# CS 255 Business Requirements Document

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 proposed system is to improve student driver preparedness and enhance business efficiency for DriverPass through a secure, digital solution. The system will support both online learning and in-person instruction while automating administrative tasks.

* The client, DriverPass, is a driving instruction company seeking to improve student outcomes and business efficiency through a digital solution.
* The system should deliver online educational content, including video lessons, interactive quizzes, and practice tests aligned with DMV requirements.
* The system should manage in-person driving lessons by assigning instructors, vehicles, and timeslots efficiently.
* The system should provide data-driven insights into student performance and program effectiveness.
* The system should reduce the manual workload by automating scheduling, logging, and reporting tasks.

### 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 currently faces challenges including:

* Increasing first-time driving test failures among students.
* Inefficient manual scheduling and tracking of driving lessons.
* Lack of a centralized system for monitoring student progress and lesson outcomes.

The proposed system addresses these problems with:

* The system will consist of the following components:
  + **DMV Integration:** Ensures that all educational content and practice exams reflect the most current regulations and testing requirements.
  + **User-Level Access:** Role-based access control allows students to view lessons and schedules, secretaries to manage appointments, admins to oversee users and generate reports, and IT staff to manage system configurations.
  + **Tiered Driving Packages:** Starter, Plus, and Premium packages offer varying levels of lessons, practice tests, and instructor support to accommodate different student needs.
  + **Student Performance Reporting:** The system will track lesson completion, test scores, and practice exam results, generating both individual and aggregate reports for analysis.
  + **Scheduling Automation:** Automatically assigns instructors and vehicles, prevents conflicts, and sends notifications to students and staff.
  + **Activity Logging:** Records all user actions (logins, schedule changes, report generation) for accountability and auditing.
* The system should log all activity to track who scheduled, modified, or canceled appointments for accountability and reporting.
* The system must include role-based access for different types of users such as administrators, IT staff, secretaries, and students.
* There should be integration of tiered driving packages (e.g., Starter, Plus, Premium) will allow for business flexibility and upselling opportunities.
* The system will evolve based on user feedback and allow updates to lessons and scheduling parameters without full redeployment.

### 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?*

#### **Goal 1: Improve student preparedness and success rates**

* **Objective 1.1:** Provide online access to DMV-aligned video tutorials, quizzes, and practice exams.
* **Objective 1.2:** Track and display student progress using performance metrics like test scores and lesson completion.
* **Objective 1.3:** Allow real-time feedback from instructors after each in-person lesson.

#### **Goal 2: Streamline scheduling and reduce administrative overhead**

* **Objective 2.1:** Implement a dynamic scheduler that matches students with instructors and available cars.
* **Objective 2.2:** Enable students to self-manage appointments (create, reschedule, cancel).
* **Objective 2.3:** Automate notifications and confirmations via email/SMS to reduce no-shows.

#### **Goal 3: Ensure secure and scalable user access**

* **Objective 3.1:** Deploy RBAC with four access levels: admin, IT, secretary, and student.
* **Objective 3.2:** Allow secure login with encryption, password resets, and activity logging for all users.
* **Objective 3.3:** Store system data in a secure, encrypted cloud environment with automatic backups.

#### **Goal 4: Support operational insight and business growth**

* **Objective 4.1:** Allow admins to export performance reports in formats like Excel or CSV.
* **Objective 4.2:** Maintain logs that capture every system interaction (e.g., user login, lesson scheduling).
* **Objective 4.3:** Provide visual dashboards to track metrics like student enrollment, test pass rates, and instructor availability.

## 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 should be accessible via modern web browsers (Chrome, Edge, Firefox, Safari) and optimized for both desktop and mobile devices (Apple and Android).
* The system will need to be responsive, loading all standard pages (dashboard, scheduling, user portal) within 2 seconds under normal conditions.
* The system should support 99.9% uptime and high availability through cloud deployment.
* System updates (non-critical) will be rolled out twice a month, while critical updates and patches shall be deployed as needed with zero downtime using continuous integration/deployment (CI/CD) tools.
* The system should be able to support simultaneous access by at least 500 users without degradation in performance.

#### 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 will be deployed on a cloud-based platform compatible with **Windows Server**, **Linux (Ubuntu)**, and containerized via **Docker** for portability.
* The backend should rely on a **relational database** (MySQL) for user data, lesson records, and test history.
* The platform shall support RESTful APIs and be built using standard web development stacks (Node.js for backend, React for frontend).
* The database must be ACID-compliant and capable of automated backups and replication for disaster recovery.

#### 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?*

* Users will be uniquely identified by email addresses and user roles (admin, IT, secretary, student).
* Login input (email and password) shall be case-sensitive to ensure secure user authentication.
* The system shall validate all form inputs using both client-side and server-side checks to prevent invalid data entry.
* Admins will receive system alerts (via dashboard and email) if there are failed login attempts, scheduling conflicts, or database connectivity issues.
* User session tracking will ensure real-time status of student or instructor availability.

#### 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?*

* The system should allow administrators and IT staff to add, remove, or modify user accounts and roles through the admin interface **without requiring direct code changes**.
* All user roles (student, secretary, IT, admin) and permissions shall be managed through a role-based access control (RBAC) system configurable in the UI.
* The system will be compatible with modern operating system updates and browser versions through forward-compatible design and modular architecture.
* IT administrators will have full access to system configuration settings, logging tools, API keys, and database backups via a secure admin control panel.
* System architecture should support future integrations with third-party tools (e.g., calendar apps, DMV APIs, analytics tools).

#### 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?*

* The system should require a valid email and secure password (minimum 12 characters with uppercase, lowercase, symbol, and number) for login.
* All communication between client and server shall be encrypted using HTTPS with **TLS 1.3**.
* Passwords will be securely hashed using modern hashing algorithms
* After five failed login attempts, the system shall temporarily lock the account and notify the user and admin of suspicious activity.
* Users will have access to a "Forgot Password" feature that triggers a secure, expiring reset link to their registered email.
* The system shall support multi-factor authentication (MFA) for admin and IT roles.
* All sensitive data should be encrypted at rest and during transmission.

### 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.”*

* The system shall allow users to register, log in, reset passwords, and update their profile.
* The system shall validate user credentials when logging in and manage session tokens.
* The system shall provide students with access to online learning modules, including quizzes and video lessons.
* The system shall allow students to schedule, cancel, and reschedule in-person driving lessons.
* The system shall enable secretaries and admins to assign instructors and vehicles to appointments.
* The system shall store and display a student’s test history, lesson progress, and practice test scores.
* The system shall log all scheduling actions with user identification for accountability.
* The system shall support exporting of reports and logs (e.g., in CSV or Excel format).
* The system shall send notifications to students and instructors for schedule changes or DMV updates.
* The system shall provide an admin dashboard for viewing system metrics, logs, and user activity.

### **Driving Packages**

* **Starter Package:** Basic online lessons, quizzes, and one in-person lesson per week.
* **Plus Package:** Full online lesson access, quizzes, practice tests, two in-person lessons per week, personalized instructor feedback.
* **Premium Package:** Full access to all online content, unlimited in-person lessons, priority scheduling, and detailed performance analytics reports.

### 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.)?*

* The system shall include a **browser-based** interface optimized for both desktop and mobile use.
* The interface must follow modern UI/UX design principles, ensuring intuitive navigation and accessibility.
* There shall be **four main user roles**, each with a tailored interface:
  + **Students**: View lessons, schedule appointments, take tests, see progress.
  + **Secretaries**: Manage schedules, assign instructors, view lesson history.
  + **Administrators**: Manage users, view reports, access logs, handle escalated issues.
  + **IT Staff**: Configure back-end settings, access system logs, perform maintenance.
* Users will interact with the system via dashboards, interactive calendars, and modular forms.
* The UI should provide real-time feedback for form validation, loading indicators, and confirmation prompts.

### 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?*

* All users have access to an internet connection and a modern web browser.
* Students will have access to a device (computer, tablet, or phone) capable of streaming video content and completing online tests.
* IT administrators will have experience with managing user permissions, viewing logs, and handling system configurations.
* The system will operate in English only, at least in its initial release.
* All users will receive training or onboarding materials on how to use the system.
* DMV content provided is assumed to be accurate and up to date.

### 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?*

* The initial system will not support native mobile apps (iOS/Android); access will be limited to responsive web design.
* Budget constraints may limit advanced analytics, DMV API integrations, or AI-driven personalization features in version 1.
* Real-time instructor availability may be impacted by external factors (e.g., last-minute cancellations or unreported absences).
* User support and troubleshooting will depend on the availability of internal DriverPass staff, not an automated helpdesk.
* All DMV practice material must be updated manually by authorized staff when DMV guidelines change.
* There may be latency during peak hours if cloud infrastructure isn’t scaled properly (to be addressed in future scaling plans).

### 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.*

