

PRE-LAB

1. What are the principles of OOP?

ANS:

1. Encapsulation
2. Abstraction
3. Inheritance
4. Polymorphism

IN-LAB:

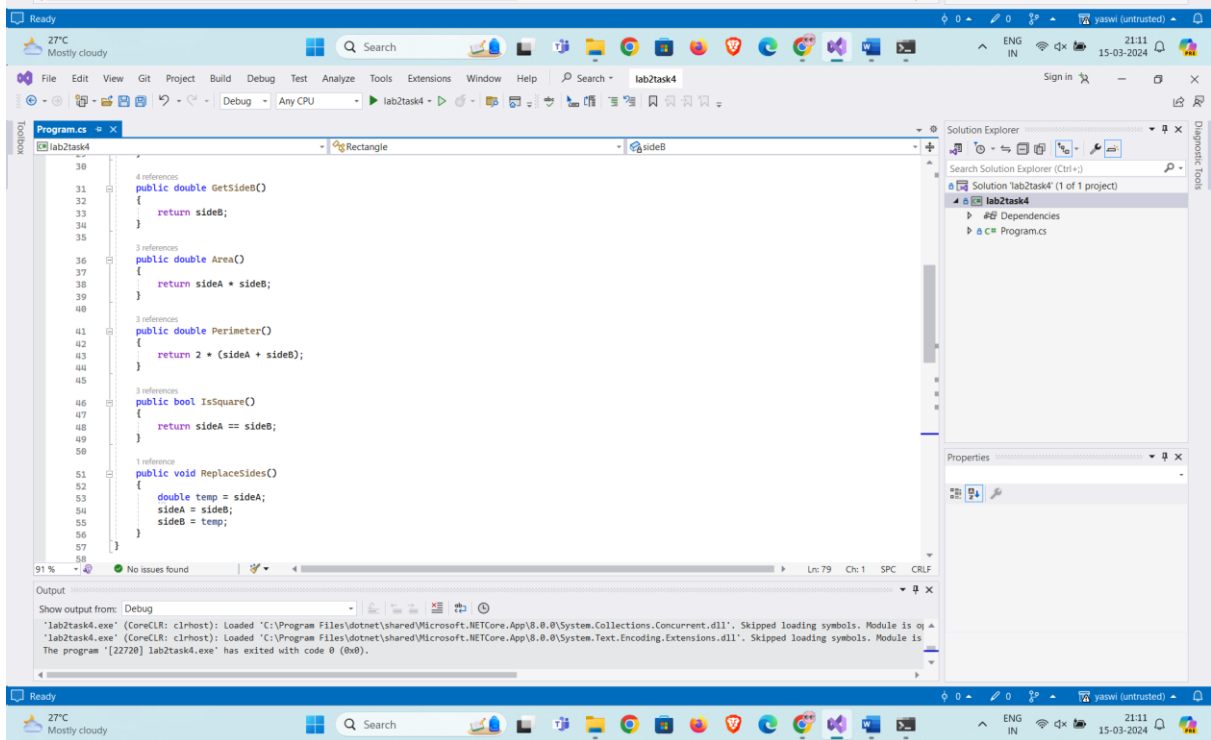
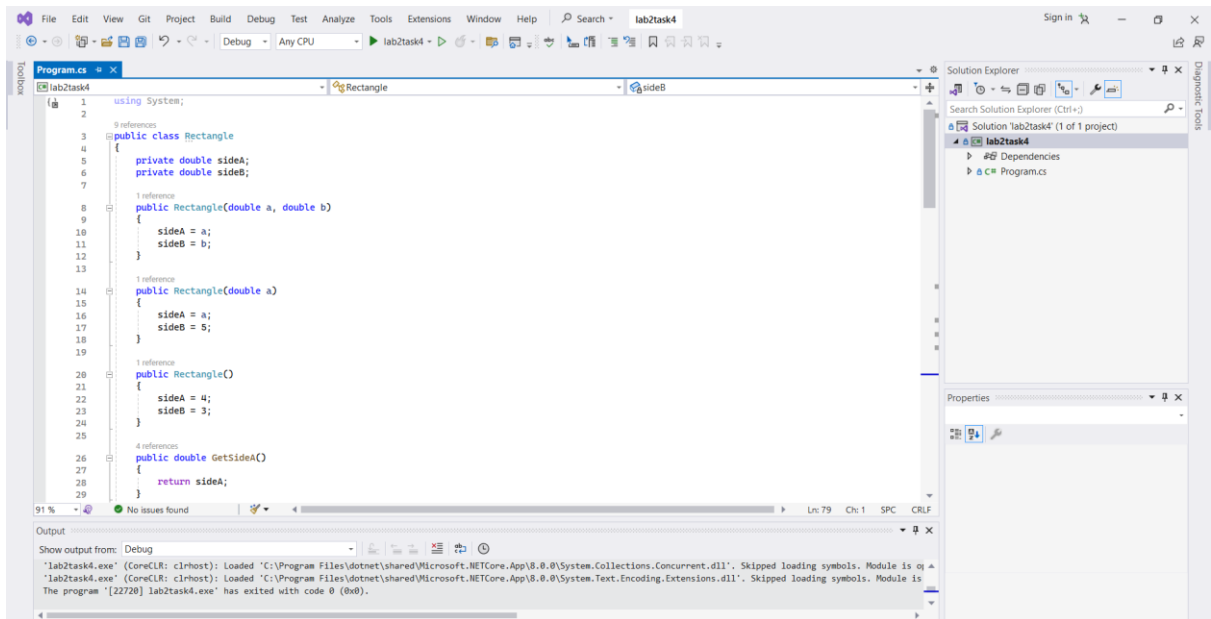
1. Develop **Rectangle** and **ArrayRectangles** with a predefined functionality.

