# CS 255 Business Requirements Document Template

## System Components and Design

### Purpose

* DriverPass is a company whose main goal is to help customers have a higher success rate on their driving test. They plan to do this through providing different services that clients can pay for. They want to offer three different packages for clients to choose from. The first will include 3 driving lessons. The second package will include 4 driving lessons as well as an in-person explanation of DMV rules and policies. The third package will include 6 driving lessons, the in-person explanation, as well as access to online content, material, and an online class. They want to create a website that can be accessed by both DriverPass employees as well as clients. It should be accessible from both mobile devices and computers. They want clients to be able to register and then view their profile online, as well as reset their own passwords. Employees of DriverPass will be able to book, modify, or cancel lessons for clients upon request. Clients should be able to create, modify, or cancel driving lessons themselves from their profile. If they paid for it, they could also access online content, material and tests from their profile as well.

### System Background

* DriverPass wants the system to be accessible online or offline through the cloud. Although they will not be able to modify or update data offline, they should be able to download reports as well as other information. This information should be exportable so it can be looked at from programs like excel (*DriverPass interview transcript, n.d.).*
* Administrators need to be able to control access for employees. They should be able to reset passwords as well as block access when employees leave (*DriverPass interview transcript, n.d.).*
* Administrators will have the most control. Employees will be able to book, modify, and cancel lessons but cannot block other employees’ access. They also cannot access reports. Student users will only be able to book, modify, or cancel their own lessons and not anyone else’s (*DriverPass interview transcript, n.d.).*
* Some important information includes who made reservations, cancelled them, or modified them. This should all be tracked within the application in case anything goes wrong. Credit cards as well as personal information like phone numbers will also be tracked within the application. The company needs to have access to this information, so they can reach out to a student if need be (*DriverPass interview transcript, n.d.).*
* DriverPass does not want to be responsible for security so this should be handled in the creation of the application (*DriverPass interview transcript, n.d.).*
* The application needs to track lessons, as well as drivers and their cars. There are 10 drivers and 10 cars. When a lesson is created the application needs to know who is taking it, so they are not double booked (*DriverPass interview transcript, n.d.).*
* There are currently three packages that are subject to change in the future. Package one contains six hours of lessons in a car. Package two contains eight hours of lessons in a car as well as an in-person lesson. The third package contains twelve hours in a car, an in-person lesson, as well as all the online content (*DriverPass interview transcript, n.d.).*
* The first package will help students pass the road portion of the driving test. The second package will help students with the road, as well as the written exam. The final package provides the most support and will help the most with both the road and written exam (*DriverPass interview transcript, n.d.).*

### Objectives and Goals

* The goal of the system is to provide services which aid students in the passing of the driving exam (*DriverPass interview transcript, n.d.)*.
* The goal is achieved if we are able to provide the following functionality: driving lessons, in-person lessons, and online material and tests (*DriverPass interview transcript, n.d.)*.
* The goal of the system is to have a platform that helps to support the DriverPass business (*DriverPass interview transcript, n.d.)*.
* The goal is achieved if we are able to provide the following functionality: exportable business reports and the tracking of all appointments. These things will support the business by allowing administrators to track how many appointments they had as well as the amount of money they made (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to provide business reports that are exportable to applications such as excel (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to provide functionality for employees and students to book, modify, or cancel driving classes (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to track pickup and drop off’s locations of students for every lesson (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to have a platform where students can create a customizable profile that contains name, contact information, and a photo (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to provide online material and tests to those who pay for it (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to track students online test progress, as well as provide them with materials and assessments in a correct order (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to allow users to change their passwords when necessary (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to provide a space in the profile where drivers can provide feedback to their students, and students can view it (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to provide a space in the profile where students can specify any special needs they have (*DriverPass interview transcript, n.d.)*.
* The objective of the system is to provide a space where students can see a photo of their driving instructor to help ensure they do not get in a car with a stranger (*DriverPass interview transcript, n.d.)*.

## Requirements

### Nonfunctional Requirements

A systems behavioral properties are what would be considered nonfunctional requirements (Dennis et al., 2012). These properties must be present in a system and directly relate to things such as usability and performance. During the design phase these requirements help influence the design of the hardware and software, user interface, and the systems architecture (Dennis et al., 2012).

#### Performance Requirements

* The system should be cloud based and run off the web (*CS 255 DriverPass interview transcript,* n.d.). Because it will be providing a service, a web application would be a better choice than a website. Websites typically provide non-interactive information, whereas web applications focus more on user interactions (“Difference between web application and website”, 2022). They mimic mobile applications without the need of multiple operating system specific code bases (Marcak, 2021). This also means that they can work on any operating system (Marcak, 2021).
* If the system is going to run on the cloud a cloud app should be used rather than a web app. This is essentially a web-app with a few key differences. Unlike a web app, a cloud app can store information for offline use, has more advanced security than web apps, and can store much more memory (“Cloud apps vs. web apps: Understanding the benefits and differences”, n.d.).
* The system should load in 1-2 seconds (Anderson, 2021). Having a system that loads in this time frame is important for a businesses success. According to Dainial An of Google, “53% of visits are abandoned if a mobile site takes longer than three seconds to load” (An, 2017). If DriverPass is to be competitive, they need to minimize the amount of users that will turn away due to poor performance.
* Frequent updates are important for the system to work well. Bugs, third party application programming interface updates, security patches, new functionality, and any other improvements will all need updates (K. & V**.,** n.d.). As a general rule, the system should be updated at least once a month, but as often as necessary (Ken, 2019).

