OOP project

Vehicle Rental Management System

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URL : https://github.com/lidyademerw/Vehicle-Rental-Management-System

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Vehicle Rental Management System

- **Problem Statement**

  Vehicle rental businesses often rely on manual record-keeping, which leads to errors such as double-booking, inconsistent pricing, and loss of rental history. This project, the Vehicle Rental Management System, provides a robust digital solution. It automates fleet tracking and cost calculation while ensuring data security through defined user roles and persistent storage.

- Explanation of OOP Concepts Used

Encapsulation: All class attributes (like plateNumber and password) are set to private. Access is controlled via public getters and setters to protect data integrity.

Abstraction: The Vehicle and User classes are declared as abstract. This ensures that common code is shared, but no "generic" vehicle or user can be created without being specific (e.g., a Car or a Customer).

Inheritance: We used the extends keyword so that Car inherits features from Vehicle. This reduces code duplication.

Polymorphism: The calculateTotalCost() method is defined in the parent class but behaves differently depending on the specific vehicle type.

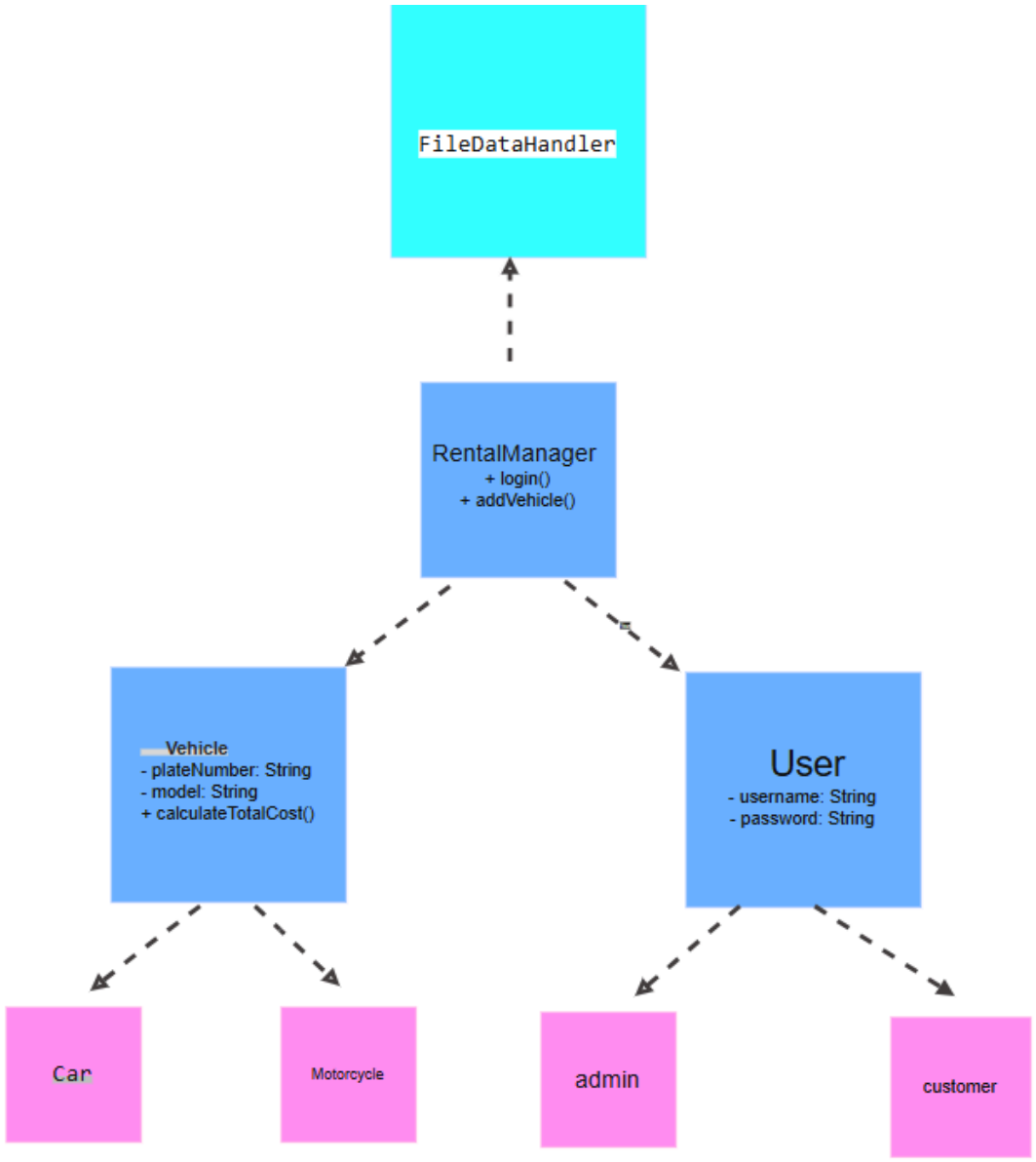
- **SOLID Principles Applied**

Single Responsibility (SRP): The FileDataHandler class is solely responsible for file operations, while the RentalManager handles business logic.

