# CS 255 Business Requirements Document Template

## System Components and Design

### Purpose

The purpose of this system design is to create a cloud hosted system/application for the company DriverPass. They specifically want to fill a void in the market for preparing students for their driving test at the DMV by offering online instruction and in person driving tutoring. DriverPass has contracted us to develop an accessible online service that students can connect to from anywhere and that can be easily modified and adapted to changes in policies, regulations, and course material.

### System Background

The background of the proposed system is provided to create a clear structure for the development of the system and the components needed to deliver a quality product. DriverPass wants to offer a flexible, easily modifiable, easy to access application/system that has current up-to-date rules and policies from the DMV and a system that makes it easy for students to change/modify their information, take/view tests, and offers different avenues to schedule, cancel, or modify in person driving training as well as contact DriverPass in the event of an emergency.

The problem identified by DriverPass is that there are many people who fail their driving tests at the DMV. They want to solve this by preparing prospective drivers with rules, policies, online classes, practice tests and in person driving instruction. Different components needed for the system are listed below:

* The different users will be:
  + Business Owner(s)
  + System Administrators
  + Secretaries
  + Drivers
  + Students
* They want high level users like business owners/administrators to be able to download reports and information from the system, and to be able to have full access over all accounts to reset them if people forget passwords or to be able to block access from specific accounts.
* The secretary needs to be able to register (or cancel/reschedule) students for training and practice and edit/ input student information.
* They want students to be able to register for (or cancel/reschedule) online training and practice tests as well as on-the-road training if they so desire, and to have the ability to make appointments with their secretary if necessary. Students should be able to view online testing results, stay updated on DMV policies and rules, and be able to contact DriverPass.
* They want the system to be available on any computer or mobile device.
* They want it to be cloud hosted.
* The system will track specific information regarding:
  + Reservations
  + In person tutoring
  + Online training and testing results
  + Current rules and regulations from the DMV

### Objectives and Goals

The objectives for the system are to provide a thorough, usable service with all relevant information needed for students to achieve their purpose, to pass the DMV driving exam. The system should also consider security and permissions for different users. The system should be easily accessible to all users. The objectives are listed below:

* The system will be cloud hosted and feature file support for Microsoft 365(Office Suite) and integration procedures for the DMV external system.
* High level users (Administrators/Owners) should be provided with:
  + Ability to download reports and information from the system.
  + Full access to all accounts with the ability to reset the account and passwords.
  + Be able to permit/restrict access from all non-administrator accounts.
  + Be able to modularly enable, disable, or update existing courses and information.
* Mid-level users (Secretaries) should be provided with:
  + Ability to register, cancel, and reschedule students for training and practice.
  + Edit and input student account information.
  + View drivers/edit drivers assigned to each reservation.
* Low-level users (Driving Instructors) should be provided with:
  + The date and time of upcoming reservations.
  + The car assigned to the reservation.
  + Type of reservation and expected time allotted.
  + The student's name and photograph.
  + The pick-up and drop-off location for the reservation.
  + Ability to contact DriverPass in the event of an emergency.
* End-users (Students) should be provided with:
  + Ability to make reservations online for driving lessons, including the day and time they want to take the lesson and the pick-up and drop-off location for the student.
  + Have the choice to pick one of three separate training packages for in-person training.
  + Ability to cancel and modify appointments online.
  + Ability to automatically reset forgotten passwords.
  + Be able to view online testing materials, courses, grades, and test results.
  + Can contact DriverPass in the event of an emergency.
* The student information should include:
  + First Name
  + Last Name
  + Address
  + Phone Number
  + State
  + Credit Card Number, Expiration Date, and Security Code.
* The system will be able to track who made a reservation, who canceled a reservation and who last made a modification to a reservation.
* The system will track and identify the driver who is scheduled to go out with the student as well as track the time and car the student and driver are to use/using.
* The system will track pick-up location and drop-off location for the student. The drop off location should be the same as the pickup location.
* The system will track online tests the students have taken.
  + Online test information should include:
    - Name of the Test
    - Time taken
    - The status of the test:
    - Taken
    - Not Taken
    - In progress
    - Passed
    - Failed
* The Interface should display:
  + Online test information
  + An input form where the student (or secretary) can fill in the student information.
  + Notes and comments from the driving instructor and start/end times of the lesson.
  + A page for contacting DriverPass and a way for DriverPass to contact the student.
  + Any special needs for the student.
  + A photo of the driver assigned to the student.
  + A photo of the student
* All the tracked information should be easily retrievable and able to be exported/printed easily in the event of an emergency.

The goal of the system is to provide an interface with which students can take exams, view information, register for classes, and sign up for online training from anywhere at any time effortlessly. Additionally, DriverPass wants to have direct access and control over accounts, security, and vital information, as well as course offerings, without the overhead of maintaining servers and equipment. In the future the company has plans to add/remove packages/modules. Currently they want to be able to disable a package if they do not want users to register for it. Lastly, the system will stay up to date on rules, policies, and would notify DriverPass in the event of DMV rules/regulation updates. The result is a semi-autonomous system that will provide students with all the information and tools they need to succeed and give DriverPass with the ability to provide this service to the students with minimal overhead and input.

## Requirements

### Nonfunctional Requirements

#### Performance Requirements

The performance requirements of the system include limitations on the system due to how the system is hosted, how much storage is needed, how it is planned to be accessed, and how fast/often the system must update. These limitations are:

* The system will be cloud hosted.
* Because the system needs to run on any device anywhere at any time, it should be web-based.
* The system must run fast because students/instructors could have an emergency and students are taking courses and tests where the results must be calculated and returned to them.
* The system should be updated very quickly and routinely as updates in DMV information could impact student testing, course materials, and because information is being passed back and forth from servers.

#### Platform Constraints

The platform constraints of the system include restrictions on the back-end tools required for the system to run, the devices/operating systems the system is designed to run on, and any integrations required. The restrictions are listed below:

* The OS should not restrict access, rather, the system should be able to be used on any web browser (Firefox, Chrome, Microsoft Edge etc.)
* The browser used to connect to the system will determine if the user is on a mobile OS or desktop and can use the browser’s aspect ratio for screen sizing.
* The back end will require a database for:
  + User accounts and information
  + Course materials and tests
  + Cars used for instruction
  + Tracked information including reservation modifications, test results, dates/times, and system updates.
  + System backups and Logs for all technical information.
* The System will connect to the DMV Website API (Application Programming Interface.)

#### Accuracy and Precision

The accuracy and precision of the system should detail permissions, access, validations, and the flow of necessary information for the various users, and information needed by various features and functions of the system. These are listed as:

* Each user will have a unique username (or email address)/password
* Case sensitivity does not need to be used for email address/username; However, the password needs to be case sensitive, require special characters, and a minimum/maximum number of total characters.
* The system will require students to verify their email and set up security questions for the event that they forget their password.
* The System should distinguish between Students, Secretaries, and Administrators/Owners based on login credentials.
* The system should associate test scores, results, reservations, and all other student specific information with the student's full name and email address (inclusive).
* The system should display different information based on the current user's credentials and permissions.
* The system should notify the administrator of any exceptions/errors thrown.
* The system should notify the administrator in the event of multiple failed login attempts specifically:
  + If a CAPTCHA is failed more than 3 times
  + If a login attempt is failed more than 5 times total, regardless of CAPTCHA success/failure.
  + If security questions for a password reset are answered incorrectly more than two times.
  + If the emergency login credentials are used regardless of success or failure of login. (In this event, all administrators and owners should be notified as well.)

**Adaptability**

The adaptability of the system refers to how the system can adapt to change. In this instance, the system must be modular and scalable. The system must be able to adapt to constant changes including:

* Addition/editing/removal of various level users (secretaries, students, drivers)
* Addition/editing/removal of various courses and testing materials
* Addition/editing/removal of different cars available for instruction
* Addition/editing/removal of reservation dates and times
* Continually update and send notifications from information provided by the DMV API
* Updates for all supported browsers

The IT admin will need full access to the cloud. Functions can be provided in the system code and accessed through the GUI (Graphical User Interface) for users with correct permissions to add, edit, remove relevant information. For example, the secretary should have a different interface than a student and should have buttons, fields etc. Available to be able to schedule reservations or modify student information for all students, however, a student should not have these same permissions to modify any student’s information besides their own. This ensures the system can be continually updated and modified without compromising the system's security.

#### Security

Securing user information and access to information is critical to the success of this system. Different users will need to have different access levels and different permissions. The transfer of data between client and server is equally important. Therefore, the system security requirements are listed below:

* Users must provide an email address, username, password, and security questions to create an account.
* The system will use email addresses or usernames (interchangeably) and password verification. CAPTCHA (Completely Automated Public Turing Test) will also be used before being able to sign into the system. Administrators will additionally be required to have two step verification either through SMS (Short Messaging Service) or through an authenticator. In the event of an emergency, the two-step verification and CAPTCHA can be bypassed using a specific login credential. The emergency credential will not be able to make modifications to the system but will have access to view (but not export) any information deemed immediately necessary in the event of an emergency.
* For student accounts and drivers, login attempts exceeding 5 failed attempts (regardless of CAPTCHA success/failure) will suspend the account and offer the option to contact DriverPass to restore the account and reset the password, where the secretary will verify information before resetting the password, or offer a password reset option to be sent to the verified email address on file granted the student answers the security questions correctly.
* For Secretary accounts, login attempts exceeding 3 failed attempts (regardless of CAPTCHA success/failure) will suspend the account and can only be reset by the system administrator.
* For all other accounts, Administrator, Owners, Emergency, login attempts exceeding 2 failed attempts will suspend the account and the cloud host will be notified. The cloud host will notify the owner and system administrator by phone and the account will only be able to be reset by the cloud host after an investigation into the incident.
* The cloud host is responsible for the security of the data transfer between the client and server, considering this information can include credit/debit card information as well as names/address etc. The information should be encrypted before being transferred from client to server.

