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Task 2 Part C – C868 Software Development Capstone

Application Design and Testing

Design Document

Class Design

The images below are diagrams that are designed to show a visual depiction of the classes that are housed within the application.   The model consists of various classes that perform a variety of functions such as querying information from the database, triggering alerts, or managing appointments. The screenshots below show a brief illustration of the structure used to create the functionality in the application.

The first diagram shows the process of the application from when it is first opened. The program begins like most applications, launching the Main class which establishes a connection with the database, and sets the log-in scene for the user. The LoginScreen class will gather the location of the user and display the time zone in the bottom left-hand corner of the screen. Additionally, upon login, the Class has a method used to query the database to verify if the credentials are correct. If they are correct, the scene will switch to the main screen.

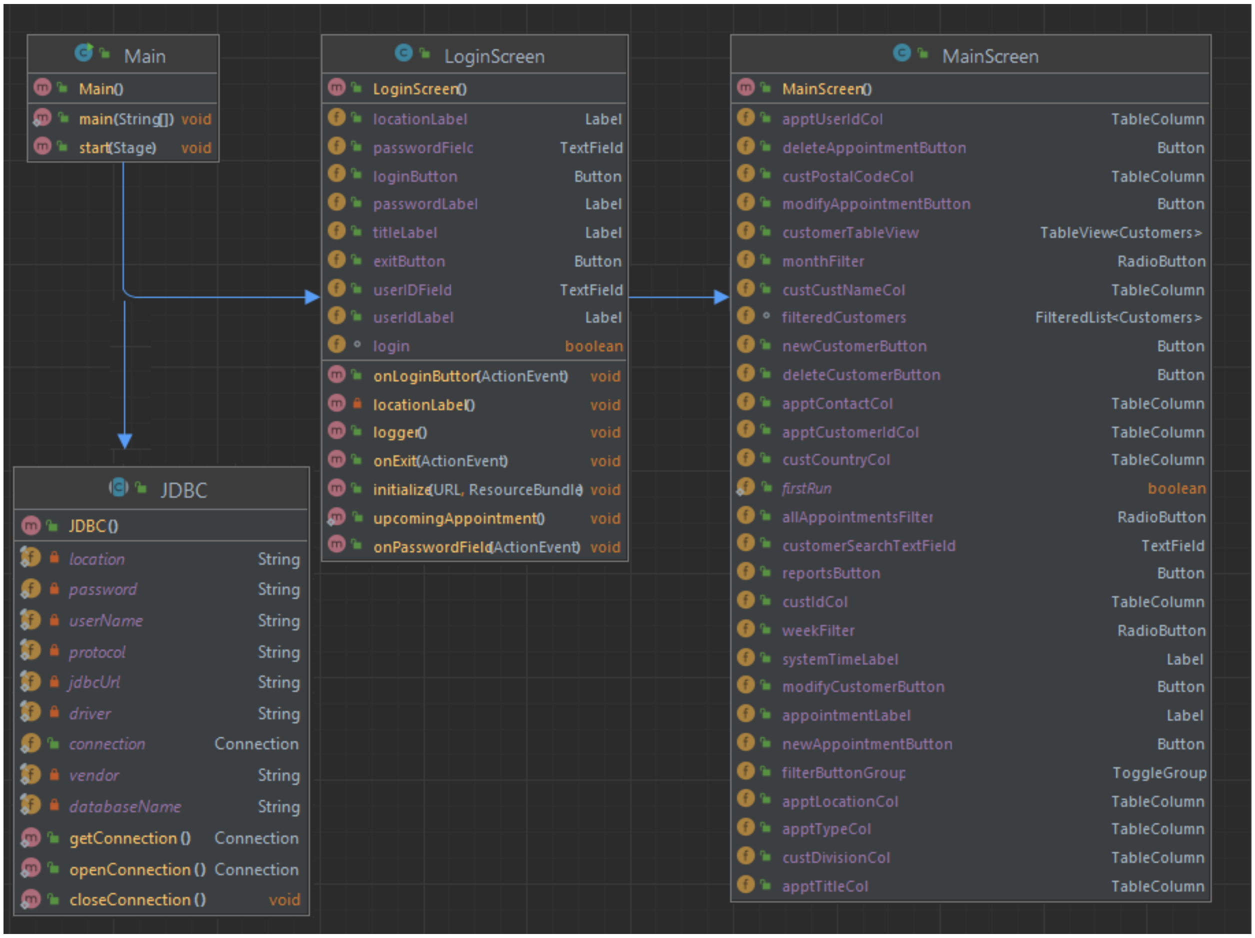


Figure 1- Diagram showing the initial login process from Main -> LoginScreen -> MainScreen

The second diagram is the structure of the modeling classes. The classes are broken up into the following categories: Appointments, Customers, Contacts, Countries, Divisions, and Users. As seen in the diagram, each of the modeling classes is dependent on their respective DB class, for example, the Customers class is dependent on DBCustomers. The DB class performs all the querying for the customer model in the database.

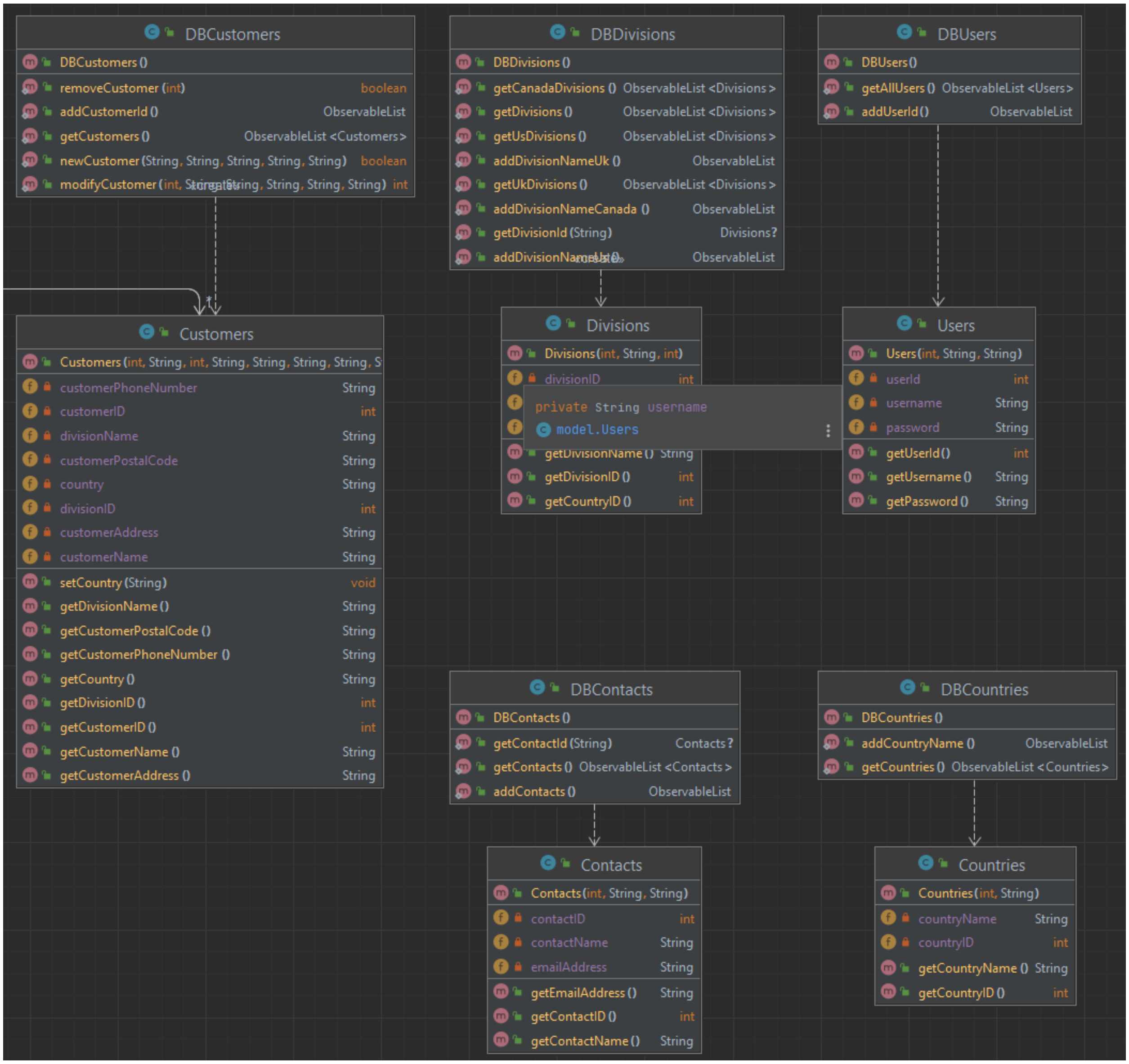


Figure 2- Diagram showing the relationship between each DB class and the modeling classes

The third diagram is the layout displaying where the scene changes take place. From LoginScreen, the user is sent to the MainScreen. Once the user is on the MainScreen, there are a few selections the user can make. The MainScreen directs the user to the NewAppointment or NewCustomer controller if an addition is being made to the database. If a modification is being made, the user is sent to the ModifyCustomer or ModifyAppointment controller. Lastly, if the user is just looking to view reporting, the MainScreen will also direct them to that screen.

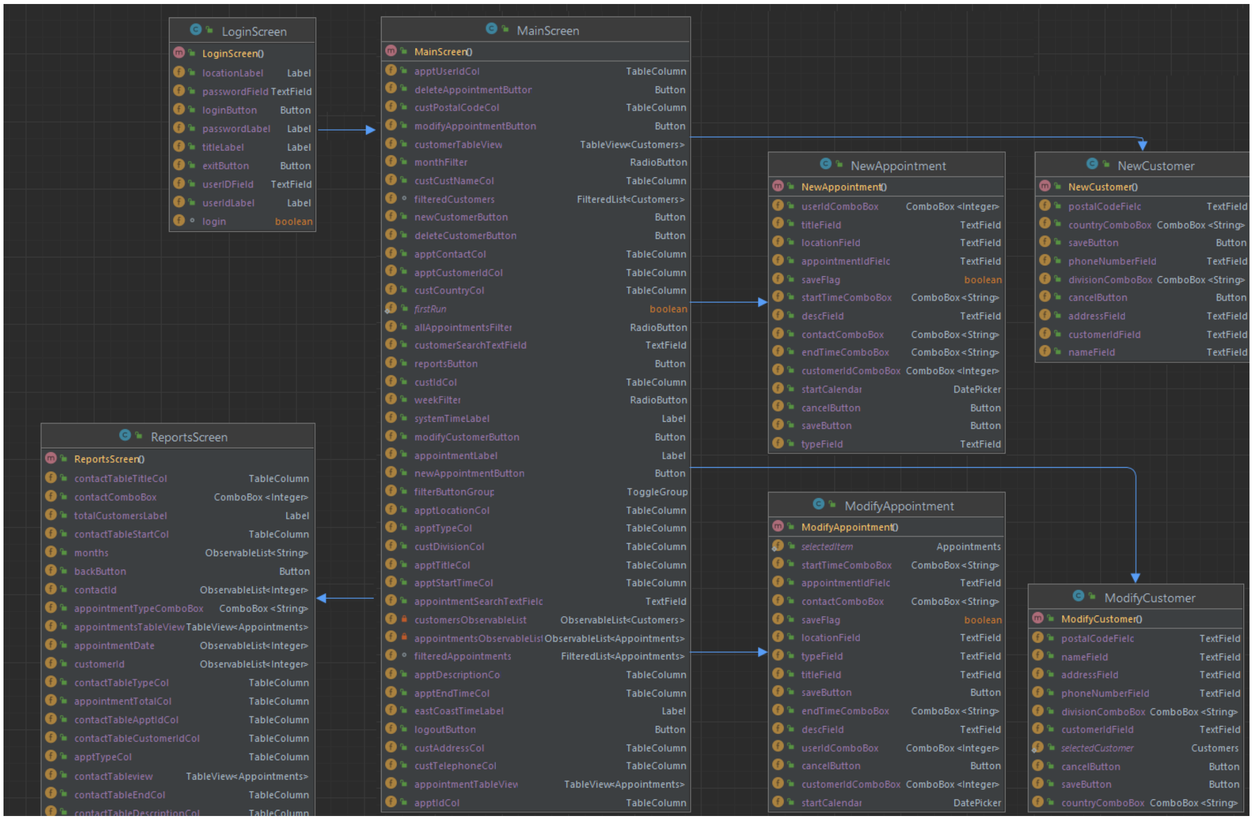


Figure 3- Application navigation diagram showing the MainScreen controller's navigation paths

UI Design

Below is the graphical user interface which was created in JavaFX. The first screen that the user will experience is the login screen. Upon entering their credentials and logging in, the user will be redirected to the "main screen" where most of the functionality takes place. There are two tables, the top one displaying the appointments and the bottom one displaying the customers. Each table has a button to add/modify/delete which will take the user to another scene. Lastly, there is a reports button that will redirect the user to a different screen that will display various reports.

Login Screen

The login screen consists of a username and password field, a login button, and an exit button. The login button will take the user to the main screen provided the credentials entered are valid. Exit will close the application. On the bottom left corner of the screen is a label that will display the user's time zone.

