VEHICLE MANAGEMENT SYSTEM

A PROJECT REPORT

Submitted by

VIDYASRI R(8115U23AM056)

in partial fulfillment of requirements for the award of the course

CGB1201 - JAVA PROGRAMMING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

K. RAMAKRISHNAN COLLEGE OF ENGINEERING

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

SAMAYAPURAM – 621 112

DECEMBER - 2024

K. RAMAKRISHNAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **" VEHICLE MANAGEMENT SYSTEM"** is the bonafide work of **VIDYASRI R (8115U23AM056)** 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 …….

INTERNAL EXAMINER EXTERNAL EXAMINER

DECLARATION

I declare that the project report on **"VEHICLE MANAGEMENT SYSTEM"** is the result of original work done by us and best of our 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 fulfilment of the requirement of the completion of the course **CGB1201 - JAVA PROGRAMMING.**

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Signature

_____

VIDYASRI R

Place: Samayapuram

Date:

ACKNOWLEDGEMENT

It is with great pride that I express our gratitude and in-debt to our institution "**K.Ramakrishnan College of Engineering (Autonomous)**", for providing us with the opportunity to do this project.

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INSTITUTE VISION AND MISSION

VISION OF THE INSTITUTION

To achieve a prominent position among the top technical institutions.

MISSION OF THE INSTITUTION

M1: To bestow standard technical education par excellence through state of the art infrastructure, competent faculty and high ethical standards.

M2: To nurture research and entrepreneurial skills among students in cutting edge technologies.

M3: To provide education for developing high-quality professionals to transform the society.

DEPARTMENT VISION AND MISSION

DEPARTMENT OF CSE(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

VISION OF THE DEPARTMENT

To prove excellence in Data Science research, education and innovation with AI tools.

MISSION OF THE DEPARTMENT

M1: To contribute for greater collaboration with academia and businesses.

M2: To impart quality and research based education to promote innovations providing smart solutions in multi-disciplinary area of Artificial Intelligence and Data Science.

M3: To provide eminent Data Scientists to serve humanity

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

Our graduates shall

PEO1: To create Graduates with successful career in the field of Data Science in all industries or pursue higher education and research or evolve as entrepreneur.

PEO2: To equip the Graduates with the ability and attitude to adapt to emerging technological changes in the field of expert systems.

PEO3: To excel the students as socially committed engineers with high ethical values, leadership qualities and openness for the needs of society.

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 practice.

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)

- **PSO1:** To develop optimized Data Science Solutions, through analysis, design, implementation, and evaluation to give technological solutions for real-time societal issues.
- **PSO2:** To employ advanced analytic platforms in creating innovative career paths to become best data scientists.

ABSTRACT

The Vehicle Management System (VMS) is an advanced solution designed to streamline the management and maintenance of vehicles, ensuring operational efficiency, safety, and regulatory compliance. The system offers an integrated platform to track and manage key aspects of vehicle ownership, including insurance and license due dates, service schedules, fuel levels, and fine history. By providing timely reminders and automated alerts for insurance renewals, license expiry, and upcoming service appointments, VMS helps users avoid potential penalties and lapses in coverage. It also monitors fuel levels, allowing users to efficiently track petrol usage and ensure timely refueling. In addition, the system maintains a detailed record of any fines incurred, providing users with a clear history of traffic violations and helping them manage payments. With its user-friendly interface and real-time data, VMS enhances the management of vehicle-related tasks, reducing administrative burdens and ensuring that all vehicle requirements are met on time. By improving vehicle maintenance, reducing the risk of fines, and ensuring optimal fuel management, the Vehicle Management System contributes to the overall efficiency and cost-effectiveness of vehicle operations, benefiting both individual owners and fleet managers. The Vehicle Management System (VMS) is a comprehensive solution designed to efficiently manage and monitor various aspects of vehicle operations, ensuring smooth functionality and timely maintenance. This system tracks and manages critical components such as insurance and license due dates, service schedules, petrol levels, and fine history. By integrating automated reminders and alerts, the VMS helps users avoid penalties due to expired insurance, licenses, or missed services. Additionally, the system provides real-time tracking of petrol levels, enabling better fuel management. It also maintains a detailed fine history, allowing users to track and settle any traffic-related fines.

