COMSATS UNIVERSITY ISLAMABAD
ATTOCK CAMPUS

CAR RENTAL SYSTEM

PROJECT REPORT

Department: Computer Engineering

Subject: Database System

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Car Rental System Report

Introduction:

The Car Rental System is a C++ program designed to manage a simple car rental service. The system allows both buyers and sellers to interact with the database, facilitating the rental and addition of cars. The program is integrated with a MySQL database for efficient data storage and retrieval.

Program Overview

The main components of the Car Rental System code include:

1. **Initialization and Database Connection:**
    - The program connects to a MySQL database using specified credentials.
    - It confirms successful connection or displays an error message.
2. **Sample Car Data Initialization:**
    - An array of sample cars is created with details like serial number, brand, model, and rental price.
    - The program checks if each car exists in the database, updating availability as needed.
3. **User Interaction:**
    - Users choose to be buyers or sellers.
    - Buyers can see available cars, choose one, and confirm the rental.
    - Sellers can add new cars to the database.
4. **Database Operations:**
    - SQL queries (SELECT, UPDATE, INSERT) manage database interactions.
    - Error handling addresses potential issues during these operations.
5. **User Interface:**
    - A text-based interface guides users through renting or adding cars.
    - Clear messages indicate the success or failure of actions.

Technical Details

- **Front-end Implementation:**
  In the front-end design phase, a Graphical User Interface (GUI) was crafted using C++ to ensure an intuitive user experience. The layout focused on user-friendly navigation within the Car Rental System.

- **Back-end Implementation:**
  The back-end implementation secured a connection to the MySQL database, facilitating reliable data exchange. SQL queries were strategically employed for CRUD operations, handling data creation, retrieval, updates, and deletions.

Key Features

1. **Buyer Section:**
    - Displays a list of available cars for rent.
    - Allows buyers to select a car by entering the serial number.
    - Marks the selected car as unavailable in the database when a car is selected.
2. **Seller Section:**
    - Enables sellers to add new cars to the database for rent.
    - Checks for existing cars whether the car has same serial no. that user wants to enter before allowing additions.
3. **Database Integration:**
    - Utilizes MySQL for data storage and retrieval.
    - Incorporates error handling for database queries.

Challenges Encountered:

Certainly, here are the identified problems encountered during the development of the Car Rental System:

- Difficulty establishing a reliable connection to the MySQL database.
- Lack of proper validation for user inputs, especially during the addition of new cars.
- Text-based interface limitations in terms of user-friendliness.
- Visual appeal concerns impacting the overall user experience.
- Absence of a robust logging mechanism for tracking system activities.
- Challenges in troubleshooting and identifying the root causes of issues.

Addressing these challenges was crucial for refining the Car Rental System and enhancing its functionality, security, and user experience.

Improvements and Recommendations

1. **Input Validation:**
    - Implement input validation to handle unexpected user inputs and enhance program robustness.
2. **Security Considerations:**

- Ensure secure handling of database credentials.
- Implement user authentication for enhanced security.

3. **Enhanced User Interface:**
    - Consider developing a graphical user interface (GUI) for a more user-friendly experience.
4. **Logging and Reporting:**
    - Integrate logging mechanisms to record important events and errors.
    - Generate detailed reports for better system monitoring.

Conclusion:

The Car Rental System provides a foundation for managing a basic car rental service. With further enhancements and refinements, it has the potential to become a more robust and user-friendly application.

References:

- For understanding the usage of MySQL C API in the code, refer to the official MySQL documentation: MySQL C API User Guide.
- If you are interested in the use of Windows API functions, you may refer to the Microsoft Windows API Documentation.
- Understanding MySQL queries and database interactions can be enhanced by referring to the official MySQL documentation: MySQL Documentation.
- Educational platforms like GeeksforGeeks or Stack Overflow can be valuable for discussions on specific programming challenges and concepts.