Liskov Substitution (LSP): Any method that expects a Vehicle can accept a Car without causing errors.

Dependency Inversion (DIP): High-level controllers depend on the RentalManager abstraction rather than directly communicating with the raw data file.

- **SystemFeatures**



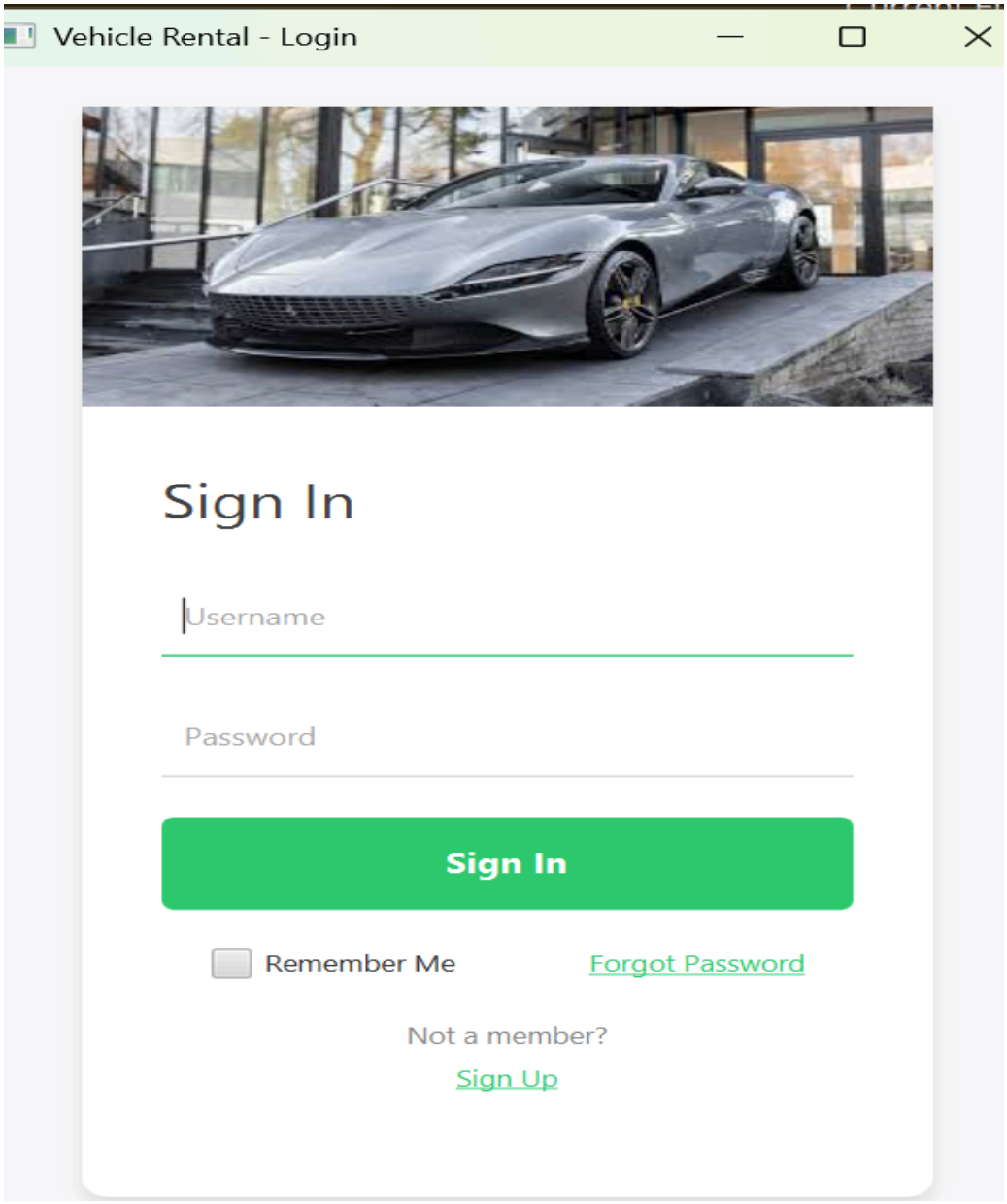
Multi-Role Access: Separate dashboards for Admins (Inventory Control) and Customers (Booking).

