

Java Exercise Sheet: Polymorphism, Abstract Classes & Interfaces

Exercise 1: Smart Devices

Task:

- Create a base class `SmartDevice` with a method `performFunction()`.
- Extend it with `LightBulb`, `Thermostat`, and `SecurityCamera`.
- Override the method in each class.

Expected Output:

LightBulb is lighting up.
Thermostat is adjusting temperature.
SecurityCamera is monitoring home.

Exercise 2: Payment Gateways

Task:

- Create an abstract class `PaymentGateway` with:
 - Abstract method `processPayment()`
 - Regular method `authenticateUser()` that prints: "User authenticated."
- Extend it with `PayPal` and `CreditCard` classes.

Expected Output:

User authenticated.
Processing payment via PayPal...
User authenticated.
Processing payment via Credit Card...

Exercise 3: Media Players

Task:

- Create interface `MediaPlayer` with method `play()`.
- Implement it in `MusicPlayer` and `VideoPlayer`.

Expected Output:

Playing music...
Playing video...

Exercise 4: Smart Kitchen Appliance

Task:

- Create two interfaces: `Cookable` and `Washable`.
- Implement both in `SmartOven` class.

Expected Output:

Cooking food...
Washing utensils...

Exercise 5: Travel Booking System**Task:**

- Interface: `BookingPlatform` with method `bookTicket()`.
- Classes: `TrainBooking`, `FlightBooking`, `BusBooking` implement the interface.
- Iterate over them in a loop and call `bookTicket()`.

Expected Output:

Booking train ticket...
Booking flight ticket...
Booking bus ticket...