Lab Tasks

1. Write a Python class called Rectangle that has attributes length and width. Implement methods to calculate the area and perimeter of the rectangle.

In [17]:
```
class Rectangle:
    def __init__(self, length, width):
        self.length = length
        self.width = width

    def calculate_area(self):
        return self.length * self.width

    def calculate_perimeter(self):
        return 2 * (self.length + self.width)
```

In [18]:
```
rectangle = Rectangle(4, 5)
area = rectangle.calculate_area()
print("Area:", area)
perimeter = rectangle.calculate_perimeter()
print("Perimeter:", perimeter)
```

```
Area: 20
Perimeter: 18
```

2. Create a class hierarchy in Python consisting of a base class called Animal, and derived classes Dog, Cat, and Bird. Each derived class should have its unique method. Instantiate objects of each class and demonstrate polymorphism by calling a common method on each object.

In [19]:
```
class Animal:
    def __init__(self, name):
        self.name = name

    def sound(self):
        pass


class Dog(Animal):
    def sound(self):
        return "Woof!"

    def fetch(self):
        return "Fetching the ball!"


class Cat(Animal):
```

```
        return "Meow!"

    def scratch(self):
        return "Scratching the furniture!"


class Bird(Animal):
    def sound(self):
        return "Chirp!"

    def fly(self):
        return "Flying in the sky!"


dog = Dog("Buddy")
cat = Cat("Whiskers")
bird = Bird("Tweety")

animals = [dog, cat, bird]
for animal in animals:
    print(animal.name + " says:", animal.sound())
```

```
Buddy says: Woof!
Whiskers says: Meow!
Tweety says: Chirp!
```

3. Write a Python class called Shape with a method area() that returns the area of the shape. Create two subclasses, Rectangle and Circle, each overriding the area() method to 7calculate the area of the specific shape. Instantiate objects of each class and display their areas.

In [20]:

```
import math

class Shape:
    def area(self):
        pass

class Rectangle(Shape):
    def __init__(self, length, width):
        self.length = length
        self.width = width

    def area(self):
        return self.length * self.width

class Circle(Shape):
    def __init__(self, radius):
        self.radius = radius

    def area(self):
        return math.pi * self.radius**2

rectangle = Rectangle(5, 8)
circle = Circle(3)
print("Rectangle Area:", rectangle.area())
print("Circle Area:", circle.area())
```

```
Rectangle Area: 40
Circle Area: 28.274333882308138
```

In [ ]: