

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.

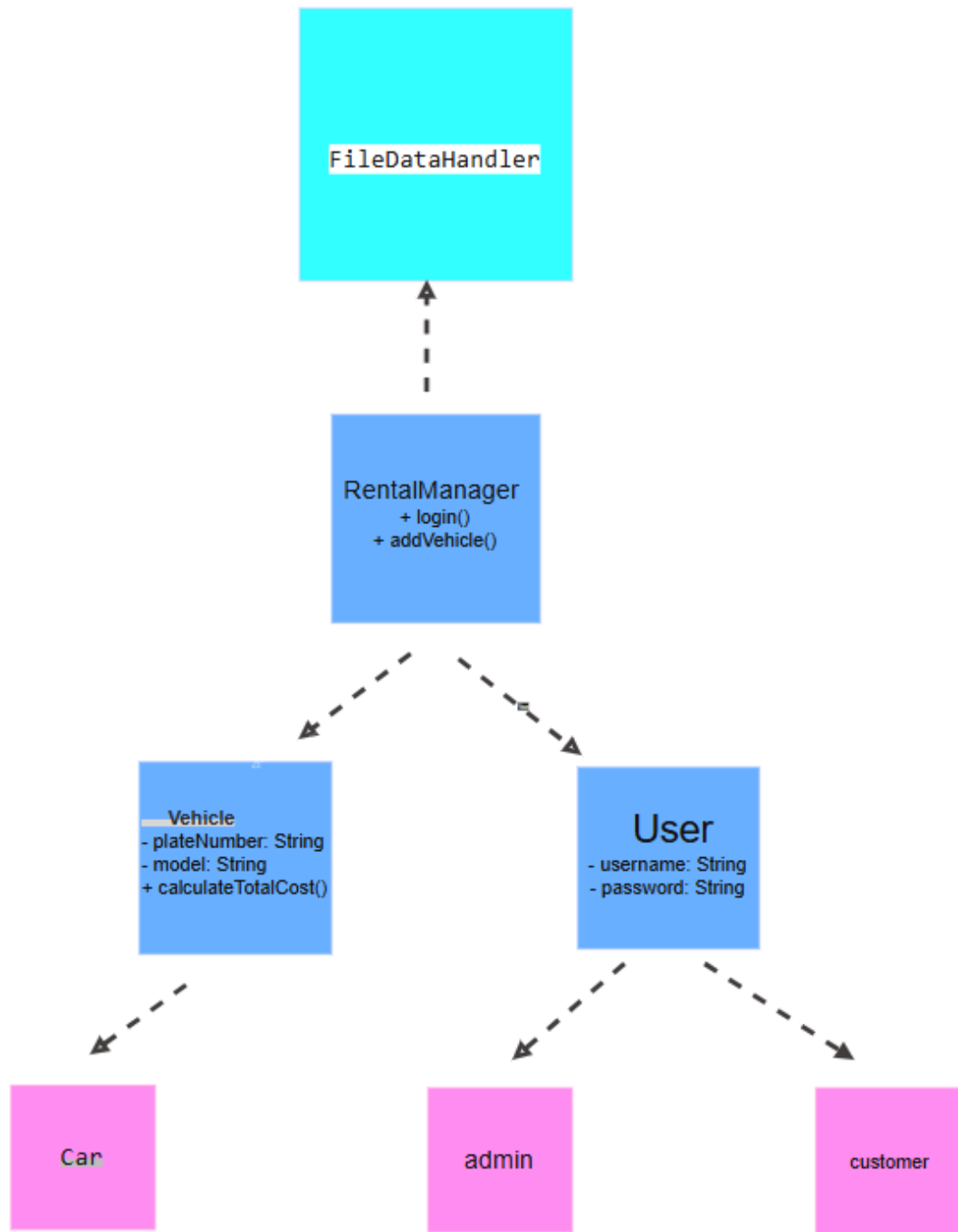
- **SOLID Principles Applied**

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).

