# 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?*

* The client DriverPass needs a new system to be created to fulfill a void in the market for student driver training as it concerns the current lack of available resources/training for driving tests at their local department of motor vehicles.
* The client, DriverPass, has conducted research and found that 65% of students are failing their driving tests on their first attempt. DriverPass believes that by providing essential resources and training to their customers, student failure rates will significantly reduce.

### 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?*

* The client wants their users to be able to access their information from anywhere when online so that they can download their reports as well as additional information that they would be able to work on at home.
* The system will consist of a mobile device or computer that individual users will use to connect to the client’s server, where this information will be stored and accessed.
* The system should also provide role-based access where the client’s employees are able to access various data or system functions based on their position in the company.

### 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?*

* The system will provide the users with the following functionality:
  + The system should allow the client to create an account for new customers who call their office and provide the necessary details for registration. This information should include their first and last names, address, phone number, state, credit card number, the expiration date of the card, as well as the security code. They also need to include the location of where they want to be picked up and dropped off.
  + Take online classes.
  + Take online practice tests.
  + Provide a method for scheduling/reserving on-the-road training online.
  + Have the ability for users to choose from one of three different driving appointment packages.
  + The client with the ability to disable packages if they decide they do not want any more customers to register for it.
  + Provide a method for users to schedule, cancel, or modify office appointments.
  + Track what users make and cancel reservations and who last modified them. Includes the ability to access reports in case something goes wrong so that mistakes are easily identifiable by the appropriate staff.
  + Track which users are matched up with which drivers, what time their appointments are, and which cars will be used for the appointments.
  + Provide a method for users to reset their password if they forget it.
  + Provide the client’s employees with the ability to connect with the DMV so that the DMV can update the client with any changes the DMV might make, such as new rules, policies, or sample test questions. The system should be notified when the DMV does make such changes.
  + Provide users with information including their online test progress, their personal information, notes the driver left, and special needs for the user, as well as a photo of the driver and student.
  + Access to contact information for the office.

## 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?*

* The system should be made available using an online web application.
* The system does not need to be significantly fast as opposed to an online system that would be hosting gaming applications. It is the recommendation to the client that they implement modern hardware on a server that is capable of handling a significantly large number of users at any given time.
* It is highly advisable that the client follows the hardware recommendations of their system’s chosen operating platform.
* For this system, data updates should occur every time changes are made to databases. Users should be able to access real-time information whenever they need to access it, so long as the system is not undergoing maintenance.
* System updates such as security updates and maintenance should occur as needed but are limited to time blocks that will affect the least amount of users. It is recommended that these types of updates occur overnight and should typically be performed once per week.

#### 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?*

* It is the recommendation that the client implements the system on Windows Server 2022. The operating platform is produced by Microsoft, a well-established operating platform company that regularly provides updates, including security regular security updates, as well as many other significant benefits the platform itself provides.
* It is also recommended that the system be hosted using Microsoft Azure cloud-based services so that the client, DriverPass, will spend less time maintaining their system. Implementation of their cloud-based services is a cost-effective approach for integrating processes, applications, and data. Azure services provide a seamless way of creating workflows that can maintain the system with ease and minimal impact on the client themselves. An Azure Administrator could easily help facilitate and monitor the system helping to minimize system faults/downtime when they occur.
* The system’s back end will require the use of additional tools, primarily databases, which will store various types of information for its users. Such databases include storing customer information, learning resources, practice tests, driver scheduling, etc.
* The system should also be capable of connecting to DMV databases so that the system is able to automatically update when changes are made to regulations.

#### 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 should be distinguished by different levels of access, better known as role-based access. The roles, such as administrator, IT admin, standard user, etc., determine the level of access the user has to the system and what types of information can be made.
* Databases should be accessed through the web-based application that the system will host for the client DriverPass. Once a user establishes a connection to the system, a separate database should control which users and what types of users can access which parts of the various databases the system hosts.
* It is recommended that the system be built case-sensitive. This helps increase security and protection for not only users but also the system itself. It increases the number of possible entries and, by doing so, makes a brute-force attack much more difficult to accomplish by an attacker.
* The system should constantly be monitored/audited to determine abnormal system behaviors. If any unusual behavior is detected, such as multiple failed login attempts, the system’s administrator(s) should be notified immediately.