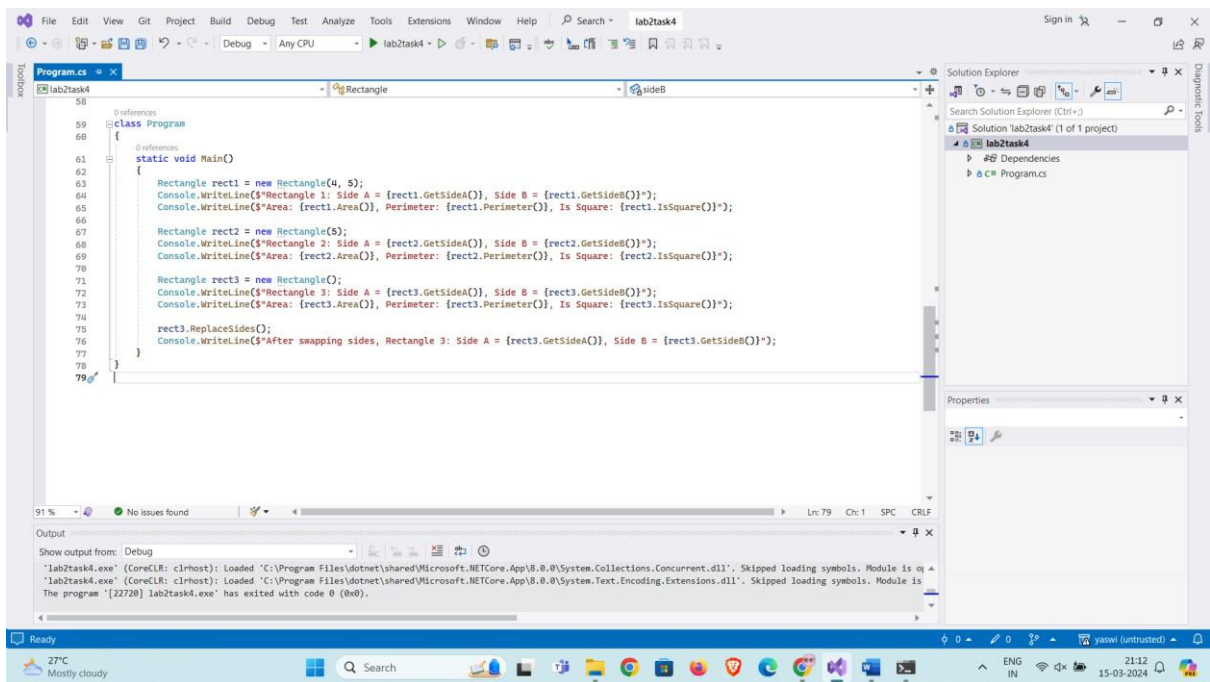
Low level Task:

TASK 1: To develop **Rectangle** class with following content:

