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PRE-LAB

1. What are the types of Inheritance & How it is helpful to implement an Application?

Solution:

1. Single Inheritance: A class inherits from only one base class.
2. Multiple Inheritance: A class inherits from more than one base class.
3. Multilevel Inheritance: A derived class inherits from another derived class.
4. Hierarchical Inheritance: Multiple classes inherit from a single base class.
5. Hybrid Inheritance: Combination of two or more types of inheritance.

Inheritance helps in code reusability, promotes the concept of hierarchical modeling, and allows for the creation of more specialized classes, enhancing the structure and extensibility of an application

IN-LAB:

Task1: To create classes Employee**,** SalesPerson**,** Manager **and** Company **with predefined functionality.**

Low level requires:

1. To create basic class **Employee** and declare following content:

- Three closed fields – text field **name** (employee last name), money fields – **salary** and **bonus**
- Public property **Name** for reading employee's last name
- Public property **Salary** for reading and recording salary field
- Constructor with parameters string **name** and money **salary** (last name and salary are set)
- Virtual method **SetBonus** that sets bonuses to salary, amount of which is delegated/conveyed as bonus
- Method ToPay that returns the value of summarized salary and bonus.

2. To create class **SalesPerson** as class **Employee** inheritor and declare within it:

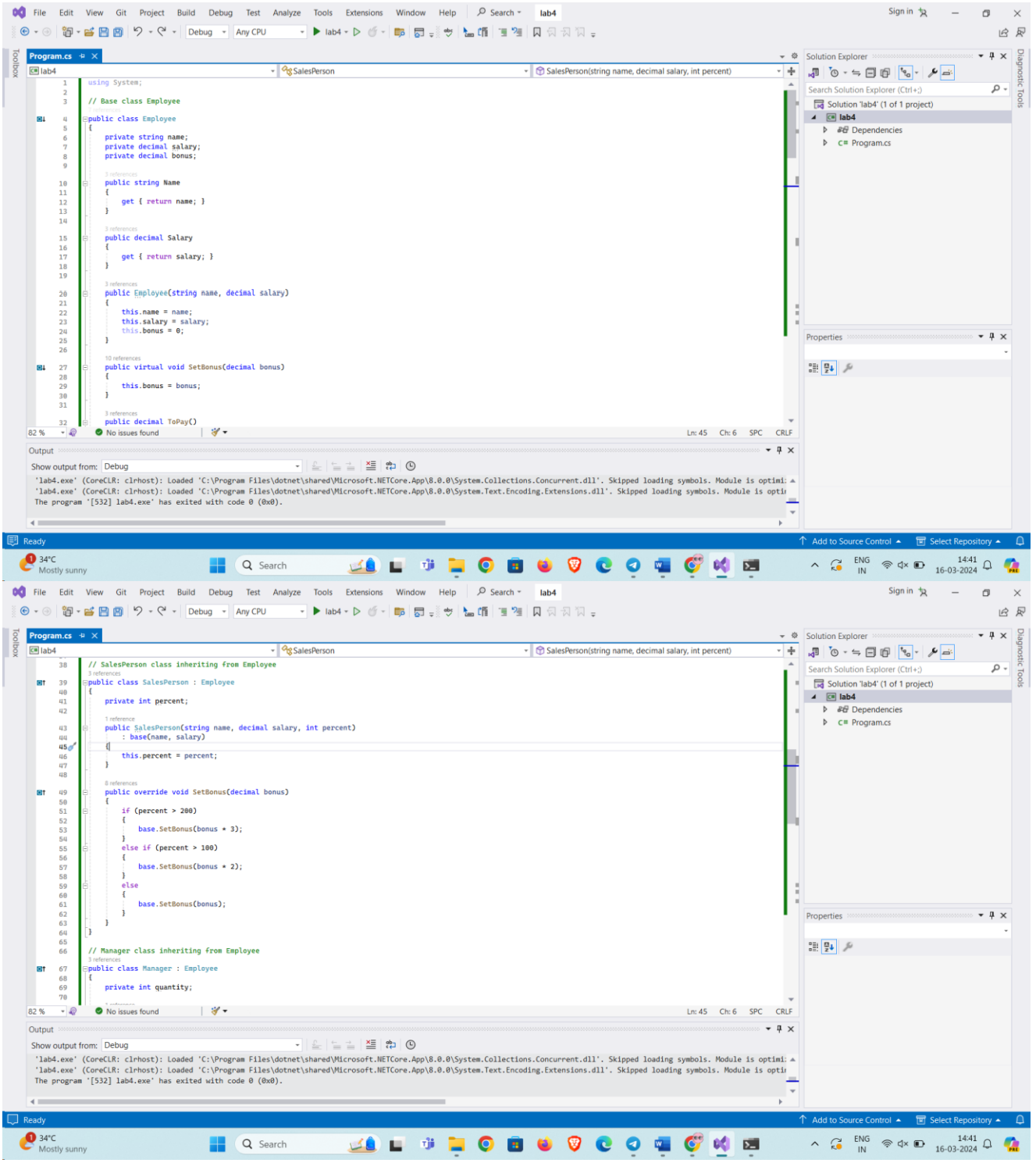
- Closed integer field **percent** (percent of sales targets plan performance/execution)
- Constructor with parameters: **name** – employee last name, **salary**, **percent** – percent of plan performance, first two of which are passed to basic class constructor
- Redefine virtual method of parent class **SetBonus** in the following way: if the sales person completed the plan more than 100%, so his bonus is doubled (is multiplied by 2), and if more than 200% - bonus is tripled (is multiplied by 3)

