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SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES
CHENNAI-602105



Car Rental Service

A CAPSTONE PROJECT REPORT

Submitted in the partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

IN

INFORMATION TECHNOLOGY

Submitted by

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DECLARATION

We, **S. Tharish reddy, K. Mohan prasad** students of **Bachelor of Engineering in Information Technology**, Department of Computer Science and Engineering, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, hereby declare that the work presented in this Capstone Project Work entitled “**Car Rental Service**” is the outcome of our own bonafide work and is correct to the best of our knowledge and this work has been undertaken taking care of Engineering Ethics.

S. Tharish reddy (192211485)

K. Mohan prasad (192210061)

Date:

Place:

CERTIFICATE

This is to certify that the project entitled “**Car Rental Service**” submitted by **S. Tharish reddy, K. Mohan prasad** has been carried out under my supervision. The project has been submitted as per the requirements in the current semester of B. Tech Information Technology.

Teacher-in-charge

Mr. Yuvaraj.S

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Abstract

A car rental service provides temporary access to vehicles, offering flexibility and convenience for personal or business use. Customers can rent cars on an hourly, daily, or long-term basis, choosing from a variety of vehicle types to suit their needs. Modern car rental services often feature online booking platforms, mobile apps, and automated processes to streamline the customer experience. Additional offerings like insurance, roadside assistance, and customizable rental plans enhance reliability and security. By bridging the gap between car ownership and public transportation, car rental services support urban mobility and promote cost-effective, sustainable transportation solutions.

Introduction

Car rental services have become an integral part of modern transportation systems, offering a flexible and cost-effective alternative to vehicle ownership. These services cater to a wide range of customers, including tourists, business travelers, and local residents, providing vehicles for short-term or long-term use based on individual needs. With increasing urbanization and the rise in travel and mobility demands, car rental services have emerged as a convenient solution for those who seek the freedom of a private vehicle without the financial or logistical burdens of ownership.

Advancements in technology have significantly transformed the car rental industry, making it more user-friendly and efficient. Many service providers now offer online booking platforms and mobile applications that allow customers to reserve vehicles, select pickup and drop-off locations, and even access self-service options. These digital tools have not only streamlined the rental process but also enhanced customer satisfaction by offering transparency and convenience. Additionally, with features like real-time tracking, automated billing, and insurance coverage, car rental services have ensured reliability and security for users.

Car rental services also play a pivotal role in promoting sustainable mobility solutions. By enabling people to share vehicles rather than own them, these services help reduce the number of cars on the road, thereby lowering carbon emissions and alleviating traffic congestion. Furthermore, the inclusion of eco-friendly vehicle options, such as electric and hybrid cars, aligns with global efforts to combat climate change. As cities continue to prioritize sustainable transportation, car rental services are expected to grow, adapting to evolving

customer preferences and contributing to a more connected and environmentally conscious future.

Project Description

The car rental service project is designed to provide an efficient, reliable, and user-friendly platform for renting vehicles to meet the diverse needs of individuals and businesses. The project aims to bridge the gap between car ownership and public transportation by offering a convenient alternative that ensures mobility without the long-term financial and maintenance commitments of owning a vehicle.

The platform will cater to a variety of use cases, such as daily commuting, travel, special occasions, or business purposes, with flexible rental durations ranging from hours to weeks. Customers will have access to a wide selection of vehicles, including economy cars, luxury sedans, SUVs, and eco-friendly options like electric and hybrid cars, ensuring a match for every preference and requirement.

Problem Description

The primary objective of this project is to build a simple software solution for managing a car rental service. Currently, many car rental services face challenges such as inefficient booking processes, lack of transparency, limited vehicle tracking capabilities, and difficulties in managing customer data and rental histories. These issues result in operational inefficiencies, customer dissatisfaction, and missed opportunities for growth.

The proposed software aims to address these problems by providing a streamlined, user-friendly platform for both customers and service providers. For customers, the software will offer features such as easy vehicle selection, real-time availability, online reservations, and transparent pricing. For service providers, it will simplify fleet management, automate billing and invoicing, and enable detailed reporting and analytics.

By integrating advanced features like GPS-based vehicle tracking, automated reminders, and insurance management, the software will enhance reliability and security. Additionally, incorporating eco-friendly options and flexible rental plans will appeal to a broader customer base, aligning with modern mobility and sustainability trends. The software will act as a comprehensive solution to meet the demands of a competitive car rental market.

Tool Description

The car rental service software is a comprehensive platform designed to simplify the process of renting vehicles for both customers and service providers. It offers an intuitive user interface with a range of features that ensure a seamless experience, from browsing available vehicles to completing bookings and managing rentals efficiently.

User interface

Homepage: Displays an overview of available vehicles, promotions, and quick navigation options.

