

Project 18: Redspot Car Rental Online Management System

About the Client

Dan founded Redspot in 1989 after seizing an opportunity to expand his service station business in Waterloo, New South Wales. He purchased two courtesy cars—a Holden Ute and a Ford Laser—and, somewhat by chance, fell into the rental industry.

Redspot quickly grew from two cars to 15 through its success in the local marketplace. But Dan wasn't completely satisfied. He felt the business still had a lot of potential, so in the mid-90s decided to open a city office on Elizabeth Street in Surry Hills, Sydney. He set out to attract clients from the tourism and hotel sectors and then closed the service station part of his business so he could focus all of his attention on rental cars.

Project Brief & Business Problem Specifications:

Redspot car rental is facing growing demand for convenient, flexible, and efficient online booking experiences. Customers increasingly expect to reserve vehicles online, review availability in real-time, and complete payments securely without visiting a physical branch.

Redspot rental operations rely on manual booking processes, over-the-counter payments, and phone-based reservations. These practices can lead to double bookings, inefficient fleet utilisation, poor customer communication, and lost revenue.

System Modules Requirements

1. User Management Module

Handles all user accounts including customers, drivers, staff, and administrators. Supports secure registration, login/logout, password reset, and role-based access control. Ensures that each user can access only the features appropriate to their role.

2. Customer Profile Management Module

Manages customer details such as personal information, driver's licence data, and contact information. Allows customers to upload verification documents, view booking history, manage saved payment methods, and update their profiles.

3. Vehicle Management Module

Enables administrators or staff to add, edit, and remove vehicles in the fleet. Stores vehicle details including make, model, type, capacity, pricing, and images. Tracks availability status and schedules maintenance to ensure a reliable fleet.

4. Booking and Reservation Module

Provides an online interface for customers to search, view, and book available vehicles. Supports making new reservations, modifying or cancelling existing ones, and confirming bookings with secure payments. Ensures bookings are accurately stored and tracked.

5. Pricing and Tariff Management Module

Allows admins to define base rental rates, seasonal pricing, and promotional discounts. Supports management of optional extras and insurance fees. Enables applying dynamic pricing rules and validating coupon codes during checkout.

6. Payment and Billing Module

Handles secure online payment processing using multiple payment methods. Tracks payment status (Paid, Pending, Refunded) and issues digital invoices and receipts. Supports refunds and adjustments while maintaining a complete payment history.

7. Fleet Availability and Scheduling Module

Tracks real-time vehicle availability to prevent double-booking. Allows blocking vehicles for maintenance or holds. Supports viewing rental schedules in calendar form and assigning vehicles to confirmed bookings efficiently.

8. Pickup and Return Management Module

Manages the logistics of vehicle pickup and drop-off. Records scheduled times, pickup and return locations, vehicle condition, mileage, fuel levels, and any damages or incidents. Logs all details for auditing and customer service.

9. Driver Management Module

Registers and manages company driver profiles with personal and licence details. Supports assigning drivers to bookings, tracking their schedules, maintaining availability, and logging incidents or performance history.

10. Customer Communication Module

Automates communication with customers via email and SMS. Sends booking confirmations, reminders, payment receipts, and notifications for changes or cancellations. Supports customer service messaging for quick issue resolution.

11. Reviews and Feedback Module

Enables customers to submit ratings and written reviews for vehicles and service. Stores and moderates these reviews. Displays average ratings on vehicle listings to help future customers make informed choices.

12. Reporting and Analytics Module

Generates detailed reports on booking activity, revenue, payment summaries, vehicle utilisation, and customer activity. Supports exporting reports in PDF or CSV format for analysis and decision-making.

13. Admin Dashboard and Management Module

Provides administrators with a centralised dashboard to manage all users, vehicles, bookings, and payments. Offers system-wide statistics, configuration options, and access to reporting and audit logs.

14. Notifications Module

Handles sending automated email and SMS notifications. Covers booking confirmations, reminders, payment receipts, maintenance alerts for staff, and promotional messages. Tracks delivery status of all notifications.

15. Content Management Module

Allows admins to manage website pages such as About, Contact, and FAQs. Supports posting news and announcements, uploading banners and images, scheduling content publishing, and editing rental policies and terms.

16. Security and Audit Module

Enforces security through role-based permissions, encryption of sensitive data, and secure session management. Logs all critical user activities for auditing and compliance, monitors for suspicious access, and maintains audit trails.

User Modules (User Frontend):

Developers need to research and discuss with the client to finalise the modules and requirements.

UI Design

User Interface Design is concerned with the dialogue between a user and the computer. It is concerned with everything from starting the system or logging into the system to the eventually presentation of desired inputs and outputs. The overall flow of screens and messages is called a dialogue.

UI Design Requirements

1. The system user should always be aware of what to do next.
2. The screen should be formatted so that various types of information, instructions and messages always appear in the same general display area.
3. Message, instructions or information should be displayed long enough to allow the system user to read them.
4. Use display attributes sparingly.
5. Default values for fields and answers to be entered by the user should be specified.
6. A user should not be allowed to proceed without correcting an error.
7. The system user should never get an operating system message or fatal error.

The aim of proposed system is to develop a system of improved facilities.
The proposed system can overcome all the limitations of the existing system.
The system provides proper security and reduces the manual work.

- Security of data.
- Ensure data accuracy's
- Proper control of the higher officials.
- Minimize manual data entry.
- Minimum time needed for the various processing.
- Greater efficiency.
- Better service.
- User friendliness and interactive.
- Minimum time required.