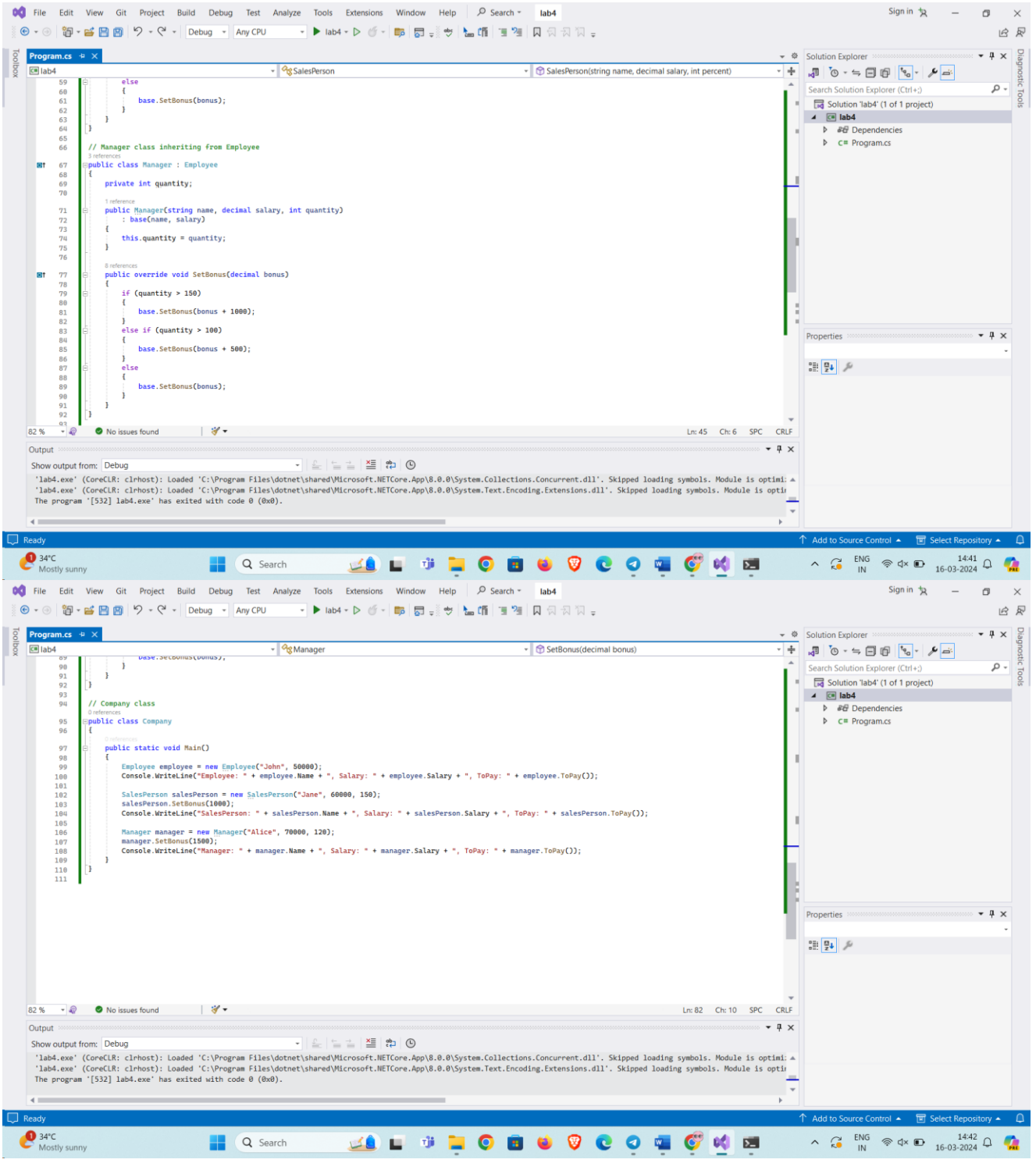
3. To create class **Manager** as **Employee** class inheritor, and declare with it:

- Closed integer field **quantity** (number of clients, who were served by the manager during a month)

- Constructor with parameters string **name** – employee last name, **salary** and integer **clientAmount** – number of served clients, first two of which are passed to basic class constructor.
- Redefine virtual method of parent class **SetBonus** in the following way: if the manager served over 100 clients, his bonus is increased by 500, and if more than 150 clients – by 1000.

Solution:




File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
lab4
Program.cs
lab4
SalesPerson
SalesPerson(string name, decimal salary, int percent)
else
{
base.SetBonus(bonus);
}
}
}
// Manager class inheriting from Employee
3 references
public class Manager : Employee
{
private int quantity;
1 reference
public Manager(string name, decimal salary, int quantity)
: base(name, salary)
{
this.quantity = quantity;
}
8 references
public override void SetBonus(decimal bonus)
{
if (quantity > 150)
{
base.SetBonus(bonus + 1000);
}
else if (quantity > 100)
{
base.SetBonus(bonus + 500);
}
else
{
base.SetBonus(bonus);
}
}
}
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Solution Explorer
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Solution 'lab4' (1 of 1 project)
lab4
Dependencies
Program.cs
Properties
Output
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16-03-2024

File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
lab4
Program.cs
lab4
Manager
SetBonus(decimal bonus)
}
}
}
// Company class
0 references
public class Company
{
public static void Main()
{
Employee employee = new Employee("John", 50000);
Console.WriteLine("Employee: " + employee.Name + ", Salary: " + employee.Salary + ", ToPay: " + employee.ToPay());
SalesPerson salesPerson = new SalesPerson("Jane", 60000, 150);
salesPerson.SetBonus(1000);
Console.WriteLine("SalesPerson: " + salesPerson.Name + ", Salary: " + salesPerson.Salary + ", ToPay: " + salesPerson.ToPay());
Manager manager = new Manager("Alice", 70000, 120);
manager.SetBonus(1500);
Console.WriteLine("Manager: " + manager.Name + ", Salary: " + manager.Salary + ", ToPay: " + manager.ToPay());
}
}
No issues found
Ln: 82 Ch: 10 SPC CRLF
Solution Explorer
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Solution 'lab4' (1 of 1 project)
lab4
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Program.cs
Properties
Output
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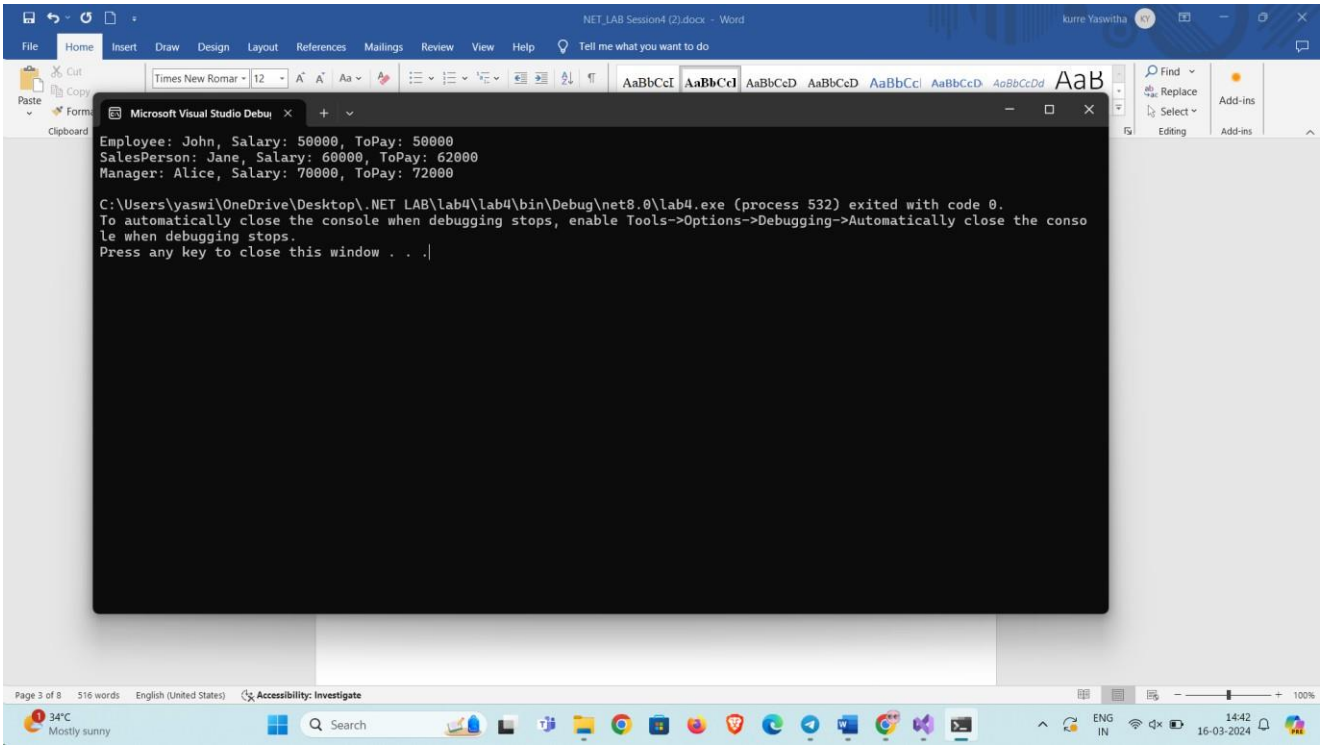
OUTPUT:

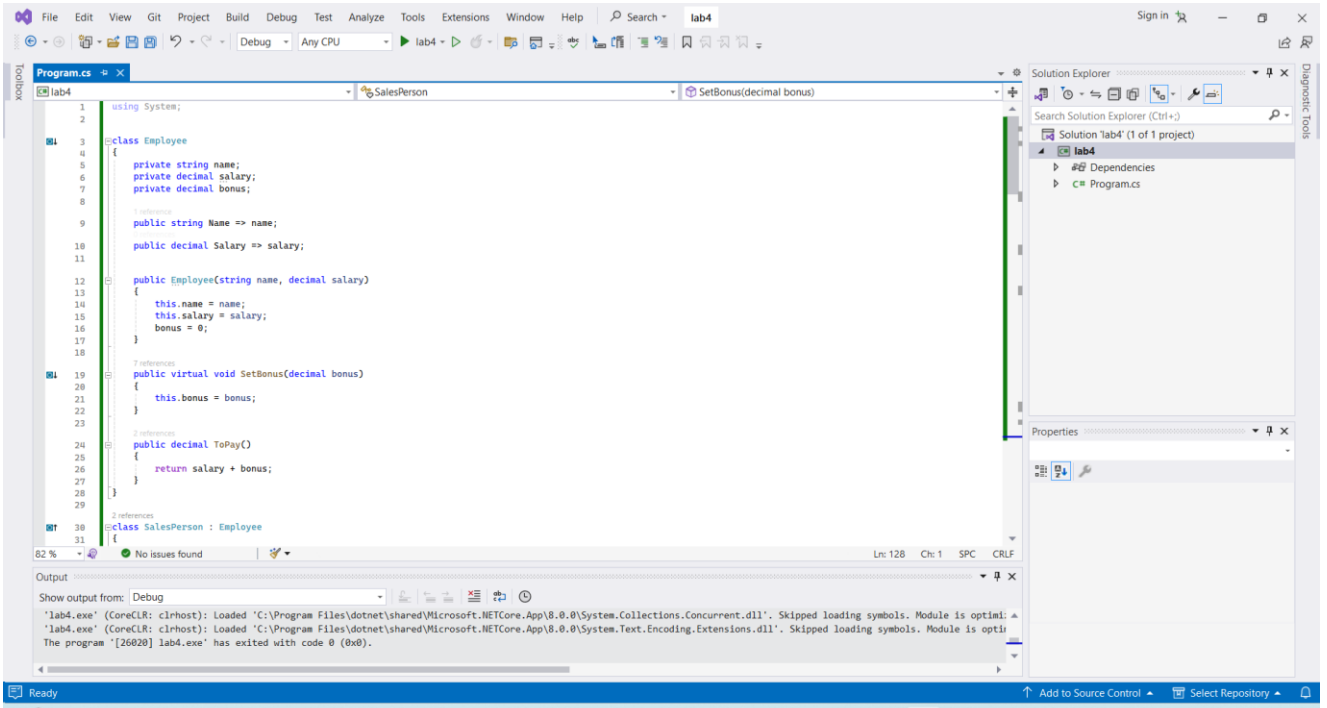


TASK 2: Advanced level requires:

1. To fully complete Low level tasks.
2. Create class Company and declare within it:

- Closed field **employees** (staff) – an array of Employee type.
- Constructor that receives employee array of **Employee** type with arbitrary length
- Method **GiveEverybodyBonus** with money parameter **companyBonus** that sets the amount of basic bonus for each employee.
- Method **TotalToPay** that returns total amount of salary of all employees including awarded bonus
- Method **NameMaxSalary** that returns employee last name, who received maximum salary including bonus.

Solution:


File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
lab4
Sign in
Debug
Any CPU
lab4
Program.cs
lab4
SalesPerson
SetBonus(decimal bonus)
using System;
class Employee
{
private string name;
private decimal salary;
private decimal bonus;
public string Name => name;
public decimal Salary => salary;
public Employee(string name, decimal salary)
{
this.name = name;
this.salary = salary;
bonus = 0;
}
public virtual void SetBonus(decimal bonus)
{
this.bonus = bonus;
}
public decimal ToPay()
{
return salary + bonus;
}
}
class SalesPerson : Employee
{
Solution Explorer
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Solution 'lab4' (1 of 1 project)
lab4
Dependencies
Program.cs
Properties
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Output
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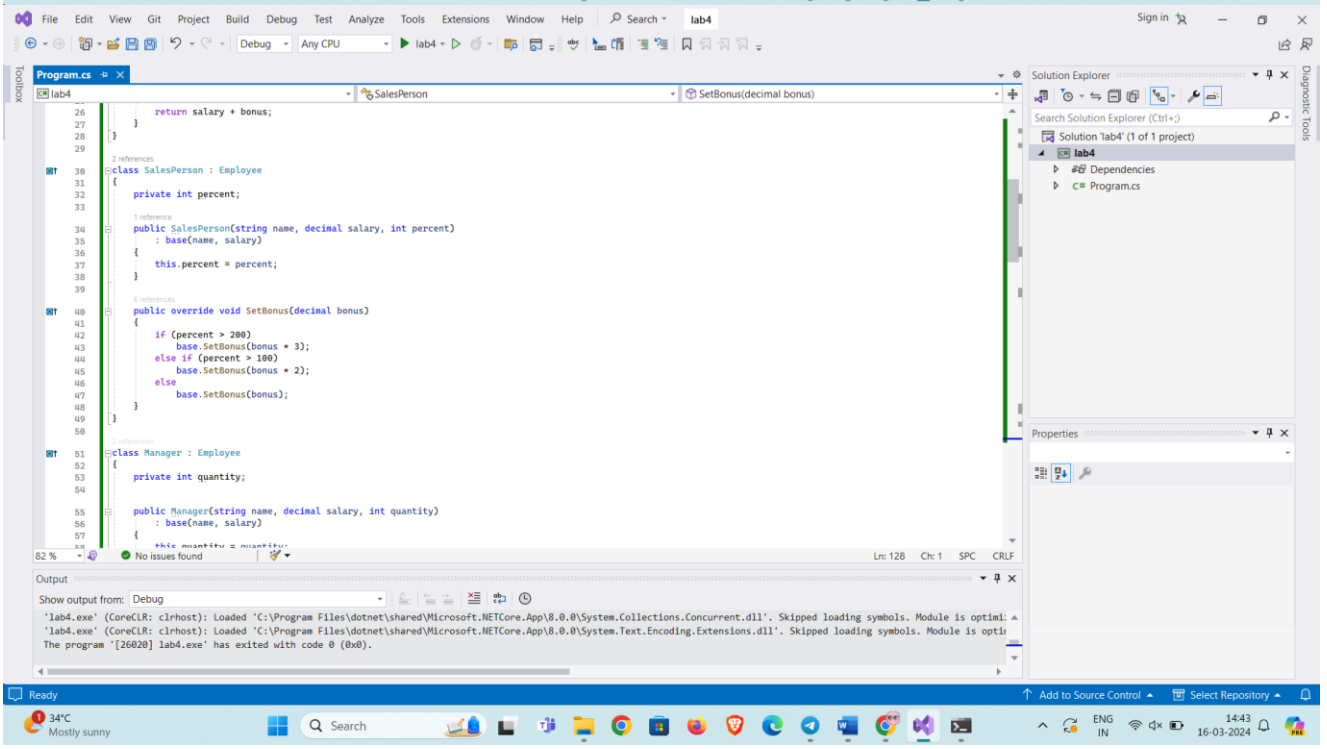
File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
lab4
Sign in
Debug
Any CPU
lab4
Program.cs
lab4
SalesPerson
SetBonus(decimal bonus)
return salary + bonus;
}
}
class SalesPerson : Employee
{
private int percent;
public SalesPerson(string name, decimal salary, int percent)
: base(name, salary)
{
this.percent = percent;
}
public override void SetBonus(decimal bonus)
{
if (percent > 200)
base.SetBonus(bonus * 3);
else if (percent > 100)
base.SetBonus(bonus * 2);
else
base.SetBonus(bonus);
}
}
class Manager : Employee
{
private int quantity;
public Manager(string name, decimal salary, int quantity)
: base(name, salary)
{
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'lab4' (1 of 1 project)
lab4
Dependencies
Program.cs
Properties
No issues found
Ln: 128 Ch: 1 SPC CRLF
Output
Show output from: Debug
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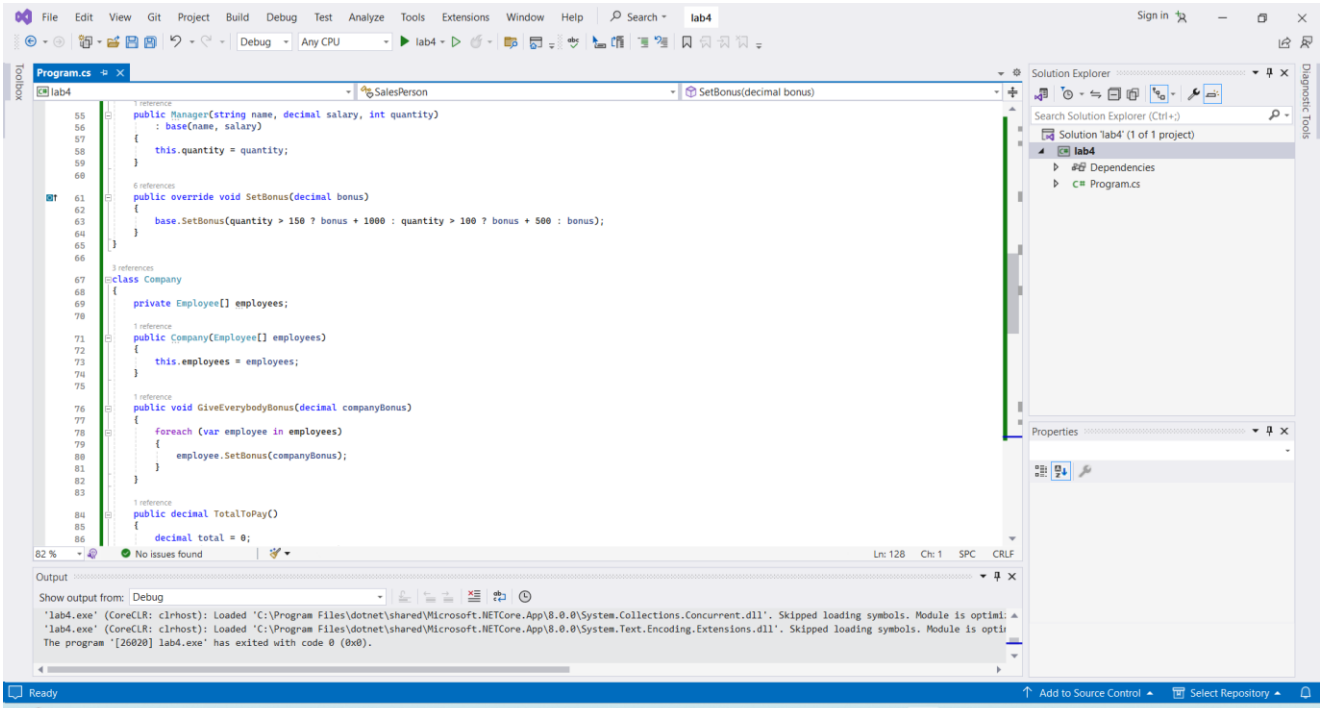
File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
lab4
Sign in
Debug
Any CPU
lab4
Program.cs
lab4
SalesPerson
SetBonus(decimal bonus)
1 reference
public Manager(string name, decimal salary, int quantity)
: base(name, salary)
{
this.quantity = quantity;
}
6 references
public override void SetBonus(decimal bonus)
{
