class for the derived class B, which in turn serves as a base class for the derived class C.



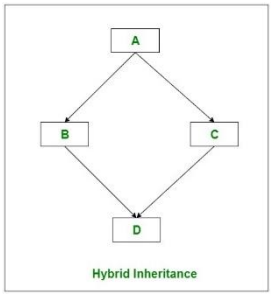
3. Hierarchical Inheritance: In Hierarchical Inheritance, one class serves as a superclass (base class) for more than one subclass. In below image, class A serves as a base class for the derived class B, C, and D.



4. Multiple Inheritance(Through Interfaces):In Multiple inheritance, one class can have more than one superclass and inherit features from all parent classes. Please note that C# does not support multiple inheritance with classes. In C#, we can achieve multiple inheritance only through Interfaces. In the image below, Class C is derived from interface A and B.



5. Hybrid Inheritance(Through Interfaces): It is a mix of two or more of the above types of inheritance. Since C# doesn't support multiple inheritance with classes, the hybrid inheritance is also not possible with classes. In C#, we can achieve hybrid inheritance only through Interfaces.



ORCHID INTERNATIONAL College

Lab no: 1.1 **Date**: 16th May, 2022

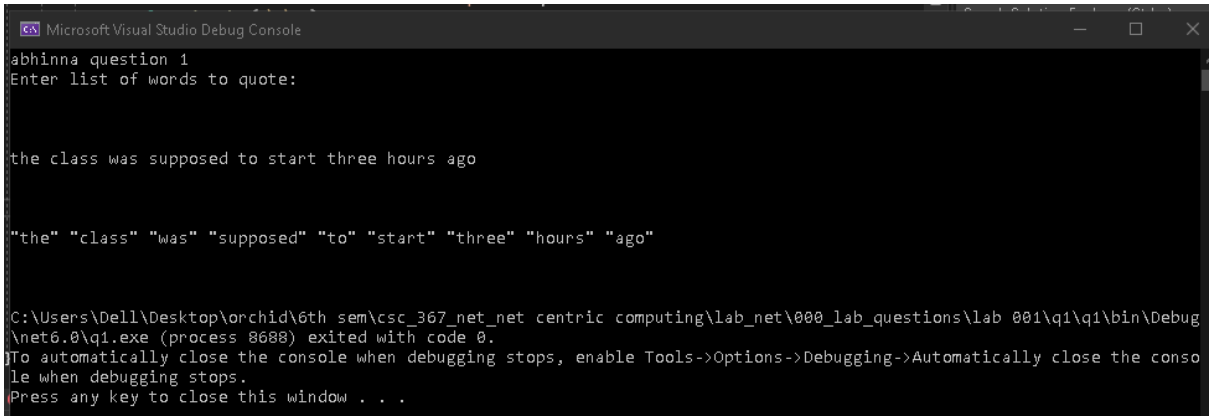
Name: Abhinna Ojha **TU Roll no:** 20788/075

Title: Write a console application that places double quotation marks around each word in a string.

