PYTHON

Assignment

1. Create an abstract class `Shape` with an abstract method `area()`. Derive two classes, `Circle` and `Rectangle`, that implement the `area()` method.

2. Create an abstract class `Vehicle` with methods `start_engine()` and `stop_engine()`. Implement concrete classes `Car` and `Bike` that provide their specific functionality for these methods.

3. Create an abstract class `PaymentGateway` with an abstract method `process_payment(amount)`. Create two subclasses `CreditCardPayment` and `PayPalPayment` that implement the payment processing logic.

4. Create an abstract class `Employee` with an abstract method `calculate_salary()`. Implement two concrete classes `FullTimeEmployee` and `PartTimeEmployee` that calculate salary based on different criteria.

5. Create an abstract class `Book` with methods `borrow()` and `return_book()`. Create concrete classes `Fiction` and `NonFiction` that implement these methods for different rules of borrowing and returning.

6. Define an abstract class `Polygon` with methods `number_of_sides()` and `perimeter()`. Implement subclasses `Triangle`, `Square`, and `Pentagon` that calculate their specific perimeter and number of sides.

7. Create an abstract class `BankAccount` with an abstract method `calculate_interest()`. Implement subclasses `SavingsAccount` and `CurrentAccount` that calculate interest differently.

8. Create an abstract class `FileHandler` with methods `open_file()`, `read_file()`, and `close_file()`. Create subclasses `TextFileHandler` and `BinaryFileHandler` that handle text and binary files respectively.

9. Create an abstract class `Product` with an abstract method `display_details()`. Implement subclasses `Electronics` and `Clothing` that provide specific implementations for displaying product details.

10. Create an abstract class `Order` with an abstract method `calculate_total()`. Implement two subclasses `DineInOrder` and `TakeawayOrder` that calculate the total price differently based on whether it's dine-in or takeaway (e.g., applying service charges for dine-in orders).