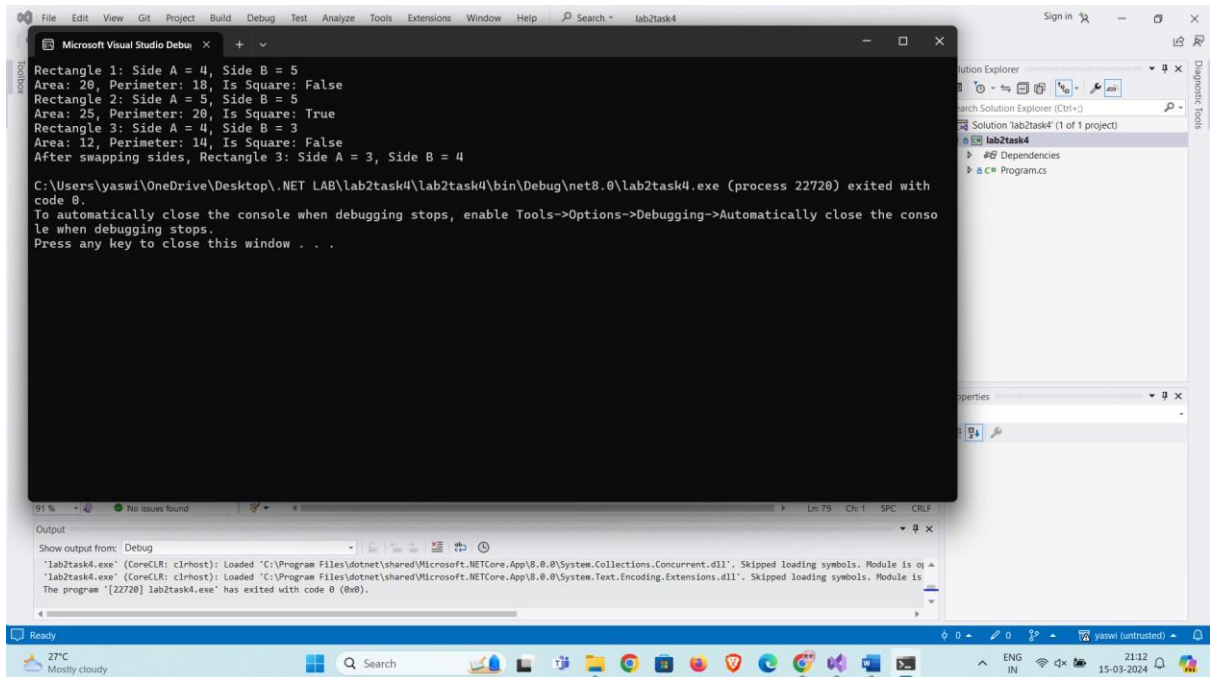
- 2 closed real fields **sideA** and **sideB** (sides A and B of the rectangle)
- Constructor with two real parameters **a** and **b** (parameters specify rectangle sides)
- Constructor with a real parameter **a** (parameter specify side A of a rectangle, side B is always equal to 5)
- Constructor without parameters (side A of a rectangle equals to 4, side B - 3)
- Method **GetSideA**, returning value of the side A
- Method **GetSideB**, returning value of the side B
- Method **Area**, calculating and returning the area value
- Method **Perimeter**, calculating and returning the perimeter value
- Method **IsSquare**, checking whether current rectangle is shape square or not. Returns true if the shape is square and false in another case.
- Method **ReplaceSides**, swapping rectangle sides

Solution:





OUTPUT:



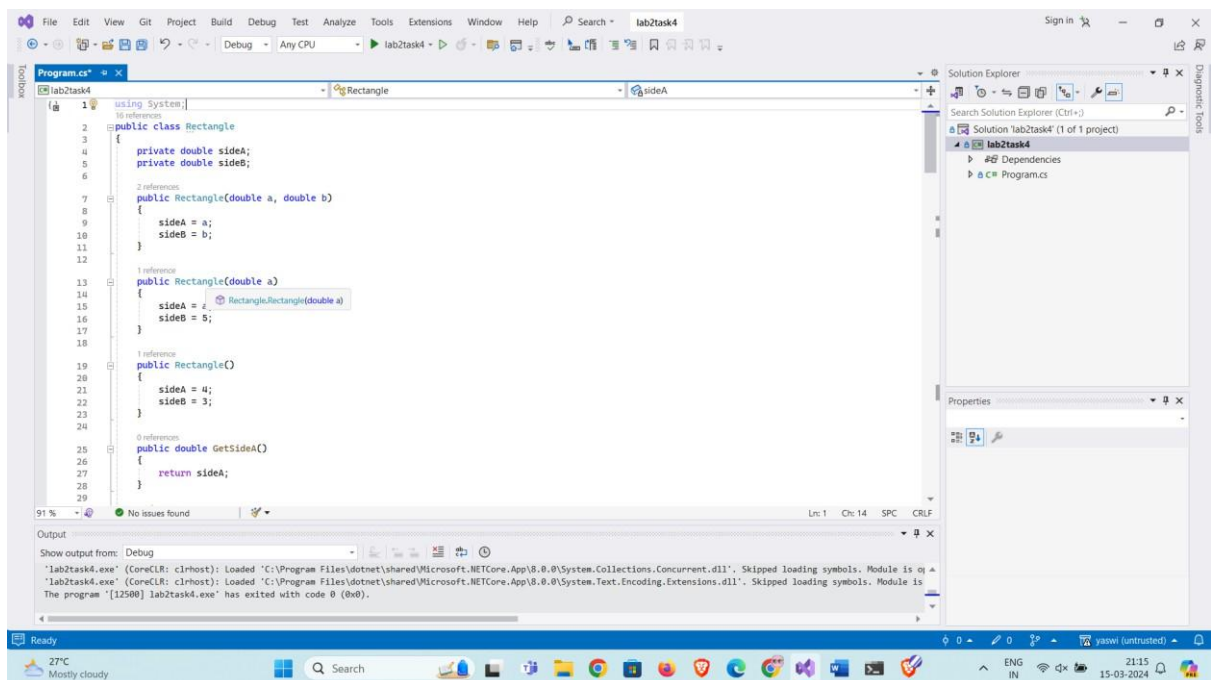
Advanced level Task:

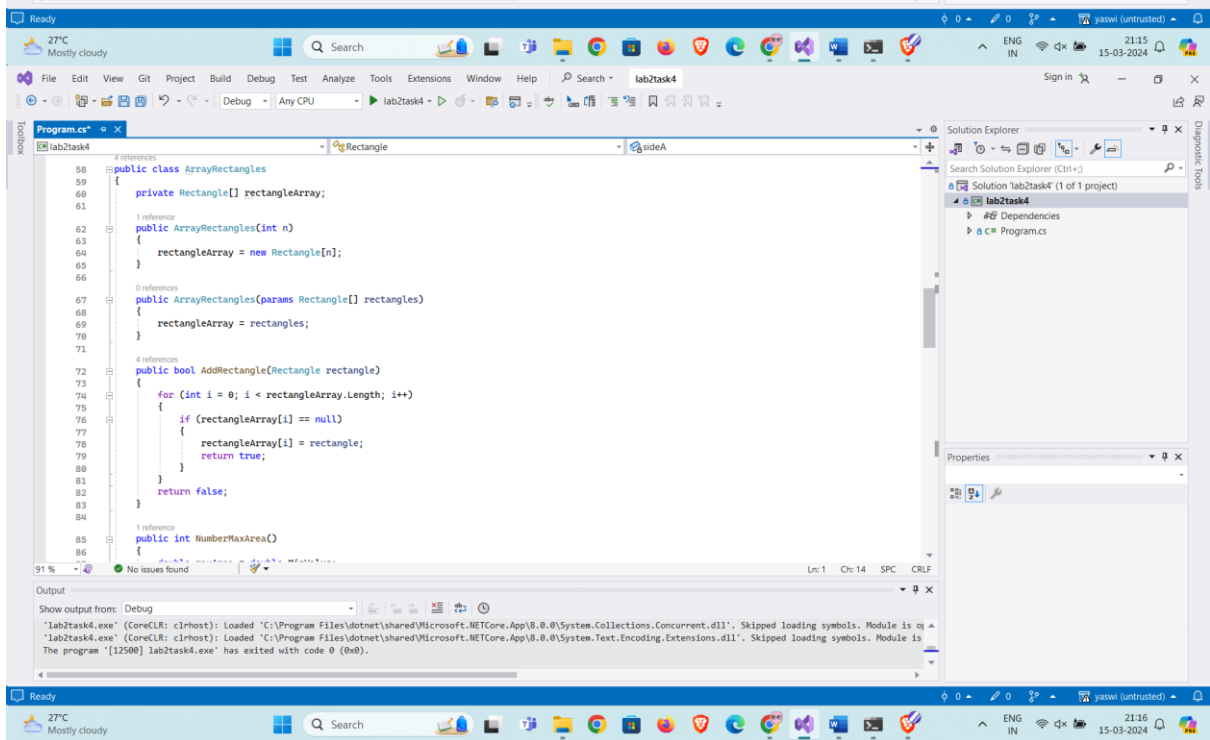
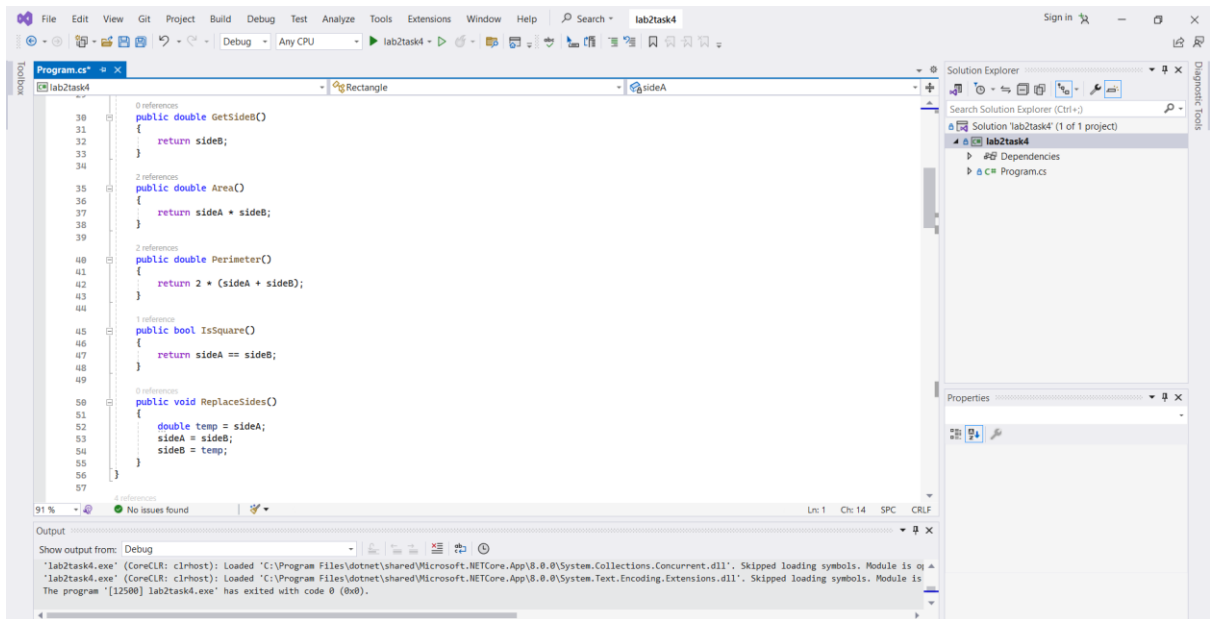
TASK 2: Develop class **ArrayRectangles**, in which declare:

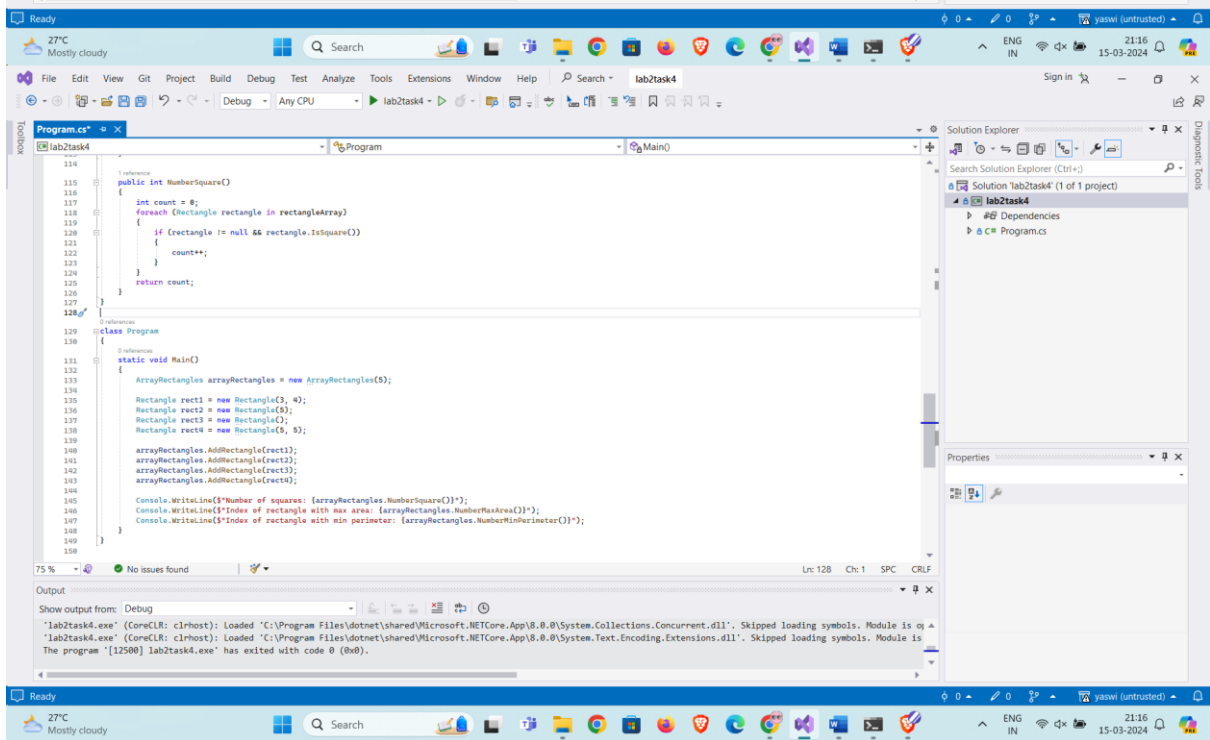
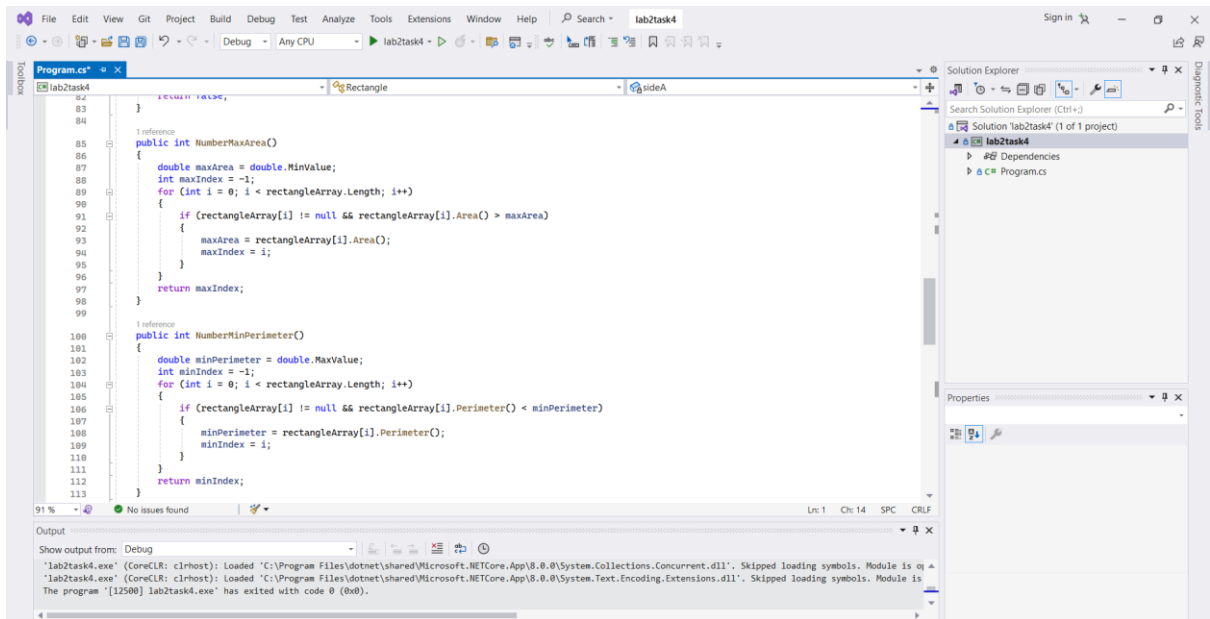
- Private field **rectangle_array** - array of rectangles
- Constructor creating an empty array of rectangles with length n
- Constructor that receives an arbitrary amount of objects of type **Rectangle** or an array of objects of type **Rectangle**.

