CAR RENTAL SYSTEM

A PROJECT REPORT

Submitted by

VISWADHARSHINI T K (2303811724322124)

in partial fulfillment of requirements for the award of the course
CGB1201 – JAVA PROGRAMMING

in

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)
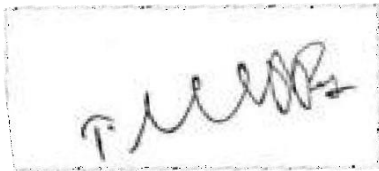
SAMAYAPURAM – 621 112

DECEMBER, 2024

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BONAFIDE CERTIFICATE

Certified that this project report on **"CAR RENTAL SYSTEM"** is the bonafide work of **VISWADHARSHINI T K(2303811724322124)** who carried out the project work during the academic year 2024 - 2025 under my supervision.

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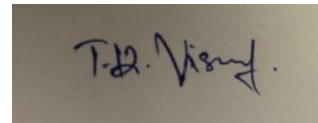Submitted for the viva-voce examination held on 3.12.24

INTERNAL EXAMINER

EXTERNAL EXAMINER

DECLARATION

I declare that the project report on " **CAR RENTAL SYSTEM**" is the result of original work done by me and best of my knowledge, similar work has not been submitted to "**ANNA UNIVERSITY CHENNAI**" for the requirement of Degree of **BACHELOR OF TECHNOLOGY**. This project report is submitted on the partial fulfillment of the requirement of the award of the **CGB1201 – JAVA PROGRAMMING.**

Signature

T.K.VISWADHARSHINI

Place: Samayapuram

Date: 3/12/2024

ACKNOWLEDGEMENT

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VISION OF THE INSTITUTION

To serve the society by offering top-notch technical education on par with global standards.

MISSION OF THE INSTITUTION

- Be a centre of excellence for technical education in emerging technologies by exceeding the needs of industry and society.
- Be an institute with world class research facilities.
- Be an institute nurturing talent and enhancing competency of students to transform them as all- round personalities respecting moral and ethical values.

VISION AND MISSION OF THE DEPARTMENT

To excel in education, innovation and research in Artificial Intelligence and Data Science to fulfill industrial demands and societal expectations.

Mission 1: To educate future engineers with solid fundamentals, continually improving teaching methods using modern tools.

Mission 2: To collaborate with industry and offer top-notch facilities in a conductive learning environment.

Mission 3: To foster skilled engineers and ethical innovation in AI and Data Science for global recognition and impactful research.

Mission 4: To tackle the societal challenge of producing capable professionals by instilling employability skills and human values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Compete on a global scale for a professional career in Artificial Intelligence and Data Science.

PEO 2: Provide industry-specific solutions for the society with effective communication and ethics.

PEO 3: Hone their professional skills through research and lifelong learning initiatives.

PROGRAM OUTCOMES

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practic.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO 1:** Capable of working on data-related methodologies and providing industry-focussed solutions.

- **PSO2:** Capable of analysing and providing a solution to a given real-world problem by designing an effective program.

ABSTRACT

The Car Rental System is a web-based or software application designed to simplify the process of renting vehicles to customers. It allows users to browse and book a car of their choice based on their preferences such as vehicle type, rental duration, and location. The system maintains an organized database of available vehicles, rental transactions, and customer information. It also manages vehicle availability, pricing, booking schedules, and payment processing.For administrators, the system provides tools for adding, updating, and deleting vehicle listings, managing customer profiles, and generating rental reports. Customers can search for available cars, view rental details, make reservations, and manage bookings online. Additionally, features like price calculation based on rental duration, user authentication, and real-time car availability ensure a seamless and user-friendly experience.The system also implements security measures for user data protection and provides notifications for reminders or alerts related to bookings. The Car Rental System, with its focus on ease of use, reliability, and efficiency, aims to streamline the car rental process, making it more accessible for customers while optimizing fleetmanagement for rental businesses.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The rapid development of technology and digital infrastructure has significantly transformed the transportation industry. One of the most notable advancements is the rise of car rental systems, which provide convenient, flexible, and cost-effective transportation solutions. A car rental system enables individuals and organizations to rent vehicles for short or long durations, meeting a variety of needs, such as travel, business, or leisure purposes. This system involves managing vehicle inventory, booking processes, customer information, and payment systems to streamline the entire rental process efficiently.