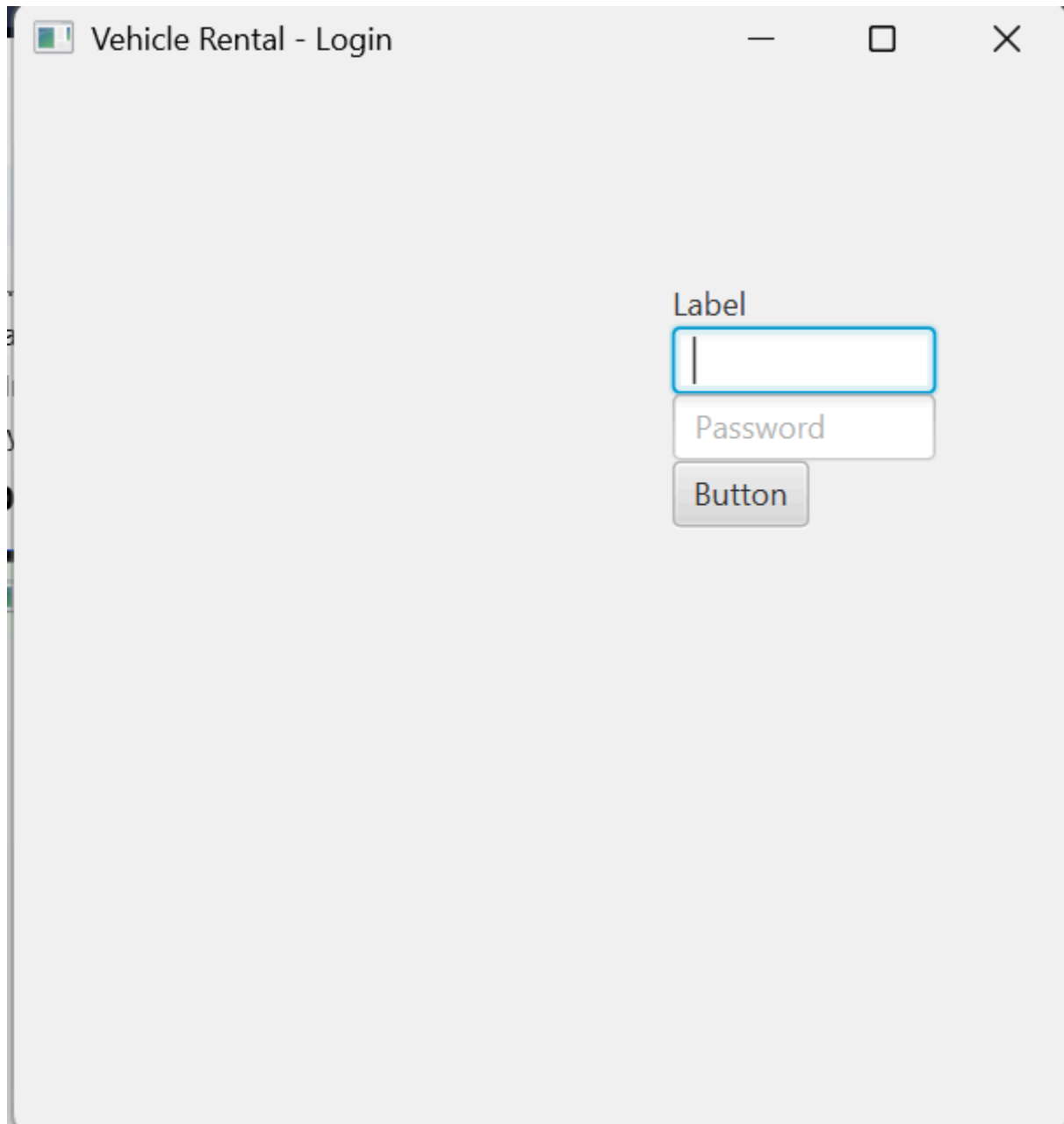
Fleet Management (CRUD): Admins can Create, Read, and Delete vehicle records in real-time.

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



Admin Dashboard - Fleet Management

Plate Number	Model	Daily Price	
ABC-111	Toyota Corolla	50.0	
XYZ-222	Honda Civic	60.0	
LUX-333	Mercedes C-Class	120.0	
MND-234	Ferrari	400.0	
ZMG-345	bajaj	300.0	
ASZ-008	Ford Mustang	600000.0	
SMC-990	Tesla Model 3	56734.0	

Customer Portal - Available Vehicles

Car Model	Price Per Day (\$)
Ferrari	400.0
bajaj	300.0
Ford Mustang	600000.0
Tesla Model 3	56734.0

[RENT SELECTED CAR](#)[Logout](#)