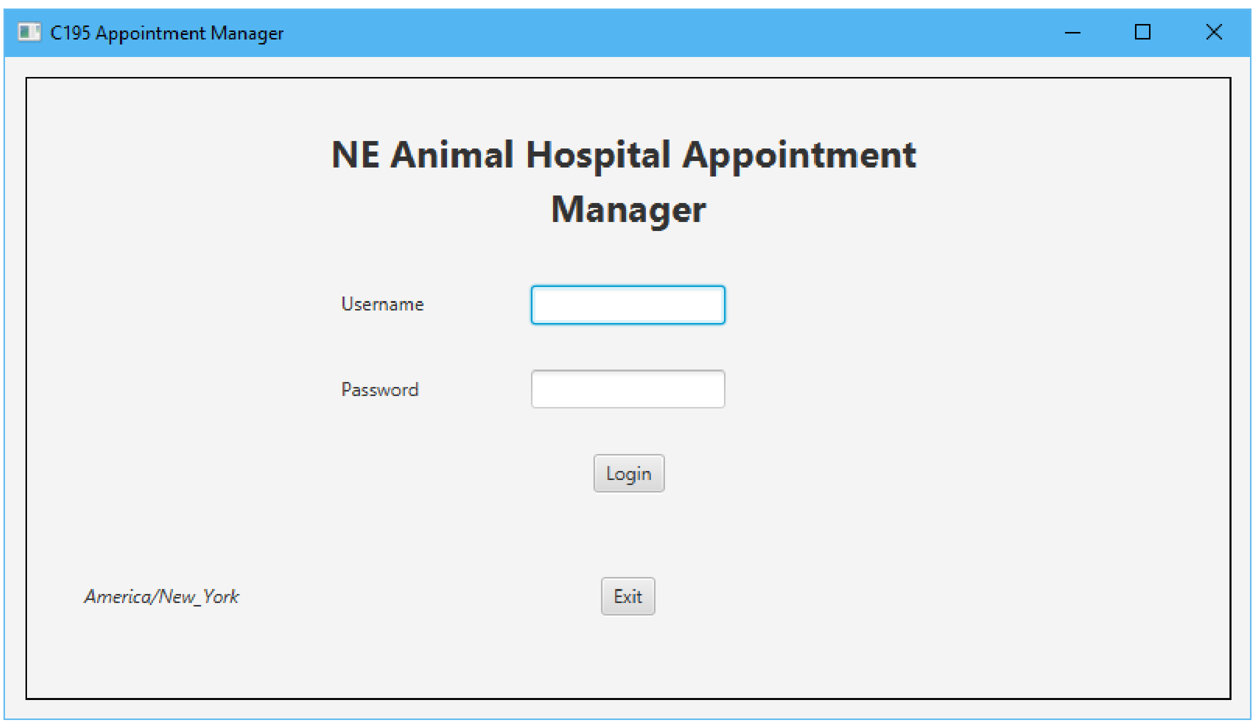


Figure 4 - Sign in screen

When the login button is pressed, there are a few alerts that may display to notify the user if there is an upcoming appointment or not:

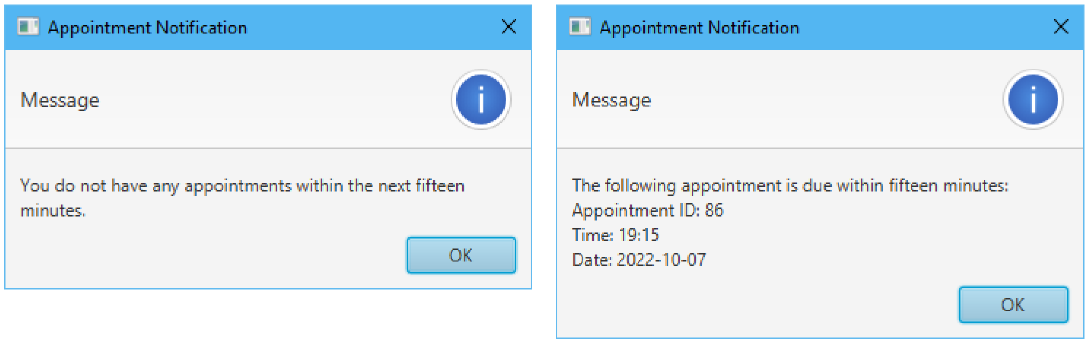


Figure 5 - Appointment Notifications for both no future appointments and upcoming appointments.

Main Screen

On successful log-in, the user is redirected to the main page. Two tables will be displayed: one for appointments, and one for customers. Each table has a button to "Add", "Modify" and "Delete" a customer or appointment. There is also a search functionality to easily locate a specific entry. The appointments table shows all appointments by default but allows radio buttons to sort by week or month as well. On the top right of the application, there is a time display that displays Eastern time (company time), as well as the user's current location time, if working in a different time zone. On the bottom right there is a button to take the user to the reports screen and a log-out button that redirects the user back to the login screen.

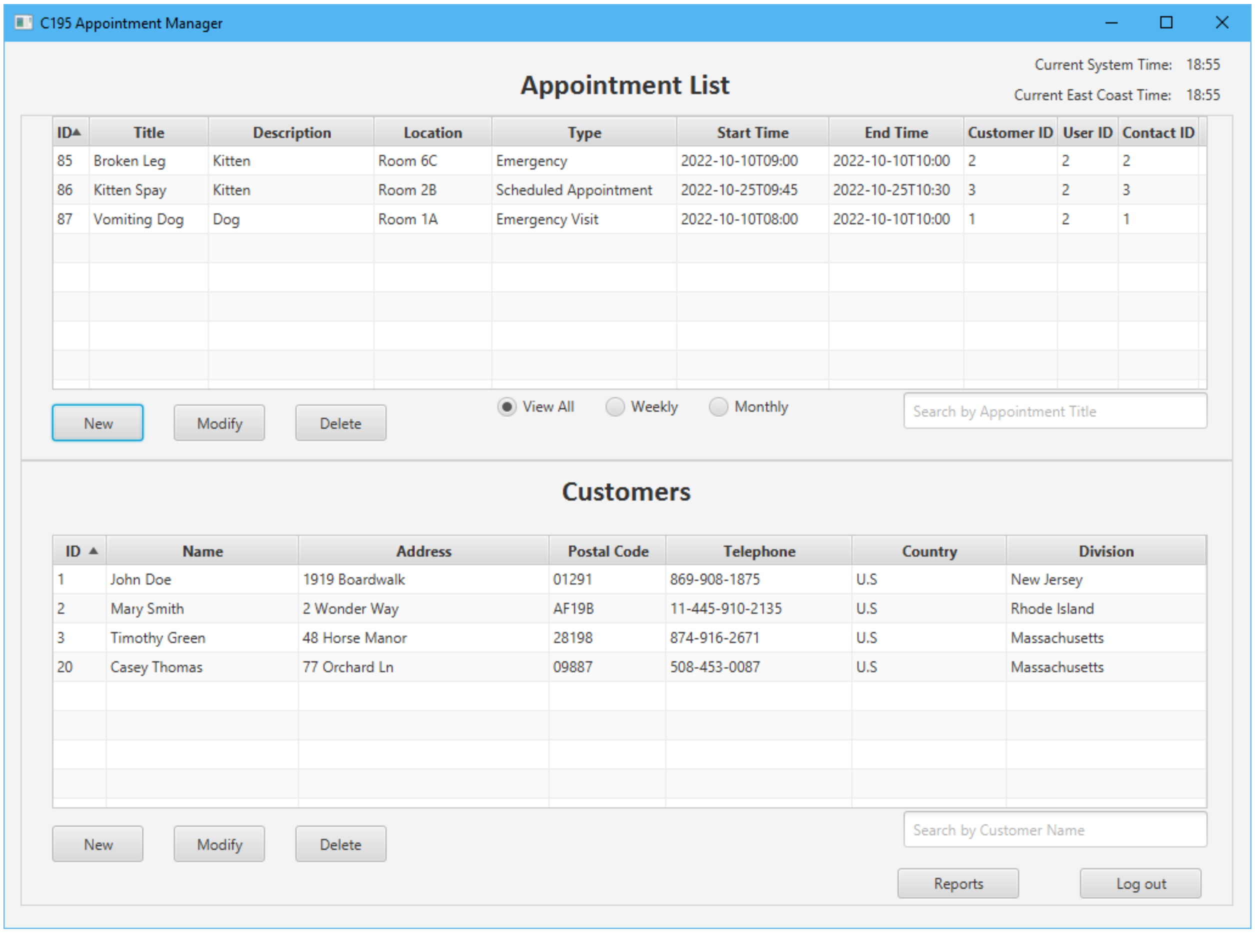


Figure 6 - Main screen that displays appointment and customer tables

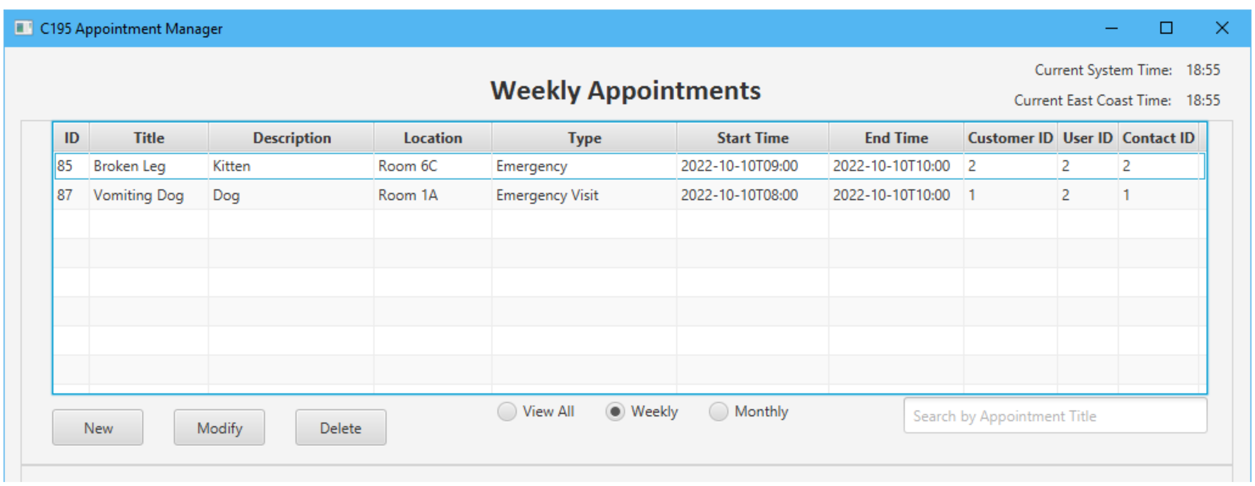


Figure 7 - Appointments sorted by week

Deleting an appointment/customer will show the following dialog box:

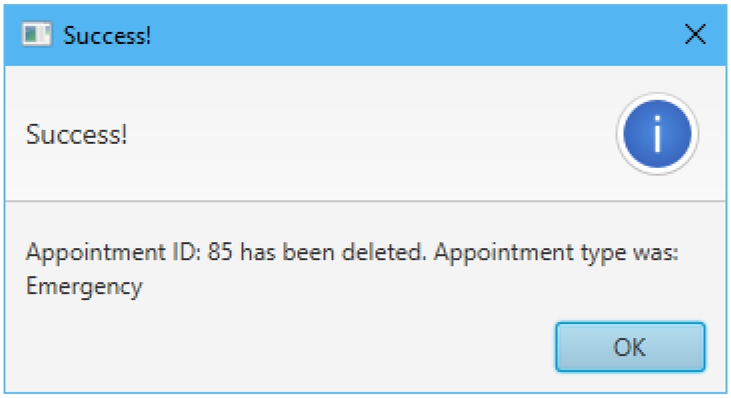


Figure 8 - Appointment deletion dialog box

Deleting a customer will display the following dialog box if a customer has scheduled appointments. This dialog box if "OK" is clicked, will delete both the customer and the appointments associated with the customer.

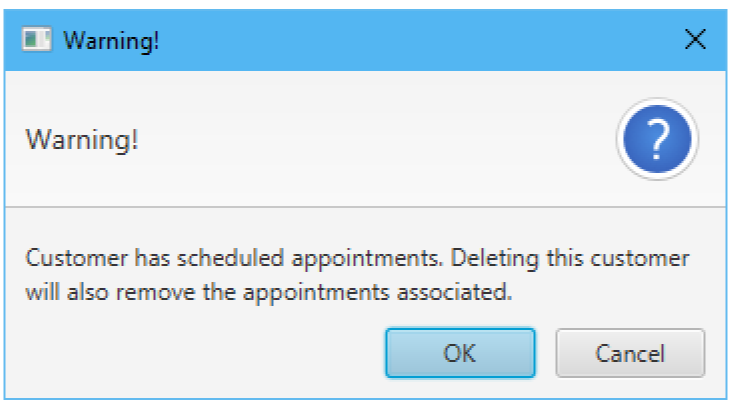


Figure 9 - Customer and related appointment deletion confirmation dialog box

The appointment table is broken down into the following columns:

Appointment ID	System-generated Appointment ID
Appointment Title	The appointments title/subject
Appointment Description	Description of the appointment
Appointment Location	Location of the appointment
Type of Animal	Type of animal being seen
Start Time	Time the appointment starts
End Time	Time the appointment ends
Customer ID	The ID of the customer
User ID	The ID of the user creating the appointment
Contact ID	Name of the contact (veterinarian) seeing the animal

The customer table is broken down into the following columns:

Customer ID	System-generated Customer ID
Customer Name	The Customer's name
Customer Address	The Customer's address
Postal Code	The Customer's Postal Code
Phone Number	The Customer's Contact Number
Country	The Customer's Country (options for outside of United States are available)
Division	The Customer's Division/State

Add / Modify Appointment Screens

When clicking the "add" or "modify" button for an appointment, the following screen will display with fields identical to what is seen in the table above. This screen is a basic form with two buttons to save or cancel. All fields must be populated before saving.

