# 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 system design is to provide DriverPass with a comprehensive online platform that addresses the needs of both students and administrators. The system will streamline the delivery of driver education, improve student outcomes, and enhance the overall efficiency of DriverPass's operations.

### 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?*

The background of the proposed system is provided to address the high failure rate in driving tests observed by DriverPass founder, Liam. This issue is attributed to inadequate preparation and lack of practical experience among new drivers. To address this, DriverPass seeks to create a system that combines online learning, practice tests, and on-the-road training, providing students with a holistic learning experience.

The system will encompass a user-friendly online learning platform delivering course materials, videos, and interactive modules on driving rules and safe practices. A comprehensive database of practice tests will simulate the DMV driving test, providing students with real-time feedback and progress tracking. A convenient scheduling system will allow students to book driving lessons at their preferred time with the instructor of their choice. The system will also streamline instructor management by tracking schedules, availability, and performance. Robust security measures will be implemented to protect user data, ensuring a safe and reliable experience for all users. Designed with accessibility in mind, the system will be usable on a variety of devices, ensuring a seamless learning experience for students wherever they are.

**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 objectives in a system analysis offer a clear roadmap of the required tasks to fulfill the client's vision, while the goals provide measurable metrics to evaluate the success of these tasks. In the case of DriverPass, the objectives and goals are tightly linked to their desire to provide effective driver education, streamline operations, and ultimately improve student outcomes on the DMV driving test.

**Objectives:**

* **Online Learning and Assessment**:
  + Develop an online learning platform hosting comprehensive course materials, instructional videos, and interactive modules covering all aspects of driving knowledge and skills.
  + Create a diverse bank of practice tests that accurately simulate the DMV driving test, allowing students to assess their knowledge, identify weaknesses, and track progress.
* **Scheduling and Resource Management**:
  + Implement a user-friendly online scheduling system enabling students to book driving lessons at their convenience, selecting preferred dates, times, and instructors.
  + Develop an instructor management module to efficiently track instructor schedules, availability, and performance metrics.
* **Communication and Reporting**:
  + Establish a communication channel within the system for students, instructors, and administrators to exchange messages, feedback, and updates.
  + Generate detailed reports on student progress, test scores, instructor performance, and overall system usage for data-driven decision-making.

**Goals:**

* **Online Learning and Assessment**:
  + Achieve a 90% student satisfaction rate with the online learning platform, as measured by post-course surveys.
  + Increase the average student score on the DMV driving test by 10% within six months of system implementation, compared to the previous pass rate.
* **Scheduling and Resource Management**:
  + Reduce scheduling conflicts and cancellations by 20% within the first quarter of system deployment.
  + Increase instructor utilization by 15% through optimized scheduling and lesson assignments.
* **Communication and Reporting**:
  + Maintain a 95% response rate to student inquiries and feedback within 24 hours.
  + Generate comprehensive monthly reports for administrators, enabling data-driven decisions to improve training effectiveness.

## 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?*

* **Environment:** The DriverPass system must be web-based, accessible through a standard web browser on various devices (desktops, laptops, tablets, and smartphones).
* **Speed and Responsiveness:** The system should provide a fast and responsive user experience, with page load times not exceeding 3 seconds and minimal latency during interactions. This is particularly crucial for the online practice tests and scheduling functions to ensure smooth user flow.
* **Updates and Maintenance:** Regular updates should be scheduled to ensure the system remains current with DMV regulations and best practices. The frequency of updates will depend on the rate of change in DMV guidelines but should be at least quarterly. Additionally, updates should be implemented during off-peak hours to minimize disruption for users.

#### 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 should be web-based and accessible through a standard web browser, eliminating the need for specific operating system compatibility.
* The system should be cloud-based to avoid the need for DriverPass to manage servers or infrastructure, allowing them to focus on their core business.
* The system will require a back-end database to store and manage user data, course content, practice tests, scheduling information, and instructor details.
* The system should be compatible with common web technologies, ensuring a wide range of user accessibility.
* The cloud platform should offer robust security measures, including data encryption, regular backups, and disaster recovery mechanisms to protect sensitive user and business information.

#### 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?*

* **User Differentiation:** The system will distinguish between users based on their roles (e.g., student, instructor, administrator) using unique usernames and passwords. Additional authentication measures like security questions or two-factor authentication can be implemented for enhanced security.
* **Case Sensitivity:** Input fields for usernames and passwords will be case-sensitive to ensure accurate authentication and prevent unauthorized access. However, other input fields, such as names and addresses, will not be case-sensitive.
* **Error Handling and Notifications:** The system will implement robust error handling mechanisms to detect and address potential issues. In cases of critical errors that could impact system functionality or data integrity, the system will immediately notify the administrator via email or SMS alerts. Examples of such errors include failed database backups, security breaches, or significant deviations in system performance.
* **Data Validation:** The system will incorporate data validation checks to ensure the accuracy and integrity of user input. For instance, phone numbers will be validated for correct format, email addresses will be checked for validity, and credit card information will be verified to prevent fraudulent transactions.
* **Data Redundancy Prevention:** To maintain data accuracy and prevent redundancy, the system will enforce data synchronization whenever changes are made online. Offline changes will be reconciled and merged with the online database when the user reconnects to the internet.

#### 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?*

* **User Management:** The system will allow administrators (such as Ian, the IT officer) to add, remove, and modify user accounts and permissions without requiring code changes. This will be achieved through an intuitive admin interface.
* **Platform Updates:** The system will be designed to be compatible with future updates to the underlying cloud platform (as requested by Ian). Regular maintenance and updates will be performed to ensure ongoing compatibility.
* **Package Management:** Liam expressed the desire to add, remove, or disable packages in the future. While this might require some technical intervention, the system should be designed to make these modifications as straightforward as possible for the IT officer.
* **DMV Compliance:** The system will need to adapt to changes in DMV rules, policies, and test questions. This could be achieved through a notification system or an API integration with the DMV database to automatically update relevant content.

#### 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?*

* **User Authentication:** The system shall require users to log in with a unique username and password to access their account.
* **Password Management**:
  + The system shall enforce strong password requirements, including a minimum length, a mix of upper and lowercase letters, numbers, and special characters.
  + The system shall implement a secure password reset mechanism, allowing users to reset their passwords via email verification.
  + The system shall lock out user accounts after a certain number of failed login attempts to prevent brute-force attacks.
* **Data Encryption**: The system shall encrypt sensitive user data, such as personal information and payment details, both in transit and at rest.
* **Authorization and Access Control**: The system shall implement role-based access, allowing administrators to assign different permissions and privileges to users based on their roles (e.g., student, instructor, administrator).
* **Audit Logging**: The system shall maintain detailed logs of user activity, including login attempts, modifications to records, and other system events, to aid in identifying and investigating security incidents.

### 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.”*

* **User Management**:
  + The system shall allow users to create accounts with a unique username and password.
  + The system shall authenticate users upon login by validating their credentials.
  + The system shall allow users to update their profile information (e.g., name, address, phone number).
  + The system shall enable administrators to manage user accounts, including creating, modifying, and deleting accounts.
* **Online Learning**:
  + The system shall provide access to online course materials, including text, videos, and interactive modules.
  + The system shall track student progress through the online course, recording completed modules and quiz scores.
  + The system shall provide feedback and personalized recommendations based on student performance.
* **Practice Tests**:
  + The system shall offer a variety of practice tests that simulate the DMV driving test.
  + The system shall present test questions randomly to prevent memorization.
  + The system shall provide immediate feedback on answers and calculate scores.
  + The system shall store test results for students and administrators to review.
* **Scheduling**:
  + The system shall allow students to schedule driving lessons online.
  + The system shall display available time slots for driving lessons based on instructor availability and student preferences.
  + The system shall send confirmation emails/notifications to students and instructors upon successful booking.
  + The system shall allow students and instructors to modify or cancel scheduled lessons, with appropriate notifications.
* **Instructor Management**:
  + The system shall maintain a database of driving instructors with their profiles, availability, and qualifications.
  + The system shall allow administrators to add, modify, and remove instructor profiles.
  + The system shall track instructor performance based on student feedback and lesson completion rates.
* **Reporting**:
  + The system shall generate reports for administrators, including:
    - Student progress and performance in the online course and practice tests.
    - Instructor performance and utilization rates.
    - Overall system usage statistics.
* **Payment Processing**:
  + The system shall securely process online payments for driving lesson packages.
  + The system shall generate invoices and receipts for students and administrators.
* **DMV Compliance:**
  + The system shall allow administrators to receive updates on DMV rules, policies, and test questions.
  + The system shall notify administrators of any changes to DMV requirements.
* **Additional Functional Requirements** (Implied from Transcript):
  + The system shall allow users to contact DriverPass for support or inquiries.
  + The system shall send notifications to students about upcoming lessons or other important information.

### 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.)?*

* **Different Users and Their Needs:**
  + **Students**:
    - View and complete online course modules.
    - Access and take practice tests.
    - Schedule, modify, and cancel driving lessons.
    - View lesson history and driver notes.
    - Update personal information and contact DriverPass.
  + **Driving Instructors**:
    - View and manage their schedules.
    - Access student information and lesson details.
    - Provide feedback and notes on student performance.
  + **Administrators**:
    - Manage user accounts (students, instructors).
    - View and generate reports on student progress, instructor performance, and system usage.
    - Update and manage course content and practice tests.
    - Modify or disable lesson packages.
    - Receive notifications from the DMV regarding rule changes.
* **Interaction with the Interface:**
  + The primary mode of interaction will be through a web browser on various devices (desktops, laptops, tablets, and smartphones).
* **Specific Interface Elements (Based on Sketch):**
  + Logo: Prominent display of the DriverPass logo.
  + Online Test Progress: Section to display test names, time taken, scores, and status.
  + Information Section: User profile area with fields for personal information.
  + Driver Notes: Section to display lesson times and driver comments.
  + Special Needs: Field for users to indicate any special requirements.
  + Photos: Areas for driver and student photos.
  + Input Form: A form for user registration and profile creation.
  + Contact Page: A page for users to contact DriverPass.

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?*

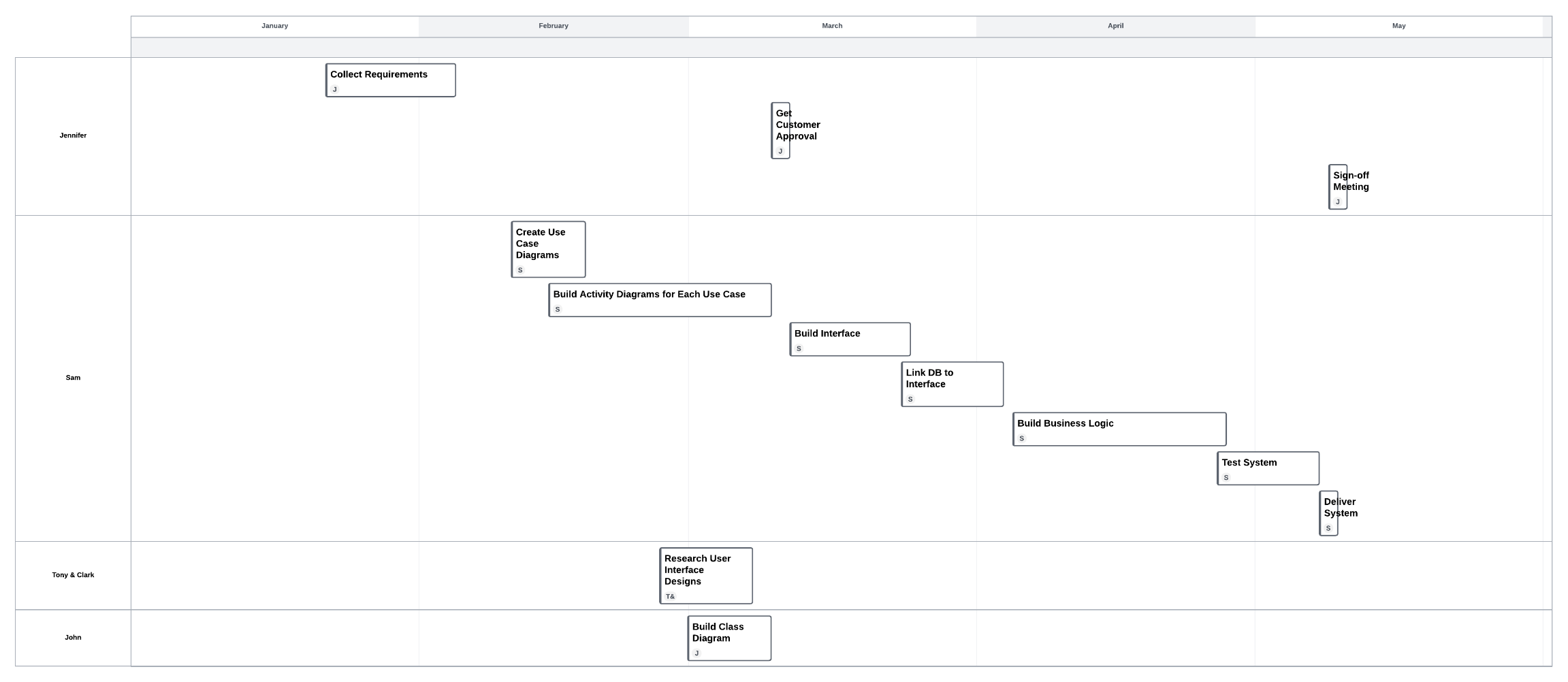
* The DMV is assumed to be willing and able to provide regular updates on rules, policies, and test questions through an established communication channel.
* Users' devices (desktops, laptops, tablets, smartphones) are assumed to have the necessary specifications to run the web-based application smoothly.
* The system is assumed to be hosted on a cloud-based platform, which will handle aspects like server management, data storage, backup, and security. This aligns with Ian's statement about not wanting to deal with these technical aspects.
* Users are assumed to have valid email addresses, as email communication is used for account verification, password resets, confirmations, and notifications.
* Users are assumed to have reliable internet access to utilize the online learning platform, practice tests, and scheduling features.

### 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?*

* **System Design Limitations**:
  + While the system aims to offer online access to course materials and resources, offline access might be limited.
  + The system relies on the DMV for timely updates on rules, policies, and test questions. Delays or inconsistencies in these updates could impact the accuracy and relevance of the training materials.
* **Limited Budget**: As a small consulting company working with a startup client, budget constraints might limit the scope of features and functionalities that can be implemented initially.
* **Time Constraints**: Tight project timelines could potentially impact the thoroughness of testing and quality assurance, leading to the risk of undiscovered bugs or issues in the initial release.
* **Technical Expertise:** Depending on the available team's expertise, certain complex features or integrations might require additional resources or external consultants, impacting project costs and timelines.
* **Technological Limitations:**
  + **Browser Compatibility:** The system's web-based interface might not function optimally on older or less common browsers, potentially limiting accessibility for some users.
  + **Mobile Devices:** The wide variety of screen sizes, operating systems, and browser capabilities across different mobile devices might present challenges in ensuring a consistent user experience.
  + **Security Risks:** While security measures are in place, the system will always be susceptible to potential cyber threats and vulnerabilities, requiring ongoing monitoring and updates.

### 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.*