base.SetBonus(quantity > 150 ? bonus + 1000 : quantity > 100 ? bonus + 500 : bonus);
}
}
3 references
class Company
{
private Employee[] employees;
1 reference
public Company(Employee[] employees)
{
this.employees = employees;
}
1 reference
public void GiveEverybodyBonus(decimal companyBonus)
{
foreach (var employee in employees)
{
employee.SetBonus(companyBonus);
}
}
1 reference
public decimal TotalToPay()
{
decimal total = 0;
82 %
No issues found
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Output
Show output from: Debug
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lab4
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Program.cs
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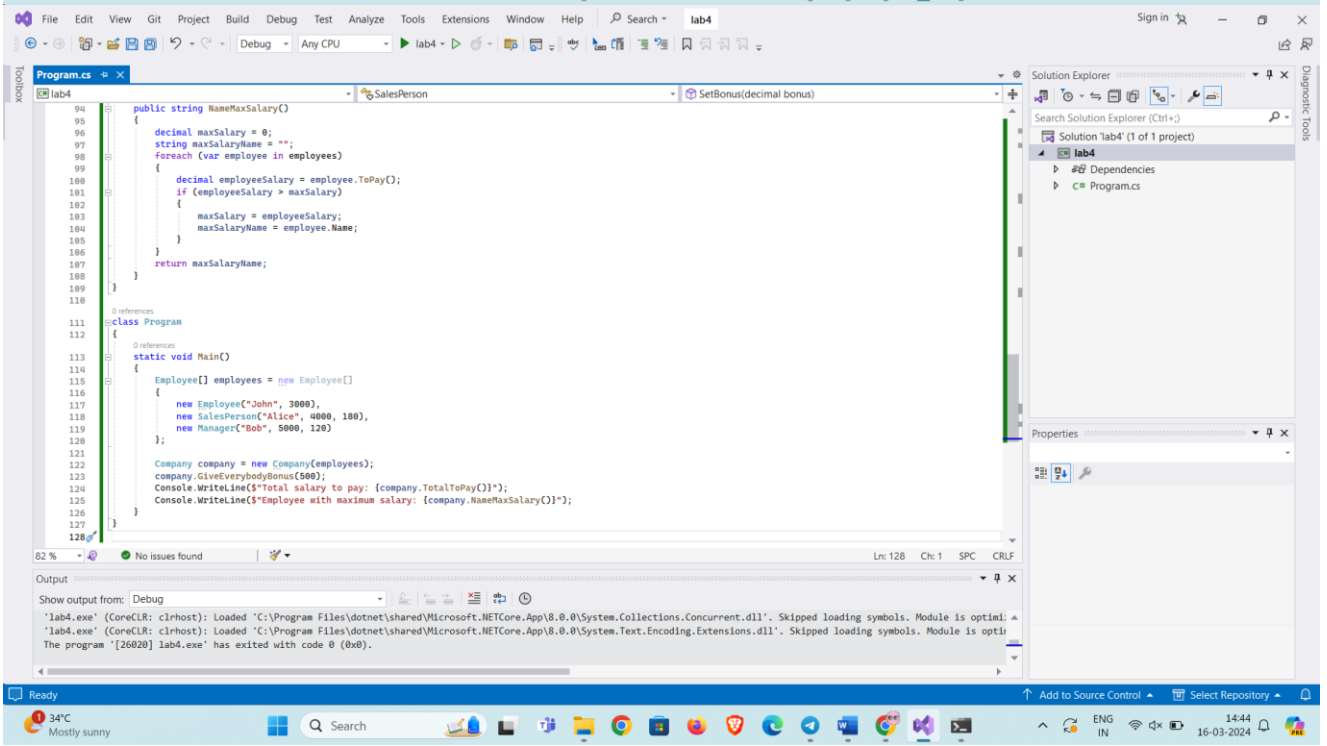
File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
lab4
Sign in
Debug
Any CPU
lab4
Program.cs
lab4
SalesPerson
SetBonus(decimal bonus)
public string NameMaxSalary()
{
decimal maxSalary = 0;
string maxSalaryName = "";
foreach (var employee in employees)
{
decimal employeeSalary = employee.ToPay();
if (employeeSalary > maxSalary)
{
maxSalary = employeeSalary;