Source code

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
namespace OIC
{
   public static class Words
   {
      static void Main()
      {
         string word_list;
         Console.WriteLine("abhinna question 1");
         Console.WriteLine("Enter list of words to quote: ");
         Console.WriteLine("\n\n");
         word_list = Console.ReadLine();
         Console.WriteLine("\n\n");
         int w_len = word_list.Length;
         Console.Write("\"");
         for (int i = 0; i < w_len; i++)
         {
            if (word_list[i] == ' ')
            {
               Console.Write("\" \"");
               continue;
            }
            Console.Write(word_list[i]);
         }
         Console.Write("\"");
         Console.WriteLine("\n\n");
      }
   }
}
```

Output


Microsoft Visual Studio Debug Console
abhinna question 1
Enter list of words to quote:
the class was supposed to start three hours ago
"the" "class" "was" "supposed" "to" "start" "three" "hours" "ago"
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q1\q1\bin\Debug
\net6.0\q1.exe (process 8688) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .

Microsoft Visual Studio Debug Console
abhinna question 1
Enter list of words to quote:
my name is abhinna ojha and I am taking .Net Centric Computing course
"my" "name" "is" "abhinna" "ojha" "and" "I" "am" "taking" ".Net" "Centric" "Computing" "course"
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q1\q1\bin\Debug
\net6.0\q1.exe (process 3056) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .

Microsoft Visual Studio Debug Console
abhinna question 1
Enter list of words to quote:
The quick brown fox jumps over the lazy dog.
"The" "quick" "brown" "fox" "jumps" "over" "the" "lazy" "dog."
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q1\q1\bin\Debug
\net6.0\q1.exe (process 4056) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .

ORCHID INTERNATIONAL College

Lab no: 1.2 **Date**: 16th May, 2022

Name: Abhinna Ojha **TU Roll no:** 20788/075

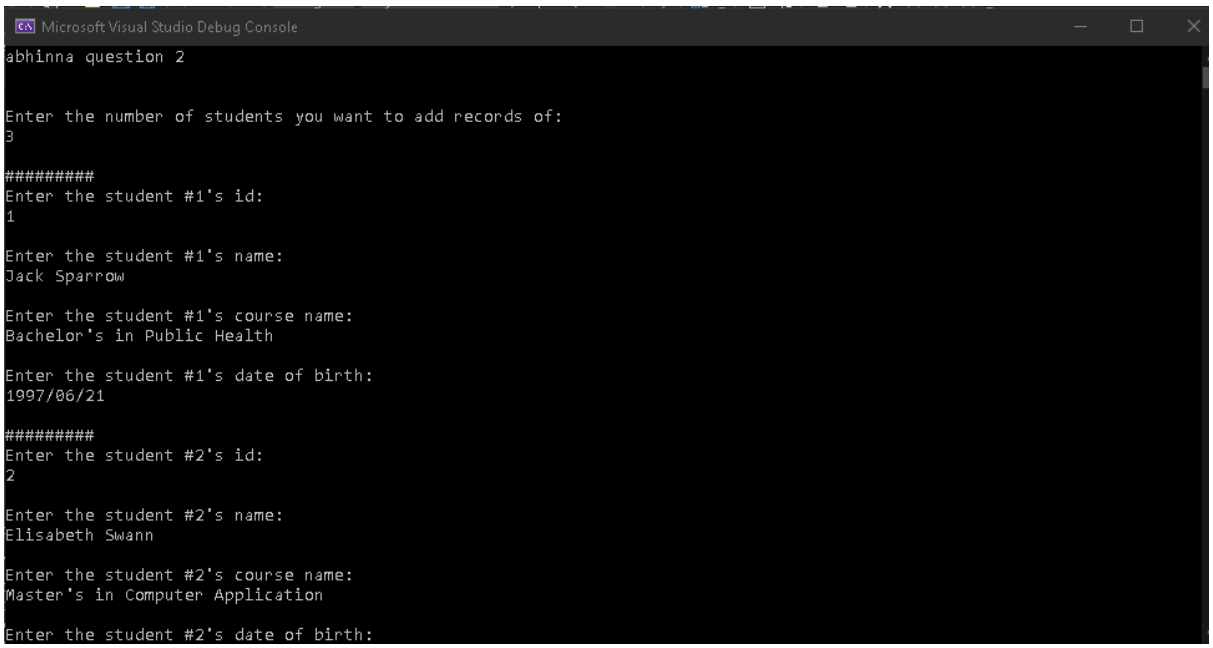
Title: Write an application that receives the Student Id, Student Name, Course Name, Date of Birth from a set of students. The application should also display the information of all the students once the data is entered. Implement this using an Array of Structures.

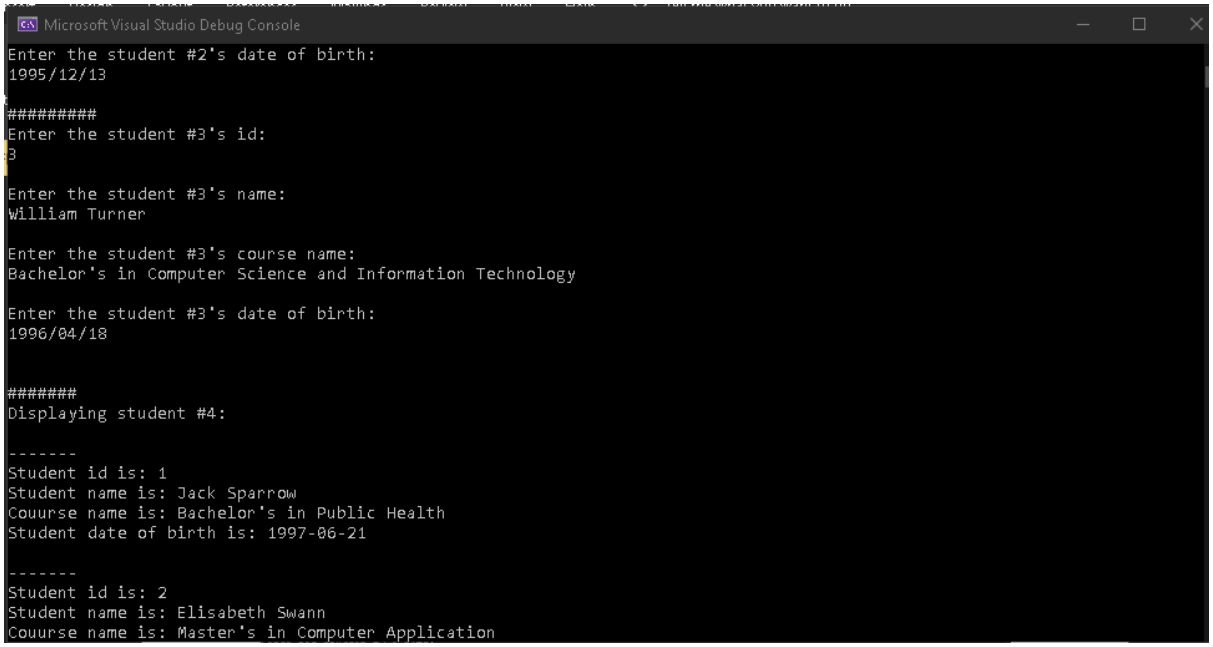
Source code

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

namespace OIC
{
   public static class ArrayTask
   {
      public struct Student
      {
         private int studentID;
         private string studentName;
         private string courseName;
         private DateOnly studentDateOfBirth;
         public Student(int id, string name, string course, DateOnly dob)
         {
            studentID = id;
            studentName = name;
            courseName = course;
            studentDateOfBirth = dob;
         }
         public void display()
         {
            Console.WriteLine($"\n-------\nStudent id is: {studentID}");
            Console.WriteLine($"Student name is: {studentName}");
            Console.WriteLine($"Couurse name is: {courseName}");
            Console.WriteLine($"Student date of birth is: {studentDateOfBirth}");
         }
      };
      static void Main()
```

```
    {
        int id, num, i;
        string name, course;
        DateOnly dob;
        Console.WriteLine("abhinna question 2\n");
        Console.WriteLine("\nEnter the number of students you want to add records of: ");
        num = int.Parse(Console.ReadLine());
        Student[] student = new Student[num];
        for (i = 0; i < num; i++)
        {
            Console.WriteLine($"\n#########\nEnter the student #{i + 1}'s id: ");
            id = int.Parse(Console.ReadLine());
            Console.WriteLine($"\nEnter the student #{i + 1}'s name: ");
            name = (Console.ReadLine());
            Console.WriteLine($"\nEnter the student #{i + 1}'s course name: ");
            course = (Console.ReadLine());
            Console.WriteLine($"\nEnter the student #{i + 1}'s date of birth: ");
            dob = DateOnly.Parse((Console.ReadLine()));

            student[i] = new Student(id, name, course, dob);
        }

        Console.WriteLine($"\n\n#######\nDisplaying student #{i + 1}:");
        for (i = 0; i < num; i++)
            student[i].display();
    }
  }
}
```