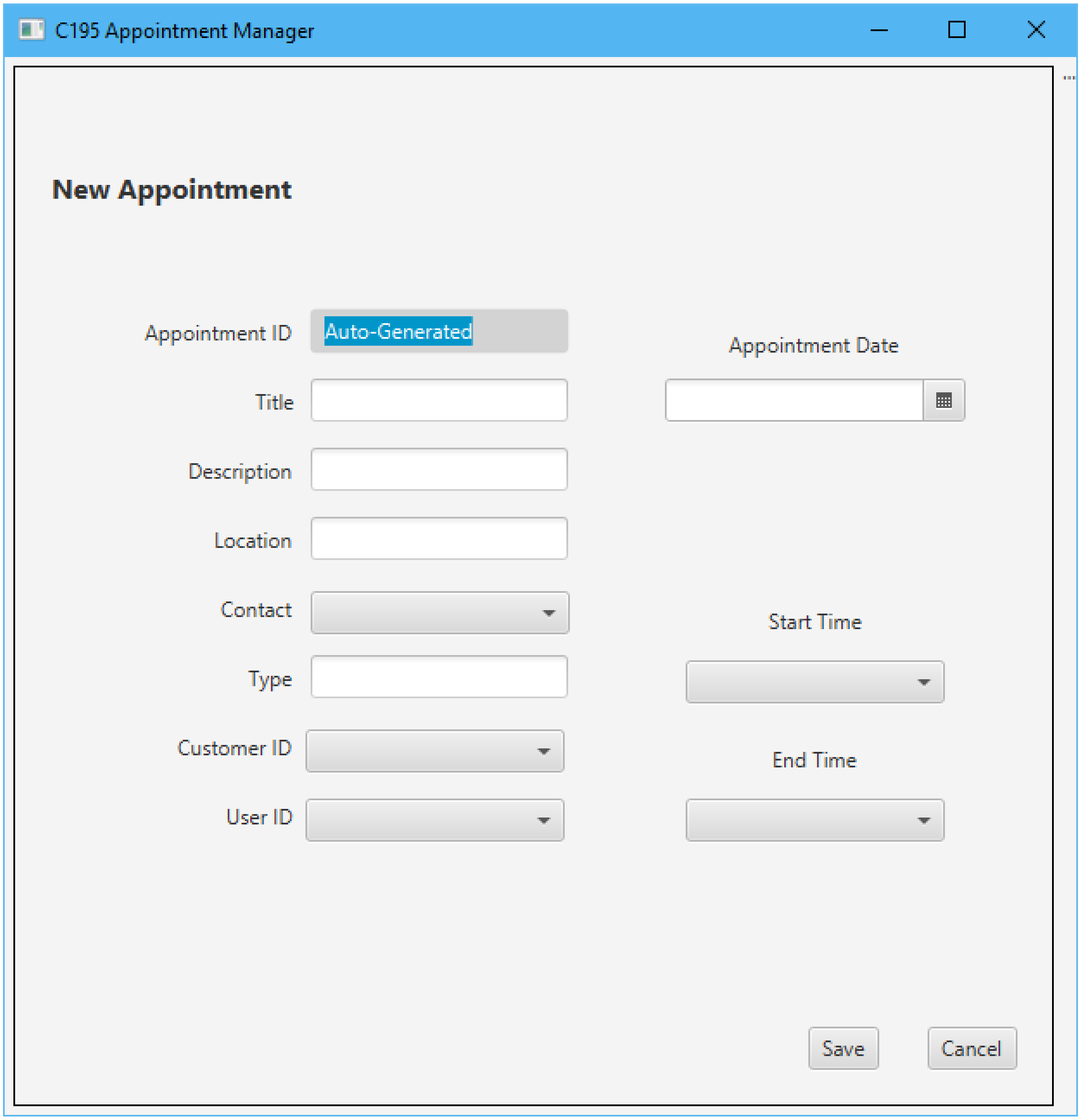


Figure 10 – Add new appointment screen

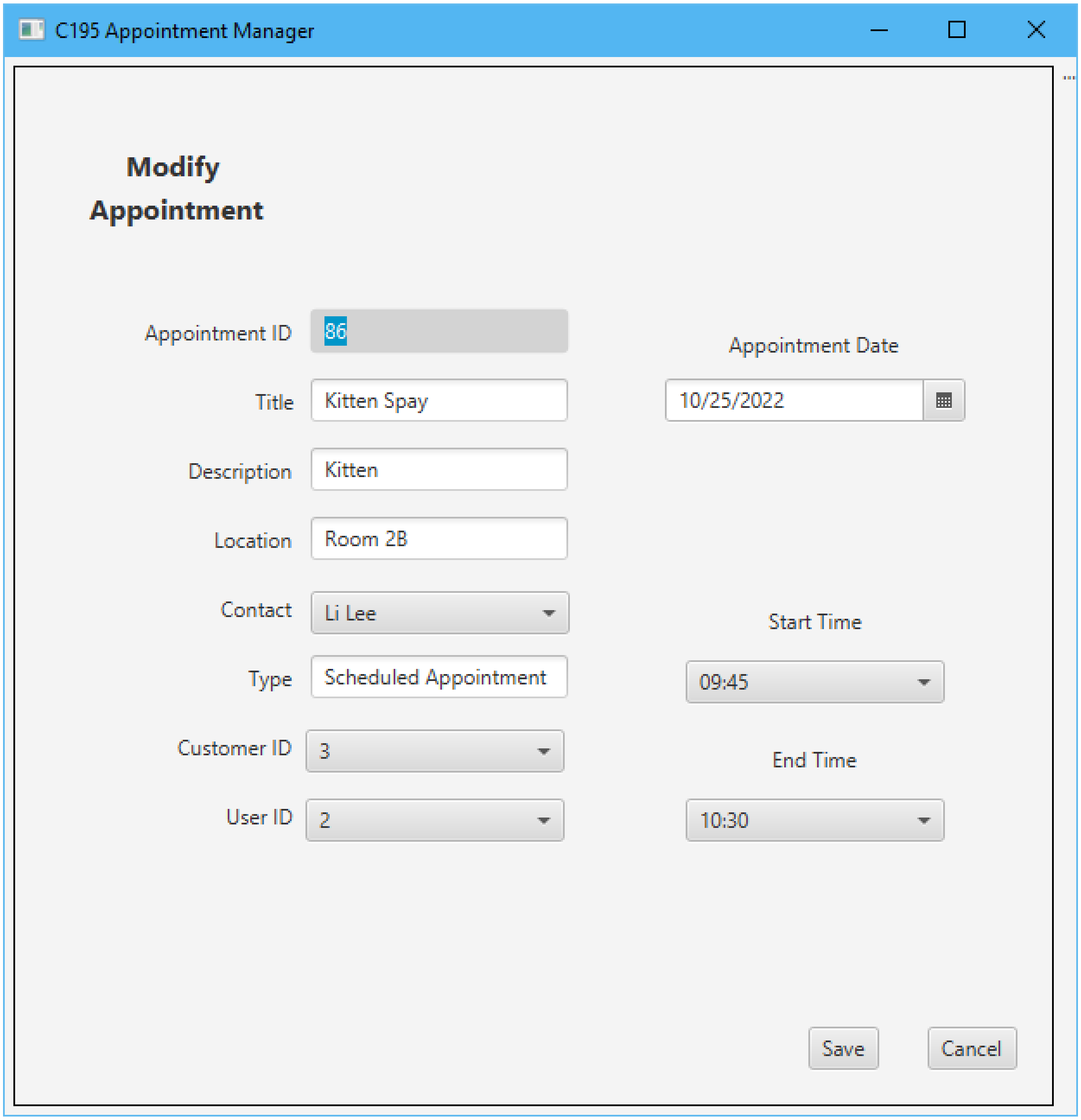


Figure 11 - Modify appointment screen

Error messages that may occur when adding or modifying an appointment:

1. All fields are not populated. All fields must be completed before saving.

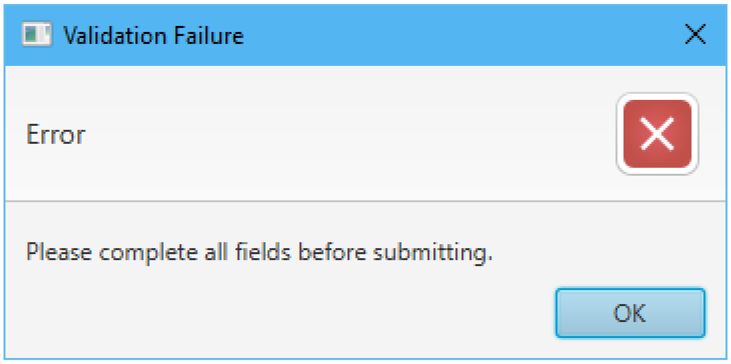


Figure 12 - Field validation failure

2. Start time or end time do not align (start time is after end time, end time is before start time)

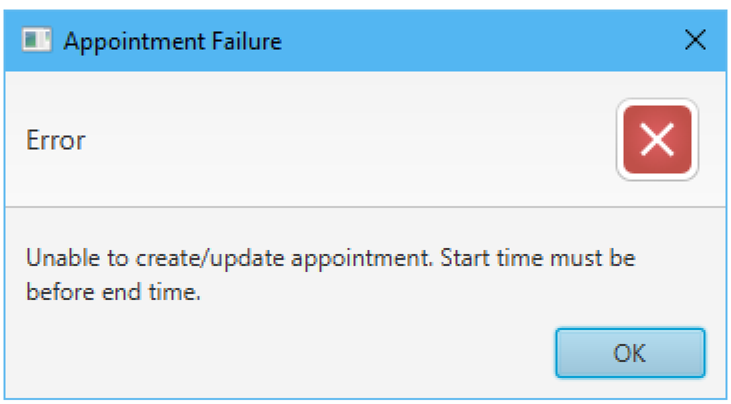


Figure 13 - Start or End Time Logic Check

3. Appointment conflicts with an already existing appointment. A new date/time must be selected, or the existing appointment needs to be deleted.

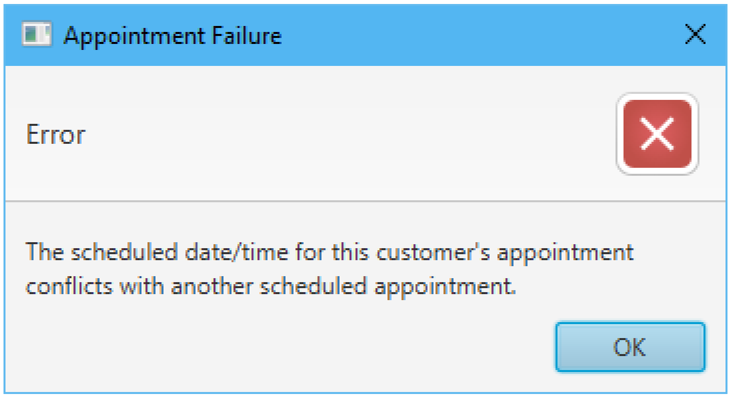


Figure 14 - Conflict with an existing appointment

Add / Modify Customer Screens

When clicking the “add” or “modify” button for a customer, the following screen will display with fields identical to what is seen in the table found on page 12. This screen is a basic form with two buttons to save or cancel. All fields must be populated before saving.