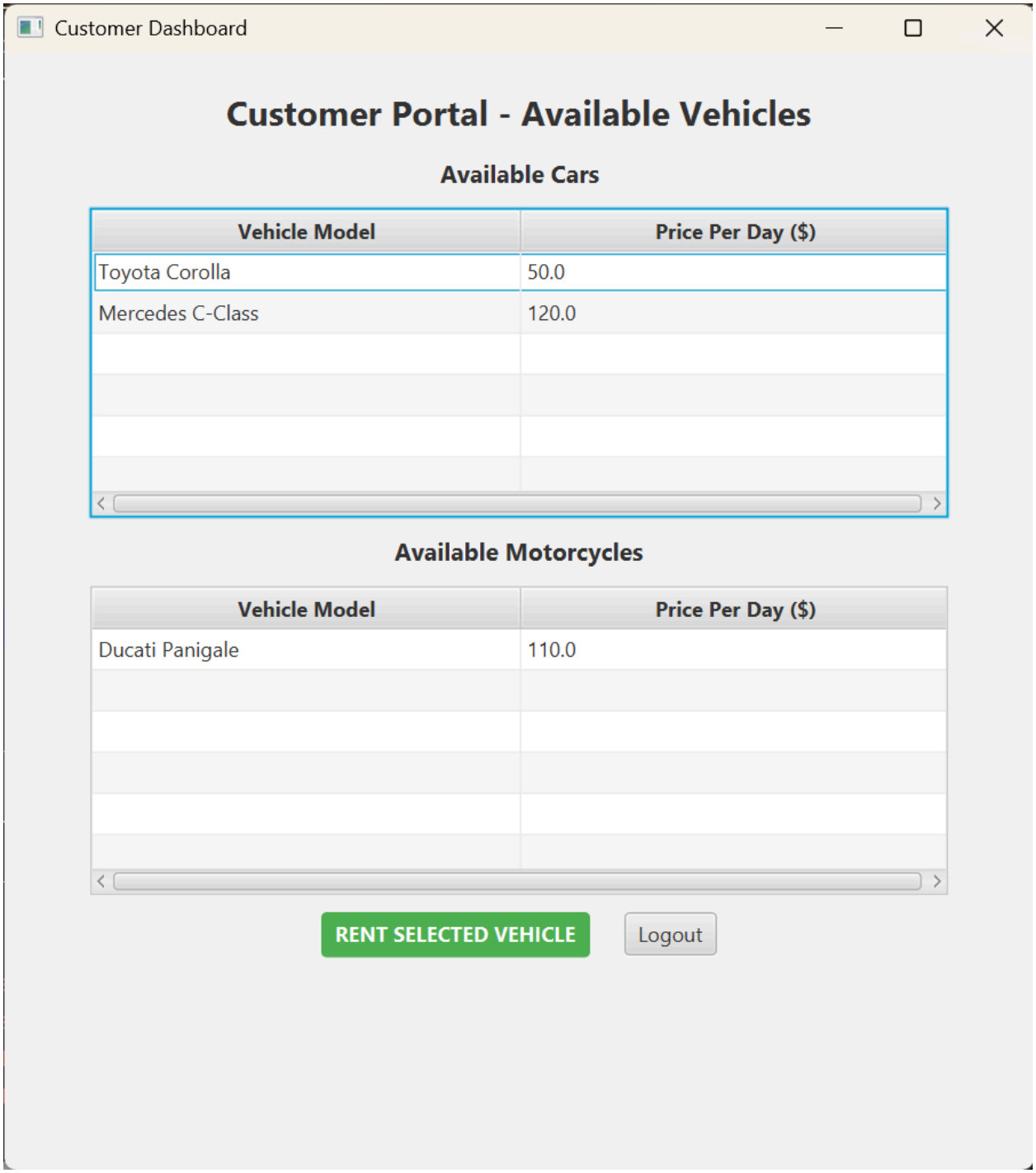
Fleet Management (CRUD): Admins can Create, Read, and Delete vehicle records in real-time.

