# CS 255 Business Requirements Document Template

Complete this template by replacing the bracketed text with the relevant information.

This template lays out all the different sections that you need to complete for Project One. Each section has guiding questions to prompt your thinking. These questions are meant to guide your initial responses to each area. You are encouraged to go beyond these questions using what you have learned in your readings. You will need to continually reference the interview transcript as you work to make sure that you are addressing your client’s needs. There is no required length for the final document. Instead, the goal is to complete each section based on your client’s needs.

**Tip:** You should respond in a bulleted list for each section. This will make your thoughts easier to reference when you move into the design phase for Project Two. One starter bullet has been provided for you in each section, but you will need to add more.

## 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?*

* DriverPass desires an application to provide ease of use for both their internal and external users. External users can use their application to take online classes and practice tests like those offered by the DMV for acquiring a driver’s license. The application also allows external users to provide DriverPass with information such as their name, address, and credit card number so they can book driving sessions with company instructors.
* Internal users can change/update packages being offered to clients. The application will be deployed on the cloud and can be used by a variety of devices such as desktop and mobile. Reports can be downloaded and accessed by these internal users can be read and modified as needed. Test results from clients can be viewed and appropriate measures be taken based on the results.

### 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?*

* Many people fail driving tests at the DMV due to lack of adequate training and test preparation. To fix this, DriverPass wants an application that can provide users the means to pass these tests through online practice tests/quizzes as well as onsite driving sessions with an instructor.

This application will have several features for both customers and DriverPass employees. With this app, customers will be able to:

* Take practice tests and quizzes containing the most up-to-date DMV information.
* Book appointments for driving lessons by date, time, instructor, and lesson package.
* Cancel or modify driving appointments as needed.
* Set up new account containing name, address, photo id, phone number and credit card information.
* Update account information/reset password.

The app should be able to do the following for DriverPass:

* Provide role-based access limiting sensitive information to only employees with the proper authority. This includes responsibilities such as blocking access to former employees and resetting account passwords if they are forgotten.
* Data synchronization between different devices within the application
* Cross platform support for many different devices including desktop and mobile.
* Add/Modify/Remove product offerings from the application.
* Receive updated information from the DMV including information such as new rules, policies, or sample questions.
* Generate online DMV tests for clients.
* Receive online test progress for each customer showing tests the client has already completed and tests currently in progress.

### 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?*

* DriverPass wants internal users of this application to be able to access updated reports and information from their devices. These reports must be able to be converted into a format a program such as Excel can read/utilize
* They also want the app to track any changes being made with an emphasis on tracking for driving appointments. If an appointment gets cancelled or information is updated, the application should provide details regarding who updated, it and when. This tracking should also apply to driving sessions. DriverPass should be able to track sessions by client/driver, car, and date/time.
* The application should provide functionality based on designated roles. For example, the head of IT should be able to reset password accounts and remove old accounts, but these responsibilities should not extend to other users with different roles.
* DriverPass should also be able to modify, add or remove service packages at any time.
* DriverPass clients should be able to schedule driving sessions by providing information such as their name, address, date, and time of session through an input form. Should the client forget their password, they should have an option to create a new password.
* The application itself must run off the cloud and be compatible with both desktop and mobile devices.
* The application should have an interface that shows each specific client’s progress for online tests. It would show details such as test scores, time taken and the status of the test. With driving sessions, drivers should be able to add comments and details such as lesson time and start/end hours should be displayed.
* There should also be a separate contact page showing a way clients can contact the company as well a display for the student’s contact information.

