# Brennon Fultz

CS 255

# CS 255 Business Requirements Document

## System Components and Design

### Purpose

The purpose of this proposed system is to enable DriverPass to provide online access to course material for driving students as well as manage in-person driving instruction schedules.

* This project is for our new client, DriverPass.
* The desired outcome is to empower driving students with online practice tests and in-person training to assist them with passing their driving license exams.
* The system needs to be able to handle scheduling reservations for training packages, as well as provide access to training material and practice tests.

### System Background

The background of the proposed system is to provide a means by which DriverPass can manage their driving test tutoring business. Understanding the system background is part of requirements analysis, which supports the initial design of the system (Valacich et al., 2019).

* DriverPass wants to give students better access to driving instruction through online and in-person training. This is the problem they want to fix.
* The client wants the system to allow users to make reservations for different training packages which will include online and in-person training.
* There are three packages:
  + 1.) Six car-hours
  + 2.) Eight car-hours and a lesson on DMV policies
  + 3.) Twelve car-hours, DMV lesson, and access to the online class material.
* The system should provide users access to online instructional material and practice tests.
* At least three types of user account will be needed: Student, Instructor, and Admin.
* As a general overview, Student has view-only access, Instructor has view and edit course access, and Admin has the same plus manage accounts access.

### Objectives and Goals

The objectives in a system analysis offer an overview of the required tasks of the to-be system and the goals provide a means for how these tasks will be measured (Dennis et al., 2016).

* This system should be able to manage:

1. Training packages
2. Appointment scheduling
3. Online training material
4. Online testing

* The owner should be able to create new packages or modify existing ones in the future, but for now disabling packages will be acceptable.
* The IT officer should have admin access to reset passwords and block accounts.
* Users (and the secretary) should be able to create, modify, or cancel appointments for training.
* These objectives will be measured in a system-wide functionality test involving collaboration between stakeholders and the development team testers, beginning April 27th.

## Requirements

### Nonfunctional Requirements

Nonfunctional requirements describe how the system functions (Valacich et al., 2019). The system must be web-based using a cloud architecture pattern so that the client need not worry about server maintenance or other technical aspects that would interfere with their primary business concerns. The system will be designed for fast performance across mobile and desktop platforms, will include a database for user management, will allow for updates and new features, and will include robust security measures.

#### Performance Requirements

The system will be a cross-platform web application that runs fast on all devices and has dynamic update capability.

* The application will be web-based using a third-party cloud service such as Amazon Web Services.
* The system must be fully functional on both mobile and desktop.
* The system should be fast enough to perform its most resource-intensive operation (backup full database) in under 10 seconds.
* The system should be updated dynamically based on DMV regulation changes, in addition to regular security updates which will occur monthly at minimum.

Rationale: Performance requirements define the measurable robustness of the system and allow for an understanding of how well the system does its job. The DriverPass online education system must be fast and capable so that students are able to learn effectively and instructors can assess them. It must be able to run on any device so that learning is convenient and adaptable to the lives of students, and updates should be frequent to ensure continued functionality.

#### Platform Constraints

This proposed system will run across multiple types of device and operating systems, using a MySQL database for management of user records.

* The web-app will support Windows, Chrome, Linux, MacOS, Android, and iOS through cloud-based infrastructure.
* Formatting for both desktop and mobile screen sizes will provide seamless access between all devices.
* The MySQL database will be supported by the chosen cloud service and fully integrated into the web-app, ensuring data integrity and consistency.
* The cloud service will handle concerns related to server hardware, providing a robust application environment.
* Users will need internet access for the system to function.

Rationale: Platform constraints are any limits imposed by the infrastructure, in terms of hardware or software, of the system (Dennis et al., 2016). Because this system will use cloud architecture, hardware concerns are not a problem beyond the user’s internet connection. Software is also not a significant limitation, as the web-app must simply be formatted to display correctly on various screen sizes. It will not actually run on the user’s platform.

#### Accuracy and Precision

The system will use modern authentication patterns to identify users and will provide email updates to administrators.

* 2-factor authentication will be used via email to allow users to log in.
* Usernames and passwords will be case-sensitive for login; however the system will not allow duplicate usernames with different capitalization (e.g., username & UserName).
* The admin should be notified immediately whenever there is a problem with the system, such as cloud services being down or the database losing connection.
* System issue notifications should also be sent to the maintenance department of the development team.
* The system will have users of three subtypes: Student, Instructor, Assistant, and Admin.
* Student and instructor can manage their own accounts and courses. Assistant can manage student and instructor accounts and register students for courses. Admin can manage all other accounts, register students for courses, as well as system functions.

Rationale: Accuracy and precision refer to users and their privileges. These types will allow each user the necessary functionality to perform their respective duties. Notably, admin has access to everything within the system to ensure that they can perform system maintenance, help other users with account problems, or view account activity, as needed.

#### Adaptability

Updates to user profiles will be enabled without changing code and platform updates will be managed through a version-control system such as Git. The IT Admin will have access to the database of users as well as access to user-level functions.

* Using MySQL for database management will allow the admin to make changes to user accounts or add or delete them entirely.
* The system will employ version control to ensure that the specific versions of the cloud service and the system itself are kept in production until updates have been thoroughly tested.
* The IT admin will have access to the database for viewing, altering, creating, or deleting user accounts.
* The admin will also be able to perform the same functions as each user, such as registering for training or editing instructor feedback.

Rationale: Adaptability is the system’s ability to adapt. More specifically, it is the readiness of the system to respond to changes in its users, infrastructure, or DMV regulations. This system must allow for user account changes, cloud service updates, and changes in driving or licensing laws.

#### Security

Security features will include 2-factor authentication, HTTPS/TLS encryption, a five-password attempt limit, and email-based password resetting.

* 2-factor authentication will require the user to enter their username and password, prompting an email to be sent to them with a numeric code. That code must be entered for the user to log in.
* After five password attempts, the user will be required to reset their password to prevent brute-force attacks.
* Passwords will be reset via a link sent to the user’s email which will then ask for the answer to a security question.
* Passwords will include capital and lowercase letters, numbers, and symbols.
* HTTPS and TLS encryption protocols will be used to ensure secure communication between client and server.
* Role-based authorization will give the correct access rights to each type of user.

**NOTE:** HTTPS is Hyper Text Transfer Protocol Secure and is the secure protocol for communication between client and server. TLS stands for Transport Layer Security and is the modern standard for secure internet communication. These ensure data integrity and software security through advanced encryption algorithms.

Rationale: Security is the system’s defense against malicious attacks from third parties interested in stealing or manipulating sensitive information or simply causing a system failure. Security is important for any software system, and this proposed system is no exception. User data should be protected via encryption, authentication, and authorization.

### Functional Requirements

The system will enable users or varying types to learn with online course material, register for training, view their progress, manage course content, provide feedback, and manage accounts.

* The system shall authenticate users and enable privileges based on role.
* The system shall allow students to register and participate in courses and training.
* The system shall display instructor feedback to students.
* The system shall enable course content and package management.
* The system shall allow the Admin and Assistant to manage accounts.
* The system shall provide scheduling for training.
* The system shall connect to a user database.
* The system shall allow the admin to download reports.

Rationale: Functional requirements are the specific tasks the system performs. These tasks are the primary uses for the system and help frame the scope of the project.

### User Interface

The user interface must display a student profile, show options for registration and content, account creation link, and provide database access. This interface will be used in both mobile and desktop browsers.

* Students will view their profile with a student photo, personal information, progress reports, instructor notes, and options for course content and registration.
* Instructors will view their profile with a driver photo, personal information, list of students and their feedback, options to manage content and view schedule.
* Admin will have an interface that shows a report of the system status and option to access the user database.
* New users will see DriverPass contact information and a create account option.

Rationale: The user interface is the part of the system that is actually visible to users and can be interacted with. This is the basic idea of what the system will look like, and it will need to be tailored to each user type and have options for the various user functions.

### Assumptions

The system design assumes that the users are able to connect to the internet and have an email address.

* Internet access will be required at all times to connect to the cloud-based system.
* Users must register with an email address to enable 2-factor authentication and password resetting.

Rationale: Assumptions are the ideas about users that the system design is based on. The system operates over the internet and relies on email, so these are assumed about the users.

### Limitations

This system must always be connected to cloud services. As with any project, budget and time are limitations that must be considered in system design.

* The system relies on the cloud service to function, it cannot operate independently.
* While there are no specific budget and time constraints, these should be given consideration.

Rationale: Limitations are the drawbacks of a system design. This system is entirely dependent on a third-party service, so this is the most significant limitation.

### Gantt Chart

*A screenshot of a computer

Description automatically generated*

**References**

Valacich, J. S., George, J. F., & Hoffer, J. A. (2019). *Modern systems analysis and design (9th ed.).* Pearson Education (US).

Dennis, A., Wixom, B., & Tegarden, D. P. (2016). *Systems analysis and design with UML*. John Wiley & Sons Inc.