Vehicle Search and Filter: Allows users to search for cars based on categories like type, size, price, or fuel type and filter results by availability or location.

Booking Dashboard: Offers a step-by-step process for selecting a vehicle, choosing rental dates, and completing payment.

Account Management: Enables customers to manage their profiles, view past bookings, and track current rentals.

Admin Panel: Provides service providers with tools to manage fleet availability, track rentals, view analytics, and process customer requests.

Features

Vehicle Browsing and Selection: Customers can view detailed information about available vehicles, including images, specifications, and rental rates.

Real-Time Availability: Users can check vehicle availability in real time and choose their preferred pick-up and drop-off locations.

Online Reservations: Provides a seamless booking experience with secure payment options and instant confirmation.

GPS Tracking: Ensures safety and accountability by allowing both users and service providers to track vehicle locations.

Automated Billing and Invoicing: Simplifies payment processes and generates detailed invoices for transparency.

Operations

>> Fleet Management.

>> Booking and Reservation.

>> Customer Service.

- >> Pricing and Payment.
- >> Vehicle Delivery and Pick-Up.
- >> Tracking and Monitoring.
- >> Legal and Compliance.
- >> Marketing and Promotion.
- >> Fleet Expansion and Diversification.
- >> Technology Integration.

Functionalities

- >> User Management
- >> Vehicle Management
- >> Booking and Reservation System
- >> Pricing and Billing
- >> Vehicle Pickup and Drop-Off
- >> Maintenance and Repairs
- >> Customer Support
- >> Marketing and Promotions
- >> Admin Dashboard
- >> Legal and Compliance
- >> Technology and Integration

Implementation

```
#include <iostream>#include <vector>

#include <string>

#include <iomanip>

using namespace std;

struct Customer {

    int id;
```



```
    string name;

    string phone;

};

struct Car {

    int id;

    string model;

    bool isAvailable;

    bool needsMaintenance;

};

struct Booking {

    int bookingId;

    int customerId;

    int carId;

    string date;

};

struct Payment {

    int paymentId;

    int bookingId;

    double amount;

    string date;

};

class CarRentalSystem {
```

private:

```
vector<Customer> customers;
```

```
vector<Car> cars;
```

```
vector<Booking> bookings;
```

```
vector<Payment> payments;
```

```
int nextCustomerId = 1;
```

```
int nextCarId = 1;
```

```
int nextBookingId = 1;
```

```
int nextPaymentId = 1;
```

public:

```
void registerCustomer() {
```

```
    Customer customer;
```

```
    customer.id = nextCustomerId++;
```

```
    cout << "Enter customer name: ";
```

```
    cin.ignore();
```

```
    getline(cin, customer.name);
```

```
    cout << "Enter customer phone: ";
```

```
    getline(cin, customer.phone);
```

```
    customers.push_back(customer);
```

```
    cout << "Customer registered successfully!\n\n";
```

```
}
```

```
void addCar() {
```

```

    Car car;

    car.id = nextCarId++;

    cout << "Enter car model: ";

    cin.ignore();

    getline(cin, car.model);

    car.isAvailable = true;

    car.needsMaintenance = false;

    cars.push_back(car);

    cout << "Car added successfully!\n\n";

}

void listCars() {

    cout << "\nCar Inventory:\n";

    cout << left << setw(10) << "Car ID" << setw(20) << "Model" << setw(15)
<< "Availability" << "Maintenance Needed" << endl;

    for (const auto &car : cars) {

        cout << left << setw(10) << car.id << setw(20) << car.model

        << setw(15) << (car.isAvailable ? "Available" : "Rented")

        << (car.needsMaintenance ? "Yes" : "No") << endl;

    }

    cout << endl;

}

void makeBooking() {

```

```
int customerId, carId;

string date;

cout << "Enter customer ID: ";

cin >> customerId;

if (!isValidCustomer(customerId)) {

    cout << "Invalid customer ID!\n\n";

    return;

}

cout << "Enter car ID: ";

cin >> carId;

if (!isCarAvailable(carId)) {

    cout << "Car is not available or invalid car ID!\n\n";

    return;

}

cout << "Enter booking date (YYYY-MM-DD): ";

cin >> date;

Booking booking;

booking.bookingId = nextBookingId++;

booking.customerId = customerId;

booking.carId = carId;

booking.date = date;

bookings.push_back(booking);
```

```

    markCarAsRented(carId);

    cout << "Booking successful!\n\n";

    processPayment(booking.bookingId);
}

void processPayment(int bookingId) {

    Payment payment;

    payment.paymentId = nextPaymentId++;

    payment.bookingId = bookingId;

    cout << "Enter payment amount: ";

    cin >> payment.amount;

    cout << "Enter payment date (YYYY-MM-DD): ";

    cin >> payment.date;

    payments.push_back(payment);

    cout << "Payment recorded successfully!\n\n";

}

void returnCar() {

    int carId;

    cout << "Enter car ID to return: ";

    cin >> carId;

    if (isValidCar(carId) && !isCarAvailable(carId)) {

        markCarAsAvailable(carId);
    }
}