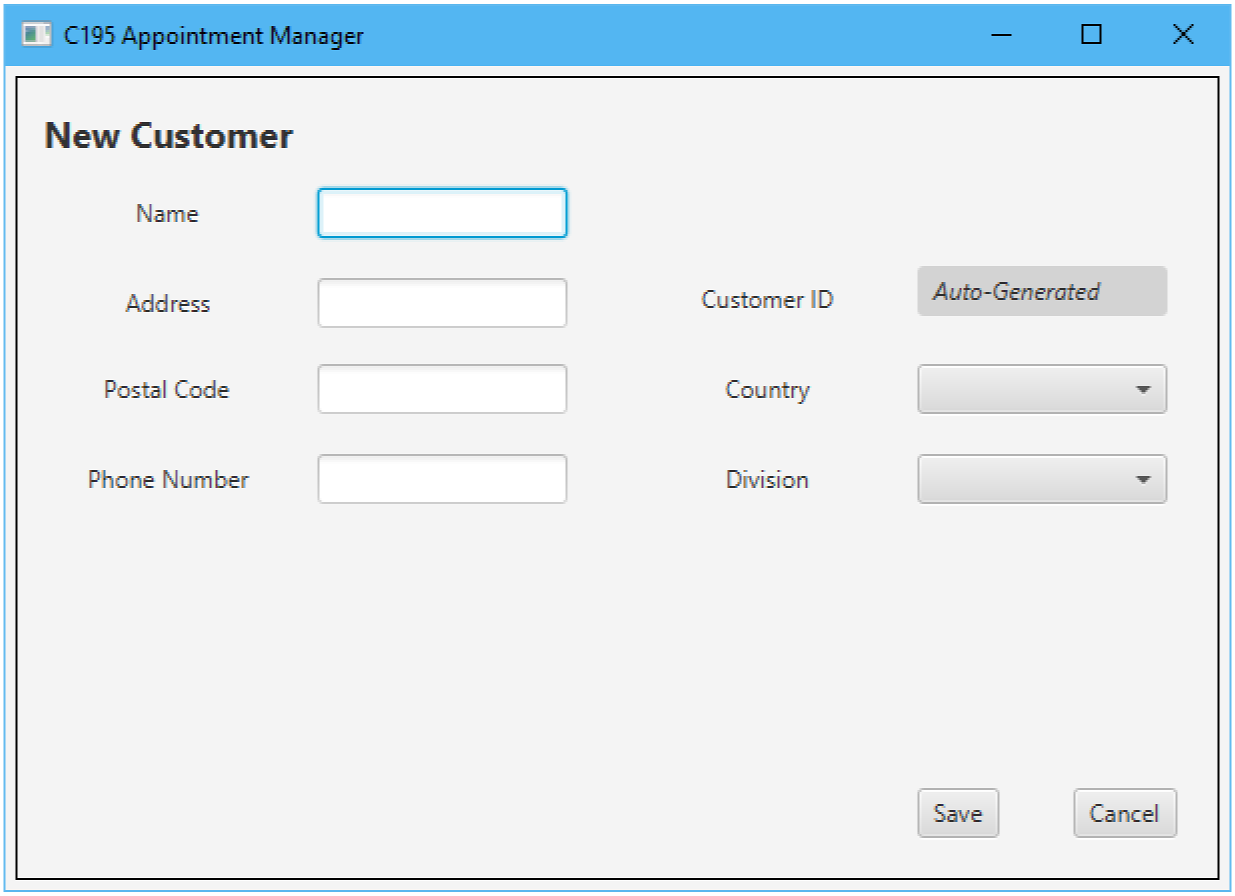


Figure 15 - New customer creation screen

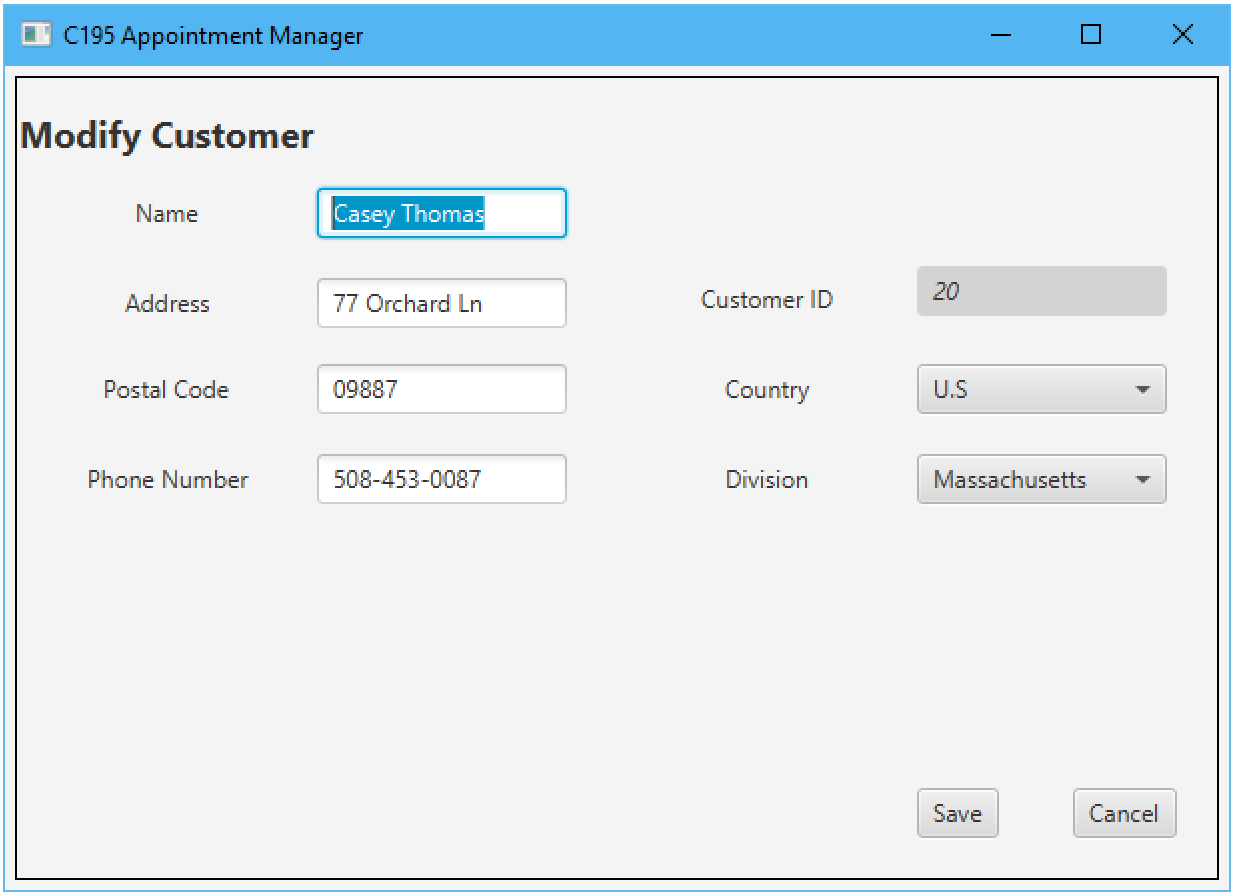


Figure 16 - Modify existing customer screen

Error Dialogs that may display:

1. All fields are not populated. All fields must be completed before saving.

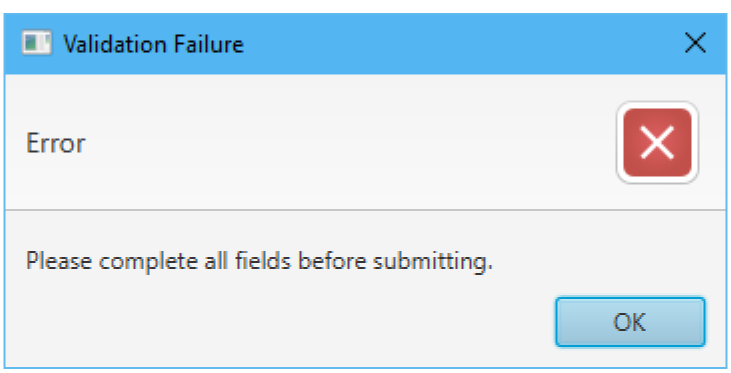


Figure 17 - Field validation check

Reports Screen

The reports screen contains 3 reports: monthly appointments total by type, the total number of customers, and the contact's schedule.

Monthly appointments total by type report is broken down by the month selected. There is a drop-down box with all twelve months available. Upon selection, a table will populate and show what type of appointment has been or is currently scheduled for the month.

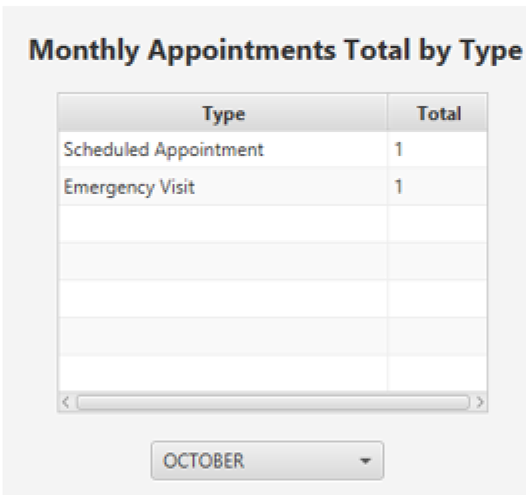
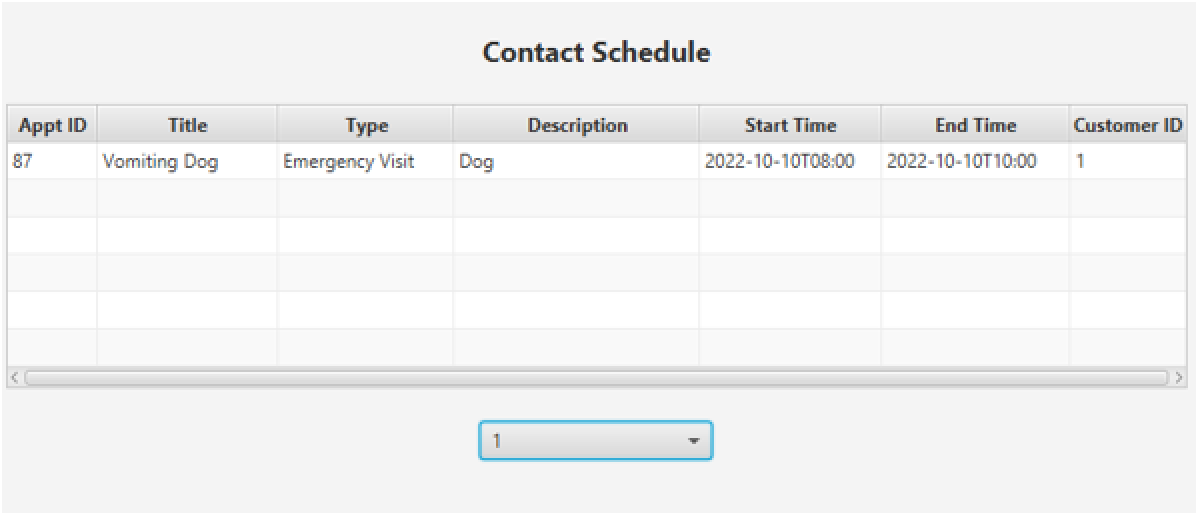


Figure 18- Total appointment type for October

Contact Schedule works similarly to the monthly appointments by type report, however, for this instance, the user is selecting the Contact ID to view their schedule.



Appt ID	Title	Type	Description	Start Time	End Time	Customer ID
87	Vomiting Dog	Emergency Visit	Dog	2022-10-10T08:00	2022-10-10T10:00	1

Figure 19- Current schedule for contact ID #1

Additionally, there is a third report that shows the total current number of customers in the database. This report requires no user intervention and will display automatically once the user opens the reports screen.

Figure 20- Total number of customers report

Unit Test Plan

Introduction

Purpose

One of the main features that went through a rigorous amount of testing was the passing of data when adding or modifying an appointment. The application does not store any internal information and gathers all records from the server, so making sure everything was being saved accurately was a necessity.

Overview

The application passes the information for appointment data either via the NewAppointment controller (if it's a new appointment) or the ModifyAppointment controller (if it's an existing appointment). When a user completes filling in all the fields to schedule a new appointment, they are required to hit the 'save' button. The save button goes through a rigmarole of validation steps before that data is pushed to the server. The first step taken is validating that all the fields are required. The database does not allow for a null field to pass, so checks are performed to make sure that the data is not null, and that it's the correct variable type. Should a field return null an alert will prompt the user to make changes to the field. Until the field validation error is resolved, the user will be unable to save any data to the server. The validation checks on the NewAppointment and ModifyAppointment controllers use the same code since they both pass the same data.

Test Plan

Items

1. NewAppointment/ModifyAppointment Controllers
2. Alerts class
3. Connection to the database
4. IntelliJ IDE 2022.1.2 using SDK Java 11.0.14
5. JavaFX 18.0.1

Features

When the save button is pressed, an ActionEvent called ‘onSaveButton’ goes off and lets the applications know it needs to start the validation process. The ActionEvent process runs through each field, dropdown box, and calendar value on the screen to validate that everything is in the correct order. Should the validation process find an anomaly, it calls an alert dialog from the Alerts class to display. This dialog displays the text title as “Validation Failure” and the text description as “Please double check all fields have been completed before submitting.” When the user clicks “OK” on the dialog box, the application returns to the form where the user can make the necessary changes to correct the data that may have been missed.

Deliverables

If the task fails, a dialog box appears and informs the user that the field validation check has failed. If the task passes, the data is saved and added to the server and will redirect the user back to the main screen where the information is now stored in the Appointments table.

Tasks

1. Log in to the application using the username “test” and password “test”

2. Navigate to the NewAppointment scene by clicking the "New" button under the appointments tableview.
3. Reference the following data when creating the new appointment:

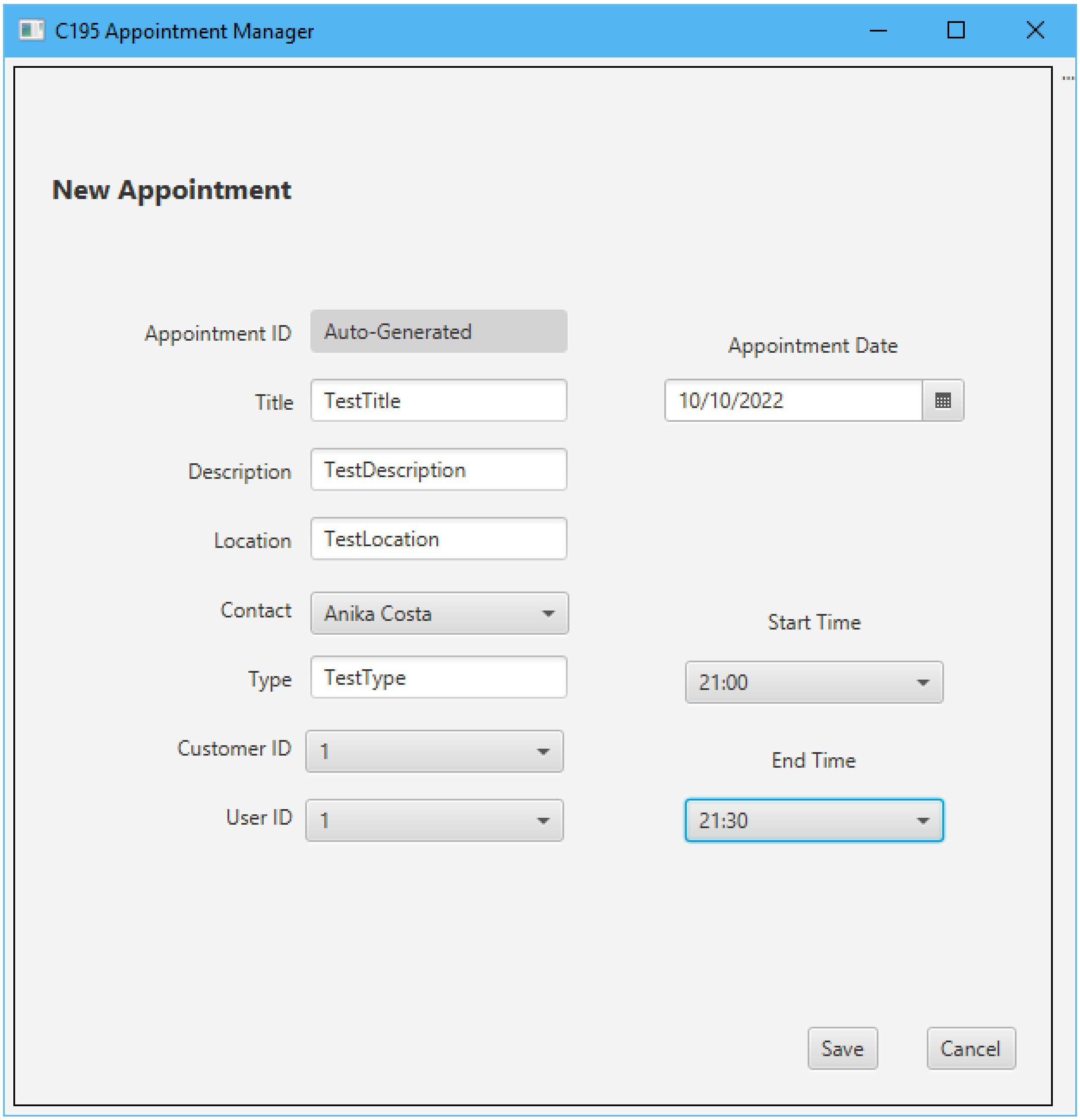
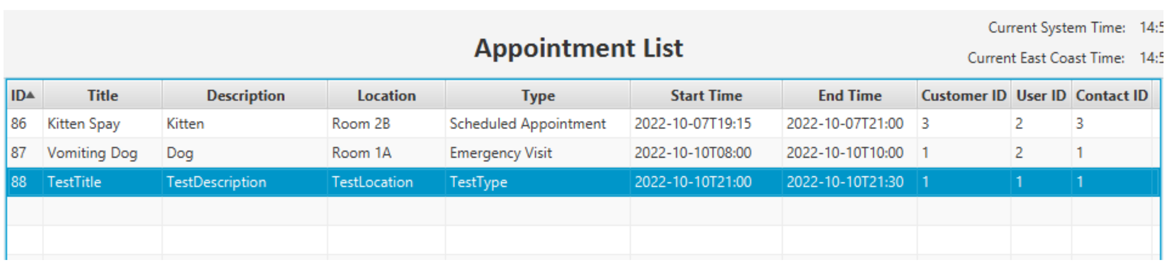


Figure 21- Test data for a new appointment

4. Fill in the fields as shown above (do not click save)

5. Remove data from the title field and click save. A dialog box should pop up notifying the user that the field is empty.
6. Re-add the data that was removed from the field in step 5 and delete the data from the next field. Click save again – the same dialog should display again.
7. Repeat steps 5 and 6 until all fields, including appointment data, start time, and end time are validated.
8. Populate all fields exactly as shown in step 3, leaving no fields empty this time. Click save.
9. Validate the newly created test appointment appears in the Appointments tableview and that the information displayed is accurate.