#### 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 is recommended that the system is adaptable and flexible.
* A non-developer should be able to work within the system to make necessary changes, such as adding, removing, or modifying existing users, without having any prior experience or knowledge of coding.
* The system being built should incorporate, along with assigned user roles, the ability to make such modifications, granted their user credentials/privileges are sufficient for making these types of system modifications.
* Because the application that will run on the system is a web-based application, system updates should have minimal impact, if any, on the application itself. The minimal impacts that could occur would be if a system update was corrupt and caused the platform or its hosting services to not operate in any manner.
* If updates require the operating platform to restart, these restarts should be scheduled as additional workflows at appropriate times when the least number of users will be impacted.
* The IT administrator would certainly need to be granted access to the system itself; however, they should be denied access to database information, which includes sensitive information regarding all system users (employees and customers).

#### 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?*

* For a user to log into the system itself, they must provide credentials that would grant them access.
* Similarly, for a user to access the hosted web application developed for the client, DriverPass, additional credentials must be provided by the user to gain access to the application. Depending on the type of access permitted for each type of credential determines how much and what types of information the user has access to.
* One method that can be utilized for securing the connection between users and the host system or for the data exchange between the client and the server would be to implement the use of a RESTful API, which follows reliable, efficient, and secure communication standards.
* If there is ever a “brute force” hacking attempt on any user account, the owner of the account should be notified immediately of the attempt. The account should be temporarily locked until further verification of the account and the person attempting to gain access can be determined.
* It is the recommendation that upon such “brute force” hacking attempt, the user must contact the client, DriverPass, to have their account unlocked once they are able to 1.) confirm that they are the account owner and 2.) if the unknown attempt was not the account owner, make the appropriate changes (e.g., change password) to ensure the account remains healthy and at a lesser risk for continued attack attempts.
* If the user forgets their password, they should be provided with a small number of attempts to recover/change their password before similar actions are taken as described previously to lock the account for security purposes.
* It is also the recommendation to the client that two-factor or multi-factor authentication be implemented in the system to add an additional layer of protection to the system and its users.

### 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 must be composed of and orchestrated by an appropriate operating platform capable of hosting the desired services to a large number of users.
* The system shall validate user credentials when a user logs onto the system.
* The system shall update components such as security as needed.
* The system shall perform maintenance, optimization, and related updates at regularly scheduled intervals when it will impact the least number of users.
* The system shall immediately notify administrators if any “brute force” attack attempts/breaches occur.
* The system shall implement a RESTful API that provides a more secure method for logging into the system and exchanging information from the client to the server and vice versa.
* The system shall contain multiple databases, each with its own access rights/user-based privileges, according to what type of information each database contains and which users should or should not be allowed access to the various types of information.
* The system shall allow the appropriate users to create/modify/remove customer accounts.
* The system shall store the provided account details in a secure database, which can only be accessed by the appropriate users.
* The system shall provide a main page that details the client’s business and the services they wish to provide to customers, as well as a contact information/page.
* The system shall provide a dashboard in the user interface where customers/employees are able to access the various parts of the system the user would need to be able to access.
* The system shall provide a means for customers to take online tests and see the progress and completion status of these tests.
* The system’s user interface should also display the user’s personal information, driver’s notes, special needs, a photo of the driver, as well as a photo of the student for identification purposes.
* The system shall provide a means for scheduling and reserving on-the-road, online training.
* The system shall contain a database that securely stores all scheduling-related information.
* The system shall provide a method for customers to choose from one of the three different driving appointment packages.
* The system shall provide a method for the appropriate users to manage the available packages and add/remove/modify/disable/enable packages as needed.
* The system shall provide a method for users to schedule, cancel, or modify office appointments.
* The system shall provide a database that is only accessible to appropriate users for managing office appointments. The information within the database shall be exposable to any authorized user; however, customers can only modify data related to themselves, and personal information regarding other customers should be hidden in a manner that does not reveal others’ personal information.
* The system shall contain a database that stores driving appointment times, car availability, and driver availability. The database should only be accessible by the system for information retrieval purposes and the appropriate users who can add/remove/modify allowable information.
* The system shall provide a method for tracking which users/customers are paired with which drivers and at what times their associated appointments are scheduled, as well as which cars will be designated for the appointment.
* The system shall provide a method for appropriate users to track which users make or cancel reservations as well as who last modified them.
* The system shall provide the ability to access reports in case something goes wrong so that mistakes are easily identifiable by the appropriate staff.
* The system shall provide a method for customers to reset their passwords if they have forgotten them.
* The system shall provide the appropriate users with the ability to connect with the DMV so that the DMV can update the client with any changes that they may make regarding new rules, policies, or sample test questions.
* The system shall be notified when the DMV does make such changes.

### 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.)?*

* It is recommended that the system runs off the web, making the interface accessible in many ways, such as from an office, home, or even on the go, from a mobile browser.
* The interface itself should be well laid out, making important information to users highly visible.
* The information should be presented in a dashboard fashion where users are able to click various pieces of information which link to more specific information for each of the data points.
* The interface dashboard should include information, such as online test progress, customer/user information (first and last name, address, city, state, zip code, phone number, email, etc.), driver notes, special needs, as well as a driver and student photo for identification purposes.
* The interface should show what tasks are in progress as well as the tasks that have been completed. Specifically, it should say, for example, the test name, the time the test was taken, the test score, and the test status (completed/not completed). The driver’s notes should show information, such as the lesson time, the starting and ending hours, as well as any comments the driver needs to make about the lesson.
* The interface should include an input form for either the students or the secretary to fill out information pertaining to the customers, which includes first and last names, addresses, etc.
* The interface should include a page containing contact information for the client DriverPass as well as a page that displays information for contacting students.

### 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?*

* One assumption that is being made that has not been addressed accordingly is that the client, DriverPass, says they do not want to have to deal with any of the updating of the system or backing up of the system. However, they have not addressed how this should be taken care of. It is implied that the IT officer should not be concerned with these issues. Security can be handled to some degree by workflows; however, this certainly would not work for all possible security scenarios.
* Backing up the system is also critical. It is assumed that businesses would always want to back up their data somehow to prevent data loss in any number of circumstances. If anything, I would want to ensure that the databases which store critical information pertaining to all aspects of the system would certainly want to be backed up in the event the system fails.
* Another assumption made about the system is that the client has no preference for the type of operating platform they would prefer to utilize. While my personal experience resides within windows platforms, many businesses may prefer a UNIX-based platform.
* Additionally, it has been assumed that the system should make use of workflows that can handle aspects of an IT officer role or that some administrative roles should be delegated to an outside administrator, such as an Azure Administrator (which does not mean this person works for Microsoft, simply that they are qualified to handle administrative duties which rely upon Azure services.
* Utilizing services such as Azure cloud-based services is also an assumption because, while the client did say they want the system cloud-based, they did not say if they wanted to implement their own “cloud” or outsource this to a well-established cloud service such as Azure.
* As it concerns the users of the system, it is assumed that all users are qualified, in their respective degrees, to use the system. No matter what role, whether it be the IT officer or even the customer at home, users must have the required knowledge to make use of the hardware and applications for their role.
* Lastly, it is assumed that the client will be implementing current/modern hardware so that the system runs as the design specification both implies or states.

### 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?*

* One of the biggest limitations I see in this system design is budget. The budget had not been addressed during the requirements gathering; therefore, the client may not be able to afford to implement specific aspects of the system design. Utilizing services, such as Azure cloud-based services, will require additional spending.
* Additionally, the more automated the system is, again, the more of a budget the system will require.
* The budget is also reflective of the type of hardware the client can incorporate into the designed system. Obviously, we, as system designers, would love to always be able to incorporate the best of the best in terms of hardware; however, this is not always possible. It is within the scope of the design that the type of hardware may need to be scaled back according to the client’s budget restraints.
* Another limitation that must be considered is how many people will work on this project and how long the project will be given to complete. Again, the budget will make a significant impact on this decision; however, resources should be properly allocated to this project based on adequate time measurement techniques. It is essential that a finished product is provided to the client within the expected amount of time, utilizing the fewest resources possible without compromising the design/desired result.

### 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.*

