# CS 255 Business Requirements – Francisco Ortega

## 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 interview has helped facilitate the software development lifecycle for our consulting company by understanding the wants and needs of our client, DriverPass.
* Based on the requirements that our project lead and systems analyst gather, we can provide a solution that meets expectations, reduces overhead for our team, and fosters a relationship with the client.
* DriverPass’ purpose is to provide a comprehensive platform for student driving preparation, a “void in the market” in terms of resources and accessibility.
* The client, DriverPass, is a small team headed by Liam, the owner, and Ian, his IT officer. They work to prepare students for their driving tests at their local DMV but currently lack a platform to make the preparation and access to resources more accessible.
* The proposed solution will be a comprehensive system that enables students to track their online learning and feedback on their in-person driving lessons. In this way, students will have a clear understanding of the progress they are making while DriverPass is able to monitor the availability of their instructors and demand from the active users.

### 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 seeks to provide a comprehensive platform that offers online courses and learning materials and then equips students with the opportunity for on-the-road training via a reservation-based system.
* The idea behind DriverPass stems from the lack of resources available for training students for their driving tests. The proposed solution includes the following components:
  + The DriverPass application will have account creation and login functionality with authorization.
  + A secure database to monitor users, their test and appointment progress, and administrative metrics like password resets.
  + A user interface that allows users to view their test progress, appointments, and feedback. Users should be able to manage and update these resources at their convenience.
  + A section for personal information will also be required for each user to optimize contact between DriverPass and the user.
* The DriverPass system should also run on the cloud to minimize the concern with security and data backups.

### 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?*

* Since there are different types of users accessing the application, there would need to be roles assigned via a login page that determines what actions a user can take once they create an account.
* A secure database is needed to manage all the data and appointments for a given student. This will also make sure administrative tasks like password resets can be monitored and only handled by the right user(s).
* Administrators should be able to readily download reports on their data in formats like Excel.
* The interface will need a section that allows students to take tests, save, and monitor their progress across existing tests.
* Students should also have a separate section where they can view their previous appointments, the feedback left behind by the instructors, and an input form for scheduling future lessons.
* The input form itself will provide information about the different packages, dates, and times available.
* A section for personal information should be editable by the user and accessible by administrative staff for assisting students with scheduling new appointments.

## Requirements

### Nonfunctional Requirements

#### 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?*

* Liam and Ian expect that the DriverPass system will run as a web-based application that is accessible to users on desktop and mobile devices alike. All operations should be available and maintain consistent results regardless of the platform used.
* The system should be highly performant. This means that user interactions with the platform remain unaffected regardless of network traffic. Changes made by students, the secretary, or admins should be asynchronous and updated simultaneously for all relevant users without any noticeable failures or unintended duplication or loss of data.
* The system should be regularly updated without impacting users. This is important as DriverPass has regulations and compliances that they must meet per the DMV. Updates to the system should align directly with these requirements with a dedicated team that can ensure minimal impact to the system occurs during these updates

#### 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 DriverPass system should reliably run on any given operating system (Windows, Unix, macOS, iOS, Android, etc.). This enforces the principle of high availability by ensuring that users can access the system regardless of the device that they are using.
* This extends to the user’s preferred web browsers. The functionality and experience of using DriverPass should remain consistent across any platform.
* As a result, the application will be deployed to the cloud. This promotes high availability and resiliency as the DriverPass team does not have to worry about security, backups, or other aspects of cloud management.
* The backend will require a database to store essential data for each user, including their personal information, progress on tests/lessons, reservation details and driving session feedback/notes, to ensure that the DriverPass application accurately displays relevant information for each student.

#### 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?*

* Different users will be distinguished by user permissions that are defined when a user creates an account. Mechanisms to enforce least privilege and correctly authenticate and authorize a user’s role will be in place when a user creates an account and logs in.
* Input across the system will be case-sensitive to prevent inaccurate data from being added to the database that could lead to unexpected side effects.
* All input will also be validated to prevent attacks like SQL injection and to ensure that users are properly authenticated at login.
* Logs should be collected of all requests made to the system. Specifically, failed login attempts, or database failures should be monitored within the logs with alarms in place when anomalies are detected. This allows the admin to investigate any issues and trace faulty requests to the relevant user or system component.

