Sample Question 01

"TECHSTORM is a multinational technology solutions company employing over 3000 professionals worldwide. Each employee in the company has a unique employee ID, name, and basic salary. For senior engineers, an additional project bonus and performance bonus are provided monthly. Write an object-oriented program to define the necessary classes to store and manipulate the details of employees and senior engineers. Your program should include:

1. A method to set the details (employee ID, name, basic salary, project bonus, and performance bonus).
2. A method to calculate and display the total monthly income of a senior engineer. You are required to identify superclasses and subclasses appropriately and implement methods for setting and retrieving data."

Sample Question 02

You are requested to develop a **Car Rental Management System** using Java. The system should allow users to add cars to the rental inventory, rent cars, return cars, and check the availability of cars.

Implement a complete application to meet the following requirements:

1. There are four private member variables: registrationNumber, model, brand, and isAvailable.
   Create a constructor method to initialize the values of these member variables. Initially, the value of the isAvailable variable should be true.
2. Define a method called checkAvailability to access the status of the isAvailable property.
3. Implement the rentCar method to check the availability of a car based on the isAvailable property. Display meaningful messages to the user regarding the success or failure of the rental.
4. Implement the returnCar method to mark the car as returned. This should update the isAvailable property and display meaningful messages to the user.
5. Create a method to display all the details of a car.
6. Write the main method to access and test the methods for car details, availability check, renting, and returning cars.

Sample Question 03

A toll management system charges different rates for different types of vehicles passing through a toll booth. The rates are as follows:

- **Car:** $2 per toll.
- **Truck:** $5 per toll.
- **Motorcycle:** $1 per toll.

The system uses a Vehicle class as the base class and has specific subclasses (Car, Truck, and Motorcycle) that override a method to calculate the toll charge for the vehicle type. Implement a Java program that demonstrates runtime polymorphism to calculate the total toll charge for a vehicle based on the type.

Requirements:

1. **Base Class Vehicle:**
   o Contains an abstract method double calculateTollCharge().
2. **Subclasses:**
   o **Car:** Implements calculateTollCharge() to return $2.
   o **Truck:** Implements calculateTollCharge() to return $5.
   o **Motorcycle:** Implements calculateTollCharge() to return $1.
3. **Driver Program:**
   o Accepts the type of vehicle and the number of tolls passed as input.
   o Creates an appropriate object of the respective subclass using a base class reference.
   o Calculates and displays the total toll charge for the vehicle type

Sample Question 04

You are developing a **Hotel Room Booking System** for a hotel. One of the requirements is to create a Room class to represent rooms available in the hotel. The Room class should have attributes such as room number, type (e.g., Single, Double, Suite), price per night, and the number of nights booked.

Requirements:

1. **Encapsulation:**
   Apply encapsulation for all attributes of the Room class (roomNumber, type, pricePerNight, and nightsBooked).
2. **Methods:**
   a) Implement a method bookRoom(int nights) to update the number of nights booked. If a room is already booked for nights greater than 0, display a suitable message indicating that the room is already booked.
   b) Implement a method cancelBooking() to reset the nightsBooked to zero and make the room available again.
3. **Main Program:**
   In the main method, demonstrate the following:
   o Create an instance of the Room class and set its attributes.
   o Book the room for a specified number of nights, showing the booking details.
   o Attempt to book the room again without canceling, demonstrating the error message.
   o Cancel the booking and attempt a new booking.
   o Display the details of the room, including the total price for the booked nights.