- Method **AddRectangle** that adds a rectangle of type Rectangle to the array on the nearest free place and returning true, or returning false, if there is no free space in the array
- Method **NumberMaxArea**, that returns order number (index) of the rectangle with the maximum area value (numeration starts from zero)
- Method **NumberMinPerimeter**, that returns order number(index) of the rectangle with the minimum area value (numeration starts from zero)
- Method **NumberSquare**, that returns the number of squares in the array of rectangles

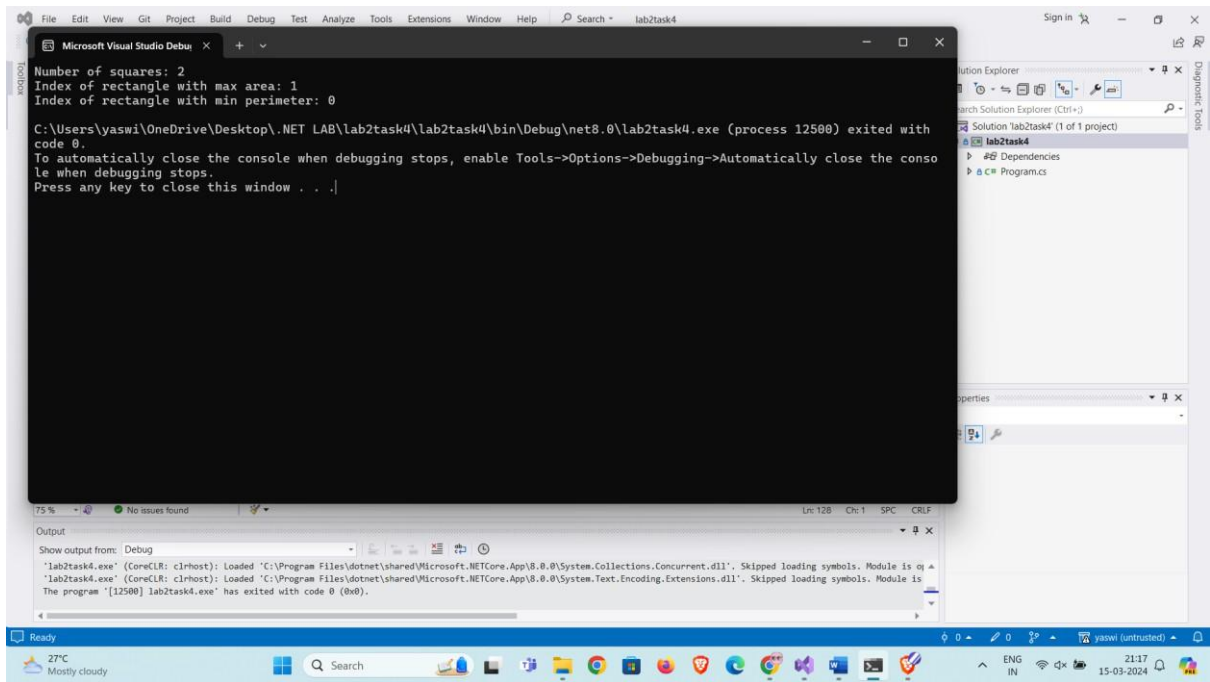
Solution:







OUTPUT

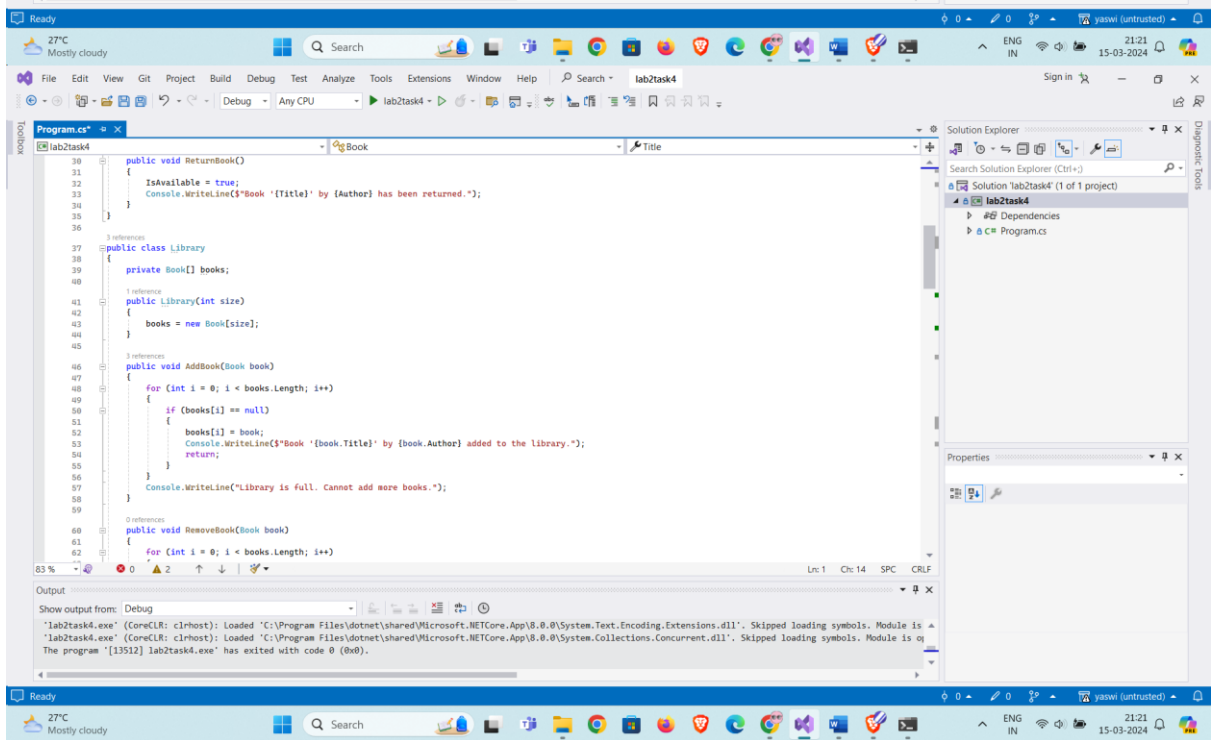
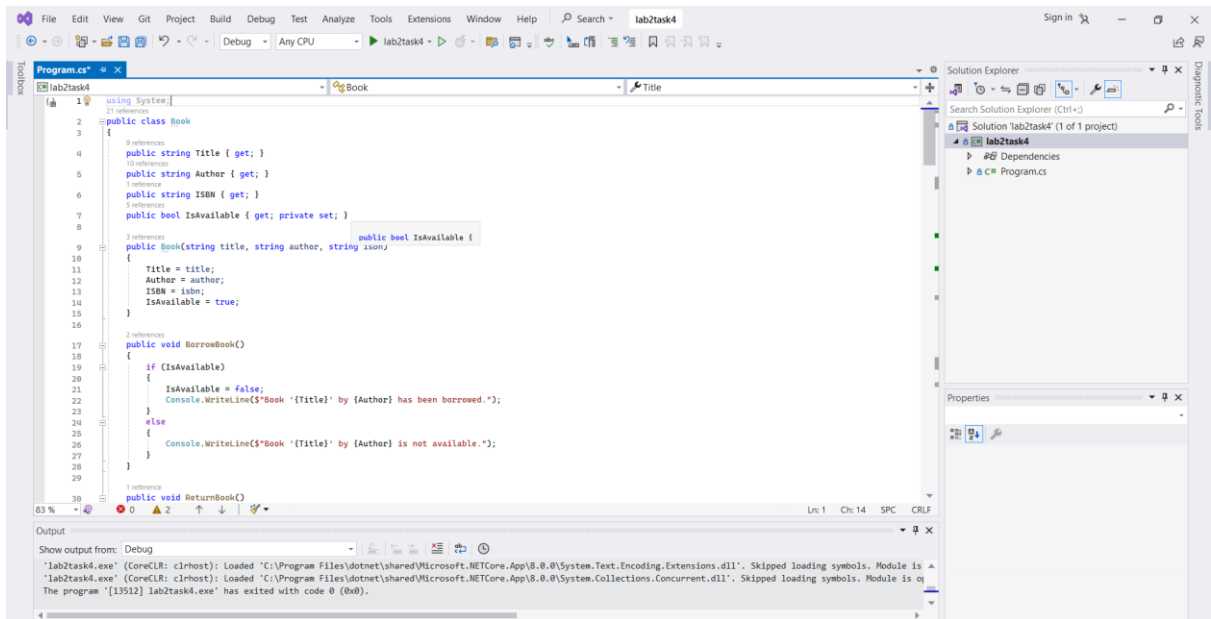


