DEPARTMENT OF COMPUTER & INFORMATION SYSTEMS ENGINEERING
BACHELORS IN COMPUTER SYSTEMS ENGINEERING
Course Code: CS-116
Course Title: Object Oriented Programming
Complex Engineering Problem
FE Batch 2024, Spring Semester 2025
Grading Rubric
TERM PROJECT

Group Members:

Student No.	Name	Roll No.
S1	Muhammad Ali	CS-24134
S2	Umer Iqbal	CS-24127
S3	Rameel Ahmed	CS-24126

CRITERIA AND SCALES				Marks Obtained		
				S1	S2	S3
Criterion 1: Does the application meet the desired specifications and produce the desired outputs? (CPA-1, CPA-3)						
1	2	3	4			
The application does not meet the desired specifications and is producing incorrect outputs.	The application partially meets the desired specifications and is producing incorrect or partially correct outputs.	The application meets the desired specifications but is producing incorrect or partially correct outputs.	The application meets all the desired specifications and is producing correct outputs.			
Criterion 2: How well is the code organization?						
1	2	3	4			
The code is poorly organized and very difficult to read.	The code is readable only to someone who knows what it is supposed to be doing.	Some part of the code is well organized, while some part is difficult to follow.	The code is well organized and very easy to follow.			
Criterion 3: How friendly is the application interface? (CPA-1, CPA-3)						
1	2	3	4			
The application interface is difficult to understand and use.	The application interface is easy to understand and but not that comfortable to use.	The application interface is very easy to understand and use.	The application interface is very interesting/ innovative and easy to understand and use.			
Criterion 4: How does the student performed individually and as a team member? (CPA-2, CPA-3)						
1	2	3	4			
The student did not work on the assigned task.	The student worked on the assigned task, and accomplished goals partially.	The student worked on the assigned task, and accomplished goals satisfactorily.	The student worked on the assigned task, and accomplished goals beyond expectations.			
Criterion 5: Does the report adhere to the given format and requirements?						
1	2	3	4			
The report does not contain the required information and is formatted poorly.	The report contains the required information only partially but is formatted well.	The report contains all the required information but is formatted poorly.	The report contains all the required information and completely adheres to the given format.			
			Total Marks:			

Car Rental Management System

Problem Description

The Car Rental Management System is designed to facilitate the process of renting and returning vehicles. It enables users to view available cars, rent a vehicle for a specified number of days, and return the vehicle while managing user balances and inventory. The system aims to streamline the car rental process, ensure accurate tracking of available cars, and handle user transactions efficiently.

Distinguishing Features of the Project / List of Object-Oriented Features Implemented

Features:

- User registration and login
- Viewing available cars
- Renting a car with duration specification
- Returning a rented car
- Managing user balances
- Tracking total available cars in inventory

Object-Oriented Features:

- Classes model entities like users, cars, and rentals.
- Encapsulation protects internal data.
- Inheritance allows for specialized subclasses.
- Polymorphism enables dynamic method behaviors based on object types.
- Abstraction simplifies complex processes into manageable methods.

Flow of the Project

- User logs in or registers.
- User views available cars.
- User selects a car and specifies rental duration.
- System checks inventory and user balance.
- If valid, system processes rental, updates inventory and user balance.
- User can return the car, updating inventory and balance.

FLOWCHART

Most Challenging Part while Working on the Project

The most challenging part was managing the synchronization between the car inventory and user rental status. Ensuring that the available cars decrease correctly when rented and increase when returned, without causing inconsistencies, required careful handling of class interactions and data updates.

Any New Thing Learned in Python While Working on the Project

I learned how to implement object-oriented programming principles effectively in Python, including class inheritance, method overriding, and encapsulation. I also gained experience in reading and writing data structures, handling user input, and managing program flow.

Individual Contributions of Each Member in the Project

- Muhammad Ali (CS-24134): Designed the class structure, implemented `User` and `Car` classes, and handled user registration and login functionalities.

- Umer Iqbal (CS-24127): Developed the rental and return process, managed inventory updates, and created the user interface.

- Rameel Ahmed (CS-24126): Tested the system, documented the flow, and prepared the report and screenshots.

Future Expansions

- Implement a graphical user interface (GUI) for better user interaction.

- Add features for different car categories and pricing models.

- Integrate a database for persistent data storage.

- Implement a reservation system for advanced bookings.

