# Module 9.5 Class - Polymorphism: Coding Questions

## Question 1: Implement a base class for vehicles with a method to display vehicle details. Derive classes for Car, Truck, and Motorcycle that override the details method.

Hint: Use inheritance and ensure each subclass has its unique implementation of the details method to demonstrate polymorphism.

## Question 2: Create a function that takes an array of shapes (circles, squares) and computes the total area. Each shape class should have its method to calculate its area.

Hint: This question requires polymorphism where each shape class implements a method for area calculation, used uniformly by the function.

## Question 3: Design a class hierarchy for animals where each class (Dog, Cat, Bird) has a method to make a sound. Write a function that calls this method for a list of animal instances.

Hint: Illustrate polymorphism by having a common method in each subclass that behaves differently.

## Question 4: Write a class for a digital media player that can play different file formats (mp3, wav, aac). Each format class should have its play method.

Hint: Demonstrate polymorphism by designing each format class to have its unique implementation of the play method.

## Question 5: Develop a class structure for a messaging app that can send messages via different channels (email, SMS, in-app). Each channel class should have a send message method.

Hint: Use polymorphism to allow for different messaging strategies through a common interface.

## Question 6: Implement classes for different types of employees in a company (Manager, Engineer, Salesperson) that override a method to calculate bonuses based on role.

Hint: Each class should have its formula for bonus calculation, showcasing polymorphism.

## Question 7: Create a set of classes that represent geometric shapes (Rectangle, Triangle, Circle) and include a method to calculate the perimeter. Use these in a program that finds the shape with the largest perimeter.

Hint: The method for calculating the perimeter should be implemented in each class, allowing polymorphism to determine the perimeter regardless of shape type.

## Question 8: Write a set of classes for handling different types of payment (credit card, PayPal, bank transfer). Each should include a process payment method.

Hint: Polymorphism allows the process payment method to have different implementations based on the payment type.

## Question 9: Design a class hierarchy for a file system where File and Directory classes derive from a BaseFile class. Both should implement a method to display their contents differently.

Hint: Highlight polymorphism by showing how files and directories can be treated similarly but behave differently when displaying contents.

## Question 10: Develop a series of classes for a UI framework with different types of UI elements (Button, Slider, TextBox) that override a draw method.

Hint: Each UI element class should provide its unique implementation of the draw method, demonstrating polymorphism in action.