maxSalaryName = employee.Name;
}
}
return maxSalaryName;
}
}
0 references
class Program
{
0 references
static void Main()
{
Employee[] employees = new Employee[]
{
new Employee("John", 3000),
new SalesPerson("Alice", 4000, 180),
new Manager("Bob", 5000, 120)
};
Company company = new Company(employees);
company.GiveEverybodyBonus(500);
Console.WriteLine($"Total salary to pay: {company.TotalToPay()}");
Console.WriteLine($"Employee with maximum salary: {company.NameMaxSalary()}");
}
}
82 %
No issues found
Ln: 128 Ch: 1 SPC CRLF
Output
Show output from: Debug
'lab4.exe' (CoreCLR: clrhost): Loaded 'C:\Program Files\dotnet\shared\Microsoft.NETCore.App\8.0.0\System.Collections.Concurrent.dll'. Skipped loading symbols. Module is optimi
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Solution 'lab4' (1 of 1 project)
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Program.cs
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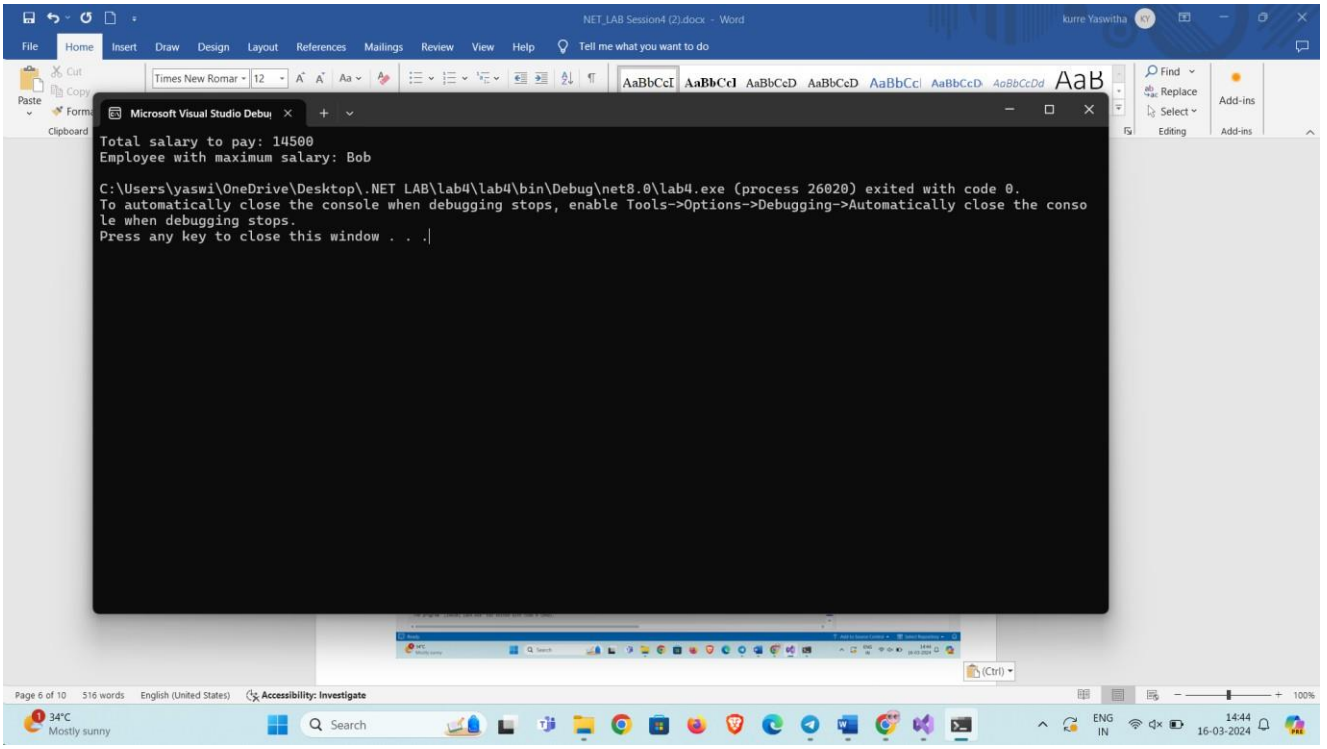
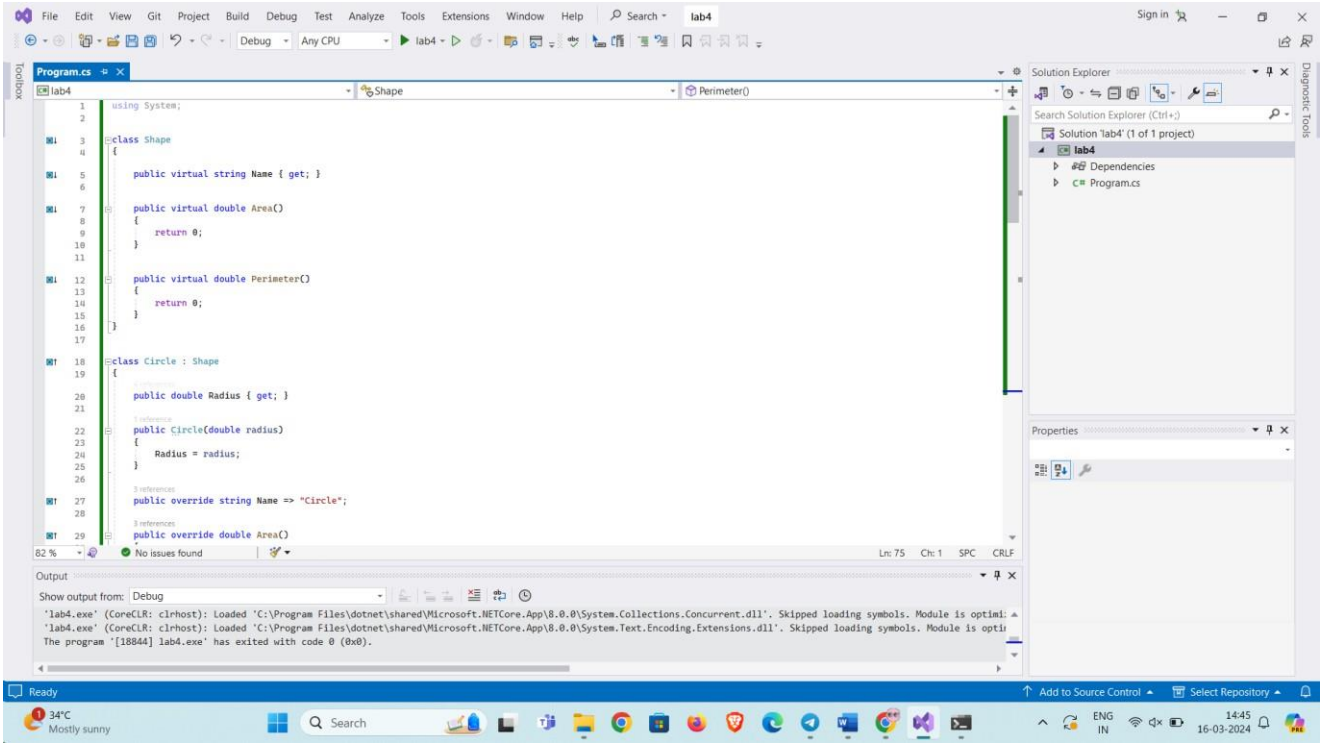
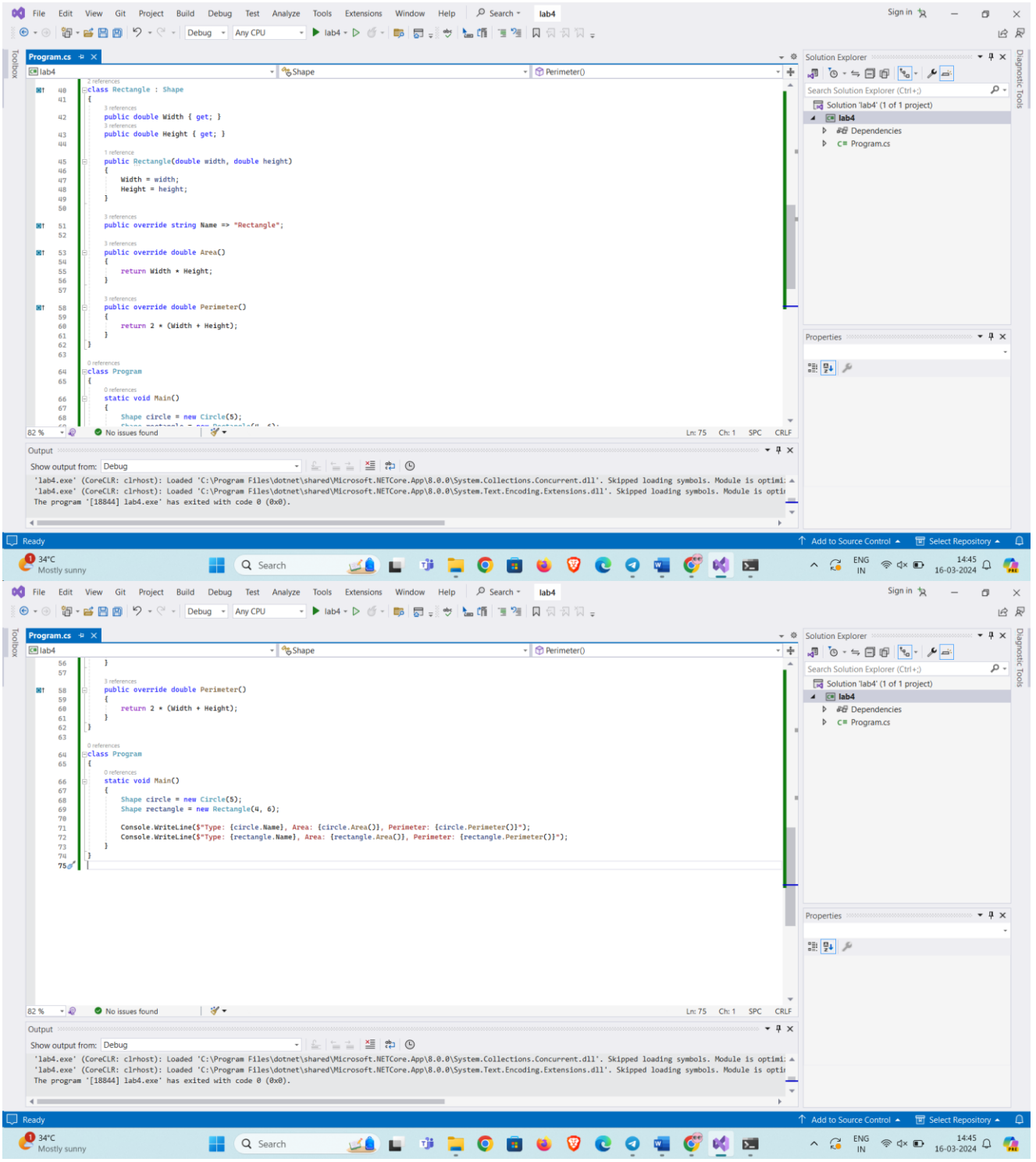


