# CS 255 Business Requirements Document

DriverPass System Design

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## System Components and Design

### Purpose

The client, DriverPass and its owner Liam are interested in taking advantage of an opportunity in the driver education market. Many people fail their driving tests at the DMV. Liam and his company have a plan for addressing the needs of students preparing for the exam. To address the opportunity, Liam wants to build a system where students can take online classes and practice tests.

### System Background

The DriverPass system will be an online application that allows students to access the system to schedule and pay for instruction packages offered by DriverPass. Instructors should be allowed access to the system where they can provide scheduled dates of unavailability. Administrators must be able to access the system to view any of the training, student, instructor, or reporting capabilities.

### 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?*

* Read/Write access to data online.
* Able to download data for use in offline applications.
* Role Based Identity and Authorization Management (IAM)
* Record level Create, Update, Delete Identity and Date Stamping.
* Online reservations for driving lessons. Including Student, Instructor, and Vehicle.
* Students will be able to create, modify, or cancel a reservation.
* Create a flexible packaging system whereby Sessions, trainers, Instruction, classes, content, and practice tests can be combined to form marketable packages.
* Password reset capability.
* Students should be able to register and pay for scheduled classes.
* Instructors should be able to login and block time they are unavailable.
* Administrators should be able to login and view information regarding students, Instructors, classes, content, scheduling, and reporting.
* The system will collect student’s first name, last name, address, phone number, state, credit card number, expiration date, and security code.
* The system will allow the student to upload a photograph of themselves.
* The system will allow instructors to register in the system. It will collect the instructors first name, last name, address, city, state, zip code, driver’s license number, expiration date, and any state certification information required by the state in which they teach driving lessons.
* The system should indicate whether this instructor has passed a background check.
* The system should allow the instructor to upload a photograph of themselves.
* Upon registration, the system will collect a username and password for the user.

## Requirements

### Nonfunctional Requirements

#### Performance Requirements

* Except when calling external systems to validate and perform credit card processing, the system will respond during page load events in 1 second or less. Credit card processing often takes several seconds. During this time a “spinner” or other UI que will be used to keep the user informed.
* The system will be deployed to the Azure Cloud utilizing App Services, Azure SQL, and App Services Auto Scaling for performance.

#### Platform Constraints

* The application will be built using the Microsoft development stack including ASP.Net MVC, .Net Core v6.0 (Long Term Support).
* The system will be hosted by Microsoft Internet Information Services (IIS).
* Code will be pushed to the production environment using a CI/CD (Continuous Integration / Continuous Deployment pipeline.
* The application’s backend database system will be Microsoft Azure SQL.

#### 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?*

* The application will utilize Azure App Service diagnostics, Azure Monitor, and Application Insights to allow for real-time analysis of resource usage, application throughput, response time, and troubleshooting.
* The system will log all exceptions thrown by the application.
* See security section for differentiation between users.
* Except for password requirements the system will not be case sensitive.

#### Adaptability

* Both Students and Instructors will be allowed to register for use of this system. They will be able to modify their profile and deactivate their account.
* Updates (Operating System Patches, .Net Framework updates, and general updates) will be applied by the cloud vender with downtime matching the service level agreement selected for that platform.
* See Security section for user access.

#### Security

* Parameterized SQL or Stored Procedures will be used to prevent SQL Injection.
* The Web Application server(s) will be deployed behind a load balancer and a firewall.
* An additional firewall will be deployed between the Web Application Server and the SQL instance.
* The Web Application and the SQL instance will be in different Virtual Networks.
* The system will employ a maximum failed login attempt counter. After the threshold has been reached the user’s account will be suspended. A page will load with instructions regarding how the user recovers the account.
* The user will be required to change their password yearly.
* The system will implement a minimum password complexity standard.
* The system will encrypt credit card numbers, and CVC numbers if this information is stored.
* The system will utilize https security certificates TLS 2.0.
* The system will utilize role-based security for users of the system including Students, Instructors, and Administrators.
* The system will provide a path for account recovery if the user forgets a password. At no time will be current password be sent via email. The recovery process will generate a time constrained link sent to the user’s registered email address to change their password.

### Functional Requirements

* The system shall validate user credentials when logging in. This will include a username that is not the user email address, and a password that meets the minimum complexity standards.
* The system shall assign the role granted to that user during the authentication process.
* The system shall allow students to self-register for use of the system.
* The system shall allow Instructors to register using a specialized link sent to their confirmed email address by a system administrator.
* The system shall NOT allow Administrators of this system to self-register. Administrator records will be inserted into the database by a database administrator (DBA). The DBA and the Administrator of the system cannot be the same person.

### User Interface

The user interface for this application will be defined for a computer or tablet-based browser. A phone-based browser will not be supported at this time.