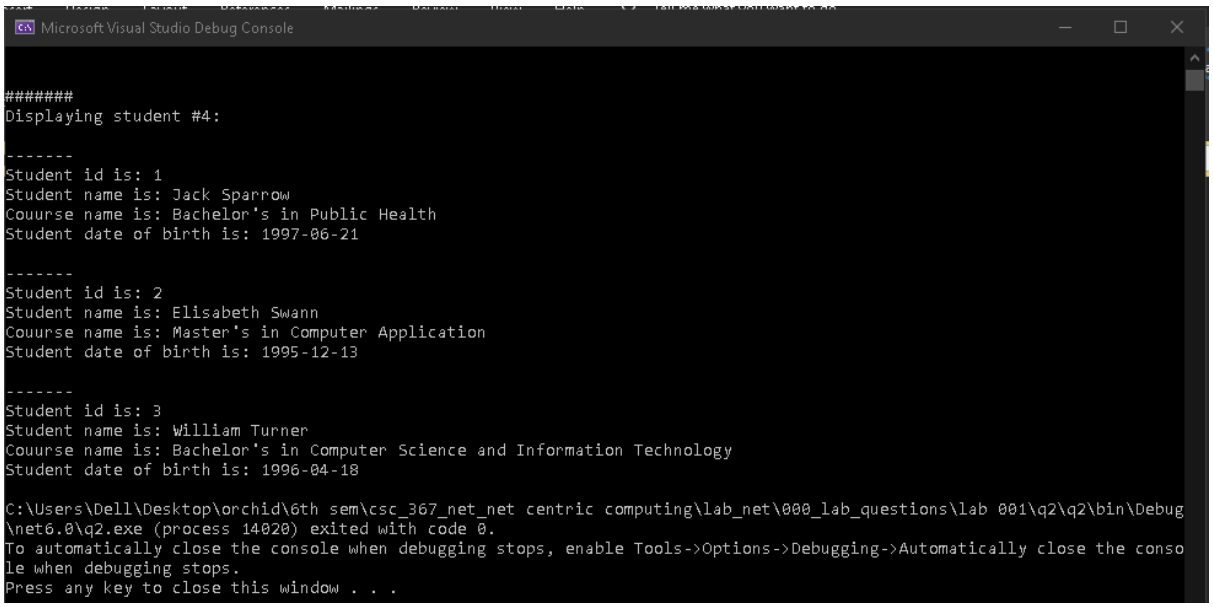
Output




Microsoft Visual Studio Debug Console
Enter the student #2's date of birth:
1995/12/13
#########
Enter the student #3's id:
3
Enter the student #3's name:
William Turner
Enter the student #3's course name:
Bachelor's in Computer Science and Information Technology
Enter the student #3's date of birth:
1996/04/18
#######
Displaying student #4:

Student id is: 1
Student name is: Jack Sparrow
Couurse name is: Bachelor's in Public Health
Student date of birth is: 1997-06-21

Student id is: 2
Student name is: Elisabeth Swann
Couurse name is: Master's in Computer Application


Microsoft Visual Studio Debug Console
#######
Displaying student #4:

Student id is: 1
Student name is: Jack Sparrow
Couurse name is: Bachelor's in Public Health
Student date of birth is: 1997-06-21

Student id is: 2
Student name is: Elisabeth Swann
Couurse name is: Master's in Computer Application
Student date of birth is: 1995-12-13

Student id is: 3
Student name is: William Turner
Couurse name is: Bachelor's in Computer Science and Information Technology
Student date of birth is: 1996-04-18
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q2\q2\bin\Debug
\net6.0\q2.exe (process 14020) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .

Lab no: 1.3 **Date**: 16th May, 2022

Name: Abhinna Ojha **TU Roll no:** 20788/075

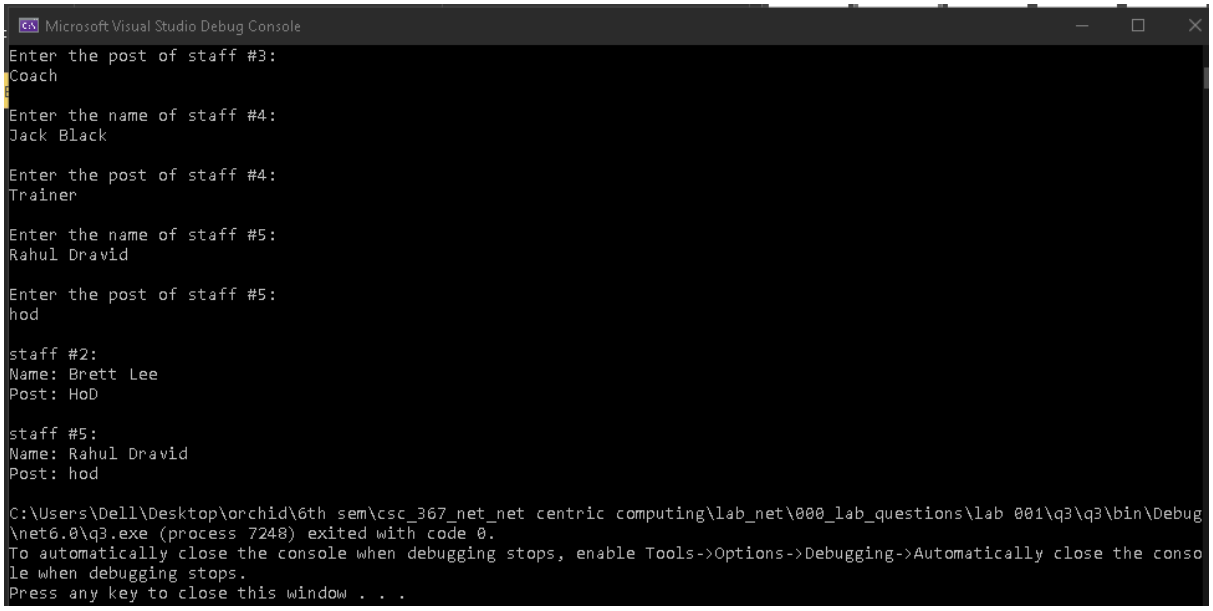
Title: Write a program to declare a class “staff” having data members as name and post. Accept this data 5 for 5 staffs and display names of staff who are HOD.