ABSTRACT WITH POs AND PSOs MAPPING

CO 5 : BUILD JAVA APPLICATIONS FOR SOLVING REAL-TIME PROBLEMS

ABSTRACT	POs MAPPED	PSOs MAPPED
The Vehicle Management System (VMS) is a comprehensive solution designed to efficiently manage and monitor various aspects of vehicle operations, ensuring smooth functionality and timely maintenance. This system tracks and manages critical components such as insurance and license due dates, service schedules, petrol levels, and fine history. By integrating automated reminders and alerts, the VMS helps users avoid penalties due to expired insurance, licenses, or missed services. Additionally, the system provides real-time tracking of petrol levels, enabling better fuel management. It also maintains a detailed fine history, allowing users to track and settle any traffic-related fines. The VMS aims to enhance the overall efficiency of vehicle ownership, reduce operational risks, and ensure compliance with regulatory requirements, offering a streamlined approach to vehicle management for individuals and organizations alike.	PO4 - 2 PO5 - 2 PO6 - 3 PO7 - 3 PO8 - 2	PSO1 - 1 PSO2 - 2

Note: 1- Low, 2-Medium, 3- High

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LIST OF ABBREVIATIONS

ABBREVIATIONS	EXPANSION
VMS	Vehicle Management System
GPS	Global Positioning System
API	Application Programing Interface
IOT	Internet of Things
RTO	Regional Transport Office
DBMS	Database Management System

CHAPTER 1

INTRODUCTION

1.1 Objective

The primary objective of the Vehicle Management System is to streamline and automate vehicle-related operations, making fleet management more efficient and reliable. This system aims to reduce manual effort and errors by providing automated processes for tasks such as booking, vehicle allocation, and maintenance scheduling. By optimizing resource utilization, the system ensures that vehicles are used effectively, minimizing downtime and improving overall operational efficiency.

It focuses on providing a centralized platform for real-time vehicle tracking, maintenance management, and user interactions, enabling organizations to enhance their decision-making capabilities. With these objectives, the Vehicle Management System seeks to improve productivity, reduce costs, and deliver a seamless experience for both administrators and users.The Vehicle Management System aims to provide a comprehensive solution for managing fleet operations by integrating advanced tracking, monitoring, and reporting functionalities.

One of its key objectives is to ensure real-time visibility of vehicle locations and statuses, enabling better route planning and reducing delays. The system also seeks to enhance customer satisfaction by simplifying the booking process and ensuring vehicle availability. Another critical goal is to improve fleet reliability by automating maintenance schedules and keeping vehicles in optimal condition. Furthermore, it aims to offer secure and role-based access, ensuring data confidentiality and proper user management. By implementing detailed reporting and analytics, the system empowers decision-makers to analyze fleet performance, identify inefficiencies, and make informed decisions to optimize operations.

Additionally, it monitors and reminds users about scheduled vehicle maintenance and service dates, promoting better vehicle performance and reducing the risk of unexpected breakdowns.

1.2 Overview

The Vehicle Management System (VMS) is a software application developed in Java to simplify and optimize the management of vehicle-related operations. The system is designed to handle core functionalities such as vehicle inventory management, booking and allocation, real-time tracking, maintenance scheduling, and detailed reporting.

The backend is powered by a relational database, such as MySQL or SQLite, to store and manage data securely, including vehicle details, user profiles, and booking history. Java's modular and object-oriented design ensures that the system is scalable, secure, and maintainable. By leveraging technologies such as GPS integration for tracking and automated notifications for maintenance alerts, the system enhances operational efficiency and reduces downtime.

The VMS is suitable for organizations managing fleets of vehicles, such as logistics companies, car rental agencies, or transportation services. With its robust architecture and real-time data handling capabilities, the system ensures efficient resource utilization, improved decision-making, and a streamlined experience for both administrators and users. The integration of role-based access control further strengthens security by restricting system features based on user roles. In conclusion, the Vehicle Management System developed in Java is a comprehensive, efficient, and scalable solution tailored to modern fleet management needs.

This system consolidates various tasks into a single platform, including the management of insurance and license renewals, service schedules, fuel levels, and fine histories. With built-in automated reminders and alerts, VMS ensures that users stay on top of important due dates, avoiding penalties and ensuring legal compliance. The system offers real-time tracking of petrol levels, helping users monitor fuel consumption and optimize refueling schedules.