1.2 OBJECTIVE

The main objectives of this car rental system are as follows:

- To provide a user-friendly platform for customers to browse, select, and bookvehicles with ease.
- To streamline the rental process by automating bookings, payments, and vehicleavailability checks.
- To ensure efficient vehicle management, including tracking reservations,maintenance schedules, and customer feedback.
- To enhance customer satisfaction by offering a variety of rental options andseamless service.
- To improve operational efficiency for rental companies by managing data,reducing paperwork, and integrating real-time reporting.
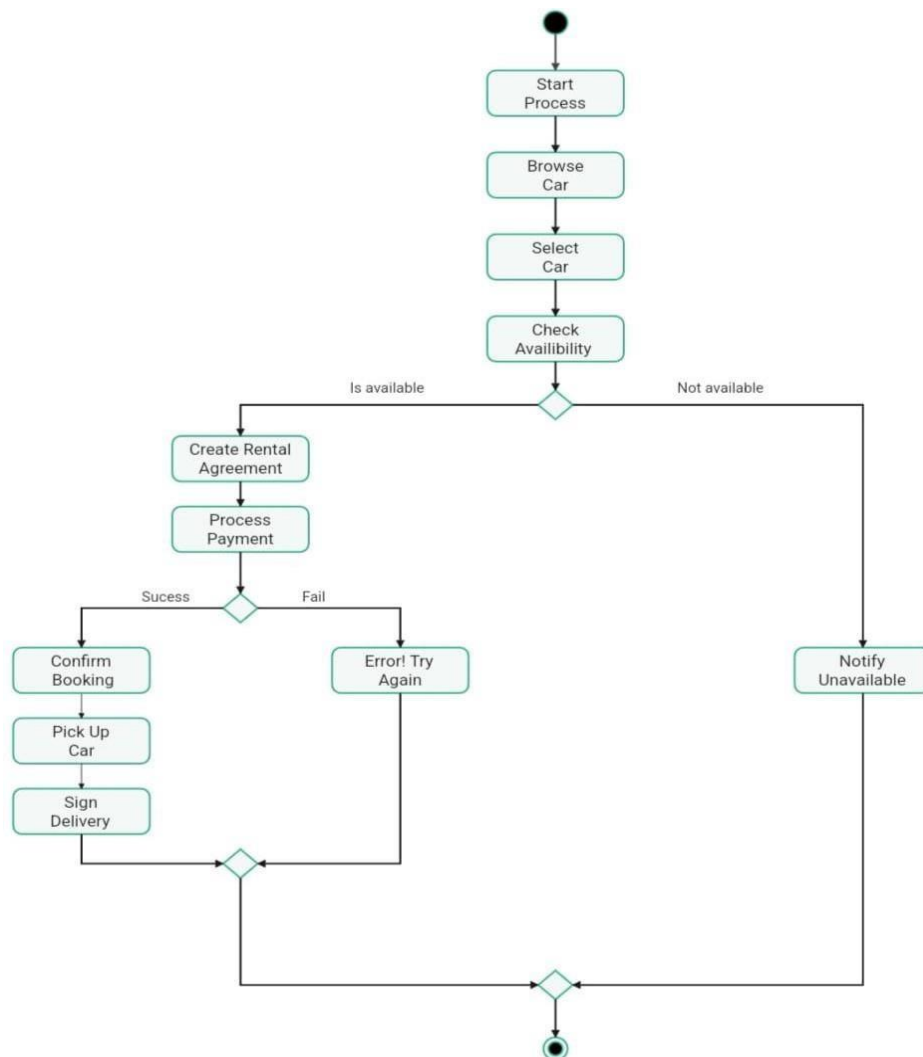
CHAPTER 2
PROJECT METHODOLOGY

2.1 PROPOSED WORK

The proposed Car Rental System aims to create a robust, user-friendly, and secure platform for managing vehicle rentals. The system will streamline processes such as vehicle booking, inventory management,and payment processing.

2.2 BLOCK DIAGRAM

CHAPTER 3
JAVA PROGRAMMING CONCEPTS

3.1 Object-Oriented Programming (OOP)

- **Class and Object:**

The system uses a Car class to define the attributes and behaviors of a car, while objects represent individual cars. This structure promotes reusability and organization.

- **Encapsulation**:

Data within the Car class (like model, seats, and isAvailable) is encapsulated to protect it from unintended interference, ensuring it can only be modified through class methods.

- **Method Overriding:**

The toString() method in the Car class is overridden to provide a custom string representation of car objects, enhancing readability and debugging.

1. **Arrays**

An array of Car objects is used to store the car inventory. This allows efficient storage, retrieval, and manipulation of car data using indexing and iteration.

3.2 Control Flow

A while loop runs continuously to keep displaying the main menu until

user chooses to exit, ensuring consistent program flow.

Conditional Statements:

if-else conditions are used to handle various scenarios, such as checking car availability, validating input, and confirming user actions.

Switch Case:

A switch statement manages different user menu choices, streamlining the control flow and improving code readability.

2. Methods

The program is divided into multiple methods, each performing a specific task (like viewing available cars or renting a car). This modular design promotes code reusability and simplifies maintenance.

5.User Input Handling

The Scanner class captures user input from the console. Various methods are used to read and process different types of input, ensuring smooth user interaction. String comparisons and manipulations, such as using equals Ignore Case(), allow for case-insensitive input checks, improving user experience and preventing errors.

CHAPTER 4
MODULE DESCRIPTION

4.1 User Management Module

The User Management Module handles the registration, authentication, and management of user accounts. It differentiates between customers and administrators, allowing users to sign up, log in, and manage their profiles. Administrators can oversee user roles and activities, ensuring secure access with role-based controls and encrypted password storage.

4.2 Vehicle Management Module

The Vehicle Management Module focuses on managing vehicle information. allows administrators to add, update, and monitor vehicles, classifying them by type, model, and status (available, booked, or under maintenance). This ensures a dynamic and up-to-date inventory, accommodating various categories such as economy, luxury, and electric vehicles.Manages the process of returning rented cars and collecting feedback from customers.

4.3 Booking and Reservation Management Module

The Booking and Reservation Management Module facilitates the core functionality of booking cars. Customers can search for available vehicles, make reservations, and cancel bookings. This module performs real-time availability checks, prevents booking conflicts, and validates date and time selections, ensuring a seamless reservation process. Provides administrative control over the car rental system, including car management, user management, and reporting.

4.4 Payment Processing Module

The Payment Processing Module integrates secure payment gateways to handle rental transactions. Customers can choose from various payment options, including credit/debit cards and digital wallets. The module ensures encrypted, secure transactions, generates payment confirmations, and manages refunds forcancellations, contributing to a smooth financial experience.

4.4 Reporting and Analytics Module

The Reporting and Analytics Module provides administrators with valuable insights through customizable reports and visual dashboards. It tracks key metrics like daily bookings, revenue, and vehicle utilization. The data-driven analysis helps identify trends and optimize business operations, with options to export reports in formats such as PDF and Excel.

CHAPTER 5
CONCLUSION

The Car Rental System provides an efficient and user-friendly platform for managing the rental of vehicles. By incorporating various modules such as user authentication, car inventory management, reservation and booking, rental and payment processing, and car return handling, the system streamlines the entire rental process for both customers and administrators. The integration of a maintenance management module ensures the fleet remains in optimal condition, while the reporting and analytics module helps in making data-driven decisions to improve service quality and business performance.

Furthermore, the system's ability to send timely notifications and collect user feedback enhances customer satisfaction and promotes engagement. With its well- structured architecture, the Car Rental System is capable of handling various aspects of car rentals efficiently, ensuring a smooth experience for all users. It is scalable andadaptable to the evolving needs of the business, making it a valuable tool for any car rental company. The system ultimately improves operational efficiency, enhances customer experience, and drives business growth.

Additionally, the system's features like user authentication, maintenance scheduling, and customer feedback management contribute to a seamless experience for allparties involved. With the ability to generate reports and analyze data, the system supports informed decision-making, ultimately driving the success of the car rental business. By focusing on user experience, ease of use, and operational efficiency, the Car Rental System is a crucial tool for managing the complex aspects of car rental services while ensuring customer satisfaction and business growth.

REFERENCES:

Books :

"Head First Java" by Kathy Sierra and Bert Bates.

"Java: The Complete Reference" by Herbert Schildt.

"Effective Java" by Joshua Bloch.

APPENDICES

APPENDIX A – SOURCE CODE

```java
import java.awt.*;

import java.awt.event.*;

public class CarRentalSystem extends Frame implements ActionListener {
    // Components declaration
    Label lblTitle, lblName, lblCarModel, lblDays, lblSummary;
    TextField txtName, txtDays;
    Choice carModelChoice;
    Button btnSubmit;
    TextArea txtSummary;

    public CarRentalSystem() {
        // Set frame properties
        setTitle("Car Rental System");
        setSize(400, 400);
        setLayout(null);
        setVisible(true);
        setResizable(false);
        addWindowListener(new WindowAdapter() {
            public void windowClosing(WindowEvent e) {
                dispose();
            }
        });

        // Title
        lblTitle = new Label("Car Rental System");
        lblTitle.setFont(new Font("Arial", Font.BOLD, 18));
        lblTitle.setBounds(100, 40, 200, 30);
        add(lblTitle);

        // Name label and text field
        lblName = new Label("Customer Name:");
        lblName.setBounds(50, 90, 120, 20);
        add(lblName);

        txtName = new TextField();
        txtName.setBounds(180, 90, 150, 20);
        add(txtName);

        // Car model label and choice
```

```
lblCarModel = new Label("Select Car Model:");
```

```java
        lblCarModel.setBounds(50, 130, 120, 20);
        add(lblCarModel);

        carModelChoice = new Choice();
        carModelChoice.add("Toyota Corolla");
        carModelChoice.add("Honda Civic");
        carModelChoice.add("Ford Focus");
        carModelChoice.add("BMW 3 Series");
        carModelChoice.setBounds(180, 130, 150, 20);
        add(carModelChoice);

        // Days label and text field
        lblDays = new Label("Rental Days:");
        lblDays.setBounds(50, 170, 120, 20);
        add(lblDays);

        txtDays = new TextField();
        txtDays.setBounds(180, 170, 150, 20);
        add(txtDays);

        // Submit button
        btnSubmit = new Button("Submit");
        btnSubmit.setBounds(150, 210, 80, 30);
        add(btnSubmit);
        btnSubmit.addActionListener(this);

        // Summary Text Area
        lblSummary = new Label("Rental Summary:");
        lblSummary.setBounds(50, 260, 120, 20);
        add(lblSummary);

        txtSummary = new TextArea();
        txtSummary.setBounds(50, 290, 300, 70);
        txtSummary.setEditable(false);
        add(txtSummary);
    }

    public void actionPerformed(ActionEvent e) {
        String name = txtName.getText();
        String carModel = carModelChoice.getSelectedItem();
        String daysStr = txtDays.getText();

        // Validate input
        try {
            int days = Integer.parseInt(daysStr);
```

```java
            if (days <= 0) {
                txtSummary.setText("Please enter a valid number of rental days.");
                return;
            }
            // Display summary
            String summary = "Customer: " + name + "\nCar Model: " + carModel + "\nRental
    Days: " + days;
            txtSummary.setText(summary);
        } catch (NumberFormatException ex) {
            txtSummary.setText("Invalid input for rental days.");
        }
    }

    public static void main(String[] args) {
        new CarRentalSystem();
    }
}
```
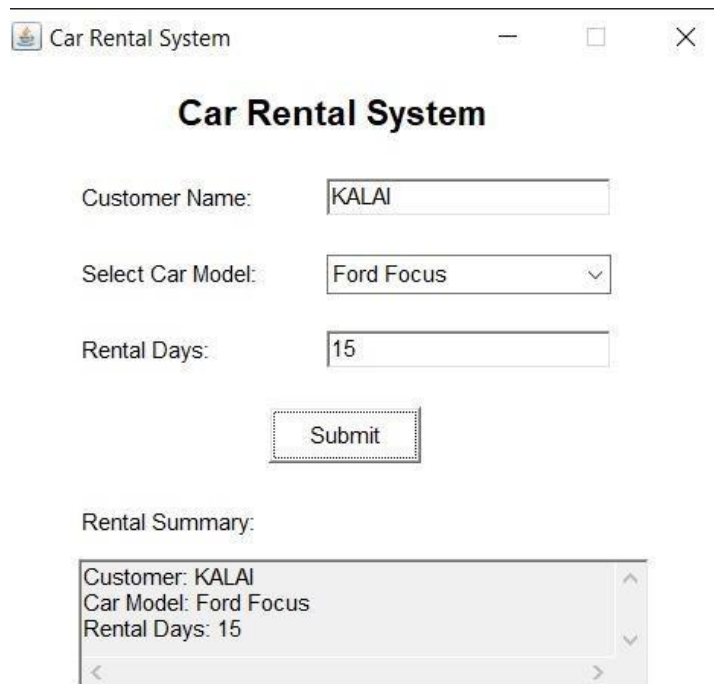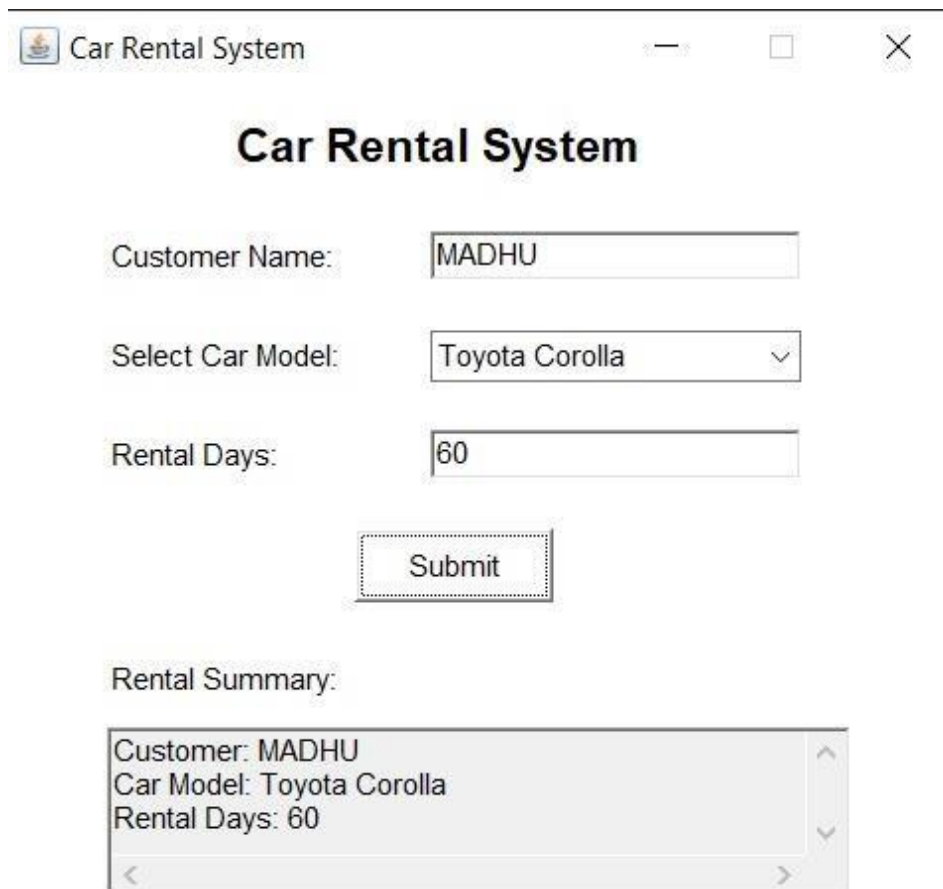
APPENDIX B - SCREENSHOTS

Car Rental System

Customer Name: SASI

Select Car Model: Honda Civic

Rental Days: 45

Submit

Rental Summary:

```
Customer: SASI
Car Model: Honda Civic
Rental Days: 45
```