# CS 255 Business Requirements Document Template

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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 and develop a system for DriverPass that addresses the needs of students preparing for their driving tests.
* The system aims to provide a platform that offers online practice exams and on-the-road training to improve students chances of passing their driving license exams. The goal is to reduce the high failure rate among driving test applicants by offering a more effective and engaging learning experience.
* The client DriverPass is represented by Liam, the owner of DriverPass, as well as Ian, the IT officer of the company.

### 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 wants to develop a system that addresses the high amount of failures students have with their driving tests. They have identified a significant gap in the market for tools that effectively train students to pass their driving exams, and they need the software for DriverPass to meet their requirements promptly.
* DriverPass seeks to address the issue of high failure rates in DMV driving tests by providing thorough and effective training. The current preparation methods are inadequate, and DriverPass wants to offer a solution that includes both theoretical knowledge and practical experience.
* The components needed for this system would be:
  + Online Practice Exams:
    - Database of test questions that cover all aspects of the driving exam.
    - A module that simulates the actual driving test environment to provide practice exams for students.
    - Instant Feedback: A feature that gives students immediate feedback on their performance, highlighting areas for improvement.
  + On the road Training:
    - A system for students to schedule on-the-road training sessions with instructors.
    - A dashboard for instructors to manage their schedules, track student progress, and provide feedback.
    - A component for instructors to log details of each training session, including student performance and areas for improvement.
  + User Management:
    - Functionality for users to create accounts and log in securely.
    - Different access levels should be made and functionalities based on user roles (student, instructor, administrator).
    - Features for users to manage their personal information and settings.
  + User Interface:
    - An interface that adapts to different devices and screen sizes (desktop, tablet, mobile).
    - Intuitive navigation and clear instructions for all user interactions.
  + Administrative Tools:
    - Tools for administrators to monitor system performance, security, and usage as well as generate reports on user activity, exam results, and training outcomes.
    - Tools for managing the content of practice exams and training materials.

### 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?*

* Improve the pass rate of driving test applicants.
* Efficiently manage training schedules and track student progress.
* Ensure the protection of user data and secure payment processing.
* Provide comprehensive online practice exams that simulate the actual driving test.
* Offer scheduling and management of on-the-road training sessions with certified instructors.
* Enable students to track their progress and receive personalized feedback from instructors.
* Deliver an intuitive and responsive user interface that works across various devices.
* Allow administrators to manage users, monitor system performance, and generate reports.

## 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 needs to be accessible via standard web browsers (Chrome, Firefox, Safari, Edge) on desktop and mobile devices.
* Additionally, there should be a mobile application for iOS and Android to provide a seamless experience for users on the go.
* The system should have a response time of less than 2 seconds for most user actions, such as logging in, accessing practice exams, and scheduling training sessions.
* Instant feedback should be provided to users upon completion of practice exams with a response time of less than 1 second.
* Scheduling changes and progress tracking updates should be reflected in real-time with a max delay of 2 seconds.
* Regular system updates should be scheduled quarterly to ensure the application remains secure and incorporates the latest features and improvements.
* Practice exam questions and training materials should be reviewed and updated monthly to ensure they reflect the latest driving test standards and requirements.

#### 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 run on Windows, macOS and Linux based machines.
* Back end tools should consist of the following:
  + The system requires a robust and scalable database to manage user data, training schedules, and progress tracking. These may include MySQL or MongoDB
  + DriverPass should run on a reliable web server such as Apache
  + The system should be developed using widely-supported languages and frameworks, such as Java with Spring Boot for the back end
  + In order to ensure secure data exchange and user authentication, tools such as SSL/TLS for secure communication and OAuth2 for secure authorization.
  + The backend should run on a cloud-based environment for scalability and reliability such as Microsoft Azure.

#### 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 should have a unique account identified by their email address, which is case sensitive, and must be verified during registration.
* Users will be differentiated based on their roles:
  + Students: users who are preparing for their driving test, scheduling on-the-road sessions and making payments.
  + Instructors: users who provide on-the-road training.
  + Administrators: users who manage the system, content, and other user accounts.
* The system will treat usernames and email addresses as case-insensitive. For example, "User@example.com" and "user@example.com" will be considered the same. On the other hand, passwords will be case-sensitive to ensure security. For example, "Password101" and "password101" will be considered different.
* The system will automatically notify administrators of critical errors or issues via email and an internal notification system.
  + Admins will be informed if there are multiple failed login attempts for a user account to prevent potential security breaches.
  + The system will monitor performance metrics and notify admins of significant slowdowns or downtime.
  + Admins will be alerted of any suspicious activities such as unauthorized access attempts or data breaches in order to take action as soon as possible to resolve these issues.

#### 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 needs an administrative interface where IT admins can add, remove, and modify user accounts without needing to change the underlying code. This interface will provide:
  + Ability to create new user accounts with relevant roles (students, instructors, admins).
  + Tools to update user details, reset passwords, and change user roles as well as options to deactivate or permanently delete user accounts.
  + The ability to enforce security policies, manage encryption keys, and respond to security alerts.
  + Access to system health dashboards and logs to monitor the performance and security.
* The system will be designed to adapt to platform updates through these mechanisms:
  + Using a modular design to allow individual components to be updated independently without affecting the entire system.
  + Implement CI/CD pipelines to ensure that updates are tested and deployed seamlessly.
  + Ensuring that new updates are backward compatible to prevent disruptions in service.
  + Implementing monitoring tools to track the performance of updates and enabling quick rollback options in case of sudden issues with a new update.

#### 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?*

* Users will be required to log in using their login credentials requiring their email address and password.
* Two-factor authentication will be available for added security requiring users to enter a code sent to their mobile device or email in addition to their password.
* All data exchanges between the client and server will be encrypted using SSL or TLS protocols to ensure secure communication.
* API endpoints will be secured using authentication tokens and HTTPS to prevent any data being stolen or outside user’s gaining unauthorized access.
* To prevent brute force attacksif there are multiple failed login attempts within a short period of time then the account will be temporarily locked.
  + The user and IT admin will be notified of this suspicious activity via email.
  + A captcha will be required to prevent any sort of automated brute force attacks.
  + Repeated failed login attempts from the same IP address could result in temporary IP blocking in order to prevent continuous brute force attempts.
* Users can reset their password using a "Forgot Password" link on the login page.
  + The user will need to verify their identity by providing their registered email address. A verification code will be sent to this email.
  + After the user enters the correct verification code the user will then be directed to a secure page where they can enter a new password.

### 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 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 interface should be intuitive and easy to navigate for any user.
  + The interface must be responsive to ensure usability across different devices such as laptops, desktops, tablets and smartphones.
* Students needs through the interface include registration/logging in, managing their profile, viewing practice exams, schedule on-the-road training sessions, view progress in practice exams and make payments easily.
* Instructors needs through the interface include all that of the students as well as an intuitive way to provide student feedback and view their schedule for on-the-road sessions with easy ways to reschedule or cancel sessions within their schedule.
* Admins needs through the interface include all that of the student and instructor as well as the ability to easily manage content, monitor the entire system in a user friendly dashboard, manage other users and the inclusion of a notification hub displaying important security notifications. The most significant should appear first in the notification list.
* The primary mode of interaction will be through web browsers on various devices.
  + A complementary mobile app will be available for both Android and iOS devices, providing access to key functionalities such as practice exams, scheduling, and progress tracking.
  + The web interface will be designed to adapt to different screen sizes making it user friendly on desktop and mobile browsers.

### 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?*

* Details about database selection and data recovery processes are not explicitly detailed in the design.
* The design does not specify any third-party services or tools that may need to be integrated into the system.
* Strategies for scaling the system to handle a growing number of users and data have not been outlined.
* Specific testing strategies or tools that will be used to ensure the system's quality and reliability are not addressed.
* It is assumed that all users have reliable internet access to use the web based system and mobile applications.
* We assume users are using more well known and up to date browsers such as Chrome, Microsoft Edge and Firefox. Older browser versions or less common browsers may not be fully supported.
* It is assumed that users will consent to necessary data processing practices and agree to all terms of service when using this software.

### 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 design might not account for large user growth in the initial months of release which could lead to potential performance issues if the user base expands too much without proper scaling strategies.
* The system may face challenges in real time processing and updating information during peak usage times or with a high volume of concurrent users.
* Integrating third-party services in features such as payment gateways could introduce potential points of failure.
* Ensuring the mobile app's compatibility across various devices and operating systems may present challenges especially with older devices.
* A small development team may limit the overall efficiency of building, testing, and deploying the DriverPass system.
* The team's expertise in specific technologies or methodologies may limit the ability to implement certain features needed.
* The need for ongoing support and maintenance may affect the ability to quickly address issues and roll out new updates.
* The project has a fixed timeline that may restrict the ability to thoroughly design and test the DriverPass system. These time limitations may require that the team prioritizes certain features over others to meet deadlines.
* Limited budget resources may also affect the ability to acquire certain tools or hire more staff. The cost of licensing necessary software also should be considered as this can impact the overall budget in a large way.
* The DriverPass system performance may be limited by the hardware infrastructure available and within the budget.

### 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.*