POST-LAB

1. Implement a small Application with help of the Inheritance and Analyze the type of Inheritance is used in the application? Justify Answer?

Solution:




File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
lab4
Sign in
Debug
Any CPU
lab4
Program.cs
lab4
Shape
Perimeter()
class Rectangle : Shape
{
public double Width { get; }
public double Height { get; }
public Rectangle(double width, double height)
{
Width = width;
Height = height;
}
public override string Name => "Rectangle";
public override double Area()
{
return Width * Height;
}
public override double Perimeter()
{
return 2 * (Width + Height);
}
}
class Program
{
static void Main()
{
Shape circle = new Circle(5);
82 %
No issues found
Ln: 75 Ch: 1 SPC CRLF
Output
Show output from: Debug
'lab4.exe' (CoreCLR: clrhost): Loaded 'C:\Program Files\dotnet\shared\Microsoft.NETCore.App\8.0.0\System.Collections.Concurrent.dll'. Skipped loading symbols. Module is optimi
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Solution Explorer
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Solution 'lab4' (1 of 1 project)
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16-03-2024

File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
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Debug
Any CPU
lab4
Program.cs
lab4
Shape
Perimeter()
}
public override double Perimeter()
{
return 2 * (Width + Height);
}
}
class Program
{
static void Main()
{
Shape circle = new Circle(5);
Shape rectangle = new Rectangle(4, 6);
Console.WriteLine($"Type: {circle.Name}, Area: {circle.Area()}, Perimeter: {circle.Perimeter()}");
Console.WriteLine($"Type: {rectangle.Name}, Area: {rectangle.Area()}, Perimeter: {rectangle.Perimeter()}");
}
}
82 %
No issues found
Ln: 75 Ch: 1 SPC CRLF
Output
Show output from: Debug
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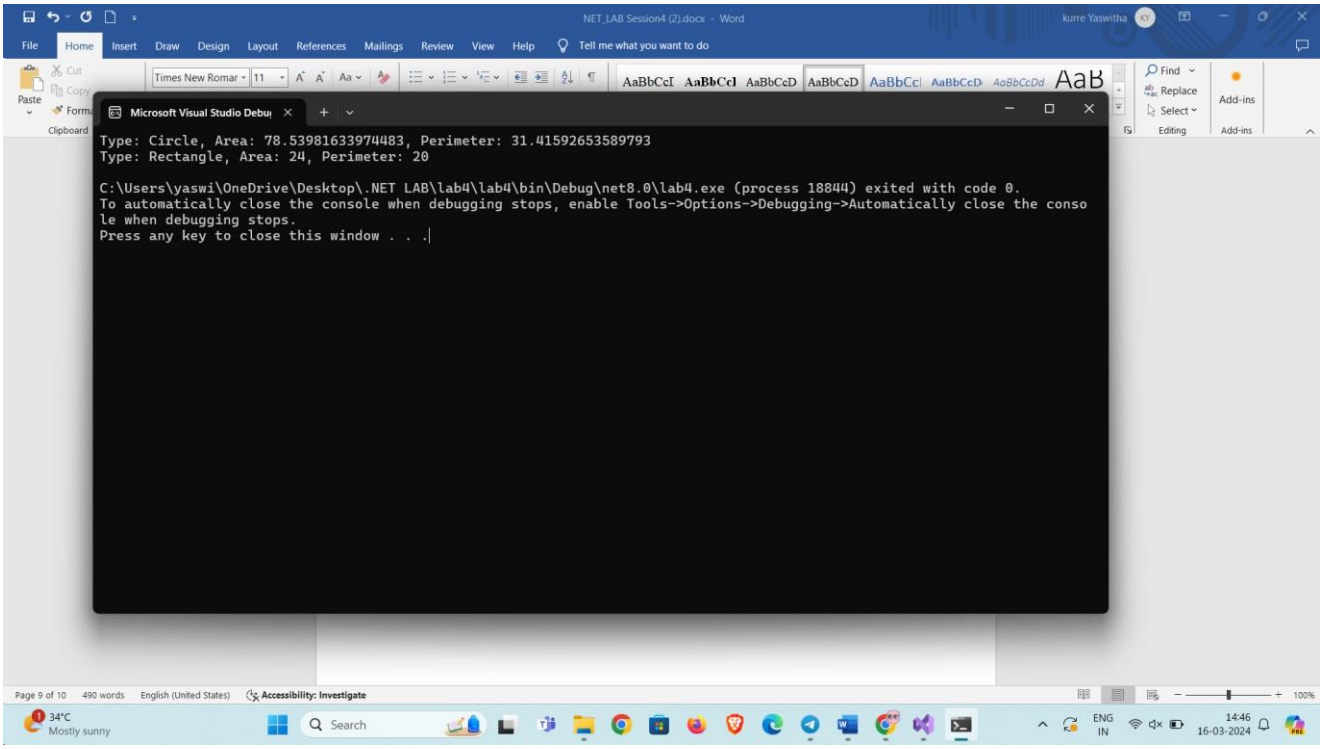
OUTPUT:


NET_LAB Session4 (2).docx - Word
Microsoft Visual Studio Debu
Type: Circle, Area: 78.53981633974483, Perimeter: 31.41592653589793
Type: Rectangle, Area: 24, Perimeter: 20
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Page 9 of 10
490 words
English (United States)
Accessibility: Investigate
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16-03-2024