Source code

```
using System;
namespace OIC
{
   public class Staff    {
      private string name;
      private string post;

      public Staff(string name, string post)       {
         this.name = name;
         this.post = post;
      }
      public string ReturnPost()       {
         return post;
      }
      public void Display()       {
         Console.WriteLine($"Name: {name}");
         Console.WriteLine($"Post: {post}");
      }
   }
   public static class ClassTask    {
      public static void Main()       {
         Console.WriteLine("abhinna question 3\n");
         Staff[] staff = new Staff[5];
         for(int i = 0; i < 5; i++)
         {
            Console.WriteLine($"\nEnter the name of staff #{i + 1}:");
            string name = Console.ReadLine();
            Console.WriteLine($"\nEnter the post of staff #{i + 1}:");
            string post = Console.ReadLine();
            staff[i] = new Staff(name, post);
         }
         for (int i = 0; i < 5; i++)
         {
            if((staff[i].ReturnPost()).ToUpper() == "HOD")
```

```
            {
                Console.WriteLine($"\nstaff #{i + 1}:");
                staff[i].Display();
            }
        }
    }
  }
}
```

Output



ORCHID INTERNATIONAL College

Lab no: 1.4 **Date**: 16th May, 2022

Name: Abhinna Ojha **TU Roll no:** 20788/075

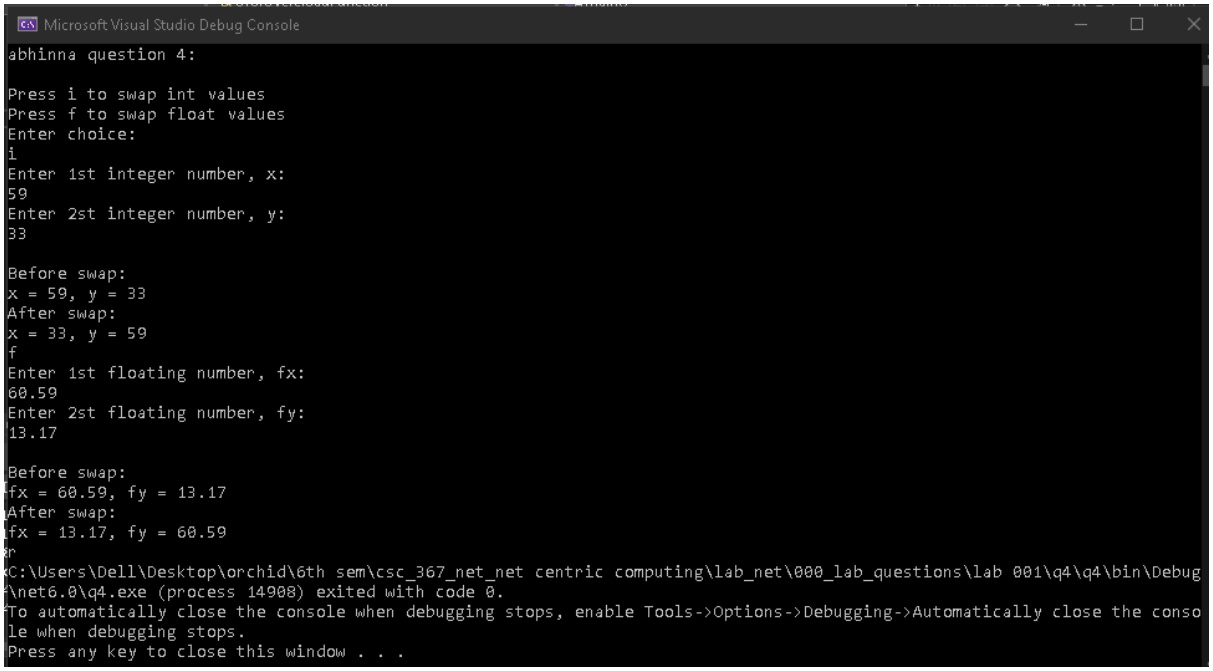
Title: Write a program using function overloading to swap two integer numbers and swap two float numbers.

Source code

```
namespace OIC
{
   public static class OvereloadFunction
   {
      static int t;
      static float tf;
      public static void swap(ref int a, ref int b)
      {
         t = a;
         a = b;
         b = t;
      }
      public static void swap(ref float a, ref float b)
      {
         tf = a;
         a = b;
         b = tf;

      }
      static void Main()
      {
         Console.WriteLine("abhinna question 4:\n");
         bool choice = true;
         Console.WriteLine("Press i to swap int values");
         Console.WriteLine("Press f to swap float values");
         Console.WriteLine("Enter choice:");
         while(choice == true)
         {
            var c = Console.ReadKey();
            switch(c.Key)
            {
               case ConsoleKey.F:
                  Console.WriteLine("\nEnter 1st floating number, fx: ");
                  float fx = float.Parse(Console.ReadLine());
```

```
                Console.WriteLine("Enter 2st floating number, fy: ");
                float fy = float.Parse(Console.ReadLine());
                Console.WriteLine("\nBefore swap: ");
                Console.WriteLine($"fx = {fx}, fy = {fy}");
                Console.WriteLine("After swap: ");
                swap(ref fx, ref fy);
                Console.WriteLine($"fx = {fx}, fy = {fy}");
                break;
            case ConsoleKey.I:
                Console.WriteLine("\nEnter 1st integer number, x: ");
                int x = int.Parse(Console.ReadLine());
                Console.WriteLine("Enter 2st integer number, y: ");
                int y = int.Parse(Console.ReadLine());
                Console.WriteLine("\nBefore swap: ");
                Console.WriteLine($"x = {x}, y = {y}");
                Console.WriteLine("After swap: ");
                swap(ref x, ref y);
                Console.WriteLine($"x = {x}, y = {y}");
                break;
            default:
                choice = false;
                break;

        }
      }
    }
  }
}
```