- Add notification alerts for due rentals or discounts.

How to Use the System

Prerequisites:

- Python 3.x installed on your system.
- The project files (Python scripts) available in your working directory.

Running the Program

1. Open your terminal or command prompt.
2. Navigate to the directory containing the Python files.

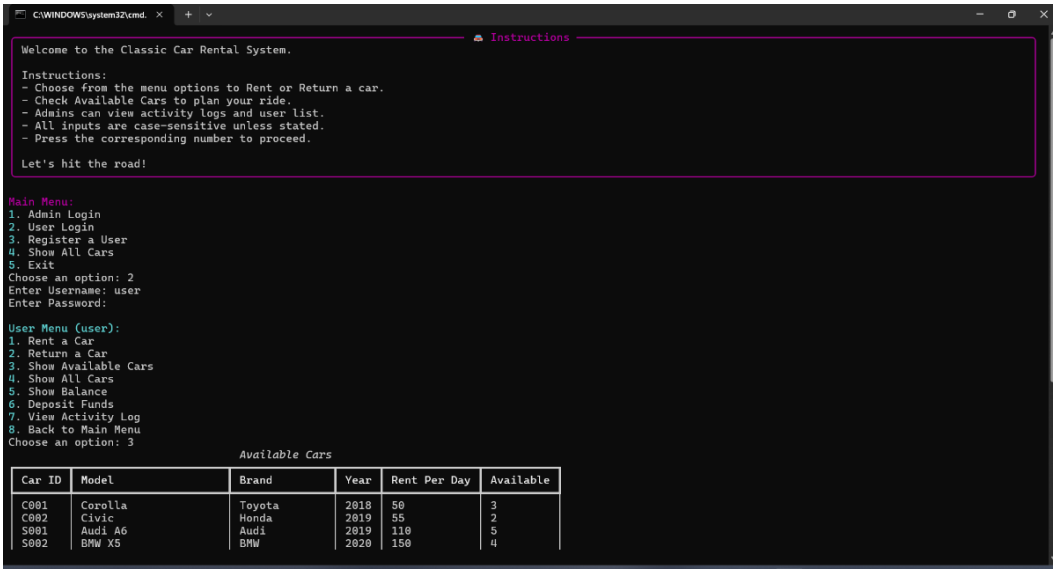
   - cd path/to/your/project/directory

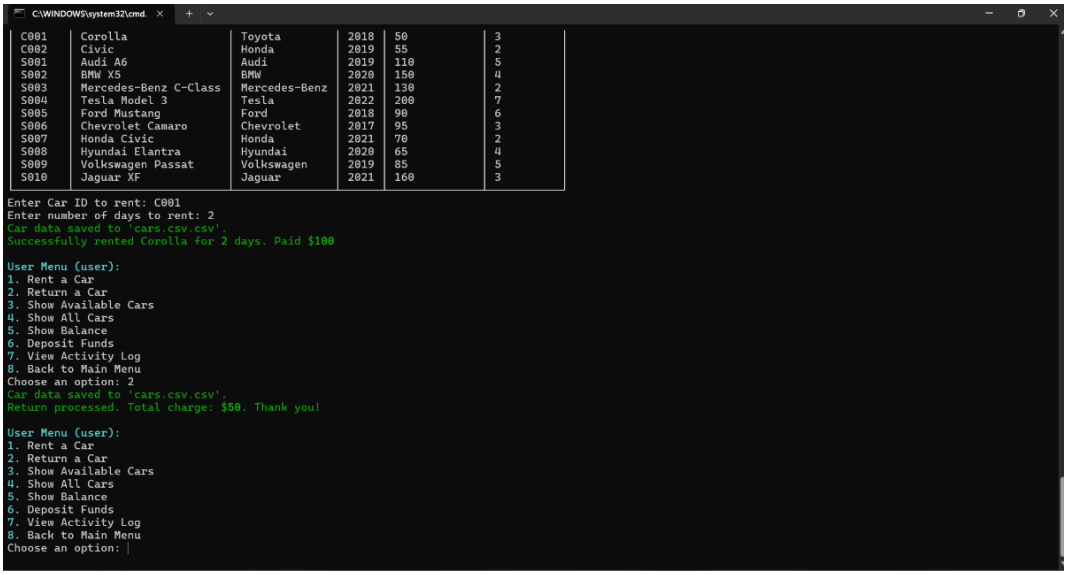
3. Run the main Python script
   - python main.py