Students

* The system shall provide a view whereby students can self-register for use of the system.
* The system shall collect the users first name, middle name, last name, street address, city, state, zip code, state that will be issuing the drivers license, phone number, and email address.
* The system shall provide profile views for each user of the system including instructors and administrators. The user’s role shall not be editable.
* The system shall provide a view of upcoming instructor sessions that include the date, time, and location of the in-car driving session.
* The system shall provide a view of available training classes the user can take online. This will include any state information pertaining to that class.
* The system shall provide a view that allows the student to pay for the class.
* The system shall provide a view that represents a receipt of payment.
* The system shall provide a mechanism whereby the student can have a copy of the receipt sent to their email address.
* The system shall provide a view where the class content is presented in a lesson-by-lesson format or other format that allows a student to move through the content in an orderly fashion.
* The system shall track the users progress through a lesson, and record when the user has completed the lesson.
* Lessons will be delivered in video segments uploaded to the server by an administrator.
* The system shall allow a student to re-take the lesson or course any number of times after payment for said course.
* The system shall provide a view where the student can select from a series of predefined practice tests.
* The system shall provide a view where the student can take a predefined practice test.
* The system shall track the student’s practice tests and scores.

Instructors

* The system shall provide a view where the instructor can register for use of the system.
* The system shall collect the instructor’s first name, middle name, last name, street address, city, state, zip code, phone number, driver’s license number and expiration date.
* The system shall provide a mechanism for the instructor to upload a picture of their state driver’s license as well as a recent photo clearly showing their face.
* The system shall provide a mechanism for the instructor to indicate if they plan to use a personal vehicle for the driving sessions.
* The system shall provide a mechanism for the instructor to designate the number of factory authorized, seat belted, seating positions in the vehicle.
* The system shall provide a mechanism for the instructor to upload photographs of the vehicle showing both the interior and exterior of the vehicle.
* The system shall provide a mechanism whereby the instructor certifies the vehicle is in good working order.
* The system shall provide a mechanism whereby the instructor can submit the license plate number of the vehicle.
* The system shall provide a mechanism whereby the instructor certifies that he/she has, and will use, the appropriate state mandated “Student Driver” signage.
* The system shall provide a mechanism whereby the instructor can upload scanned or photographed vehicle registration and insurance coverage information.
* The system shall, upon registration of an instructor, mark that instructor’s user record as “Under-Review”.
* The system shall NOT allow an instructor to sign up for a given driving session while their account record is in the “Under Review” state.
* The system shall provide an instructor with a view of upcoming driving sessions and locations that do not have an instructor assigned.
* The system shall provide a mechanism to prevent one instructor from taking over a session already assigned to another instructor.
* The system shall provide a mechanism for the instructor to select a driving session and be assigned as the instructor.
* When an instructor selects a driving session, their information will be attached and visible to the student upon paying for the driving session.
* The system shall provide a mechanism whereby an instructor can remove themselves as the instructor for a particular driving session.
* The system shall provide a view that allows the instructor to mark a driving session complete and allow a space where the instructor can add notes to the session record.

Administrators

* The system shall allow the administrator to create/modify/delete driving session records.
* The system shall allow the administrator to assign an instructor to a session. Only “Approved” instructors can be assigned.
* The system shall track instructor availability and prevent over-scheduling.
* The system shall allow the administrator to set a limit regarding the number of students allowed for any driving session.
* The system shall allow an administrator to review the registration records of any student or instructor.
* The system shall allow an administrator to review the documentation provided by an instructor and approve or reject their status.
* The system shall allow an administrator to make notes on an instructor record.
* The system shall allow an administrator to export Student Registration records to a comma separated values (csv) file. The export will never include credit card data.
* The system shall allow an administrator to export Instructor registration data. This export excludes photos or scanned documents.
* The system shall allow an administrator to export driving session records including the assigned instructor and registered students.
* The system will allow the administrator the ability to deactivate the login capabilities of any student or instructor.
* The system will allow an administrator the ability to define and upload new class content.
* The system will allow an administrator the ability to add/modify/delete predefined practice tests.

### Assumptions

* The design presumes that the user will access the site from a computer or tablet browser.
* The design does not address how practice tests are created or deployed.
* The design does not address how class content is designed and deployed.

### Limitations

* This system will likely take longer to build than the defined time constraints given in the requirements interview.
* There are a great many details of this system that are presumed in the requirements section but were not specified in the requirements interview.
* The requirements interview did not specify budget or technology. The technology stack chosen in this case is Microsoft .net MVC and SQL Server in the Azure Cloud.

### Gantt Chart

A screenshot of a computer

Description automatically generated

This Gantt chart is based on the dates given in the requirements interview. It is not realistic in terms of the system as defined by this design requirements documents.