Appointment List

Current System Time: 14:5

Current East Coast Time: 14:5

ID	Title	Description	Location	Type	Start Time	End Time	Customer ID	User ID	Contact ID
86	Kitten Spay	Kitten	Room 2B	Scheduled Appointment	2022-10-07T19:15	2022-10-07T21:00	3	2	3
87	Vomiting Dog	Dog	Room 1A	Emergency Visit	2022-10-10T08:00	2022-10-10T10:00	1	2	1
88	TestTitle	TestDescription	TestLocation	TestType	2022-10-10T21:00	2022-10-10T21:30	1	1	1

Figure 22 - Successful addition of test data to the new appointment tableview

Expected Results: All fields should successfully pass validation checks. Appointments should be added to the database and shown on the tableview once saved.

Needs

1. IntelliJ IDE 2022.1.2 using SDK Java 11.0.14
2. JavaFX 18.0.1
3. Connection to the active database
4. Application login credentials

Pass/Fail Criteria

Pass - All fields will display an alert dialog if data is not present. Upon saving, the appointment is successfully added to the database and is viewable on the tableview.

Fail –

1. Dialog boxes do not pop up for one or multiple fields when clicking save
2. The application throws an SQLException error when save is clicked
3. Data is not present in the tableview once save is clicked

Specifications

```
public void onSaveButton(ActionEvent actionEvent) throws IOException, SQLException {

    saveFlag = true;

    if (titleField.getText().isEmpty() ||
            descField.getText().isEmpty() ||
            locationField.getText().isEmpty() ||
            typeField.getText().isEmpty() ||
            startCalendar.getValue() == null ||
            startTimeComboBox.getSelectionModel().isEmpty() ||
            endTimeComboBox.getSelectionModel().isEmpty() ||
            customerIdComboBox.getSelectionModel().isEmpty() ||
            userIdComboBox.getSelectionModel().isEmpty() ||
            contactComboBox.getSelectionModel().isEmpty()) {

        Alerts.emptyFields();
        saveFlag = false;
        return;
    }
```

Figure 23- onSaveButton method used to validate the fields on the NewAppointment scene

```
public static void emptyFields(){
    Alert alert = new Alert(Alert.AlertType.ERROR, s: "Please double check all fields have been completed before submitting.");
    alert.setTitle("Validation Failure");
    Optional<ButtonType> option = alert.showAndWait();
}
```

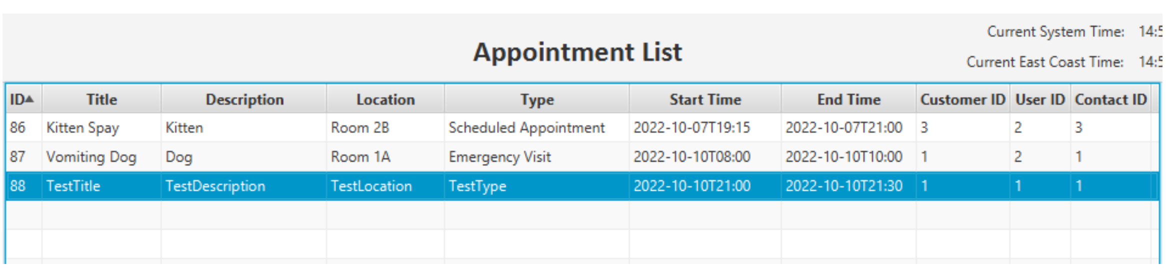
Figure 24 - Alert called if field validation fails

Procedures

The following test case has been created to test the validation feature:

1. Log in to the application using IntelliJ using the username “test” and password “test”
2. Navigate to the NewAppointment scene by clicking the “New” button under the appointments tableview.
3. Enter data for all fields except for one. Click save. Ensure that the dialog box displays correctly.
4. Continue entering data for all fields except one until all fields have been tested, ensuring that the validation test is working properly for each specific field.
5. When all fields have been tested successfully, complete all fields to save a test appointment to the database.
6. Validate the newly created test appointment appears in the Appointments tableview and that the information displayed is accurate.

Expected Results: All fields should successfully pass validation checks. Appointments should be added to the database and shown on the tableview once saved.


Appointment List

Current System Time: 14:5

Current East Coast Time: 14:5

ID	Title	Description	Location	Type	Start Time	End Time	Customer ID	User ID	Contact ID
86	Kitten Spay	Kitten	Room 2B	Scheduled Appointment	2022-10-07T19:15	2022-10-07T21:00	3	2	3
87	Vomiting Dog	Dog	Room 1A	Emergency Visit	2022-10-10T08:00	2022-10-10T10:00	1	2	1
88	TestTitle	TestDescription	TestLocation	TestType	2022-10-10T21:00	2022-10-10T21:30	1	1	1

Figure 25- Successful addition of test data to the new appointment tableview

Failed Results:

1. A dialog box does not appear and an SQLException displays in the IDE.
2. A dialog box does not appear but accepts null values for one/multiple fields.
3. A dialog box appears but saves the incorrect data anyway
4. A dialog box does not appear; however, the data is not saved to the database or does not display on the tableview.

Results

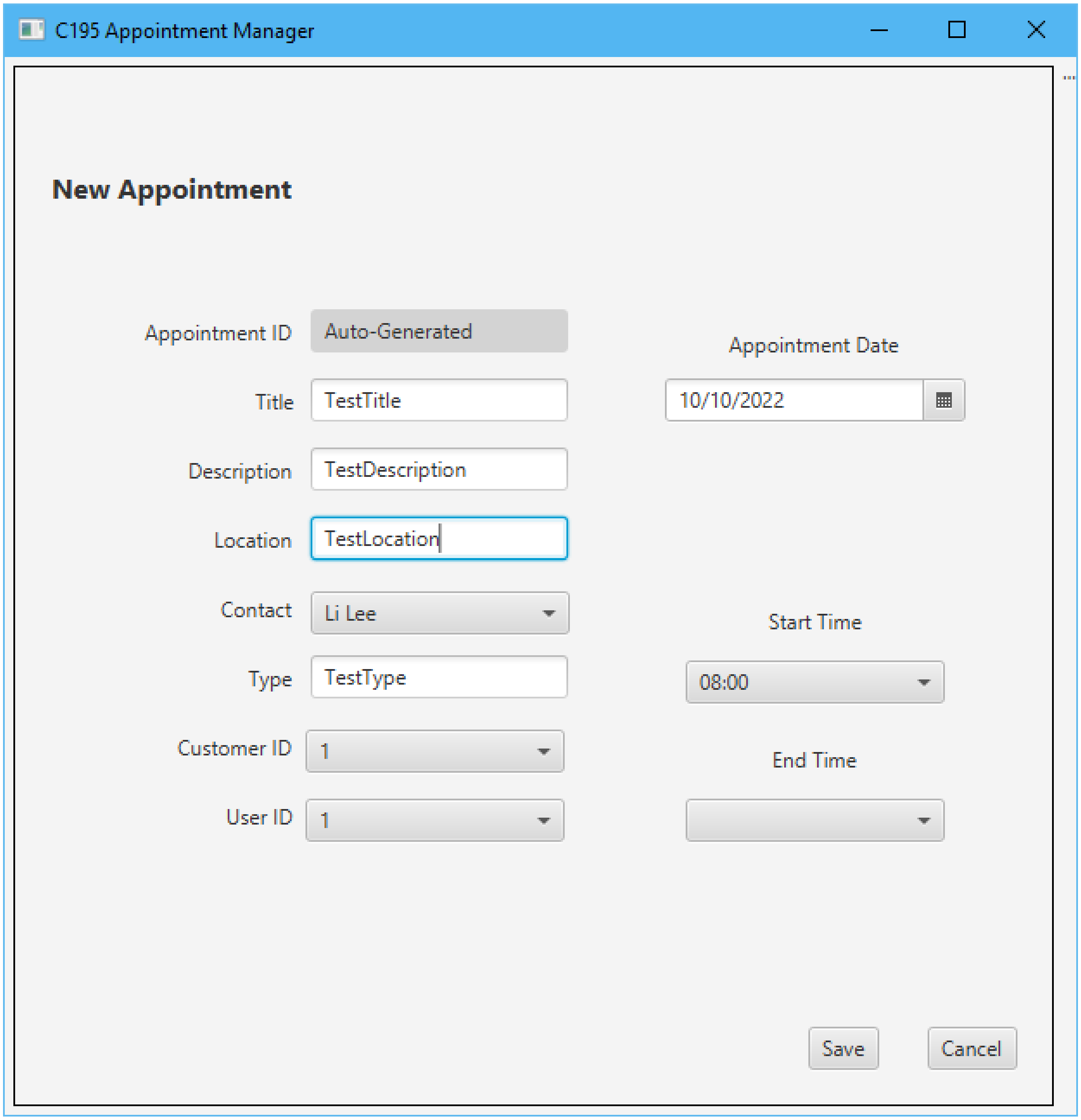


Figure 26 - Test Data entered omitting the End Time selection box to perform validation checks