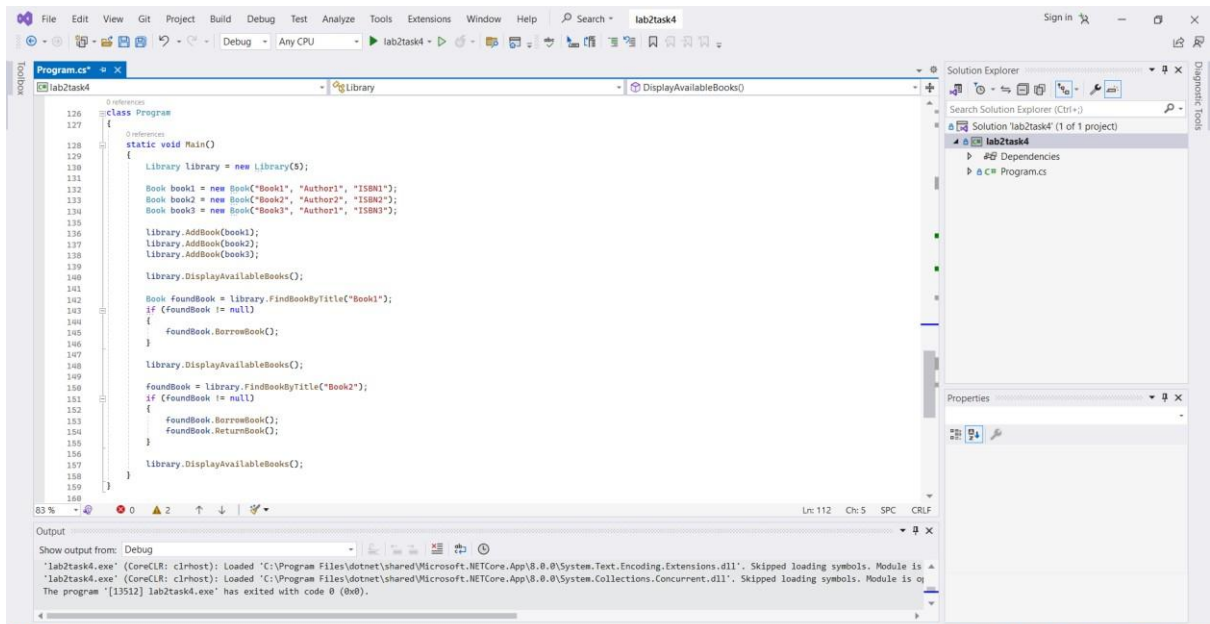
POST-LAB

1. What are the building blocks of an OOP Application ,Design an Application and find the low-level and Advanced classes in that Application along with specifications?

Note: here you can take any real time user defined class and supporting methods to implement low level and advanced level classes.

Solution:





OUTPUT:

