5-2 Project One

Business Requirements Document

CS-255 System Analysis and Design

10/6/24

# CS 255 Business Requirements Document Template

Complete this template by replacing the bracketed text with the relevant information.

This template lays out all the different sections that you need to complete for Project One. Each section has guiding questions to prompt your thinking. These questions are meant to guide your initial responses to each area. You are encouraged to go beyond these questions using what you have learned in your readings. You will need to continually reference the interview transcript as you work to make sure that you are addressing your client’s needs. There is no required length for the final document. Instead, the goal is to complete each section based on your client’s needs.

**Tip:** You should respond in a bulleted list for each section. This will make your thoughts easier to reference when you move into the design phase for Project Two. One starter bullet has been provided for you in each section, but you will need to add more.

## System Components and Design

### Purpose

*What is the purpose of this project? Who is the client and what do they want their system to be able to do?*

* The purpose of this project is to design a comprehensive system for DriverPass, a company dedicated to improving driver training and increasing the success rate of individuals taking driving tests. DriverPass aims to fill a gap in the market where inadequate preparation leads to many failures at the Department of Motor Vehicles (DMV) driving tests.
* The system needs to provide not just online classes and practice tests but also facilitate on the road training by allowing students to schedule driving lessons. This system will be essential in preparing students through a combination of theoretical knowledge and practical experience, ensuring they are well-equipped for their driving tests.
* The client, DriverPass, envisions a system that supports the full range of their services, including the ability for students to access and track their progress from any device, whether online or offline. The system should also enable the administrative staff to manage reservations, track lesson details, and maintain secure user accounts, ensuring that the training process is smooth and effective.

### System Background

*What does DriverPass want the system to do? What is the problem they want to fix? What are the different components needed for this system?*

* DriverPass identified a significant issue where many individuals fail their driving tests due to inadequate preparation. They want to address this problem by providing a comprehensive training solution that includes both online and in-person components.
* The system should allow students to access online practice exams, schedule driving lessons, and receive on-the-road training with certified instructors. Additionally, it should offer a smooth experience for students to monitor their progress, access test results, and manage their appointments.
* Key components of the system include:
  + User accounts for students, administrators, and instructors.
    - Each user type will have different access levels and functionalities. For instance, students need to manage their learning and lesson schedules, while administrators should have the ability to reset passwords, manage accounts, and oversee system security.
  + Online course modules and practice exams.
    - These will provide students with the necessary theoretical knowledge and practice they need before taking their driving tests. The system should track which tests have been taken, the scores, and the status of each (passed, failed, in progress).
  + Scheduling system for booking and managing driving lessons.
    - This component should allow students to book, modify, or cancel driving lessons online. It must integrate with the availability of instructors and vehicles, ensuring that each session is accurately scheduled and tracked.
  + Tracking and reporting features for monitoring student progress and instructor notes.
    - The system should enable instructors to leave detailed feedback on each student's performance after every lesson, and students should be able to view these notes along with their progress reports.
  + Security features for role-based access control, ensuring different levels of access for different users.
    - The system needs to confirm that only authorized users can access sensitive information, such as financial details and personal data, by implementing strict access controls and monitoring user activity.

### Objectives and Goals

*What should this system be able to do when it is completed? What measurable tasks need to be included in the system design to achieve this?*

* The system should enable students to:
  + Register and manage their accounts online.
    - This includes the ability for students to create accounts, update personal information, and manage their passwords securely. The system should also allow for easy recovery of forgotten passwords and secure handling of financial information for lesson payments.
  + Access and complete online practice tests.
    - Students should be able to take practice tests that simulate the DMV’s format. The system should track each attempt, provide immediate feedback, and store results for future reference. Additionally, it should notify students of updates to the test content that align with DMV changes.
  + Schedule and manage driving lessons with options to book, modify, or cancel appointments.
    - The scheduling system should allow for flexibility in booking lessons, including the ability to choose specific instructors and vehicles. It should automatically adjust availability based on existing bookings and provide reminders to students and instructors about upcoming sessions.
  + Track their progress through detailed reports showing test scores, lesson history, and instructor feedback.
    - Students should have access to a dashboard that displays their overall progress, including completed lessons, test results, and any feedback from instructors. This data will help them identify areas for improvement and track their readiness for the driving test.
* The system should include:
  + A responsive user interface that works across devices, including desktops and mobile devices.
    - The interface should be intuitive and accessible from any device, ensuring that users can access the system from home, on the go, or even during their lessons. It should adapt to different screen sizes and maintain functionality across various platforms.
  + Automated notifications for students regarding updates, scheduled lessons, and DMV policy changes.
    - The system should automatically send out notifications to students about their upcoming lessons, changes in DMV policies, or updates in their test progress. This ensures that students are always informed and prepared.
  + Comprehensive security measures to protect user data and ensure that only authorized users can access specific features.
    - This includes encryption of sensitive data, regular security audits, and the implementation of multi-factor authentication where necessary. The system should also log all user activities to provide a clear audit trail in case of any security incidents.