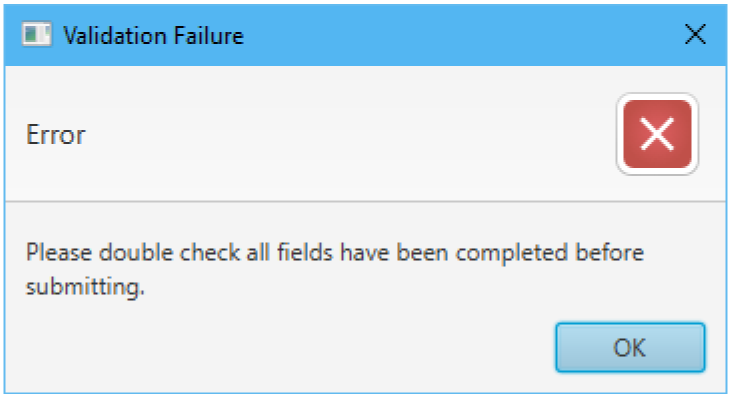


Figure 27- Dialog box displayed because of the end time selection box being null

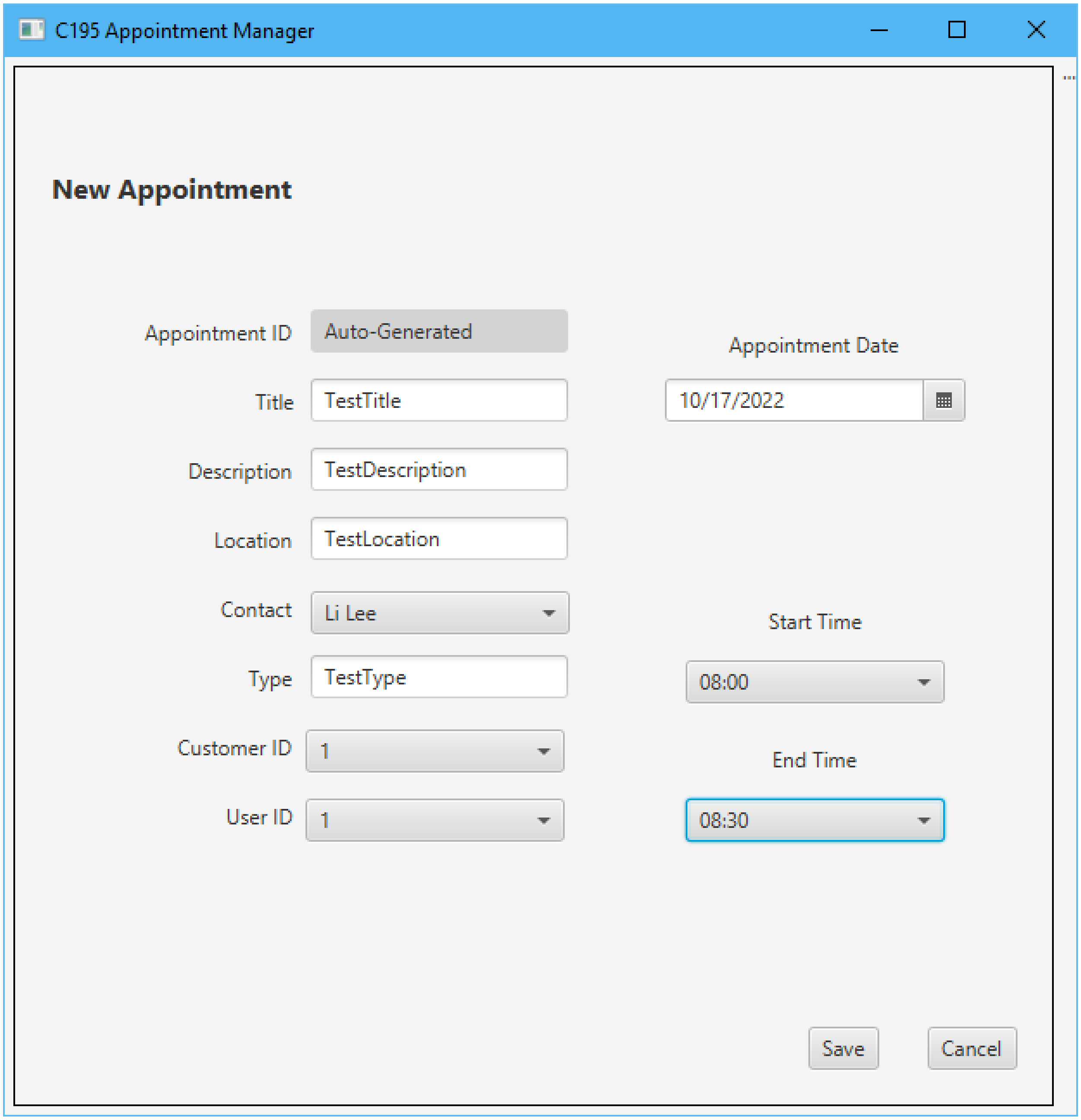


Figure 28- Re-running the test with the end-time selection box being populated

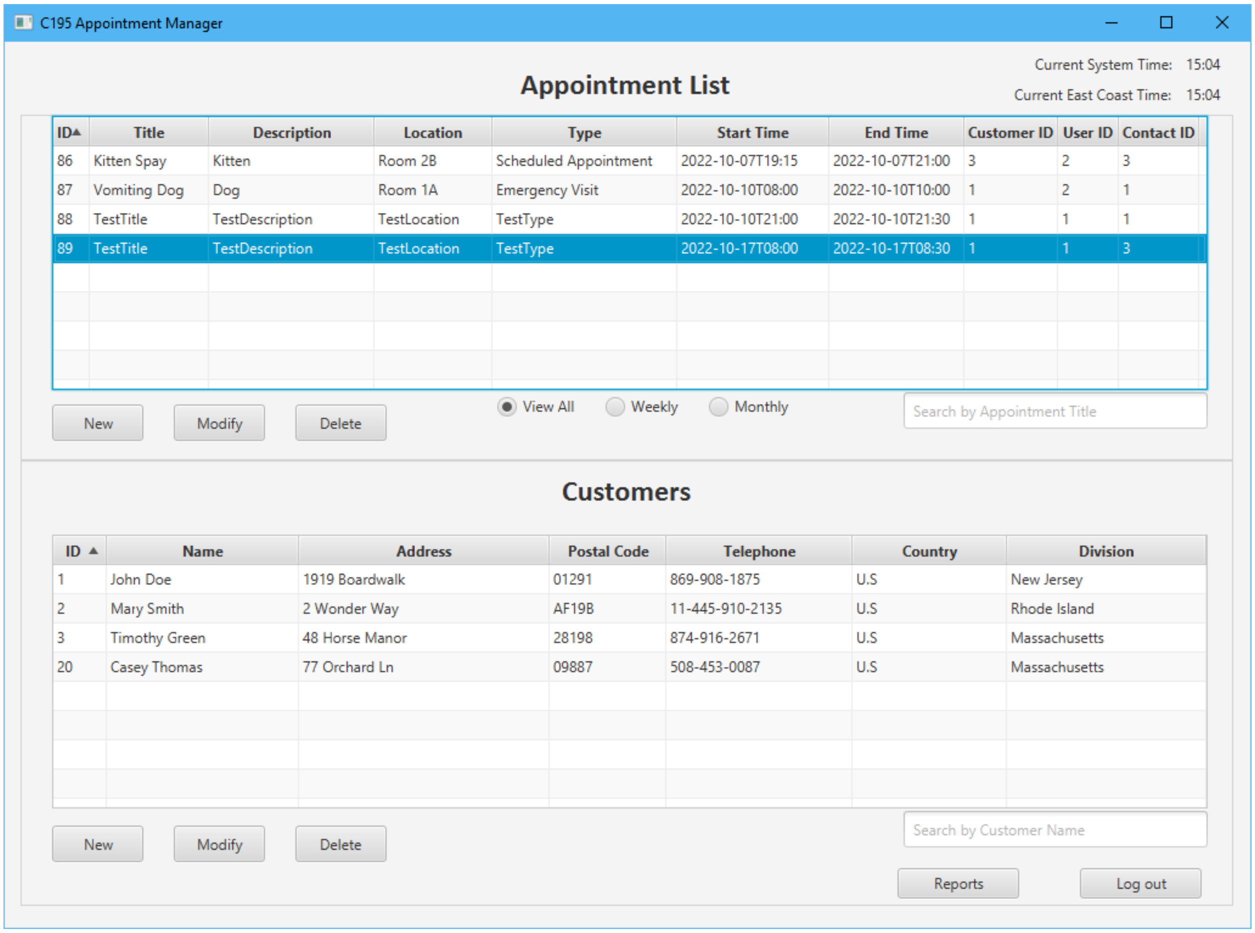


Figure 29 - Test data has successfully been added to the appointment tableview

C4. Source Code

The source code will be contained in a separate zip file.

C5. Link to Live Version

A live version is unavailable. The application can be via the code provided in the zip file using IntelliJ IDE. To login to the application, use username “test” and password “test”.

User Guide

Introduction

This user guide provides an overview of how to navigate the appointment manager as well as explains the basic steps needed to properly use the application. This guide will assist the user in creating, modifying, and deleting appointments and customers, and show the user how to generate and read the reporting available.

Installation and Using the Application

Login Screen

The first screen user will see upon first opening the login application is the login screen. The login screen contains a username field, a password field, a location label, a login button, and an exit button.

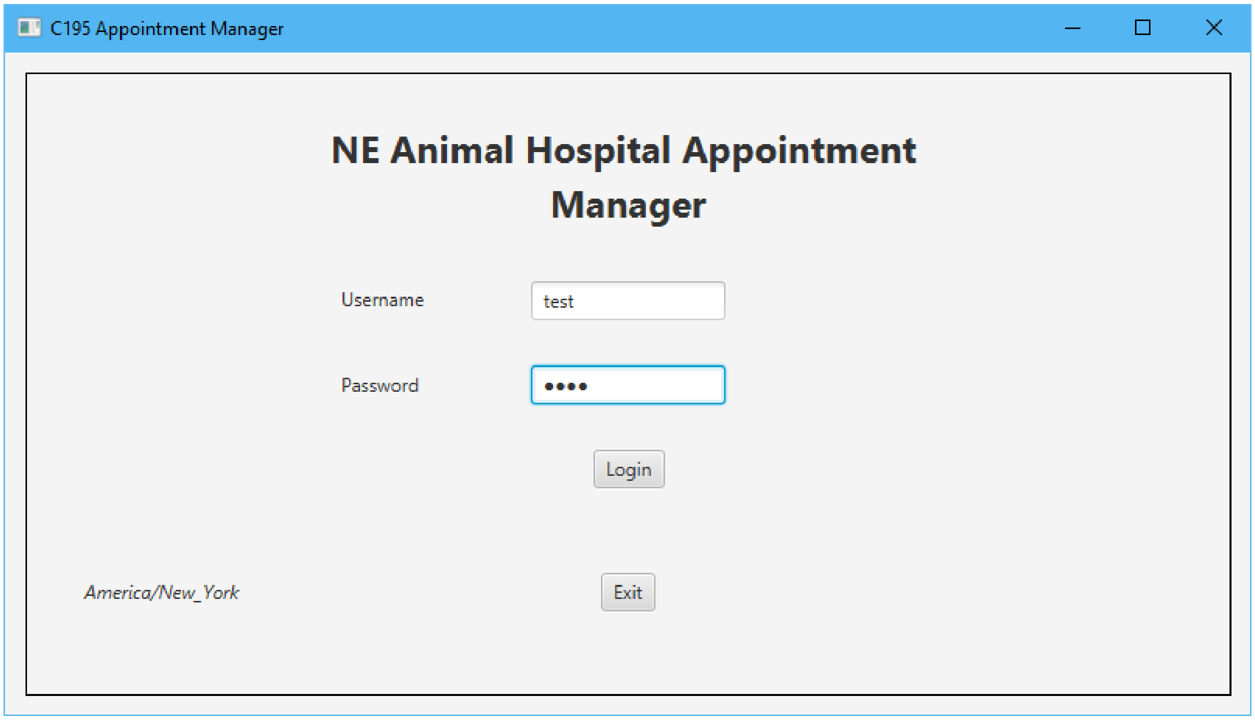


Figure 30- Login Screen

1. Enter your username in the username field. (Evaluators can use the username "test")
2. Enter your password in the password field. (Evaluators can use the password "test")
3. Click login
4. A notification will display letting the user know if there is an appointment scheduled in the next fifteen minutes.

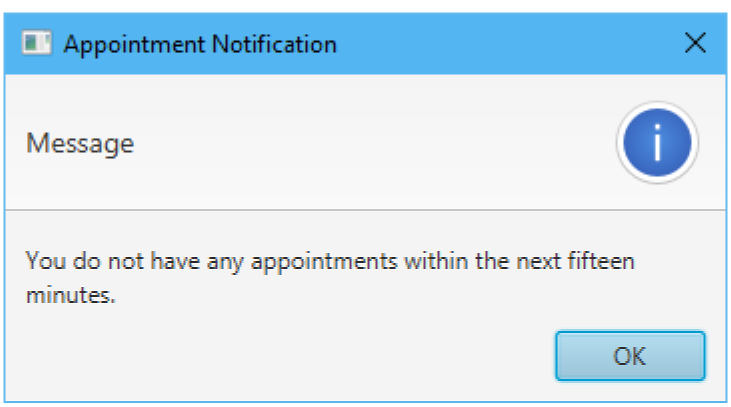


Figure 31 - Appointment notification

Create a New Appointment

1. Once logged in, click the "New" button below the Appointment's table to add a new appointment.

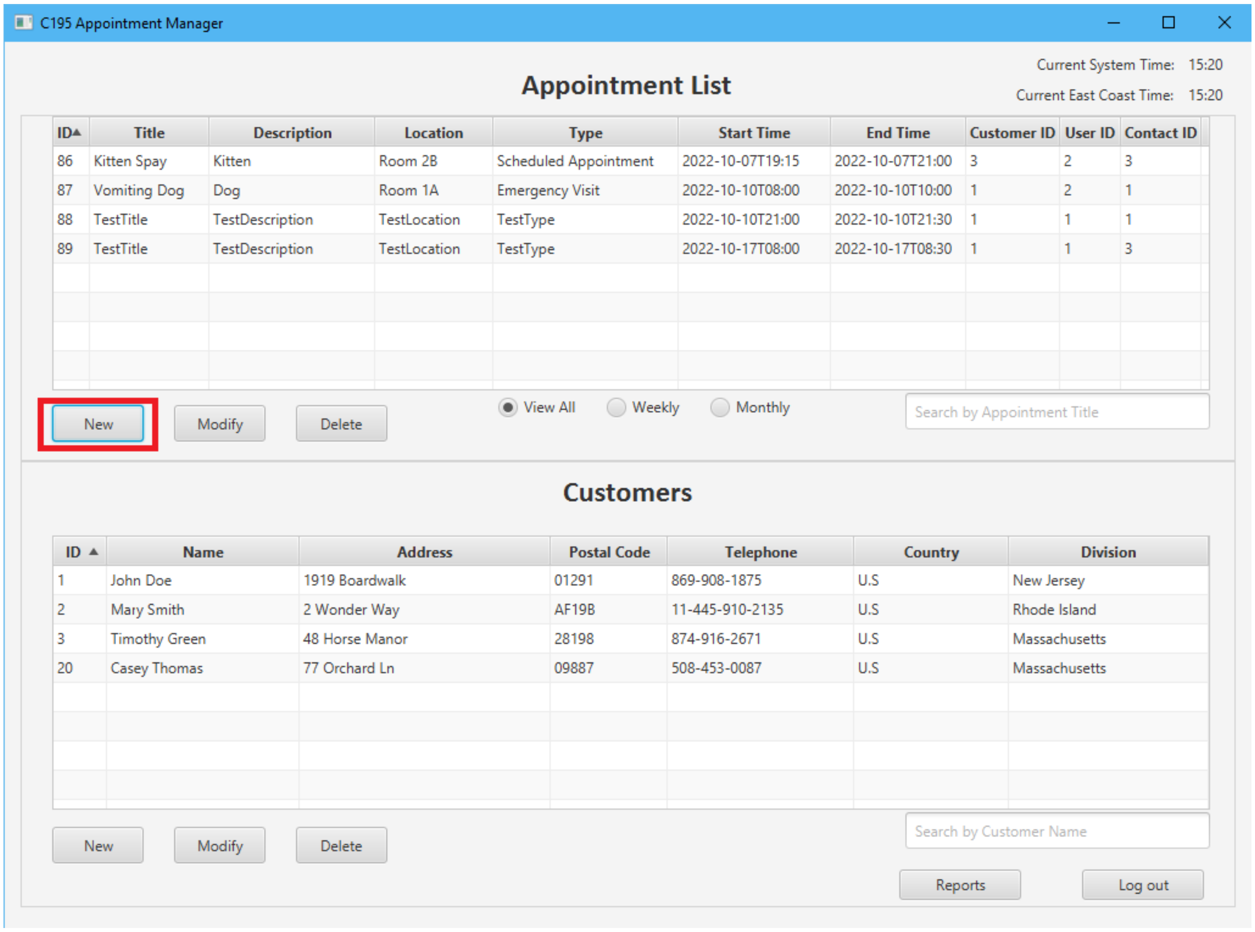


Figure 32 - New appointment button

2. To create an appointment, fill out all the fields on the screen. All fields must be completed to pass validation checks. Remember that appointments cannot overlap with other existing appointments.