## Requirements

### Nonfunctional Requirements

*In this section, you will detail the different nonfunctional requirements for the DriverPass system. You will need to think about the different things that the system needs to function properly.*

#### 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?*

* This will be a web-based application on the cloud utilizing a cloud provider for much of the security and backup functionality.
* The system itself should receive periodic updates. These updates would include software updates and patches. The system will also need to receive updates whenever the DMV makes changes regarding rules, policies or sample questions which can be applied to the application’s tests and quizzes. These updates would need to be seamlessly integrated into the current application. As a result, this will require a modular design that is flexible.
* The system should be able to effectively scale as more users utilize the application. Starting off, the system should be able to handle a few hundred users with the ability to handle more as the business grows. The effectiveness would be measured by factors such as network response time, latency, and the reliability of the system.
* Optimization techniques should be utilized by the system to support efficient performance. This would include optimized queries to the database, caching and ensuring DriverPass has the appropriate hardware to support these operations.
* As the user base grows, the application should also utilize load balancers to support directing oncoming traffic from clients to the servers. These load balancers can also be used as network traffic increases between the server and database. These should help the application maintain a constant performance as it is scaling. These load balancers can either be implemented in-house, using a third-party load balancing service or those provided by the cloud provider.

#### 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?*

* Based on user requirements, this system needs to run on all major operating systems (Windows, Mac, and Linux).
* There would need to be a database that stores client accounts, a database for driver/employee accounts as well as a database containing online tests and test results. Finally, a fourth database would contain the driver package offerings and driving appointment information.
* Since this is utilizing a cloud provider, we would also need to enable the system to make connections to the provider through the provider’s API. This would require the system to be integrated with the cloud provider (high interoperability).
* The application should also be supported on three of the most current versions of each major browser (Internet Explorer, Google Chrome, Firefox). For example, users of the application should be able to use app features on Windows 10, Windows 10 S and Windows 11. Having older browser support ensures more users can utilize the apps features leading to larger growth and higher revenue for DriverPass.

#### 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?*

* Users will be distinguished in several ways. Users are broken down into either Clients or Faculty. Faculty are further broken down through role assignment. The roles and responsibilities of the staff determine their access to sensitive data and the operations they can perform with the application (i.e. A driver will not be able to add/remove users from the application). The User class would also be subject to role-based authorization since client’s should not have access to sensitive data. Having a role-based system also helps track when changes have been made to the system and by whom. As an additional measure, each user will contain a unique id number both for security and identification purposes. Actions taken by a user can be traced back to this identification number.
* For accurate input from the user, the application would also utilize proper input validation techniques. Some of the techniques used would include trimming whitespace, regular expressions, database validation and format matching. These validations ensure that data entered by the client (such as names, passwords and payment information) is accurate while reducing potential security issues such as injection attacks. Input validation will also be utilized with the API calls made between the application and the cloud provider.
* IT admin would be notified when there are major changes to the performance of the application. These can include factors such as long load times, or if an unusually large number of computing resources are being used while the app is running. Other scenarios IT would be notified included any scheduled changes/updates to the system or severe issues such as the network crashing or a cybersecurity breach.

#### 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?*

* IT admin will need to be able to revoke access to inactive users. This would include former employees and clients who have deleted their accounts. IT admin would also need access to perform actions such as site maintenance and client support.
* Components such as Clients, Servers and Load balancers can interact with each other through interfaces. These interfaces can offer greater flexibility to the system allowing for greater modularity in the system.
* The system should also support multiple versions of the system and its software components. This would allow changes such as adding new features, fixing bugs or code refactoring to be added over time.
* Automated testing and fault tolerance would be utilized to ensure the application can operate under a variety of conditions should be present within the system. This can either be developed internally or it can use the tools/services provided by the cloud provider.

#### 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?*

* The system shall allow users to create a user account by providing the required information to a login form. This information includes the first/last name, address, phone number and payment information (payment information will be encrypted).
* The system shall implement roles-based access control to ensure only individuals who are authorized can perform sensitive actions such as blocking system access to former employees.
* Communications between client and server will rely on the HTTPS protocol of communication. Data will be encrypted with two different keys: a public and private key. This will make it near impossible for malicious users to read any of the data.
* Databases will be used to securely store data such as account information and package offerings. The cloud provider will assist with security by backing up this data on their servers.
* Input validation and parameterized queries will be used for the login and account forms to prevent attacks such as SQL injection from occurring.
* If the user forgets their password, the system will allow them to generate a new password through password recovery.

### 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 allow users to create a new account.
* The system shall allow users to modify/delete their accounts.
* The system shall validate user credentials when logging in.
* The system shall allow users to reset/recover their passwords.
* The system shall allow users to access data both online and offline (offline-first app)
* The system shall track user progress on online testing.
* The system shall track driving appointment information such as what instructor each client is using, the date/time of session and the car being used.
* The system shall allow users to make reservations for driving lessons with DriverPass instructors. Users would need to input the date/time of the lessons as well as what driving package they want.
* The system shall allow the application to add reservations made both online and over the phone.
* The system shall allow DriverPass to add, edit and remove driver packages from their product offerings.
* The system shall allow DriverPass to track any changes to driver reservations. This includes when a reservation is added, deleted, or modified.

### 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 interface needs to be simple and intuitive for consumers to use. There are many ways the interface can be simplified. This can include providing a consistent look to the layout, generating prompt feedback when a user performs an action and implementing proper error handling techniques when the user makes a mistake.
* There are two main users for this application: Clients and Staff. Staff can further be broken down into subclasses of IT, drivers, clerical staff, and managers. Clients will need to be able to take practice online tests and quizzes. They should also be able to create and update their account information as well as book driver packagers. If the client needs to contact DriverPass they should also have the ability to contact them. Clerical staff should be able to use the interface to add appointments booked over the phone to the database. Clerical staff could also use the interface to provide general customer support. Drivers should be able to use the interface to add, edit and delete comments from their driving sessions. IT should be able to use the interface to perform scheduled tasks such as updates and site maintenance. They should also be able to use the interface to add/remove users from the system as well as assign roles to each user based on how they will use the system. Managers should have the ability to view changes made in the application by the various users. An example of these changes would be driver appointments. They should be able to view and track online test result progress among the clients. These metrics can help management figure out what product offerings are working and what offerings would need to be tweaked.

### 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?*

* The application will be compatible with approximately 98% of internet browsers. If the application is only compatible with older versions, there could be potential security issues which have been fixed in newer versions. If the application is only compatible with the latest browser versions, application growth might be limited.
* The business requirements will remain relatively stable. While the package/service offerings will vary slightly, they will remain closely aligned with the goals of DriverPass. DriverPass main goals are providing driving related educational services to their target market. These services include driving lessons and online quizzes/tests for their users. Unless the DMV and DOT make sweeping changes to their laws and policies, DriverPass’s service offerings will experience few changes.
* The application will be compatible with cloud provider – In order to utilize a cloud provider for backup and security, the application needs to be compatible with the provider and its various components such as APIs or endpoints. Without this compatibility, the app cannot use a cloud provider which goes against the business requirements of DriverPass.

### 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?*

* Performance is limited by cloud provider features and capabilities – Depending on the features and services offered by the cloud provider, performance, security, and scalability could be affected. A large part of the application’s security is handled by the cloud provider. If the cloud provider cannot provide adequate security, the app could be at risk. As the app scales, more data is being stored to the database. This also means more data is being backed up by the provider. If the cloud provider cannot adequately back this data up, this will affect the security and scalability of the system. Also, DriverPass might run into issues such as using too many or too few resources from the cloud provider. Using too many results in paying for unused resources. Using too few will result in performance and scaling issues.
* User Interface is limited by business requirements – Based on the interview transcript, DriverPass has a particular way they want the interface designed which will affect development on the application. For example, the transcripts show the desired design for their online test page. While their design works for desktop devices, it might be more difficult to implement on other devices such as tablets and smartphones. To fix this, the UI will need to be developed with responsive design in mind. This would entail allowing the system to automatically adjust the layout/content based on the size and orientation of the device being used.
* Scalability is limited to DriverPass business model. DriverPass revenue comes from driving packages. How many of these packages are sold determines how much revenue DriverPass receives. Revenue growth is also limited by the number of trainers available; how many clients book these packages and how many vehicles DriverPass has. Then DriverPass needs to pay for expenses such as staff, vehicle costs, and application costs (cloud provider, site maintenance). Since costs go up as the application scales, unless additional revenue streams are found, its growth will be limited.

### 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.*