Output



Lab no: 1.5 **Date**: 16th May, 2022

Name: Abhinna Ojha **TU Roll no:** 20788/075

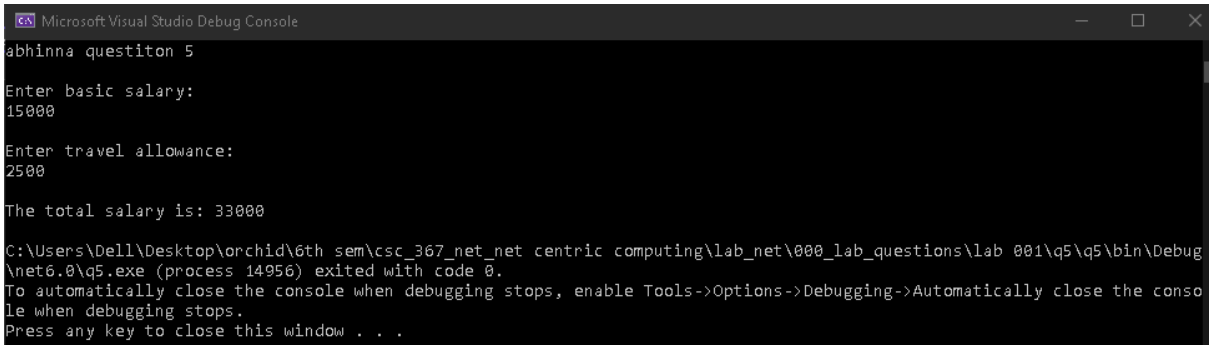
Title: Define a class “salary” which will contain member variable Basic, TA, DA, HRA. Write a program using Constructor with default values for DA and HRA and calculate the salary of employee.

Source code

```
using System;
namespace OIC
{
   class Salary
   {
      private double basic;
      private double TA;
      private double DA;
      private double HRA;

      public Salary(double basic, double ta, double da = 500.00, double hra = 15000.00)
      {
         this.basic = basic;
         TA = ta;
         DA = da;
         HRA = hra;
      }

      public double display()
      {
         return (basic + TA + DA + HRA);
      }

      static void Main()
      {
         Console.WriteLine("abhinna questiton 5");

         Console.WriteLine("\nEnter basic salary:");
         double basic = double.Parse(Console.ReadLine());
         Console.WriteLine("\nEnter travel allowance:");
         double ta = double.Parse(Console.ReadLine());
```

```
            Salary salary = new Salary(basic, ta);
            Console.WriteLine($"\nThe total salary is: {salary.display()}");
        }
    }
}
```

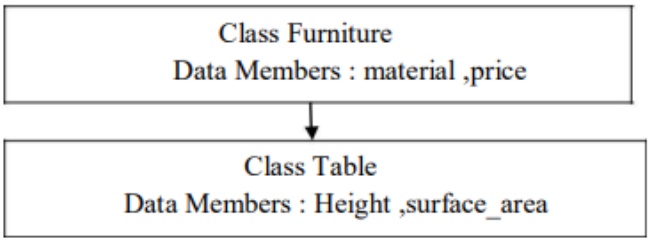
Output



Lab no: 1.6 **Date**: 16th May, 2022

Name: Abhinna Ojha **TU Roll no:** 20788/075

Title: Write a program to implement single inheritance from following figure. Accept and display data for one table:

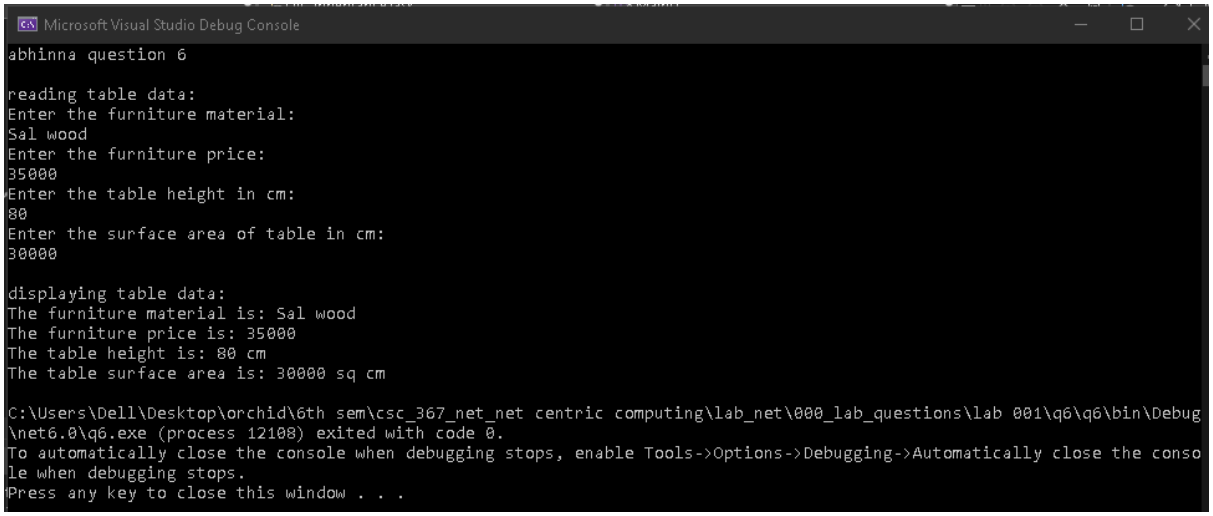


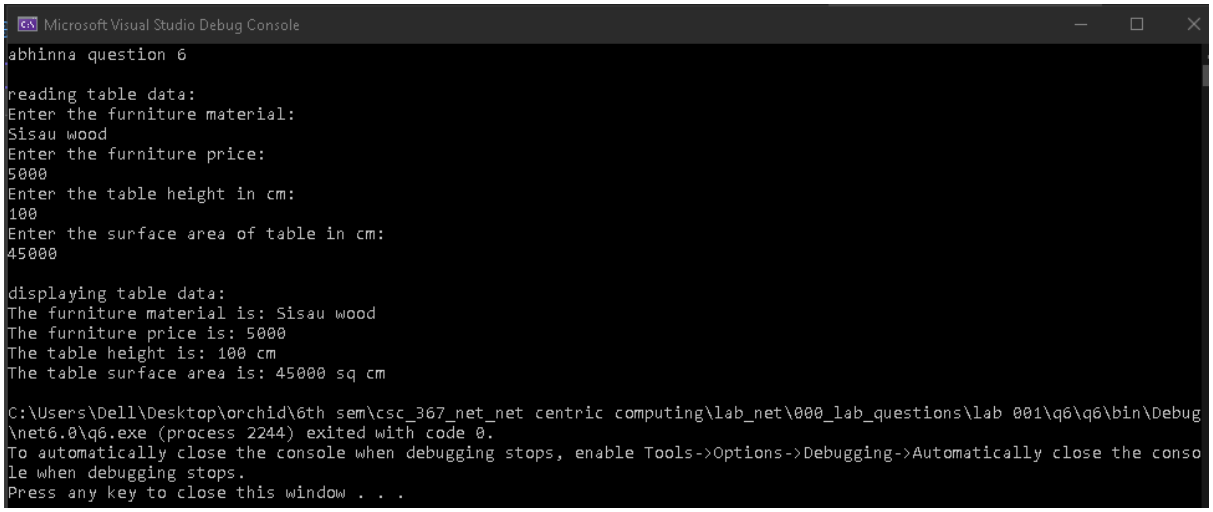
Source code

```
namespace OIC
{
   class Furniture
   {
      protected string material;
      protected float price;

      public void setFurniture()
      {
         Console.WriteLine("Enter the furniture material: ");
         material = Console.ReadLine();
         Console.WriteLine("Enter the furniture price: ");
         price = float.Parse(Console.ReadLine());
      }

      public void getFurniture()
      {
         Console.WriteLine($"The furniture material is: {material}");
         Console.WriteLine($"The furniture price is: {price}");
      }
   }

   class Table : Furniture
   {
      private float height;
      private float surface_area;
```

```
    public void setTable()
    {
        setFurniture();
        Console.WriteLine("Enter the table height in cm: ");
        height = float.Parse(Console.ReadLine());
        Console.WriteLine("Enter the surface area of table in cm: ");
        surface_area = float.Parse(Console.ReadLine());
    }

    public void getTable()
    {
        getFurniture();
        Console.WriteLine($"The table height is: {height} cm");
        Console.WriteLine($"The table surface area is: {surface_area} sq cm");
    }

}

class InheritanceTask
{
    static void Main()
    {
        Console.WriteLine("abhinna question 6");

        Table table = new Table();
        Console.WriteLine("\nreading table data:");
        table.setTable();
        Console.WriteLine("\ndisplaying table data:");
        table.getTable();
    }
}
}
```

Output

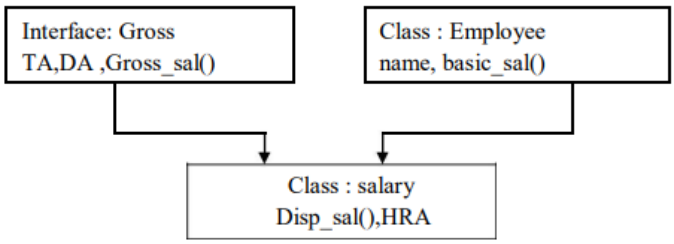

Microsoft Visual Studio Debug Console
abhinna question 6
reading table data:
Enter the furniture material:
Sal wood
Enter the furniture price:
35000
Enter the table height in cm:
80
Enter the surface area of table in cm:
30000
displaying table data:
The furniture material is: Sal wood
The furniture price is: 35000
The table height is: 80 cm
The table surface area is: 30000 sq cm
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q6\q6\bin\Debug
\net6.0\q6.exe (process 12108) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .


Microsoft Visual Studio Debug Console
abhinna question 6
reading table data:
Enter the furniture material:
Sisau wood
Enter the furniture price:
5000
Enter the table height in cm:
100
Enter the surface area of table in cm:
45000
displaying table data:
The furniture material is: Sisau wood
The furniture price is: 5000
The table height is: 100 cm
The table surface area is: 45000 sq cm
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q6\q6\bin\Debug
\net6.0\q6.exe (process 2244) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .

Lab no: 1.7 **Date**: 16th May, 2022

Name: Abhinna Ojha **TU Roll no:** 20788/075

Title: Program to implement the following multiple inheritance using interface.