3. Once all fields are completed, click the save button.

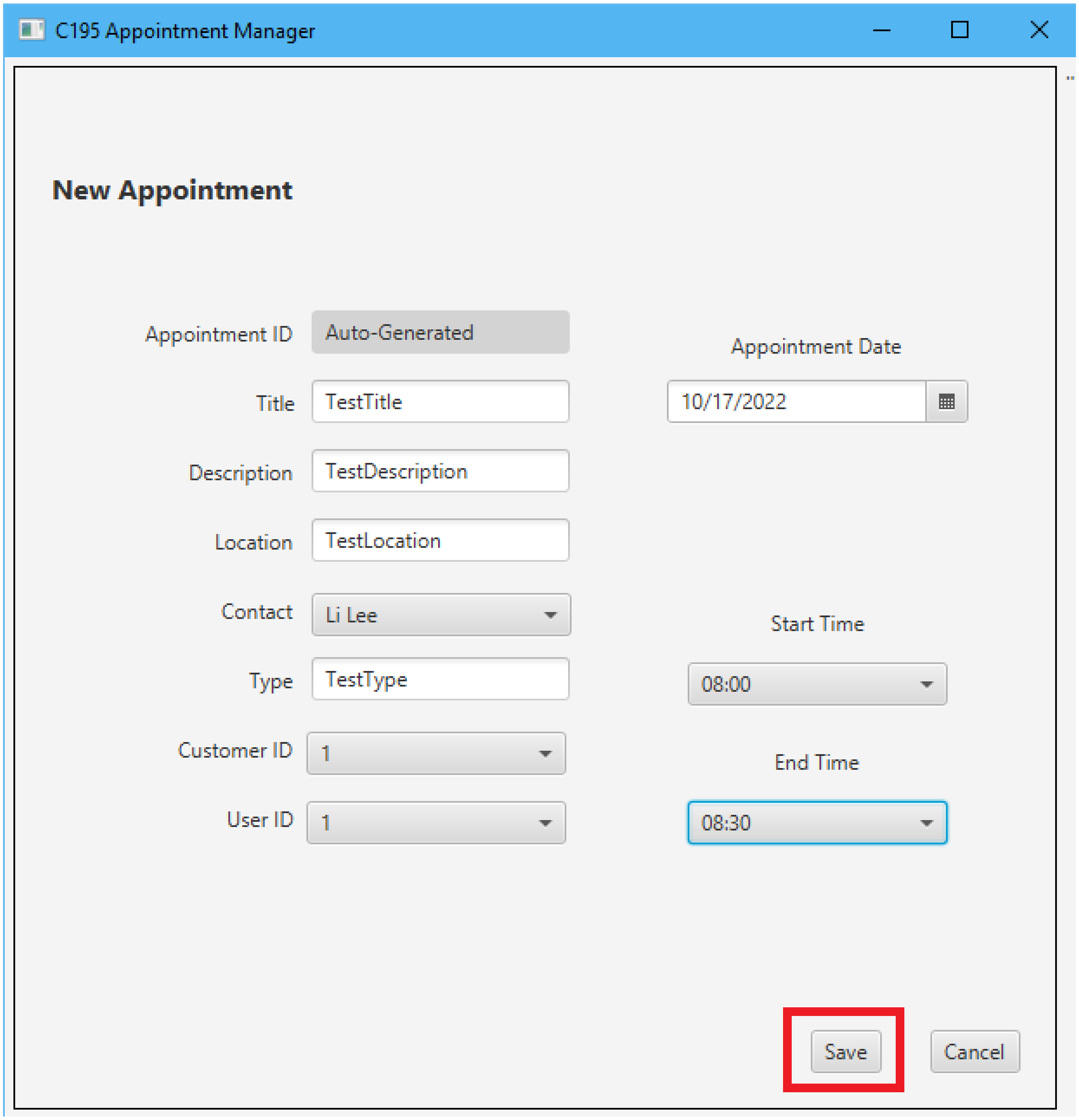


Figure 33- Adding a new appointment

4. The new appointment should now display on the appointments table.

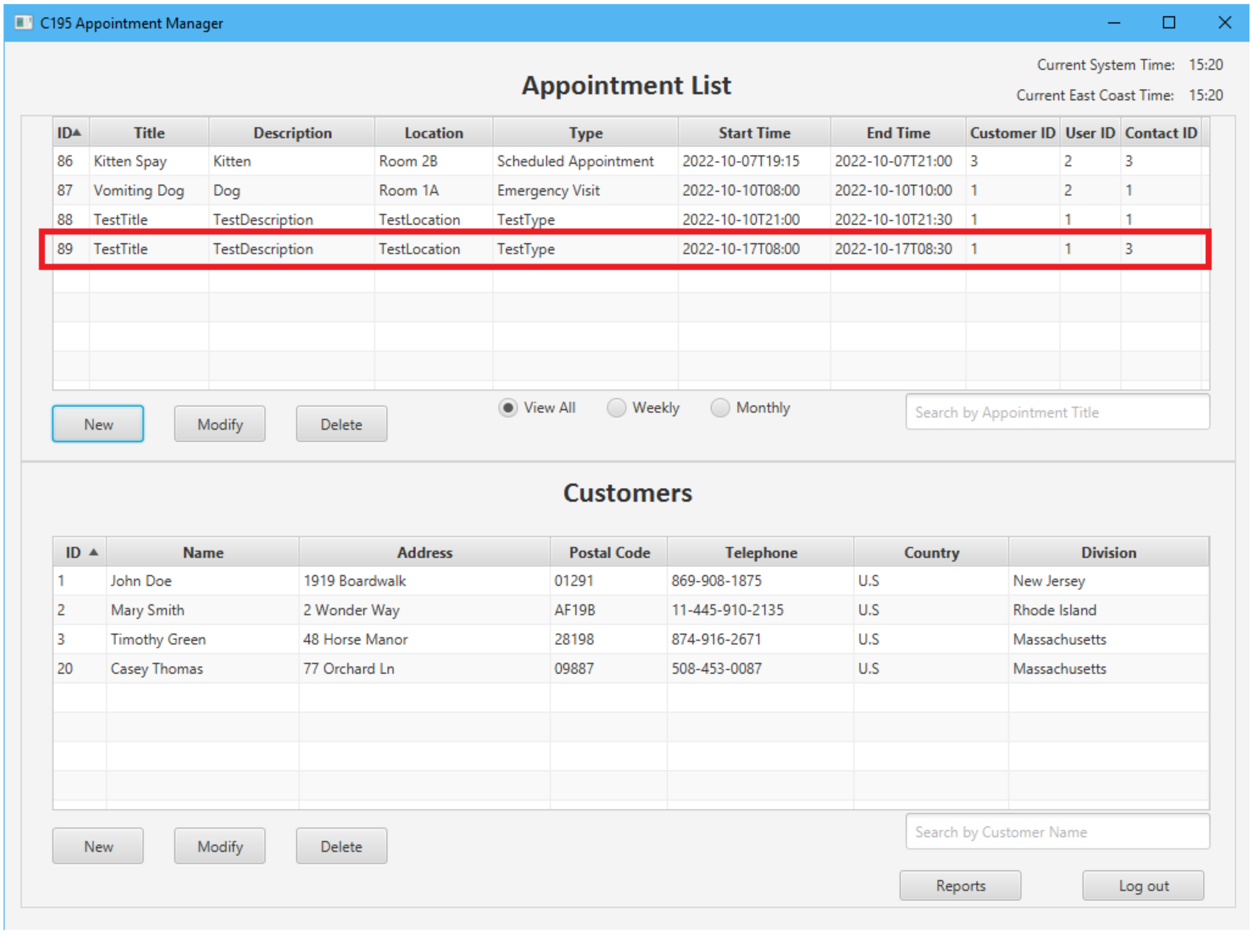


Figure 34 - Displaying the new appointment in the appointments table

Modify an Existing Appointment

1. Once logged in, click the "Modify" button below the Appointment's table to modify an appointment.

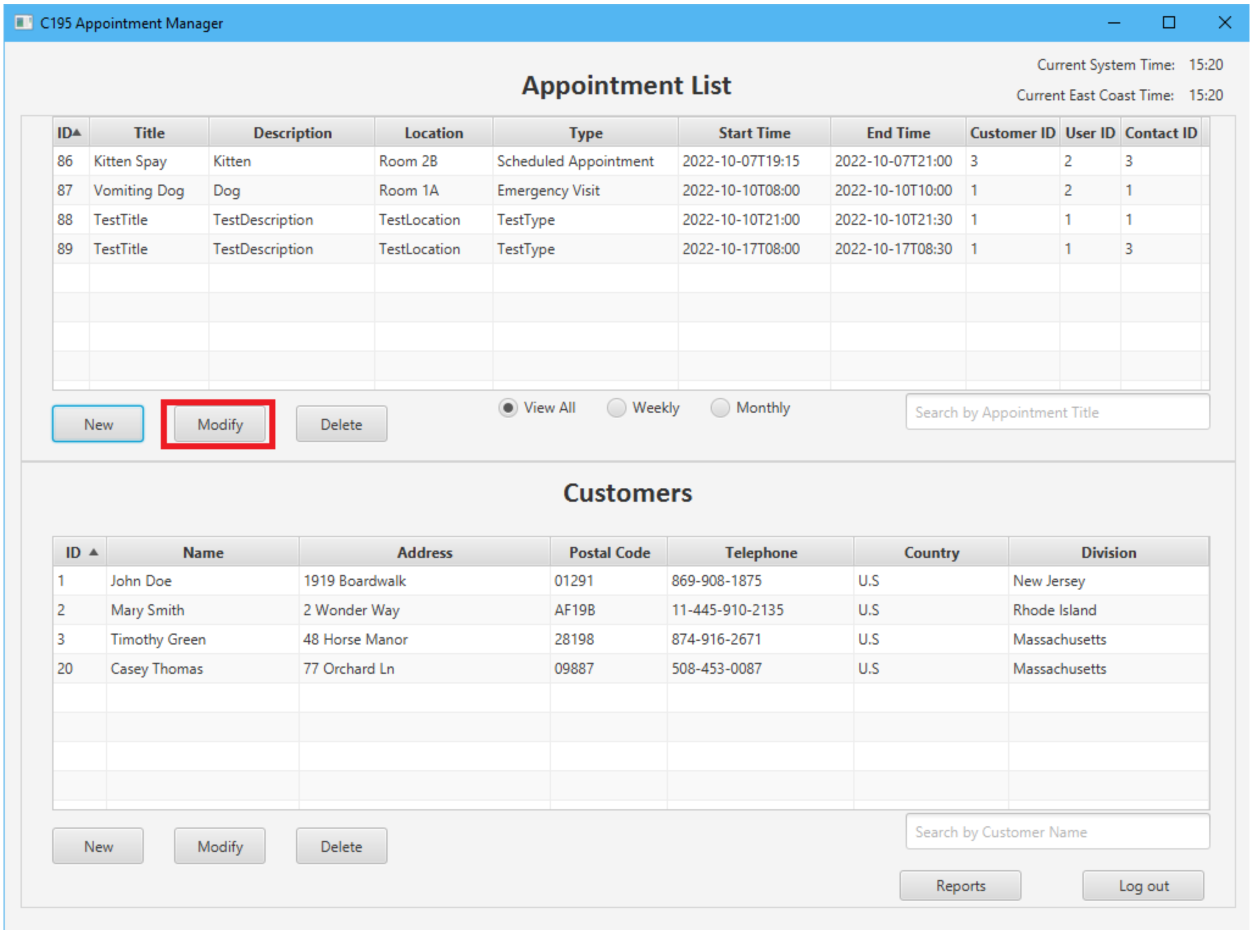


Figure 35 - Modify an appointment button

2. Find the field you are looking to modify. In this example, I will be modifying the title of the appointment. Change the field to the desired value. Once completed, click save.