#### 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?*

* Changes to a user (add/remove/modify) will be readily available without changing code for users identified as admins. These administrative actions should not require downtime and should only produce the intended action when the correct role is attached to the user. Otherwise, a non-admin user should never even see this as an action on their end.
* The system should be able to handle platform updates gracefully. Updates should not impact core system functionality or user engagement. However, in cases where something unexpected happens, the user should be notified and the DriverPass team alerted of this potential downtime.
* The IT admin role will require access to modify users, modify the system itself, access reports, and access to metrics and logs that provide insight on the health and state of the application.

#### 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?*

* Authentication will be required for all users. Initially, this will not need to be complex or multi-layered if not required but should provide enough security to ensure that each user only has the accesses they need to engage with the system.
* To secure the connection or data exchange between client and server, the system should use secure protocols like TLS or SSL encryption. This ensures that sensitive information is not intercepted during transport.
* With logging in place, the system will be able to identify “brute force” attacks. In such occurrences, the system should lock out the relevant user and notify the admin of the potential attack for further investigation.
* If a user forgets their password, functionality to recover or change their password will exist. This will need to be securely handled using something like multi-factor authentication to ensure that it is the actual user requesting the password reset and not a malicious actor who has gained unauthorized access.

### 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 and ensure that each user is authorized by their assigned role when accessing the system.
* The system shall allow users to automatically reset their password if they forget it.
* The system shall allow students to update their personal and contact information.
* The system shall allow students to access online material and practice tests.
* The system shall allow students to track their progress.
* The system shall allow student to make, modify, and cancel on-the-road training reservations online or through an office call.
* The system shall allow a secretary to also make, modify, and cancel appointments for students who call with their information.
* The system shall allow students to choose and register from a collection of driving packages.
* The system shall allow the admin to disable/enables packages as needed.
* The system shall allow students to view feedback on their training from their instructor.
* The system shall provide the admin with full access over all accounts, including the ability to reset passwords or revoke user access.
* The system shall allow the admin to track reservation changes.
* The system shall allow the admin to have download and print activity reports and logs.
* The system shall integrate with the DMV to receive updates regarding rules and policies and notify admins of such updates​

### 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 user interface (UI) needs to align with the intended functionality needed for the various users of the DriverPass system. The UI should be consistent in appearance and highly navigable. Information and actions should be completable within a couple clicks or gestures.
* The different users of the interface will include students, secretary, and admins. Based on the roles, the UI could be vastly different in terms of what options each user will have to meet their needs. These needs are broken down as follows:
  + **Students** will need to be able to access tests and materials, schedule/modify appointments, view their progress, update their information, and review their feedback.
  + **Secretary** will use the interface to manage appointments for students.
  + **Admins** will need access to all system functionalities, including resetting accounts, revoking access, changing packages, and downloading reports.
* Users at all roles can expect to interact with the interface via all major web browsers on nearly any given device. This allows the application to be accessed on both desktop and mobile devices without worrying about maintaining two different applications or code bases.

### 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?*

* It is assumed that the user will have reliable access to the Internet.
* Is it assumed that all users would know how and for what purpose the DriverPass system exists for and what information is needed.
* It is assumed that students will understand the responsibility of appointment management and that no operational faults will result from late cancellations or extreme demand.
* It is assumed that the application will run the same on any given modern web browser regardless of the device used to access the platform.
* It is assumed that integration with the DMV will be seamless with non-disruptive updates, when necessary, that will not require manual interaction or code changes.

### 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?*

* As a web-based application, DriverPass must be optimized for as many devices as possible. With varying dimensions and limited time, it may be hard to ensure that all sizes are covered.
* Running an application on the cloud can be expensive if not carefully crafted. The application should be able to scale to the demand of the users without exceeding the operating budget or impacting functionality.
* Since DriverPass has opted to deploy on the cloud without having to worry about security or backup strategy, it may be difficult to control how data is collected and stored on the vendors end.
* Additional functionality or enhancements that were initially discussed may not be implemented in the first iteration of the application as core functionality will be prioritized.
* Time and budget may impact the final look and feel of the user interface depending on how many meetings the DriverPass team has regarding these decisions.

### 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 chart with multiple colored bars

Description automatically generated with medium confidence