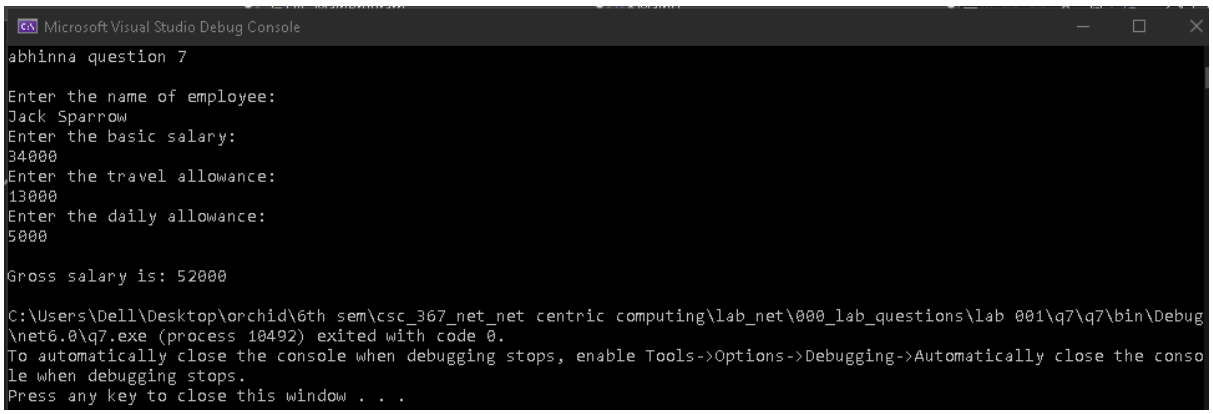
Source code

```
namespace OIC
{
   interface Gross
   {
      public float TA();
      public float DA();
      public float Gross_sal();
   }

   class Employee
   {
      protected string name;

      public Employee()
      {
         Console.WriteLine("Enter the name of employee: ");
         string name = Console.ReadLine();
      }
      public float basic_sal()
      {
         Console.WriteLine("Enter the basic salary: ");
         float sal = float.Parse(Console.ReadLine());
         return sal;
      }
   }

   class salary: Employee, Gross
   {
```

```
        public float TA()
        {
            Console.WriteLine("Enter the travel allowance: ");
            float ta = float.Parse(Console.ReadLine());
            return ta;
        }
        public float DA()
        {
            Console.WriteLine("Enter the daily allowance: ");
            float da = float.Parse(Console.ReadLine());
            return da;
        }
        public float Gross_sal()
        {
            float gross = basic_sal() + TA() + DA();
            return gross;
        }
    }

    class MainProgram
    {
        static void Main()
        {
            Console.WriteLine("abhinna question 7\n");

            salary s = new salary();
            Console.WriteLine($"\nGross salary is: {s.Gross_sal()}");

        }
    }
}
```

Output

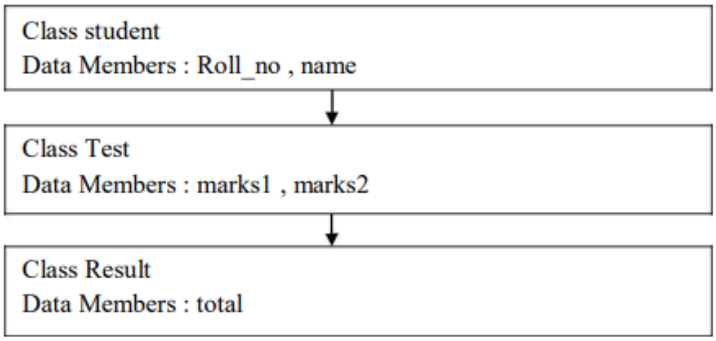
Microsoft Visual Studio Debug Console
abhinna question 7
Enter the name of employee:
Ram Dhami
Enter the basic salary:
25000
Enter the travel allowance:
5000
Enter the daily allowance:
4000
Gross salary is: 34000
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q7\q7\bin\Debug
\net6.0\q7.exe (process 14480) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .


Microsoft Visual Studio Debug Console
abhinna question 7
Enter the name of employee:
Jack Sparrow
Enter the basic salary:
34000
Enter the travel allowance:
13000
Enter the daily allowance:
5000
Gross salary is: 52000
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q7\q7\bin\Debug
\net6.0\q7.exe (process 10492) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .

Lab no: 1.8 **Date**: 16th May, 2022

Name: Abhinna Ojha **TU Roll no:** 20788/075

Title: Write a program to implement multilevel inheritance from following figure. Accept and display data for one student.