1.3 Java Programming Concepts

1.Object-Oriented Programming (OOP)

The system leverages OOP principles to structure the code effectively:

- **Classes and Objects:** Classes like Vehicle, User, Booking, and Maintenance represent entities in the system, while objects store data for specific instances.
- **Inheritance:** Classes such as Car and Truck can inherit common properties from a Vehicle superclass.
- **Polymorphism:** Methods like calculateCost() can be overridden to handle different pricing for different vehicle types.
- **Encapsulation:** Private fields with getter and setter methods ensure secure data handling.

2.Data Structures and Collections

Efficient management of data in the system requires the use of Java's collection framework:

- **ArrayList:** To store and manage lists of vehicles, bookings, and users.
- **HashMap**: For storing key-value pairs, such as vehicle IDs and their statuses.
- **Queue:** For implementing a booking queue to handle multiple requests sequentially.

3. Exception Handling

To ensure system robustness, Java's exception-handling mechanism is used:

- **Try-Catch Blocks:** To handle invalid inputs, database connection issues, and file I/O errors.

- **Custom Exceptions**: To create application-specific exceptions, such as Vehicle Not Available Exception.

4**. File Handling and Persistence**

Java's file I/O capabilities and database integration are critical:

- **File Handling**: For logging system activities and generating reports in text or CSV format.
- **JDBC (Java Database Connectivity):** For connecting to databases like MySQL to store vehicle, booking, and user data persistently.

5. Multithreading

Multithreading is useful for handling concurrent operations:

- **Example:** Processing multiple booking requests simultaneously while maintaining real-time data updates.
- Thread synchronization ensures data integrity during simultaneous access.

6. Design Patterns

Common design patterns improve system design and scalability:

- **Factory Pattern:** To create objects dynamically, such as different types of vehicles (Car, Bike, Bus).
- **Observer Pattern**: For implementing notification features, such as maintenance alerts.

7. Networking (Optional)

If the system supports remote access:

- **Socket Programming:** To allow communication between clients and the server.

CHAPTER 2

PROJECT METHODOLOGY

2.1 Proposed Work

1.Objectives

- To design and develop a robust Vehicle Management System that simplifies fleet operations and enhances efficiency.
- To provide functionalities for vehicle tracking, booking, maintenance management, and reporting.
- To ensure secure and user-friendly interaction through role-based access controls.

2.Scope of the System

- Vehicle Management: Add, update, and manage vehicle details such as type, registration, status, and availability.
- Booking System: Allow users to book vehicles in real time and avoid conflicts.
- Maintenance Scheduling: Automate the scheduling and tracking of maintenance activities.
- User Management: Implement role-based access for administrators, operators, and customers.
- Tracking and Reporting: Provide real-time vehicle tracking and generate detailed usage reports.

3.Methodology / Work Phases

Phase 1: Requirement Analysis

- Identify the functional requirements such as vehicle inventory, booking, and tracking.
- Define non-functional requirements, including system security, scalability, and performance.

- Gather user inputs for additional feature customization.

Phase 2: System Design

- System Architecture: Use UML diagrams to design the workflow.
- Database Design: Develop an efficient schema for storing vehicle details, booking records, and user data.
- Technology Stack:
    - Programming Language: Java
    - Database: MySQL or SQLite
    - GUI: JavaFX or Swing (for user interface).

Phase 3: System Implementation

- Module Development:
    - Vehicle Management Module: CRUD operations for vehicles (add, view, update, delete).
    - Booking Module: Enable users to check availability and book vehicles.
    - Maintenance Module: Schedule and notify upcoming maintenance tasks.
    - Tracking Module: Integrate GPS functionality for real-time vehicle monitoring.
    - User Authentication: Implement login/registration with secure role-based access.

Phase 4: Testing

Conduct thorough testing to ensure the system's reliability and efficiency:

- Unit Testing: Test individual modules for proper functionality.
- Integration Testing: Validate interactions between different modules.
- System Testing: Ensure the complete system meets requirements.

Phase 5: Deployment and Maintenance

- Deploy the system locally or on a cloud server for multi-user access.
- Provide user training and a detailed user manual.
- Regular updates for new features and bug fixes.

4.Expected Deliverables

- A fully functional Vehicle Management System with modules for booking, vehicle management, and maintenance tracking.
- A user-friendly interface for staff and customers.
- Detailed reports on vehicle usage, revenue, and maintenance activities.
- Enhanced operational efficiency and resource management.

Key Features

- Real-time vehicle availability tracking.
- Automated maintenance scheduling and reminders.
- Secure and scalable architecture for multi-role access.
- Comprehensive reporting and analytics for informed decision-making.

2.2 Block Diagram

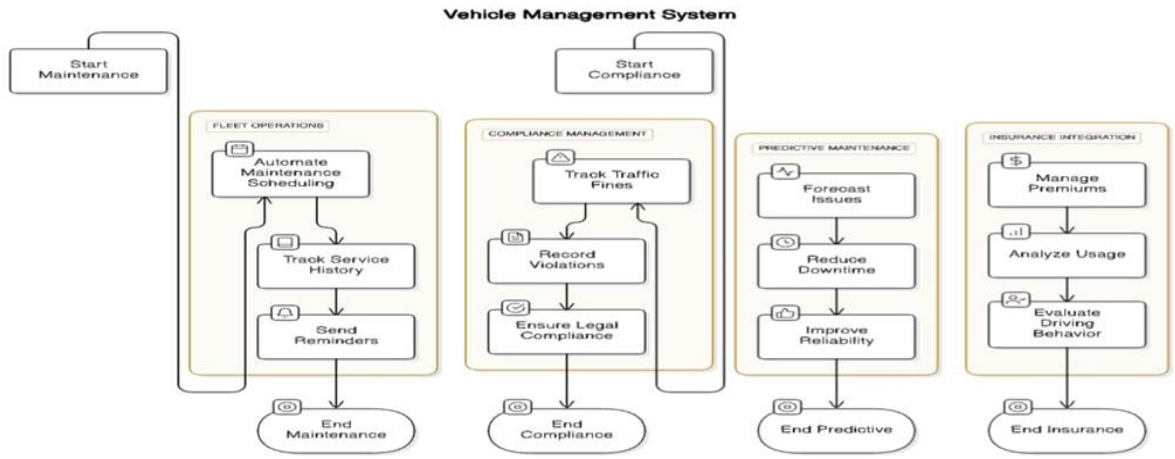


Fig. 2.2.1 Block Diagram For Managing Vehicle

CHAPTER 3

MODULE DESCRIPTION

3.1 USER MANAGEMENT MODULE

- Description: This module handles user authentication and access control. It differentiates between various user roles, such as admin, vehicle operator, and customer, ensuring role-based permissions.
- Key Features:
    - User registration and login functionality.
    - Role-based access to system features.
    - Profile management for users.

3.2 VEHICLE INVENTORY MODULE

- Description: Manages the addition, updating, and removal of vehicle information in the system. This module maintains a database of all available vehicles with detailed information such as type, registration number, model, and status (available, booked, under maintenance).
- Key Features:
    - Add, view, update, and delete vehicle records.
    - Track vehicle status in real-time.
    - Filter and search vehicles based on criteria like type or availability.

3.3 BOOKING MANAGEMENT MODULE

- Description: This module facilitates the reservation of vehicles by customers or staff. It ensures that vehicles are booked only when available and prevents conflicts such as double bookings.

- Key Features:
    - Real-time vehicle booking and cancellation.
    - Check availability based on date and time.

3.4 MAINTANENCE MANAGEMENT MODULE

- Description: Tracks and schedules vehicle maintenance activities to ensure the fleet remains operational and in good condition. It includes automated notifications for scheduled maintenance and records service history.
- Key Features:
    - Maintenance scheduling and alerts.
    - Log and track repair history.
    - Monitor vehicle health and service requirements.