## Requirements

### Nonfunctional Requirements

*In this section, you will detail the different nonfunctional requirements for the DriverPass system. You will need to think about the different things that the system needs to function properly.*

#### Performance Requirements

*What environments (web-based, application, etc.) does this system need to run in? How fast should the system run? How often should the system be updated?*

* The system must be web-based, providing a seamless experience across both desktop and mobile devices with support for responsive design.
* The system must support up to 200 concurrent users while maintaining a maximum response time of 2 seconds for 99% of user interactions, including booking lessons, viewing progress, and modifying schedules.
* The system must handle up to 500 users during peak periods, such as DMV test season, with no more than a 10% increase in response time.
* Updates to the system must be conducted biweekly, with downtime limited to 15 minutes during off-peak hours. Update notifications will be sent to users 24 hours in advance to minimize disruption.

#### Platform Constraints

*What platforms (Windows, Unix, etc.) should the system run on? Does the back end require any tools, such as a database, to support this application?*

* The system must be fully compatible with Windows, macOS, and Linux operating systems, as well as iOS and Android mobile platforms. A responsive, cross-platform design will be implemented to ensure uniform functionality across these environments.
* The back-end database will utilize a scalable, cloud-hosted, ensuring high availability, automatic scaling during high traffic periods, and redundancy for disaster recovery.
* Secure cloud storage, compliant with HIPAA and GDPR, must be used for hosting sensitive student progress data and lesson details, with daily encrypted backups stored in multiple geographically diverse locations.

#### Accuracy and Precision

*How will you distinguish between different users?* *Is the input case-sensitive? When should the system inform the admin of a problem?*

* Each user’s unique ID must be case-sensitive and strictly adhere to role-based access permissions.
* The system must automatically alert administrators after three consecutive failed login attempts, with an option to temporarily lock the account.
* Data entry fields should validate and sanitize inputs, ensuring precise data handling and reducing errors from user input.

#### Adaptability

*Can you make changes to the user (add/remove/modify) without changing code? How will the system adapt to platform updates? What type of access does the IT admin need?*

* Administrators must have access to an intuitive dashboard for user management, allowing them to add, modify, or remove users in real time without system downtime or the need for code changes.
* The system must support hot-fix patches and incremental updates for adapting to new DMV policies, curriculum updates, or platform improvements without requiring a full system redeployment or disruption to ongoing user sessions.
* IT administrators must have fine-grained control over system settings, including security configurations, user roles, and lesson scheduling options, with access to an audit log that tracks changes made to the system for compliance and security purposes.

#### Security

*What is required for the user to log in? How can you secure the connection or the data exchange between the client and the server? What should happen to the account if there is a “brute force” hacking attempt? What happens if the user forgets their password?*

* All user logins must require strong passwords of at least 12 characters, incorporating uppercase and lowercase letters, numbers, and special characters. Passwords must comply with OWASP security standards.
* SSL/TLS encryption must be applied to all client-server communications to prevent data interception during transmission. Encryption certificates must be renewed annually to ensure the highest level of protection.
* To prevent brute-force attacks, user accounts will be locked after five consecutive failed login attempts. A cool-down period of 15 minutes will be applied before the user can try again, with a notification sent to both the user and system administrator.
* Password recovery will involve multi-factor authentication with a combination of email verification and a one-time passcode sent via SMS or authenticator app.
* Administrator accounts must be secured with MFA, including a hardware token or an app-based authenticator, to ensure that only authorized personnel have access to sensitive configuration areas.

### Functional Requirements

*Using the information from the scenario, think about the different functions the system needs to provide. Each of your bullets should start with “The system shall . . .” For example, one functional requirement might be, “The system shall validate user credentials when logging in.”*

This outlines the specific actions the system will perform to meet the client’s business needs.

* User Authentication:
  + The system shall validate user credentials upon login and allow users to securely manage their accounts.
  + Users must be able to retrieve or reset their password using a secure email-based verification process.
* Lesson Scheduling:
  + The system shall provide students with a dynamic, real-time calendar interface, allowing them to schedule, modify, and cancel driving lessons with instant feedback on available time slots based on the real-time schedules of instructors and vehicles.
  + Instructors must be able to view and manage their daily schedules, including viewing students’ profiles and lesson history. They must also be able to add detailed feedback to completed lessons and confirm upcoming sessions, with automatic updates synced across all devices.
* Progress Tracking:
  + The system shall track student progress in both online theory exams and practical driving lessons.
  + It shall display test results and lesson feedback in a graphical dashboard that helps students monitor their improvement over time.
* Notifications:
  + The system shall send automated reminders to students and instructors 24 hours before scheduled lessons.
  + Students must be notified of updates to DMV requirements or changes in training materials, ensuring they are prepared for changes to the driving test.
* Administrative Features:
  + Administrators shall be able to create, update, and delete user accounts for students, instructors, and staff members.
  + The system shall log all user actions to provide an audit trail.

Reporting:

The system shall generate detailed reports for both students and administrators, including lesson history, test performance, and instructor feedback.

It must allow administrators to export these reports in a variety of formats, including PDF and Excel, for further analysis..

### User Interface

*What are the needs of the interface? Who are the different users for this interface? What will each user need to be able to do through the interface? How will the user interact with the interface (mobile, browser, etc.)?*

This section outlines the requirements for the user interface, the expected interactions, and how each user type will interact with the system across different devices.

* Students will interact with the system to:
  + Schedule driving lessons through an intuitive calendar interface.
  + View progress in both theory and practical training via a dashboard.
  + Take online practice tests, with immediate feedback and historical tracking of test results.
  + Receive automated notifications for upcoming lessons, test results, and other important updates.
  + Access the system through web browsers and mobile apps, ensuring a seamless experience across desktop and mobile devices. The design should prioritize user-friendliness, allowing students to quickly manage their schedules and review their progress.
* Instructors will interact with the system to:
  + Manage their daily and weekly schedules by viewing upcoming lessons.
  + Track and monitor student progress and performance across both practical and theoretical components.
  + Provide real-time feedback after each driving lesson, accessible via a tablet-friendly interface, with the ability to sync data when internet access is restored.
  + Use both web and mobile applications to manage their daily workflow, ensuring compatibility across devices and providing an offline mode for note-taking when internet access is unavailable.
* Administrators will use the system to:
  + Manage user accounts for students, instructors, and other administrative staff through a secure interface that allows account creation, updating, and deletion.
  + Oversee lesson schedules and make adjustments to accommodate instructor availability or changes in lesson bookings.
  + Monitor system performance and security settings, including access to activity logs, to ensure compliance with data security policies.
  + Access a secure backend for advanced management of the system’s health, usage statistics, and security settings.
* Interface Interaction:
  + The system shall be responsive across all device types (desktops, tablets, and smartphones).
  + The interface will feature a streamlined, user-friendly design that allows users to access key functions, such as scheduling lessons and viewing feedback, within a few clicks or taps.
  + Offline Functionality: For instructors, the system will provide offline capabilities to input lesson data while on the road, which will automatically sync once the internet connection is restored.

### Assumptions

*What things were not specifically addressed in your design above? What assumptions are you making in your design about the users or the technology they have?*

* The system assumes that:
  + All users have stable internet connections when accessing the system and are equipped with modern web browsers on their devices.
  + Users will receive basic training on how to navigate and use the platform effectively.
  + The system will initially support only English, with potential future expansions to include multilingual support as DriverPass grows or expands into other markets.
  + Users have access to either desktop or mobile devices compatible with the system’s platform constraints, including both Windows and macOS for desktops and Android or iOS for mobile devices.

### Limitations

*Any system you build will naturally have limitations. What limitations do you see in your system design? What limitations do you have as far as resources, time, budget, or technology?*

Despite best efforts, every system comes with limitations. This section outlines the known limitations in the system’s current design due to technical, budgetary, and resource constraints.

* Offline Support:
  + The system will not support offline lesson booking or modification. All scheduling actions must occur online to ensure real-time accuracy and avoid conflicts or discrepancies.
* Budget Constraints:
  + Due to budget constraints, the system’s initial deployment will focus on a web-based platform compatible with Windows and macOS operating systems, with mobile applications being developed in later phases as additional funding becomes available.
* Platform Expansion:
  + The system may face limitations in integrating with older, legacy systems if DriverPass expands its services to older, non-supported devices. This may restrict full adoption for users with outdated technology, though efforts will be made to offer compatibility with widely used modern devices.

### Gantt Chart

*Please include a screenshot of the GANTT chart that you created with Lucidchart. Be sure to check that it meets the plan described by the characters in the interview.*