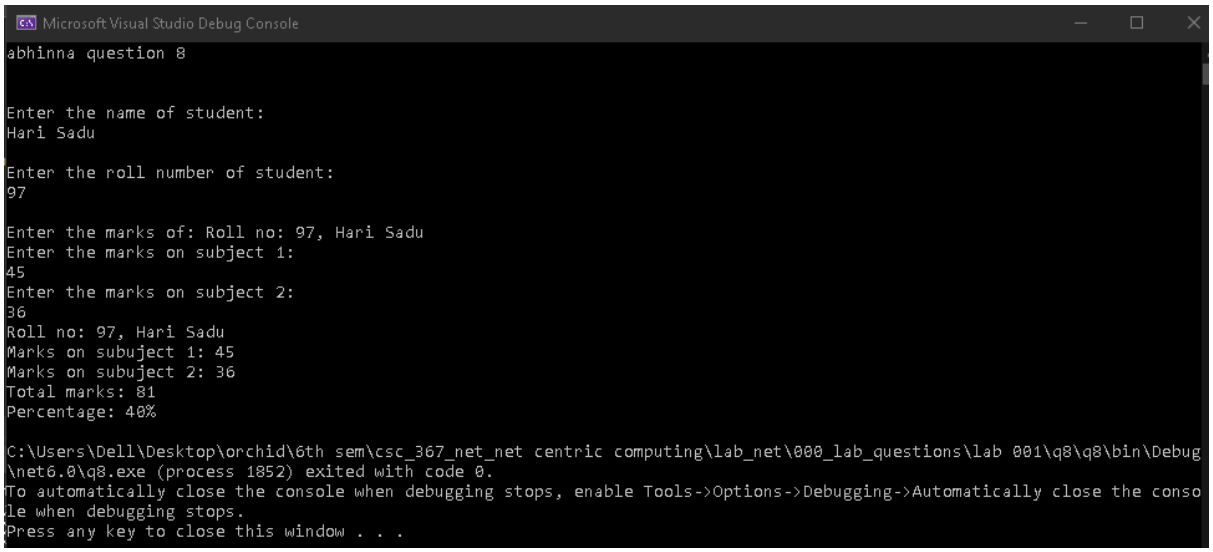
Source code

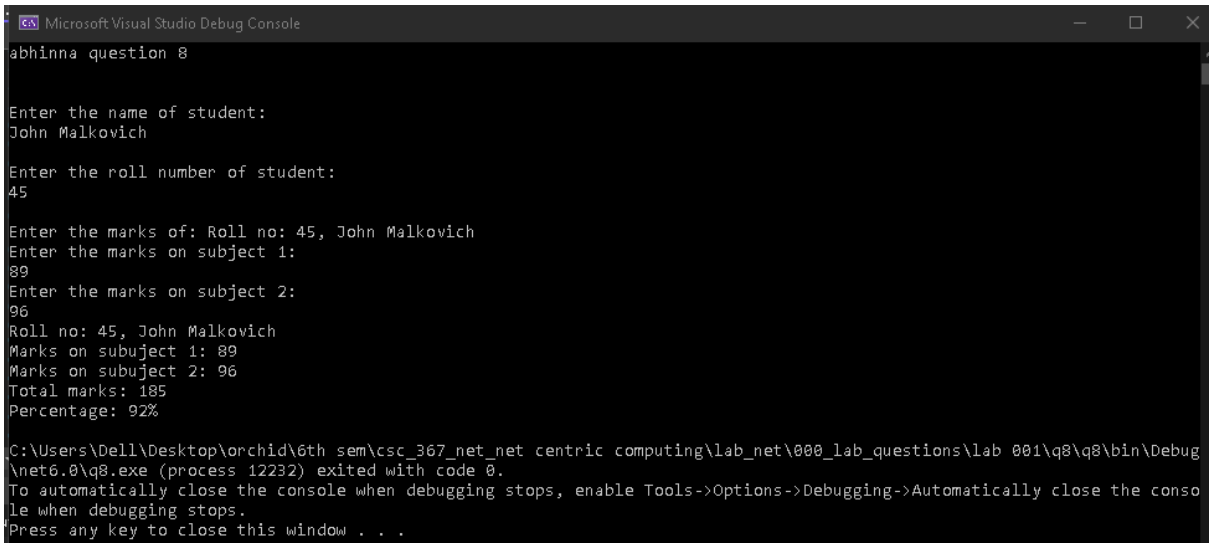
```
namespace OIC
{
   class student
   {
      public int roll;
      public string name;

      public void setstudent()
      {
         Console.WriteLine("\nEnter the name of student: ");
         name =  Console.ReadLine();
         Console.WriteLine("\nEnter the roll number of student: ");
         roll = int.Parse(Console.ReadLine());
      }
      public void getstudent()
      {
         Console.Write($"Roll no: {roll}, {name}\n");
      }
   }

   class Test: student
   {
      protected int marks1;
```

```
    protected int marks2;

    public void setTest()
    {
        Console.Write("\nEnter the marks of: ");
        getstudent();
        Console.WriteLine("Enter the marks on subject 1: ");
        marks1 = int.Parse(Console.ReadLine());
        Console.WriteLine("Enter the marks on subject 2: ");
        marks2 = int.Parse(Console.ReadLine());
    }
    public void getTest()
    {
        Console.WriteLine($"Marks on subuject 1: {marks1}");
        Console.WriteLine($"Marks on subuject 2: {marks2}");

    }
}

class Result: Test
{
    private int total;

    public void setResult()
    {
        setstudent();
        setTest();

        total = marks1 + marks2;
    }
    public void getResult()
    {
        getstudent();
        getTest();
        Console.WriteLine($"Total marks: {total}");
        Console.WriteLine($"Percentage: {total / 2}%");
    }
}
static class MainProgram
{
    static void Main()
    {
        Console.WriteLine("abhinna question 8\n");

        Result result = new Result();
        result.setResult();
        result.getResult();
    }
}
}
```

Output

Microsoft Visual Studio Debug Console
abhinna question 8
Enter the name of student:
Sita Dulal
Enter the roll number of student:
32
Enter the marks of: Roll no: 32, Sita Dulal
Enter the marks on subject 1:
78
Enter the marks on subject 2:
67
Roll no: 32, Sita Dulal
Marks on subuject 1: 78
Marks on subujject 2: 67
Total marks: 145
Percentage: 72%
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q8\q8\bin\Debug\net6.0\q8.exe (process 16448) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .


Microsoft Visual Studio Debug Console
abhinna question 8
Enter the name of student:
Hari Sadu
Enter the roll number of student:
97
Enter the marks of: Roll no: 97, Hari Sadu
Enter the marks on subject 1:
45
Enter the marks on subject 2:
36
Roll no: 97, Hari Sadu
Marks on subujject 1: 45
Marks on subujject 2: 36
Total marks: 81
Percentage: 40%
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q8\q8\bin\Debug\net6.0\q8.exe (process 1852) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .


Microsoft Visual Studio Debug Console
abhinna question 8
Enter the name of student:
John Malkovich
Enter the roll number of student:
45
Enter the marks of: Roll no: 45, John Malkovich
Enter the marks on subject 1:
89
Enter the marks on subject 2:
96
Roll no: 45, John Malkovich
Marks on subujject 1: 89
Marks on subujject 2: 96
Total marks: 185
Percentage: 92%
C:\Users\Dell\Desktop\orchid\6th sem\csc_367_net_net centric computing\lab_net\000_lab_questions\lab 001\q8\q8\bin\Debug\net6.0\q8.exe (process 12232) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .