# CS 255 Business Requirements Document Template

## 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?*

**What is the purpose of this project?**  
The purpose of this project is to develop a comprehensive system for DriverPass, a company that provides driver training services to help students pass their driving tests.

**Who is the client and what do they want their system to be able to do?**  
The client, DriverPass, wants the system to offer online classes, practice tests, and on-the-road training to their customers, addressing the high failure rates of driving tests at the DMV.

### 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?*

**What does DriverPass want the system to do?**  
DriverPass identified a significant market need for better driver training, as more than 65% of students fail their driving tests due to bad preparation. The DriverPass system will provide students with access to online practice exams, training materials, and on-the-road training to better prepare them for driving tests.

**What is the problem they want to fix?**  
The problem is the high failure rate of driving tests at the DMV due to inadequate preparation.

**What are the different components needed for this system?**  
The system will be web-based, accessible from any device with an internet connection, and hosted on the cloud for scalability and reliability.

### 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?*

**What should this system be able to do when it is completed?**

Allow customers to easily access online classes, training materials, and practice tests from any device. Provide a user-friendly reservation system for scheduling on-the-road training sessions with DriverPass instructors. Ensure the system is secure, scalable, and maintainable to accommodate future growth and enhancements. Enable DriverPass staff to efficiently manage customer data, reservations, and training resources through an intuitive interface. Generate reports and analytics to track customer progress, system usage, and business performance metrics.

**What measurable tasks need to be included in the system design to achieve this?**  
Included in the description of objectives and goals are the measurable tasks necessary to achieve these objectives, such as developing a user-friendly reservation system, ensuring system security and scalability, and generating reports and analytics.

## 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 does this system need to run in?**  
The DriverPass system needs to be a web-based application, ensuring it is accessible from any device with an internet connection. This approach allows for maximum availability and convenience for users, enabling access from desktops, laptops, tablets, and smartphones.

**How fast should the system run?**  
The system should be optimized for performance, ensuring that page’s load quickly and interactions are responsive. While specific speed metrics may vary, the goal is to ensure that users can navigate the system and access its features without experiencing noticeable delays. Performance should be tested under various conditions, including high user load, to ensure the system remains responsive.

**How often should the system be updated?**  
The system should undergo regular updates for security patches, feature enhancements, and performance improvements. Scheduled updates should occur during off-peak hours to minimize disruption to users. Critical security updates should be applied as soon as possible, while feature updates might follow a more planned schedule, such as quarterly or bi-annually, depending on the development roadmap and user feedback.

#### 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?*

**What platforms (Windows, Unix, etc.) should the system run on?**

The DriverPass system, being web-based, should be designed to operate independently of client operating systems, ensuring accessibility via web browsers on any platform, including Windows, macOS, Linux, iOS, and Android. For the server-side, a Unix/Linux platform is recommended due to its robustness, security, and performance for web server operations.

**Does the back end require any tools, such as a database, to support this application?**

Yes, the backend of the DriverPass system requires several tools to support its operation:

* **Database:** A relational database management system (RDBMS) like PostgreSQL or MySQL is essential for storing structured data such as user profiles, course information, and reservations. These databases offer reliability, ACID compliance, and support complex queries.
* **Web Server:** A web server software like Apache or Nginx is required to handle HTTP requests from clients and serve the web application's content.
* **Development Framework:** Backend development frameworks such as Node.js with Express, Ruby on Rails, Django (Python), or Spring Boot (Java) provide libraries and tools for rapid development, security features, and easy database integration.
* **Cloud Services:** For hosting, storage, and additional services like email notifications, cloud platforms such as AWS, Google Cloud, or Microsoft Azure can be utilized. These services offer scalability, reliability, and a wide range of tools for application development and deployment.
* **Security Tools:** Security mechanisms including SSL/TLS for encrypted connections, firewalls, and authentication/authorization tools (e.g., OAuth 2.0, JWT) are necessary to protect the application and user data.

#### 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?*

**How will you distinguish between different users?**

To distinguish between different users, the DriverPass system will implement a robust user authentication mechanism. Each user will have a unique username or email address and a password. Upon registration, users will be assigned specific roles (e.g., customer, administrator, instructor), which determine their access levels and functionalities available within the system. User authentication will be handled through secure login processes, ensuring that each user accesses only the data and functionalities appropriate to their role.

**Is the input case-sensitive?**

For usernames or email addresses, the system should be designed to treat them as case-insensitive to ensure user accessibility and avoid login issues due to case mismatches. However, passwords will be case-sensitive, adhering to best security practices, requiring users to enter the exact combination of characters, including uppercase and lowercase letters, as created during registration.

**When should the system inform the admin of a problem?**

The system should automatically inform the admin of critical issues that could affect the system's integrity, security, or user experience. This includes:

* **Security breaches or multiple failed login attempts:** Indicating possible brute-force attacks or unauthorized access attempts.
* **System errors or failures:** Such as server downtime, database connectivity issues, or application crashes.
* **Resource limitations:** Like reaching storage capacity limits or excessive bandwidth usage, which could degrade system performance.
* **Compliance or data integrity issues:** Any violations of data protection regulations or anomalies in data that could suggest tampering or corruption.

#### 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?*

**Can you make changes to the user (add/remove/modify) without changing code?**

Yes, the system will allow for changes to user accounts (addition, removal, modification) through an administrative interface, eliminating the need for direct code alterations. This will be facilitated by a dynamic user management system that administrators can interact with via a graphical user interface (GUI).

**How will the system adapt to platform updates?**

The system will be designed with a modular architecture, ensuring that it can easily adapt to platform updates without significant overhauls. By utilizing containerization and microservices, individual components of the system can be updated independently, thus minimizing downtime and ensuring compatibility with new platform versions.

**What type of access does the IT admin need?**

IT administrators will require comprehensive access to the system, including superuser or administrative rights. This access level will enable them to manage system configurations, perform updates, monitor system health, manage user accounts, and execute backup and recovery procedures. The system will also provide role-based access control (RBAC) to ensure that administrators have the necessary permissions to perform their duties while maintaining strict security protocols.

#### 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?*

**What is required for the user to log in?**

For user login, the system will require a combination of a username and a strong password that meets specific security criteria (e.g., a minimum length, inclusion of uppercase and lowercase letters, numbers, and special characters). Additionally, two-factor authentication (2FA) may be implemented to provide an extra layer of security, requiring users to verify their identity through a secondary method (e.g., a code sent to their mobile device) upon logging in.

**How can you secure the connection or the data exchange between the client and the server?**

To secure the connection and data exchange between the client and the server, the system will implement Transport Layer Security (TLS) encryption for all data in transit. This ensures that any data sent between the user's device and the server is encrypted and protected from interception. For data at rest, encryption techniques such as AES (Advanced Encryption Standard) will be used to secure sensitive information stored in the database.

**What should happen to the account if there is a “brute force” hacking attempt?**

In the event of a brute force hacking attempt, the system will automatically lock the targeted user account after a predefined number of unsuccessful login attempts. This temporary lockout period helps to prevent unauthorized access. Additionally, the system will alert the user and system administrators of the attempted security breach, prompting further investigation and potential security measures to protect the account.

**What happens if the user forgets their password?**

If a user forgets their password, the system will provide a secure password reset process. This process typically involves the user verifying their identity through an alternative method, such as answering security questions or receiving a password reset link via their registered email address. This link will direct the user to a secure platform where they can create a new password, ensuring that only the legitimate user can regain access to their account.

### 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 validate user credentials when logging in** to ensure secure access to user accounts and protect against unauthorized access.
* **The system shall provide an intuitive user registration process**, allowing new users to easily create accounts with necessary information such as name, email, and password.
* **The system shall offer a comprehensive library of online learning materials**, including interactive lessons, videos, and practice quizzes, accessible to registered users.
* **The system shall enable users to schedule on-the-road training sessions** with certified instructors, including the ability to view available slots and book appointments.
* **The system shall allow users to track their progress** through online learning materials and on-the-road training sessions, displaying their achievements and areas for improvement.
* **The system shall provide a secure payment gateway** for users to pay for courses, practice tests, and on-the-road training sessions online.
* **The system shall enable administrators to manage user accounts**, including the ability to add, remove, or modify user information and access levels.
* **The system shall allow instructors to update and manage the content** of online learning materials and quizzes to ensure up-to-date and comprehensive training resources.
* **The system shall generate reports and analytics** for administrators to monitor user progress, system usage, and identify trends for continuous improvement.
* **The system shall send notifications and reminders** to users about upcoming training sessions, payment confirmations, and progress updates via email or SMS.
* **The system shall implement a feedback mechanism**, allowing users to rate their experience with the online materials and on-the-road training, providing valuable insights for service improvement.

### 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.)?*

**What are the needs of the interface?**

The interface needs to be user-friendly, intuitive, and responsive to ensure a seamless experience across different devices and platforms. It should provide easy navigation, clear instructions, and quick access to all features and functionalities. The design should be accessible, adhering to WCAG 2.1 guidelines to accommodate users with disabilities.

**Who are the different users for this interface?**

The different users include customers (students seeking driver training), instructors (providing on-the-road training and online material creation), and administrators (managing the system, user accounts, and content).

**What will each user need to be able to do through the interface?**

**Customers** need to register and manage their accounts, access online learning materials, schedule on-the-road training sessions, make payments, and view their progress and feedback.

**Instructors** need to manage their availability for on-the-road sessions, create and update online learning materials, and view feedback from students.

**Administrators** need to oversee user accounts, manage system settings, update course content, generate reports on user progress and system usage, and handle customer support queries.

**How will the user interact with the interface (mobile, browser, etc.)?**

Users will interact with the interface through various devices, including desktops, laptops, tablets, and smartphones. The system will be accessible via web browsers like Chrome, Firefox, Safari, and Edge, ensuring broad accessibility. The design will be responsive, ensuring that the interface adjusts to different screen sizes and resolutions for optimal viewing and interaction.

### 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?*

**What things were not specifically addressed in your design above?**

The initial design does not specifically address real-time communication features between students and instructors, integration with external DMV systems for direct test scheduling, and detailed accessibility features for users with specific disabilities beyond general WCAG 2.1 guidelines.

**What assumptions are you making in your design about the users or the technology they have?**

**User Technology Assumptions:** It is assumed that users have access to basic internet-connected devices such as smartphones, tablets, or computers with modern web browsers. This assumption underlies the design's focus on web-based accessibility and responsive design.

**User Skill Level Assumptions:** The design assumes a moderate level of digital literacy among users, enabling them to navigate web interfaces, complete online forms, and interact with digital content without requiring extensive technical support.

**Content Accessibility Assumptions:** While the design aims to be inclusive by adhering to WCAG 2.1 guidelines, it assumes that users with disabilities will have access to necessary assistive technologies (e.g., screen readers) that can interface effectively with the system.

**Internet Connectivity Assumptions:** The design presupposes reliable internet connectivity for users to access online materials and functionalities without significant disruptions, which may not be the case in all regions or for all users.

### 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?*

**What limitations do you see in your system design?**

The system design primarily focuses on online and on-the-road training aspects, potentially limiting in-person interaction and personalized feedback that might be crucial for some learners. Additionally, the reliance on web-based delivery may not fully cater to users with limited internet access or those who prefer traditional classroom settings.

**What limitations do you have as far as resources, time, budget, or technology?**

* **Resources:** The project's scope may be constrained by the availability of skilled developers and educators to create and curate high-quality content and ensure the platform's technical robustness.
* **Time:** Given the ambitious nature of the project, time constraints could affect the depth of features implemented in the initial release, necessitating prioritization of core functionalities over advanced features.
* **Budget:** Financial limitations could impact the ability to license state-of-the-art educational technology, secure high-bandwidth servers for smooth online experiences, and invest in extensive marketing to reach a broad audience.
* **Technology:** The system's effectiveness is contingent on leveraging cloud infrastructure and modern web technologies, which may evolve rapidly. Keeping pace with technological advancements and ensuring compatibility across various devices and browsers could pose ongoing challenges.

### 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.*

A colorful bars on a white surface

Description automatically generated with medium confidence

References

Satzinger, J. W., Jackson, R. B., & Burd, S. D. (2016). Systems analysis and design in a changing world (7th ed.). Cengage Learning.