#### Platform Constraints

* The system will be a web or cloud app, this means it can run on any system (Marcak, 2021). This includes Windows, Unix, Apple, and Android because it works regardless of device or screen size (Marcak, 2021).
* If the system is to be run on the cloud then that means it will be serverless. An application framework provided by companies such as Amazon Web Services allows a web or cloud application to be built and run (Mahajan, 2019).
* A serverless application is made up of storage services, Lambda functions, security token service, user authentication, and a database (Mahajan, 2019).
* A storage service such as Amazon Simple Storage Service (Amazon S3) is in charge of storing system data. Amazon S3 not only stores and retrieves data, but also provides security and scalability. If a third party is not wanted in this system then a storage system will need to be built in the back end specifically for the system (“Amazon S3”, n.d.).
* The back end also needs to contain something to make the system’s code run. AWS Lambda can do this, as well as manage and provision the infrastructure for the system. A service like this also guarantees optimized code execution time and memory size (“AWS Lambda”, n.d.).
* A back-end tool such as AWS Security Token Service is needed to connect users to the back end of the system. This tool in particular enables users to invoke the systems application programming interface (API), and in turn triggers a tool such as Lambda to run the system (Mahajan, 2019).
* The system will have both customer and administrator users. Because of this, the back end of the system needs to be able to authenticate users. (Mahajan, 2019). This is also necessary because the system will have some users that have access to more content than others (“CS 255 DriverPass interview transcript”, n.d.). Because of this the system needs to differentiate between different types of users, as well as fraudulent users. Lambda can be integrated with a user identity service to provide authentication of users (Mahajan, 2019).
* A database is necessary for a system to run. Utilizing AWS, a NoSQL database called DynamoDB can be implemented (“Amazon DynamoDB”, n.d.). A NoSQL database stores data in a way which is easily scaled and with a flexible schema (“What is NoSQL?”, n.d.). Scalability refers to the ability for a database to grow and expand with a company (Hayes, 2020). A schema is a blueprint of a database that organizes data in such a way that it is easily understood by programmers looking at it (“Database schema”, 2021). DynamoDB also performs analytics, encrypts data, and automatically scales (“Amazon DynamoDB”, n.d.).

#### Accuracy and Precision

* The system distinguishes between different users through the use of usernames and passwords which work as IDs and keys (“User authentication: Understanding the basics & top tips”, 2020).
* Each ID and key are associated with a user and must be unique, this way unauthenticated users cannot gain access (“User authentication: Understanding the basics & top tips”, 2020).
* This particular system will have non case sensitive usernames, and case sensitive passwords.
* Traditionally, a system administrator is in charge of troubleshooting and managing the system as well as updating hardware and software assets (“Frequent question: What kinds of issues does system administration cover?”, n.d.). This means the system admin should be notified when any issues with the systems functionality arises. They should also be notified when there are updates available for the hardware or software being used.

#### Adaptability

* Changes to users can be part of a user admins scope without needing to change code. This is common functionality that can be seen in examples like Google Workspace, and the Windows operating system (“Delete or remove a user from your organization”, n.d.) (“Add or remove accounts on your PC”, n.d.). This functionality should be built into the system.
* Some updates can be handles by services such as AWS. These updates include security patches and minor software updates (“*Amazon ElastiCache Managed Maintenance and Service Updates Help Page*”, n.d.). Other updates are to be performed by the system admin (“Frequent question: What kinds of issues does system administration cover?”, n.d.). When there are OS updates, a beta is often released three to five months before users will be affected (“How do OS updates impact apps?”, 2021). This means the system can be used with the beta for a few months to determine what changes may need to be made to it.
* An IT admin needs to troubleshoot, diagnose network problems, track usage stats, and carry out routine updates (“Information technology (IT) administrator job description”, n.d.). Because of this, they need access that allows them to update the system. To help with trouble shooting they may need certain accesses that users do not. For instance, if a user is locked out of their account an IT admin may need to send a password reset email to allow the user to reset their password. A typical user does not need access to send password reset emails to other users, so this is admin privilege.

#### Security

* Each user will have a username and password which they will use to login.
* To secure the connection between clients and the server, data being exchanged should be encrypted (“Secure socket layer (SSL)”, 2021). One way to do this is through the use of a secure socket layer (SSL). By implementing SSL, the link connecting a user’s browser to the server is encrypted thus hiding all data (“Secure socket layer (SSL)”, 2021).
* Accounts should have a certain amount of failed logins before they are locked to prevent “brute force” hacking. This is an effective way to minimize these attacks because for a person or bot to hack into an account using brute force, they have to guess a user’s username and password (“Brute force attack”, n.d.). This method typically takes a few tries before an account can successfully be hacked into. Therefore, by locking they account after a few failed logins this type of attack can be avoided.
* If a user forgets their password then they can reset it themselves through the system (“CS 255 DriverPass Transcript”, n.d.).

