

Polymorphism Task: SmartCar Rentals System

Task Summary

You are hired to build a **SmartCar Rentals System** for a company that rents out various types of vehicles: cars, trucks, and motorbikes. The system must manage different vehicle types, calculate rental fees, and allow for various rental conditions. You must apply **inheritance**, **method overloading**, and **method overriding**.

Functional Requirements

1. Vehicle Base Class

- Properties:
 - string Brand
 - string Model
 - int Year
 - string LicensePlate
- Methods:
 - virtual double CalculateRentalCost(int days)
 - Overloaded method: double CalculateRentalCost(int days, bool withDriver)

2. Car Class (inherits Vehicle)

- Additional property: bool IsLuxury
- Override CalculateRentalCost(int days) to charge:
 - \$80/day if IsLuxury is true
 - \$60/day if not
- Overload method: CalculateRentalCost(int days, bool withDriver)

3. Truck Class (inherits Vehicle)

- Additional property: double MaxLoadKg
- Override CalculateRentalCost(int days) to charge \$100/day
- Overload method: double CalculateRentalCost(int days, double cargoWeight)

4. Motorbike Class (inherits Vehicle)

- Additional property: bool RequiresHelmet
- Override CalculateRentalCost(int days) to charge \$40/day

Conditional requirements

- Apply a discount if rental days > 7
 - Validate that cargoWeight <= MaxLoadKg in trucks
 - Show error if Year is older than 10 years (for real-world simulation)
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Sample Output

--- SmartCar Rentals System ---

Available Vehicles:

1. Toyota Corolla 2022 | Car | Luxury: No
2. Mercedes E300 2023 | Car | Luxury: Yes
3. Volvo FH16 2021 | Truck | Max Load: 18000kg
4. Honda CBR 2019 | Motorbike | Helmet Required: Yes

Simulation:

Renting Toyota Corolla for 3 days with driver

Total Cost: \$240

Renting Volvo FH16 for 2 days with 5000kg load

Total Cost: \$250

Renting Honda CBR for 5 days

Total Cost: \$200