EXERCISE

Question:

You've been tasked with designing and implementing a Pets App in C#. The app should incorporate Object-Oriented Programming principles to manage user authentication, pet listings, adding pets, and favorite pets functionality. Design a class structure for this application, considering the following features:

1. User Login: Users should be able to register, log in, and log out of the application. Implement a secure authentication mechanism to validate user credentials.

2. Pet Management: Users should be able to list pets available in the system. Each pet should have attributes such as name, species, age, and owner information. Implement methods to add pets to the system.

3. Favorites: Users should be able to mark pets as favorites. Implement functionality to add and remove pets from a user's list of favorites.

Your solution should demonstrate a clear understanding of encapsulation, inheritance, polymorphism, and abstraction. Additionally, consider how you would handle potential errors and exceptions gracefully within your class structure.

Provide a detailed explanation of your class design, including class names, properties, methods, and their relationships. Discuss how you would implement the mentioned features using the principles of Object-Oriented Programming in C#.

This question should prompt the examinee to think deeply about designing a robust class structure that incorporates various OOP principles to fulfill the requirements of the Pets App. It also encourages them to consider error handling and proper encapsulation of functionality.