Functional Requirements

Functional requirements are product features or functions that developers must implement to enable users to accomplish their tasks. So, it's important to make them clear for the stakeholders. Generally, functional requirements describe system behavior under specific conditions. The developers of this system must enhance the performance and efficiency of the system by adding all the functional requirements. Students need to do their own research to find how they can improve the system and which FRs need to added. The group must need a prior approval from the stakeholders/project supervisor before finalizing these Functional Requirements. These enhanced FRs must be reflected separately in Final SRS Report after the approval.

FR1. Enable customer registration with email verification.

FR2. Support secure login and logout using PHP sessions.

FR3. Allow password reset and account recovery via email.

FR4. Enforce role-based access control for Customers, Drivers, Staff, and Admins.

FR5. Let users edit and update personal profiles.

FR6. Store customer details including contact info and driver's licence data.

FR7. Allow customers to upload verification documents securely.

FR8. Display customer booking history in the profile.

FR9. Manage saved payment methods for repeat customers.

FR10. Provide a customer dashboard with account summary.

FR11. Add, edit, and remove vehicles from inventory.

FR12. Store vehicle details including make, model, year, capacity, and pricing.

FR13. Upload and manage vehicle images and documents.

FR14. Set vehicle availability status in the system.

FR15. Track maintenance schedules and block vehicles for service.

FR16. Search available vehicles by date, location, and type.

FR17. Display vehicle details including photos, pricing, and rental terms.

FR18. Allow customers to make new bookings with date and time selection.

FR19. Enable customers to modify or cancel existing bookings.

FR20. Store confirmed bookings in the database with status tracking.

FR21. Define base rental rates by vehicle type in the admin panel.

FR22. Manage seasonal pricing and promotional discounts.

FR23. Allow optional extras and insurance add-ons to be selected at checkout.

FR24. Support applying and validating coupon codes.

FR25. Update and manage pricing rules dynamically.

FR26. Support multiple payment methods including card and wallet.

FR27. Process secure online payments with transaction logs.

FR28. Generate and issue digital invoices and receipts.

FR29. Track payment status (Paid, Pending, and Refunded).

FR30. Allow admin-initiated refunds and payment adjustments.

FR31. Prevent double-booking by checking real-time availability.

FR32. Block vehicles automatically for maintenance or manual holds.

FR33. Assign specific vehicles to bookings in the admin panel.

FR34. View rental schedules in a calendar format.

FR35. Record vehicle condition, mileage, and fuel levels at pickup and return.

FR36. Manage pickup and drop-off locations in the system.

FR37. Schedule pickup and return times for each booking.

FR38. Log damages and incident reports with notes and images.

FR39. Enable staff to record condition reports at pickup and return.

FR40. Store and link all pickup/return logs to booking records.

FR41. Chatbot Integration: Provide 24/7 customer support for bookings and FAQs.

Non-Functional Requirements

NFR1. Performance

Process user requests with average page load times under 2 seconds, even during peak hours, using optimised PHP code and MySQL indexing.

NFR2. Scalability

Support horizontal scaling of PHP application servers and MySQL database replication to handle growing bookings and users without redesign.

NFR3. Availability

Maintain 99.5% system uptime excluding planned maintenance. Use redundant servers to minimise downtime.

NFR4. Reliability

Ensure that booking and payment transactions complete reliably with ACID-compliant MySQL transactions to prevent double bookings or data loss.

NFR5. Maintainability

Follow PSR-12 PHP coding standards with modular design, clear documentation, and version control for easy updates and debugging.

NFR6. Security – Data Storage

Encrypt sensitive user data in the MySQL database (e.g., bcrypt for passwords) and store payment details securely with tokenisation.

NFR7. Security – Data Transmission

Enforce HTTPS for all communications between clients and servers to protect data in transit.

NFR8. SQL Injection Protection

Use prepared statements or ORM in PHP to prevent SQL injection attacks on all database queries.

NFR9. Session Management

Implement secure PHP session handling with timeouts, regeneration on login, and prevention of hijacking.

NFR10. Access Control

Enforce role-based permissions in PHP code so only authorised users can access admin, payment, or fleet management features.

NFR11. Audit Logging

Log critical user actions (logins, bookings, payments, changes) securely in MySQL with timestamped records for review and auditing.

NFR12. Backup and Recovery

Perform automated daily backups of the MySQL database, with tested restoration procedures to recover within 4 hours of a failure.

NFR13. Usability

Provide clear, intuitive interfaces for customers, staff, and admins with consistent layout and labels.

NFR14. Responsiveness

Design all interfaces with responsive layouts using HTML/CSS so they work seamlessly on mobile, tablet, and desktop.

NFR15. Compatibility

Support modern browsers (Chrome, Firefox, Edge, Safari). Ensure PHP 7.4+ and MySQL 5.7+ compatibility with best practices.

NFR16. Accessibility

Follow WCAG 2.1 Level AA guidelines to ensure forms and pages are accessible to users with disabilities.

NFR17. Notification Delivery

Ensure reliable sending of email/SMS confirmations, reminders, and receipts using robust PHP integrations with third-party APIs.

NFR18. Reporting Accuracy

Generate accurate PDF and CSV reports on bookings, fleet utilisation, payments, and user activity using PHP libraries and MySQL queries.

NFR19. Payment Security

Integrate PCI-compliant payment gateways to handle card transactions securely, with no raw card data stored in MySQL.

NFR20. Compliance

Ensure compliance with data protection laws (e.g., GDPR) by supporting user data consent management and right to deletion.

Hardware Requirement: Should be recommended by the developers.

Software Requirement: Should be recommended by the developers.