Test Cases

Test Case 1:

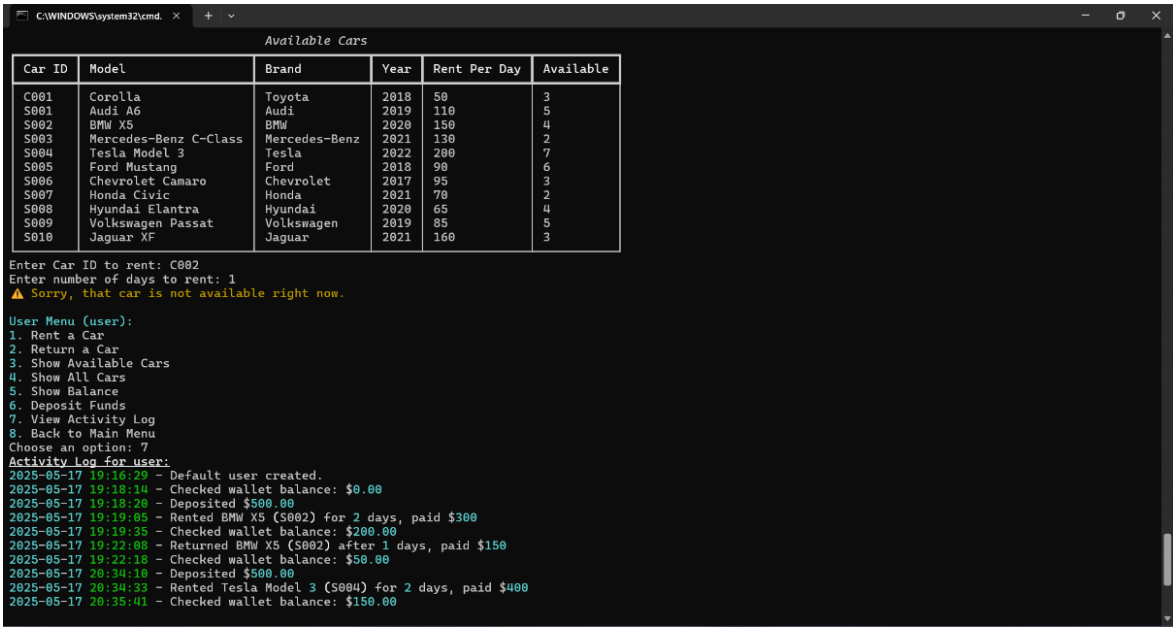
- User login, views available cars, rents a car, and returns it.





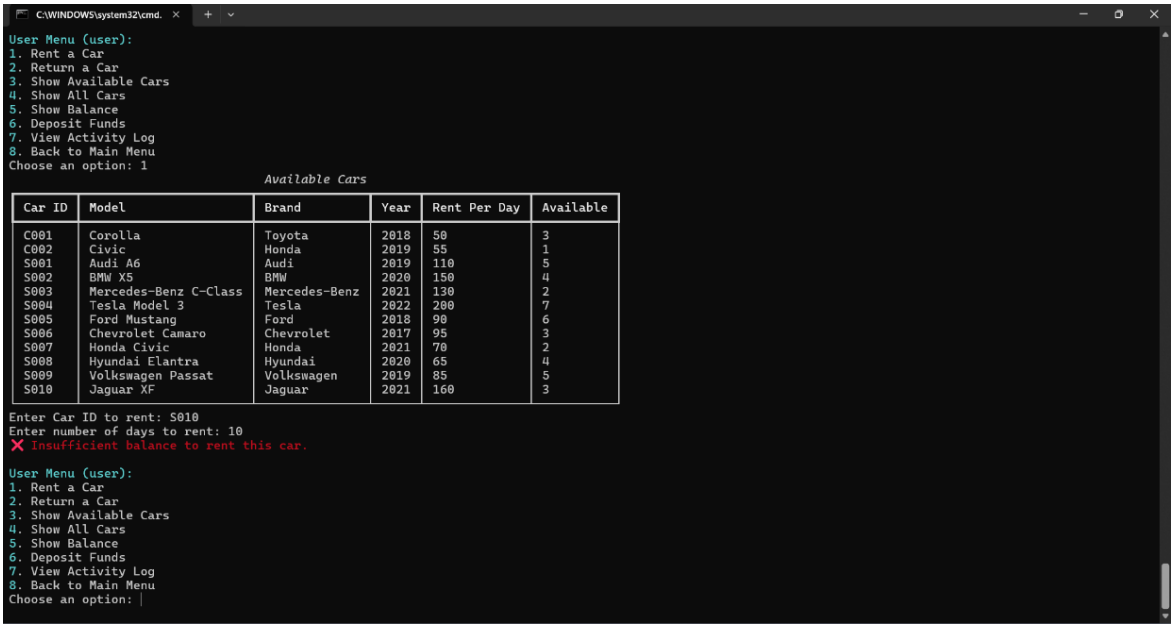
Test Case 2:

- Attempt to rent a car when none are available.



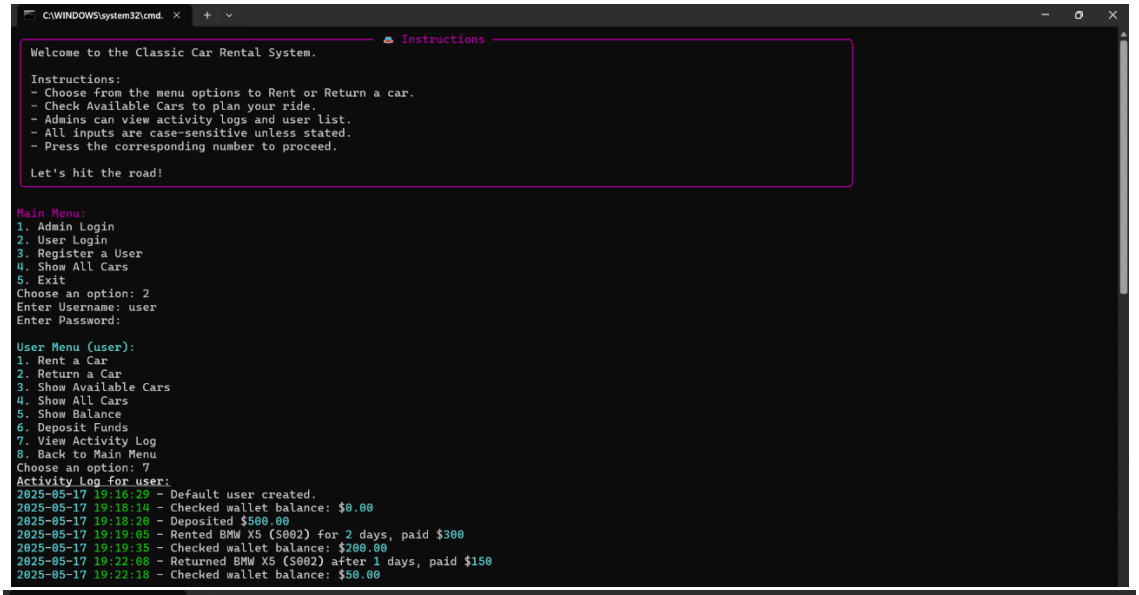
Test Case 3:

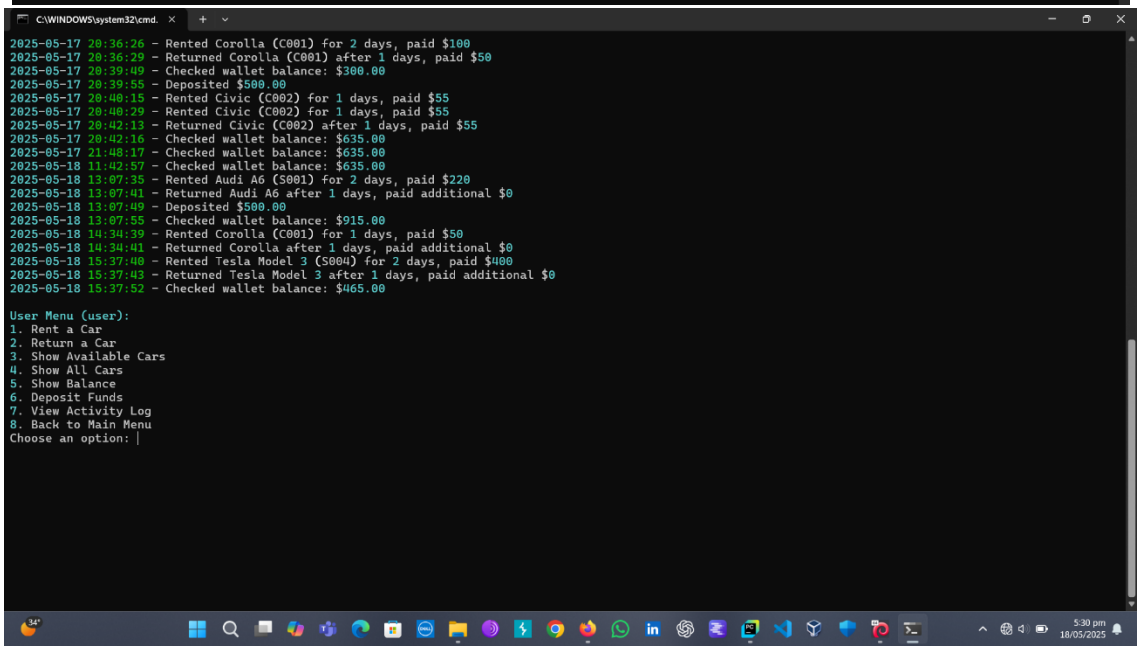
- User tries to rent a car with insufficient balance.



Test Case 4:

- User Activity logs


C:\WINDOWS\system32\cmd.
Instructions
Welcome to the Classic Car Rental System.
Instructions:
- Choose from the menu options to Rent or Return a car.
- Check Available Cars to plan your ride.
- Admins can view activity logs and user list.
- All inputs are case-sensitive unless stated.
- Press the corresponding number to proceed.
Let's hit the road!
Main Menu:
1. Admin Login
2. User Login
3. Register a User
4. Show All Cars
5. Exit
Choose an option: 2
Enter Username: user
Enter Password:
User Menu (user):
1. Rent a Car
2. Return a Car
3. Show Available Cars
4. Show All Cars
5. Show Balance
6. Deposit Funds
7. View Activity Log
8. Back to Main Menu
Choose an option: 7
Activity Log for user:
2025-05-17 19:16:29 - Default user created.
2025-05-17 19:18:14 - Checked wallet balance: $0.00
2025-05-17 19:18:20 - Deposited $500.00
2025-05-17 19:19:05 - Rented BMW X5 (S002) for 2 days, paid $300
2025-05-17 19:19:35 - Checked wallet balance: $200.00
2025-05-17 19:22:08 - Returned BMW X5 (S002) after 1 days, paid $150
2025-05-17 19:22:18 - Checked wallet balance: $50.00


C:\WINDOWS\system32\cmd.
2025-05-17 20:36:26 - Rented Corolla (C001) for 2 days, paid $100
2025-05-17 20:36:29 - Returned Corolla (C001) after 1 days, paid $50
2025-05-17 20:39:49 - Checked wallet balance: $300.00
2025-05-17 20:39:55 - Deposited $500.00
2025-05-17 20:40:15 - Rented Civic (C002) for 1 days, paid $55
2025-05-17 20:40:29 - Rented Civic (C002) for 1 days, paid $55
2025-05-17 20:42:13 - Returned Civic (C002) after 1 days, paid $55
2025-05-17 20:42:16 - Checked wallet balance: $635.00
2025-05-17 21:48:17 - Checked wallet balance: $635.00
2025-05-18 11:42:57 - Checked wallet balance: $635.00
2025-05-18 13:07:35 - Rented Audi A6 (S001) for 2 days, paid $220
2025-05-18 13:07:41 - Returned Audi A6 after 1 days, paid additional $0
2025-05-18 13:07:49 - Deposited $500.00
2025-05-18 13:07:55 - Checked wallet balance: $915.00
2025-05-18 14:34:39 - Rented Corolla (C001) for 1 days, paid $50
2025-05-18 14:34:41 - Returned Corolla after 1 days, paid additional $0
2025-05-18 15:37:40 - Rented Tesla Model 3 (S004) for 2 days, paid $400
2025-05-18 15:37:43 - Returned Tesla Model 3 after 1 days, paid additional $0
2025-05-18 15:37:52 - Checked wallet balance: $465.00
User Menu (user):
1. Rent a Car
2. Return a Car
3. Show Available Cars
4. Show All Cars
5. Show Balance
6. Deposit Funds
7. View Activity Log
8. Back to Main Menu
Choose an option:
5:30 pm
18/05/2025