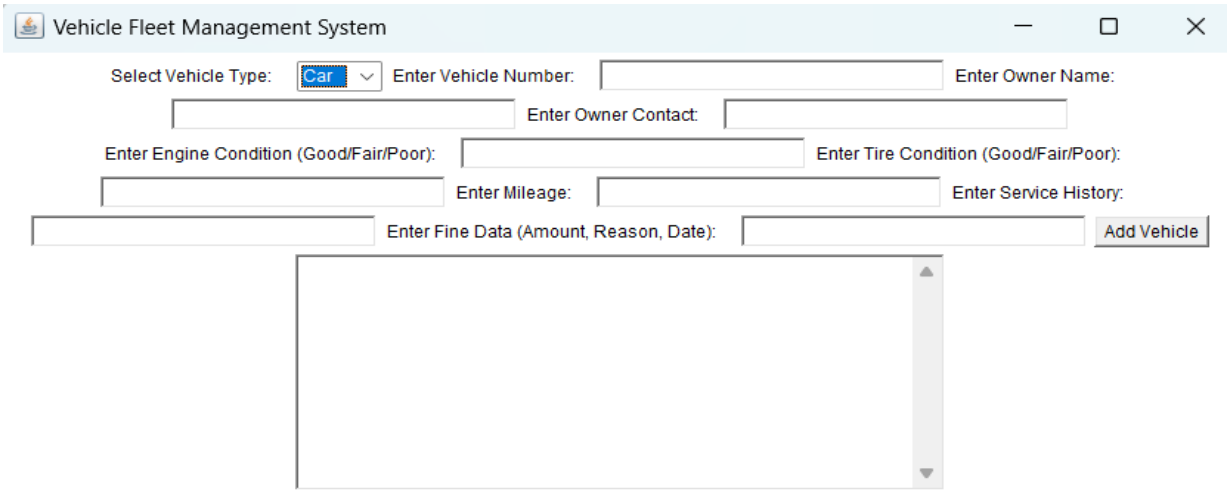
3.5 PAYMENT MANAGEMENT MODULE

- Description: Handles financial transactions related to vehicle bookings. It supports various payment methods and ensures secure processing of payments.
- Key Features:
    - Process payments for bookings.
    - Generate and manage payment receipts.
    - Support for multiple payment options (e.g., credit card, digital wallets).

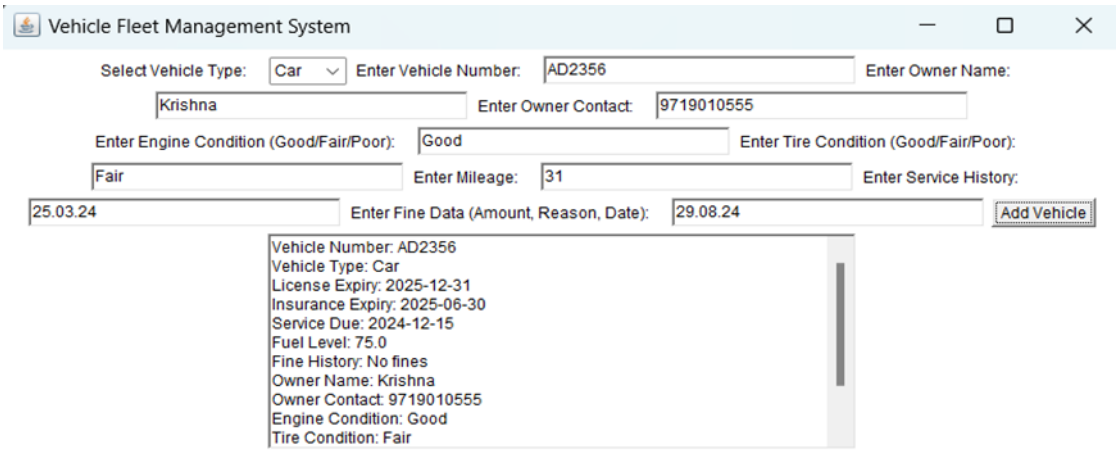
CHAPTER 4

RESULTS AND DISCUSSION

Vehicle Management System Interface



Vehicle Management System Interface With Sample Data



Description of the Vehicle Fleet Management System GUI:

The Vehicle Fleet Management System is a desktop application designed to manage vehicle details, maintenance schedules, and owner information. The interface provides fields for data entry and displays vehicle information in a structured format.

Interface Overview

Form Layout:

- The interface has an intuitive and user-friendly design, divided into two sections:
  - Data Entry Section: Allows the user to input various details about a vehicle.
  - Output/Display Section: Displays the details of the added vehicle after submission.

Input Fields:

- Vehicle Type: A dropdown menu to select the type of vehicle (e.g., Car, Truck, Bike, etc.).
- Vehicle Number: A text field to enter the registration number of the vehicle (e.g., AD2356).
- Owner Name: A text field to input the name of the vehicle owner.
- Owner Contact: A text field for the contact number of the owner.
- Engine Condition: A dropdown or text field to indicate the condition of the engine (e.g., Good, Fair, Poor).
- Tire Condition: A dropdown or text field to specify the condition of the tires (e.g., Good, Fair, Poor).
- Mileage: A text field to input the mileage of the vehicle (e.g., 31 miles).
- Fine Data: A field to record fine details, including the amount, reason, and fine date.
- Service History: A text field to log service history or future service due dates (e.g., 25.03.24).

Action Button:

- Add Vehicle: This button submits the entered vehicle data, processes it, and displays the details in the output section.

Features and Functionality

Adding Vehicle Details:

- Users can input all essential information about a vehicle, such as registration details, owner contact, maintenance history, and condition.

Tracking Maintenance and Compliance:

- Fields like service history, license expiry, and insurance expiry allow users to keep track of vehicle compliance and maintenance schedules.

Displaying Summarized Data:

- Once the user clicks the "Add Vehicle" button, all the entered details are displayed in a structured format in the output section.
- The displayed information includes:
  - Vehicle details: Registration number, type, license expiry, insurance expiry, and fuel level.
  - Maintenance details: Service due date, engine condition, and tire condition.
  - Owner details: Name and contact information.
  - Fine history: Any fines recorded with their reasons and dates.

CHAPTER 5

CONCLUSION

In conclusion, the implementation of a Vehicle Management System (VMS) is crucial for streamlining the day-to-day operations of managing a fleet of vehicles. This system not only ensures efficient handling of various tasks but also enhances the overall performance and safety of the vehicles, reducing operational costs and risks. One of the key features of such a system is the management of insurance and license due dates, which helps prevent lapses in these critical documents, thereby ensuring legal compliance and avoiding fines. By automatically tracking the expiration dates of insurance policies and vehicle licenses, the system allows fleet managers or vehicle owners to receive timely reminders, ensuring renewal procedures are completed without delay.

Additionally, service due dates are effectively managed within the system, ensuring that regular maintenance is carried out on time. This proactive approach to vehicle upkeep can significantly extend the lifespan of the vehicles, minimize breakdowns, and reduce repair costs. The system allows for tracking service history, upcoming service requirements, and maintenance schedules, which contribute to smoother vehicle operation and overall safety. Another important aspect is the monitoring of petrol levels, which can help identify irregular consumption patterns or prevent unnecessary fuel wastage. With real-time tracking of fuel levels, the system enables better planning and cost control, reducing the risk of running out of fuel during critical operations.

Furthermore, the fine history feature of the Vehicle Management System ensures that fleet managers or vehicle owners stay informed about any fines incurred by their vehicles. This feature records all fines, helping to track patterns, identify recurring

APPENDIX

CODING

```
import java.awt.*;
import java.awt.event.*;
import java.util.HashMap;
import java.util.Map;

public class VehicleFleetManagementSystem {
    // Maps to store the vehicle data
    private static Map<String, Vehicle> vehicles = new HashMap<>();

    // A simple Vehicle class to store vehicle data
    static class Vehicle {
        String vehicleNumber;
        String vehicleType;
        String licenseExpiry;
        String insuranceExpiry;
        String serviceDue;
        double fuelLevel;
        String fineHistory;
        String ownerName;
        String ownerContact;
        String engineCondition;
        String tireCondition;
        double mileage;
        String serviceHistory;
        String fineData;

        public Vehicle(String vehicleNumber, String vehicleType, String licenseExpiry,
```

```
String insuranceExpiry, String serviceDue,
            double fuelLevel, String fineHistory, String ownerName, String ownerContact, String engineCondition,
            String tireCondition, double mileage, String serviceHistory, String fineData) {
        this.vehicleNumber = vehicleNumber;
        this.vehicleType = vehicleType;
        this.licenseExpiry = licenseExpiry;
        this.insuranceExpiry = insuranceExpiry;
        this.serviceDue = serviceDue;
        this.fuelLevel = fuelLevel;
        this.fineHistory = fineHistory;
        this.ownerName = ownerName;
        this.ownerContact = ownerContact;
        this.engineCondition = engineCondition;
        this.tireCondition = tireCondition;
        this.mileage = mileage;
        this.serviceHistory = serviceHistory;
        this.fineData = fineData;
    }

    @Override
    public String toString() {
        return "Vehicle Number: " + vehicleNumber + "\nVehicle Type: " + vehicleType + "\nLicense Expiry: " + licenseExpiry +
                "\nInsurance Expiry: " + insuranceExpiry + "\nService Due: " + serviceDue + "\nFuel Level: " + fuelLevel +
                "\nFine History: " + fineHistory + "\nOwner Name: " + ownerName + "\nOwner Contact: " + ownerContact +
```

```
                "\nEngine Condition: " + engineCondition + "\nTire Condition: " +
tireCondition + "\nMileage: " + mileage +
                "\nService History: " + serviceHistory + "\nFine Data: " + fineData;
        }
    }

    public static void main(String[] args) {
        // Create a simple AWT Frame
        Frame frame = new Frame("Vehicle Fleet Management System");

        // Labels and input fields
        Label label1 = new Label("Select Vehicle Type:");
        Label label2 = new Label("Enter Vehicle Number:");
        Label label3 = new Label("Enter Owner Name:");
        Label label4 = new Label("Enter Owner Contact:");
        Label label5 = new Label("Enter Engine Condition (Good/Fair/Poor):");
        Label label6 = new Label("Enter Tire Condition (Good/Fair/Poor):");
        Label label7 = new Label("Enter Mileage:");
        Label label8 = new Label("Enter Service History:");
        Label label9 = new Label("Enter Fine Data (Amount, Reason, Date):");

        Choice vehicleTypeChoice = new Choice();
        vehicleTypeChoice.add("Car");
        vehicleTypeChoice.add("Truck");
        vehicleTypeChoice.add("Bus");

        // Increase the number of columns to make the input fields wider
        TextField vehicleNumberField = new TextField(30);
        TextField ownerNameField = new TextField(30);
```

```
TextField ownerContactField = new TextField(30);
TextField engineConditionField = new TextField(30);
TextField tireConditionField = new TextField(30);
TextField mileageField = new TextField(30);
TextField serviceHistoryField = new TextField(30);
TextField fineDataField = new TextField(30);

// Button to add the vehicle
Button addButton = new Button("Add Vehicle");

// TextArea for displaying information
TextArea outputArea = new TextArea();

// Set layout and add components to the frame
frame.setLayout(new FlowLayout());
frame.add(label1);
frame.add(vehicleTypeChoice);
frame.add(label2);
frame.add(vehicleNumberField);
frame.add(label3);
frame.add(ownerNameField);
frame.add(label4);
frame.add(ownerContactField);
frame.add(label5);
frame.add(engineConditionField);
frame.add(label6);
frame.add(tireConditionField);
frame.add(label7);
frame.add(mileageField);
```

```
        frame.add(label8);
        frame.add(serviceHistoryField);
        frame.add(label9);
        frame.add(fineDataField);
        frame.add(addButton);
        frame.add(outputArea);

        // Set frame size and visibility
        frame.setSize(500, 600);
        frame.setVisible(true);

        // Action to be performed when the Add Vehicle button is pressed
        addButton.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e) {
                // Get the selected vehicle type and number
                String vehicleType = vehicleTypeChoice.getSelectedItem();
                String vehicleNumber = vehicleNumberField.getText();
                String ownerName = ownerNameField.getText();
                String ownerContact = ownerContactField.getText();
                String engineCondition = engineConditionField.getText();
                String tireCondition = tireConditionField.getText();
                double mileage = Double.parseDouble(mileageField.getText());
                String serviceHistory = serviceHistoryField.getText();
                String fineData = fineDataField.getText(); // Fine Data field (fine amount,
reason, date)

                // Simulate the addition of the vehicle data
                String licenseExpiry = "2025-12-31";
                String insuranceExpiry = "2025-06-30";
```

```
            String serviceDue = "2024-12-15";
            double fuelLevel = 75.0; // Example fuel level
            String fineHistory = "No fines";

            // Create a new Vehicle object with Fine Data included
            Vehicle vehicle = new Vehicle(vehicleNumber, vehicleType, licenseExpiry, insuranceExpiry, serviceDue, fuelLevel, fineHistory,
                                          ownerName, ownerContact, engineCondition, tireCondition, mileage, serviceHistory, fineData);

            // Add the vehicle to the map
            vehicles.put(vehicleNumber, vehicle);

            // Display the vehicle information in the TextArea
            outputArea.setText(vehicle.toString());
        }
    });

    // Closing the frame properly
    frame.addWindowListener(new WindowAdapter() {
        public void windowClosing(WindowEvent we) {
            System.exit(0);
        }
    });
  }
}improving driver behavior by offering insights into traffic violations or illegal parking, thereby encouraging adherence to traffic rules and regulations.
```

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