### Functional Requirements

* The system shall prompt the user to enter a username and password.
* The system shall prompt the user to create an account if they do not have one.
* The system shall validate user credentials and permissions when logging in.
* The system shall allow for password resetting if proper conditions are met.
* The system shall allow students to book reservations, take courses, take tests, and contact DriverPass.
* The system shall allow students to view research material, and review scores and grades.
* The system shall offer three different packages for students to choose from, each with different resources and time allotments.
* The system shall track student and driver information and show the student the driver’s photograph and name and show the driver the student’s photograph and name.
* The system shall track the cars available, in use and their location.
* The system shall **NOT** allow a drop-off and pick-up location to be separate locations.
* The system shall allow administrators the ability to modify existing package offerings, course materials, and users.
* The system shall allow secretaries the ability to make, cancel, and edit reservations.
* The system shall allow secretaries the ability to add, edit, and remove student users.
* The system shall allow for secure processing of payment information.
* The system shall integrate with the DMV API and update based on changes from the DMV.
* The system shall allow for easy exportation of information to file types accessible from typical office software (Microsoft 365, Word/Excel etc.)
* The system shall update quickly and run efficiently.
* The system shall be available on as many web browsers as possible and compatible with all devices and OS.

### User Interface

The interface needs to be scalable based on the size of the aspect ratio of the web browser. The interface must allow users to log in and, based on their permissions, allow for different functionality to be accessed.

* The different users are:
  + Owners
  + Administrators
  + Emergency
  + Secretary
  + Driver
  + Student

All users need to be able to have access to the system from mobile. However, owners, system administrators, and secretaries do not need to have full functionality when using a mobile browser. Owners, system administrators, and secretaries should be able to view, export information related to the system and relevant information related to their position and owners and administrators will have the functionality to suspend access for accounts. But for full functionality they would need to be on a desktop browser.

Owners will need to be able to modify all lower accounts and restrict access except for the emergency account which only the cloud host will be able to modify. They will need to be able to view and export all information tracked by the system and will be the only account that is able to restrict access of an administrator account.

Administrators will be able to view and export information tracked by the system. They will have access to all lower-level accounts and can restrict the access of those accounts. They will be able to directly modify course modules, and perform any changes needed to maintain the integrity of the system and information. The only accounts they are unable to modify are the Owners and emergency.

Secretaries need to be able to add, edit, and modify student accounts. They need to be able to make modifications to reservations and assign drivers to reservations.

Drivers need to be able to view their assigned reservations, the car they will be using, the student's name and photo, and the pick-up and drop-off location for the reservation. They cannot make any modifications and cannot export any information. They need to be able to reset their password and they will have the option to contact DriverPass in an emergency.

Students need to be able to submit payments, take courses, make reservations, view research materials, and take tests. They need to be able to view progress and results. They need to be able to reset their password and view the driving instructor's name and photograph. They need to be able to set the pick-up and drop-off location, and they need to be able to contact DriverPass in an emergency. Students cannot make any modifications to any information other than their own personal information.

### Assumptions

* They did not specifically address whether the driving instructors would have an account as well. I assumed a driver would need an account for relevant information being tracked by the system to perform their instruction accordingly.
* They did not mention any information regarding an emergency other than students/drivers should be able to contact DriverPass in the event of an emergency. I am assuming a contingency plan for quick access to vital information in an emergency.
* They did not mention a budget or what cloud service host they wanted to use. These can vary in cost and will need to be clarified before proceeding forward.
* They did not specify what type of product they wanted, be it a desktop application, mobile application, or browser/web-based system. I assumed because they want it available anywhere, on all devices, that a browser-based system would be universally best.
* I am assuming that many lower-level users (Drivers/Students) will be using the application on mobile devices more than higher level users who would be on a desktop.

### Limitations

This project has a few limitations listed below:

* There is no budget specified, this will determine the cloud host used, and the number employees able to be allocated to different tasks.
* The project has a timeline of 5 months.
* The project needs to be available anywhere at any time by anyone on any operating system on any platform.
* DriverPass provided a rudimentary interface drawing, however, the interface may change due to scaling of aspect ratios, and available permissions of the user. Further information must be gathered before developing a true GUI.
* They did not mention how they wanted the system to gather information from the DMV, I am assuming an API although I am unsure of the interactions between external systems and the DMV.

Within my system design without knowing what the budget is, the host to be used, and that it must be available on any platform at any time, restricts the system to online only, and specifically web browsers.

In the meantime, until more information is gathered, I would recommend taking an agile approach to minimize cost/production and to proceed with development based on the current information.

### Gantt Chart