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OOP

Quiz-2

1.Problem Scenario:
You are tasked with designing a **University Student Management System**. 6

The system includes:

- A **Student** who can enroll in multiple **Courses**.
- Each **Course** can have multiple **Students** enrolled (many-to-many relationship).
- Each **Student** has details such as studentID, name, and GPA.
- Each **Course** has details such as courseCode, courseName, and creditHours

Task:

- Describe how encapsulation helps protect sensitive information like GPA.
- Explain how the GPA should be updated securely using encapsulation principles.

2. **Problem Scenario:**
You are designing an **Online Payment System** that supports multiple payment methods. 9

The system includes:

- A base class **Payment** with a method `processPayment()`.
- Subclasses: **CreditCardPayment**, **PayPalPayment**, and **BankTransferPayment**.
- Each subclass processes the payment differently — for example, credit cards require card validation, PayPal needs authentication, and bank transfer uses account verification.

Question:

1. Explain how **runtime polymorphism** helps in processing all payment types using a single `Payment` reference.
2. Describe how **method overriding** allows each subclass to define its own payment behavior.
3. Discuss the advantages of this approach if new payment types are added in the future.