```

```

        cout << "Car returned successfully!\n\n";

    } else {

        cout << "Invalid car ID or car is already available!\n\n";

    }

}

void trackMaintenance() {

    int carId;

    cout << "Enter car ID to mark for maintenance: ";

    cin >> carId;

    if (isValidCar(carId)) {

        markCarForMaintenance(carId);

        cout << "Car marked for maintenance successfully!\n\n";

    } else {

        cout << "Invalid car ID!\n\n";

    }

}

void listBookings() {

    cout << "\nBookings:\n";

    cout << left << setw(10) << "Booking ID" << setw(10) << "Car ID" <<
    setw(15) << "Customer ID" << "Date" << endl;

    for (const auto &booking : bookings) {

```

```
        cout << left << setw(10) << booking.bookingId << setw(10) <<
booking.carId << setw(15) << booking.customerId << booking.date << endl;
```

```
    }
```

```
    cout << endl;
```

```
}
```

```
void adminDashboard() {
```

```
    cout << "\nAdmin Dashboard:\n";
```

```
    cout << "Total Customers: " << customers.size() << endl;
```

```
    cout << "Total Cars: " << cars.size() << endl;
```

```
    cout << "Total Bookings: " << bookings.size() << endl;
```

```
    cout << "Total Payments: " << payments.size() << endl;
```

```
}
```

```
private:
```

```
bool isValidCustomer(int customerId) {
```

```
    for (const auto &customer : customers) {
```

```
        if (customer.id == customerId)
```

```
            return true;
```

```
    }
```

```
    return false;
```

```
}
```

```
bool isValidCar(int carId) {
```

```
    for (const auto &car : cars) {
```

```

        if (car.id == carId)

            return true;

    }

    return false;
}

bool isCarAvailable(int carId) {

    for (const auto &car : cars) {

        if (car.id == carId && car.isAvailable)

            return true;

    }

    return false;
}

void markCarAsRented(int carId) {

    for (auto &car : cars) {

        if (car.id == carId) {

            car.isAvailable = false;

            break;

        }

    }

}

void markCarAsAvailable(int carId) {

    for (auto &car : cars) {

```



```

        if (car.id == carId) {

            car.isAvailable = true;

            break;

        }

    }

}

void markCarForMaintenance(int carId) {

    for (auto &car : cars) {

        if (car.id == carId) {

            car.needsMaintenance = true;

            break;

        }

    }

}

};

int main() {

    CarRentalSystem system;

    int choice;

    do {

        cout << "\nCar Rental System Menu:\n";

        cout << "1. Register Customer\n";

        cout << "2. Add Car\n";

```

```
cout << "3. List Cars\n";

cout << "4. Make Booking\n";

cout << "5. Return Car\n";

cout << "6. Track Maintenance\n";

cout << "7. List Bookings\n";

cout << "8. Admin Dashboard\n";

cout << "9. Exit\n";

cout << "Enter your choice: ";

cin >> choice;

switch (choice) {

    case 1:

        system.registerCustomer();

        break;

    case 2:

        system.addCar();

        break;

    case 3:

        system.listCars();

        break;

    case 4:

        system.makeBooking();

        break;
```

```
case 5:

    system.returnCar();

    break;

case 6:

    system.trackMaintenance();

    break;

case 7:

    system.listBookings();

    break;

case 8:

    system.adminDashboard();

    break;

case 9:

    cout << "Exiting system. Goodbye!\n";

    break;

default:

    cout << "Invalid choice! Please try again.\n\n";

}

} while (choice != 9);

return 0;

}
```

Conclusion

In conclusion, establishing a successful car rental service requires a well-structured approach encompassing user-friendly systems, efficient fleet management, and robust operational modules. From seamless booking and payment systems to effective customer support and real-time vehicle tracking, each functionality must prioritize convenience, safety, and transparency. By leveraging advanced technology, such as mobile apps, GPS integration, and automated processes, the service can enhance customer experience while optimizing operational efficiency. Combining these features with strategic marketing, regular maintenance, and adherence to legal compliance ensures the business remains competitive, scalable, and sustainable in the dynamic rental industry.

Future enhancement

Electric Vehicle (EV) Integration, AI and Machine Learning, IoT and Connected Cars, Subscription-Based Models, Autonomous Vehicles, Enhanced Personalization, Carbon Offset Programs, Peer-to-Peer (P2P) Rentals, Advanced Safety Features, Cross-Border and Multi-Location Rentals, Green Certifications, Blockchain Technology.

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