### Functional Requirements

Information that is necessary to a system, or processes that a system needs to execute are considered functional requirements. They are what help create a system’s various models such as functional, structural, and behavioral (Dennis et al., 2012).

* The system shall have an option to add or edit users or admins in the system (*DriverPass interview transcript, n.d.)*.
* The system shall access data for admin work from anywhere, online as well offline (*DriverPass interview transcript, n.d.)*.
* The system shall connect with the external interfaces such as a bank for when students buy classes (*DriverPass interview transcript, n.d.)*.
* The system shall book appointments and track them (*DriverPass interview transcript, n.d.)*.
* The system shall grade user tests (*DriverPass interview transcript, n.d.)*.
* The system shall track all changes made to appointments (*DriverPass interview transcript, n.d.)*.
* The system shall track the amount of lessons each user has paid for and only allow them to book that amount of lessons (*DriverPass interview transcript, n.d.)*.
* The system shall only provide material, tests, and other online content to those students who paid for them (*DriverPass interview transcript, n.d.)*.
* The system shall track students online content progress, provide it in the correct order, and grade their tests (*DriverPass interview transcript, n.d.)*.
* The system shall provide functionality to allow admins to disable packages (*DriverPass interview transcript, n.d.)*.

### User Interface

* The interface needs to have a login screen which validates user credentials.
* Users should be able to take online tests and be given a progress report (*DriverPass interview transcript, n.d.)*.
* The interface should display information such as name, address, email, and phone number (*DriverPass interview transcript, n.d.)*.
* Option to add special needs and display it (*DriverPass interview transcript, n.d.)*.
* Option to upload student and driver photo and display them (*DriverPass interview transcript, n.d.)*.
* Option for driver to provide notes, should be displayed on student profile (*DriverPass interview transcript, n.d*.). Drivers need to be able to view, edit, and add new notes.
* The interface should have an admin view and a student view.
* The admin should be able to access data, edit accounts, view changes made to the schedule, and restrict user access (*DriverPass interview transcript, n.d*.).
* Admins also need to be able to edit the schedule meaning block off days they are closed such as holidays, can also edit driver’s schedules.
* Drivers need an interface that allows them to check their schedule, add notes for students, and block days off that they will not be available.
* Student’s interface should have the option to take online tests, study with material and view progress (*DriverPass interview transcript, n.d*.).
* If student does not pay for the online content then the system should block them from utilizing it.
* Students should be able to book, modify, and cancel their appointments (*DriverPass interview transcript, n.d*.).
* Admins and employees should be able to book, modify, and cancel appointments upon request (*DriverPass interview transcript, n.d*.).
* If a web or cloud app is created then the system is cross platform meaning it will work on PCs, as well as mobile devices. This also means it works on all operating systems such as Windows and Linux.
* The interface will have the same functionality on mobile devices as well as PCs.

### Assumptions

* It will be assumed that all users have access to a mobile device, tablet, or computer.
* To utilize all functions of the system, it is assumed users have access to internet.
* It is assumed if a student has an account then they have registered with the company.
* It is assumed students are willing to pay for the services, otherwise they cannot utilize any functionality (they will be blocked from booking and all online content).
* All users with admin privileges are assumed to be trusted by the company to use these privileges.
* All drivers are assumed to have their licenses and can teach students.

### Limitations

* Depending on the budget of DriverPass, they may not be able to afford a mobile app as it is an additional cost (Marchuk, n.d.).
* If they want to have a mobile app, they may not have the budget to build an iPhone and Android native app and may instead have to make a cross-platform app (Marchuk, n.d.).
* As far as system design, only part of the systems interface was designed. The login screen, booking screen, and admin versus student interface was not given. Because of this, extra time may need to go into the designing of the system which in turn may put the team behind schedule (“CS 255 DriverPass Interview Transcript”, n.d.).
* A few things were not accounted for that may also put the team behind schedule. For instance, the system design does not account for users that do not pay for online content. It is unknown how the interface should look for those who paid for the online content and material versus those who did not (“CS 255 DriverPass Interview Transcript”, n.d.).
* A user’s registration was left vague. It is said that users will call to register with an employee. It is not determined how they will then get an online account. It is unknown whether the user will be given a username and password when they register over the phone with an employee, or if once they are registered they can go online and make their account. If it is the former, their email may be the username and they may be given a random password. Or they may have the option to create their own password after entering in their email. If it is the latter, they may have to enter in some verifying credentials such as email and phone number, and then be given the option to create a unique username and password.
* Another limitation is how the interface should look when they have used up all their classes. The system should track all the classes the student takes and then block them from booking anymore once they have used up their allotted amount of classes. It is unknown if the interface should display a statement saying they cannot book any more classes until they pay for more, or if it should still allow them to book but have a confirmation screen saying they will be charged.

### Chart, funnel chart Description automatically generatedGantt Chart

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