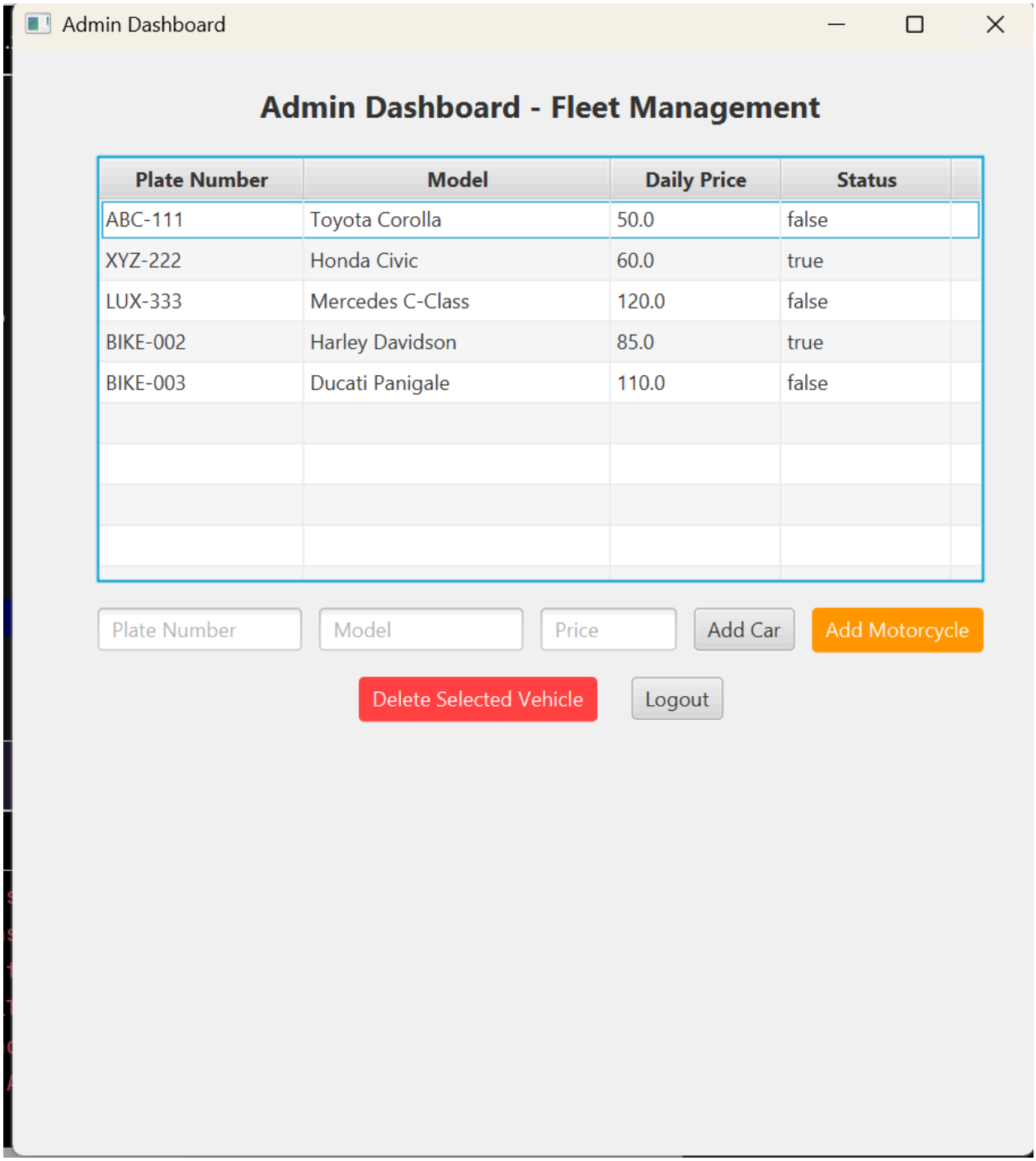
Booking System: Customers can view only available vehicles and rent them with a single click.

Data Persistence: All data is saved to and loaded from a local vehicles.txt file using Java I/O.Input Validation: The system prevents errors by validating user inputs during login and data entry.

Application Screenshots




Customer Dashboard
Customer Portal - Available Vehicles
Available Cars
Vehicle Model
Price Per Day ($)
Toyota Corolla
50.0
Mercedes C-Class
120.0
Available Motorcycles
Vehicle Model
Price Per Day ($)
Ducati Panigale
110.0
RENT SELECTED VEHICLE
Logout



How to Run

Admin: admin / admin123
Customer: customer / user123