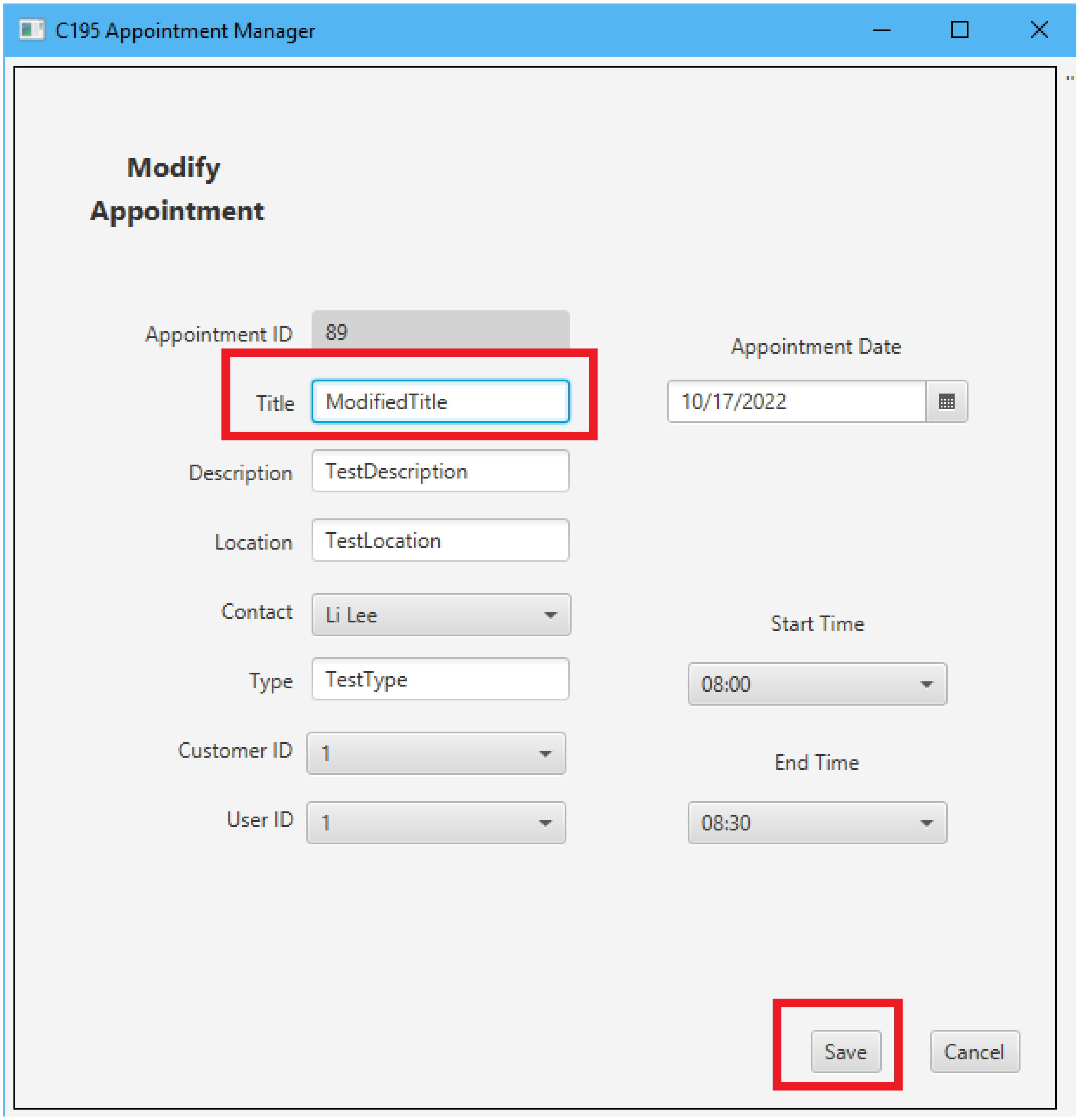


Figure 36 - Modify appointment screen

3. View the table. The modified appointment should now display the updated information.

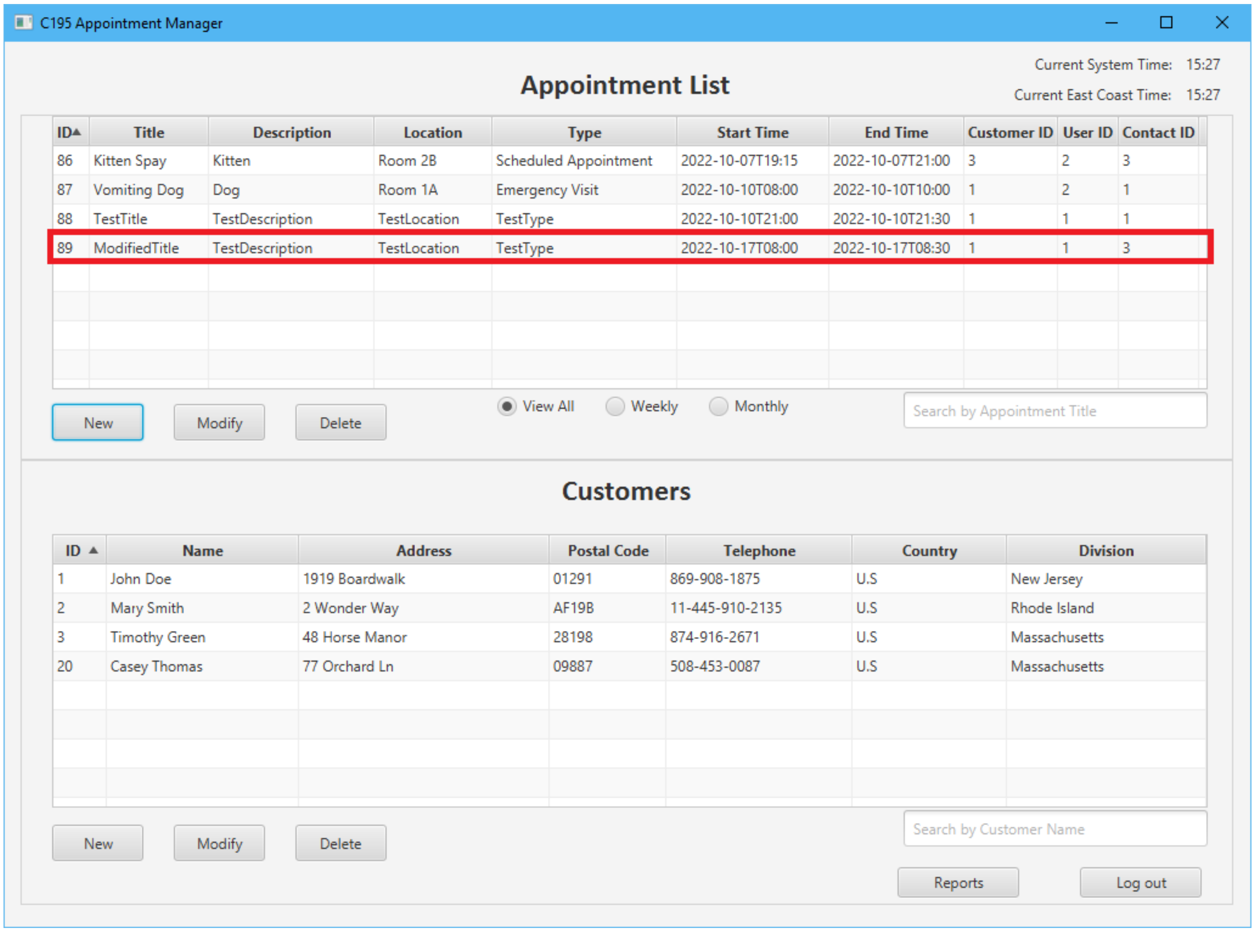


Figure 37 - Successful modification of an appointment in the table

Delete an Appointment

1. Once logged in, locate the appointment to be deleted.
2. Select the item on the appointments table

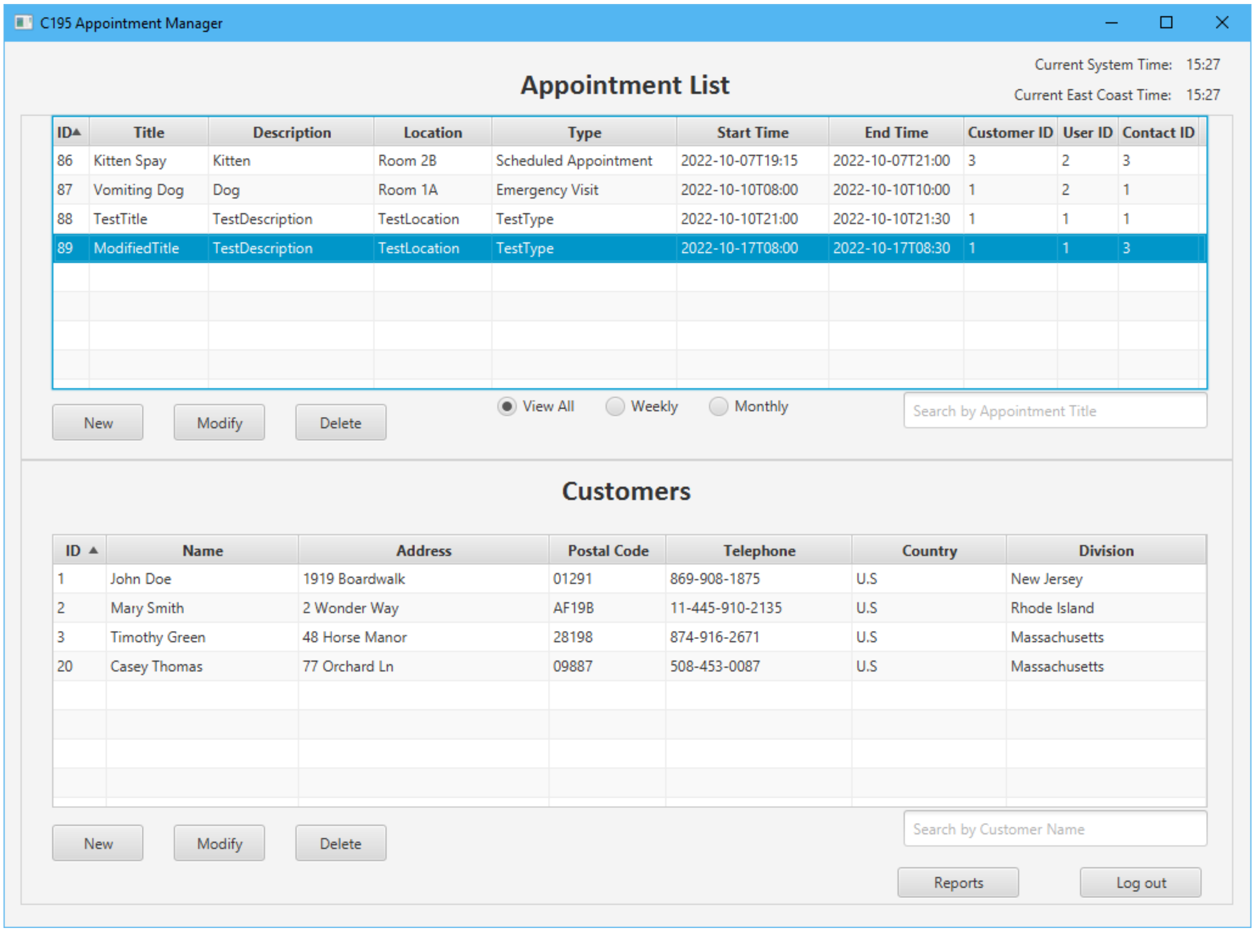


Figure 38 - Selecting an appointment to delete

3. Click the “delete” button.

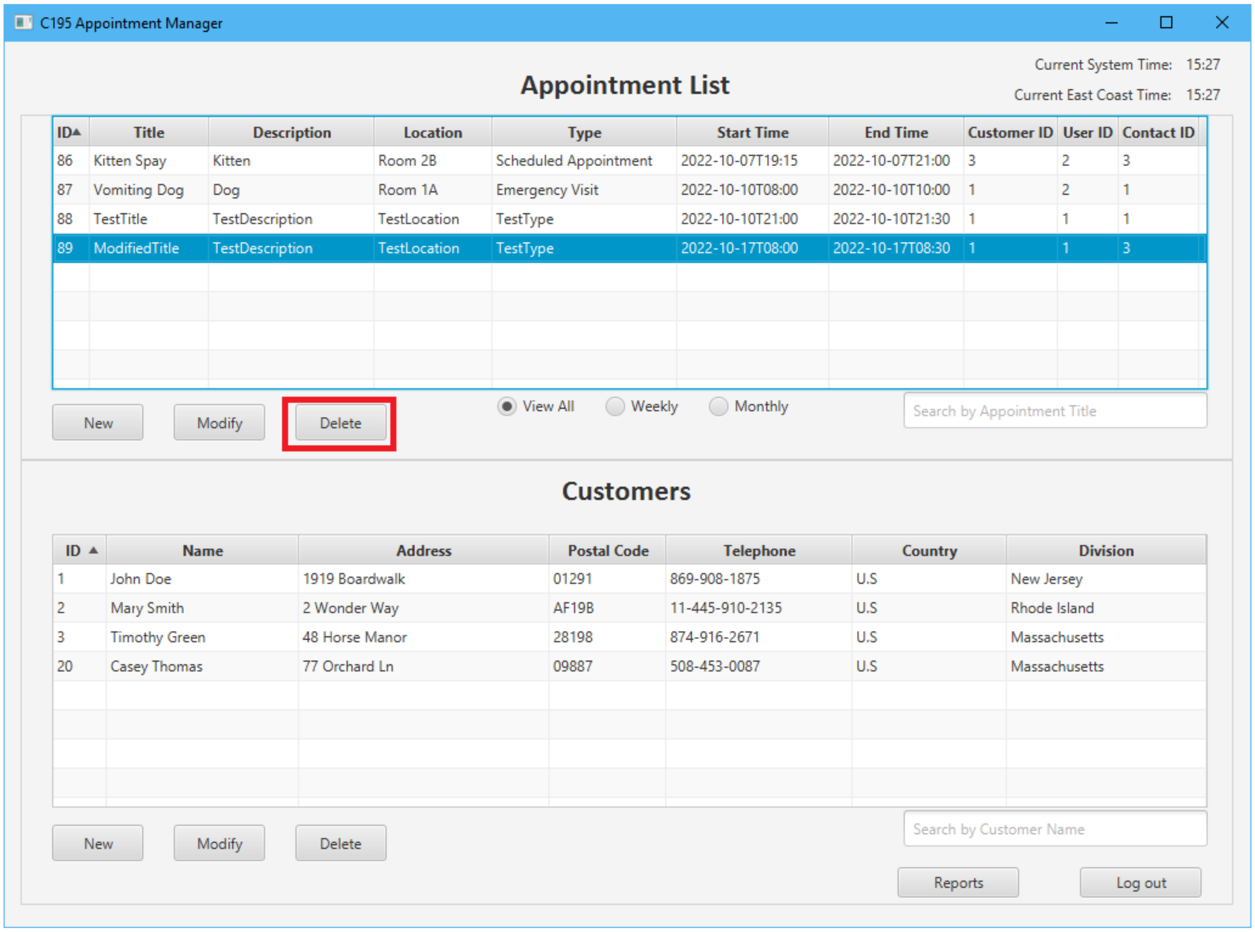


Figure 39 - Deleting the appointment

4. A dialog prompt will display showing successful deletion. The prompt will display some of the deleted appointment information.

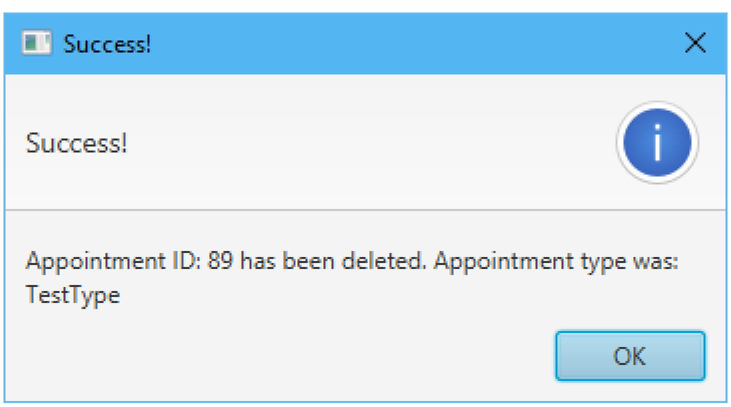


Figure 40 - Successful deletion notification

Changing the appointment list view

1. Login and observe the appointments table. By default, all appointments are displayed.

2. To sort by weekly appointments, click on the "Weekly" button.

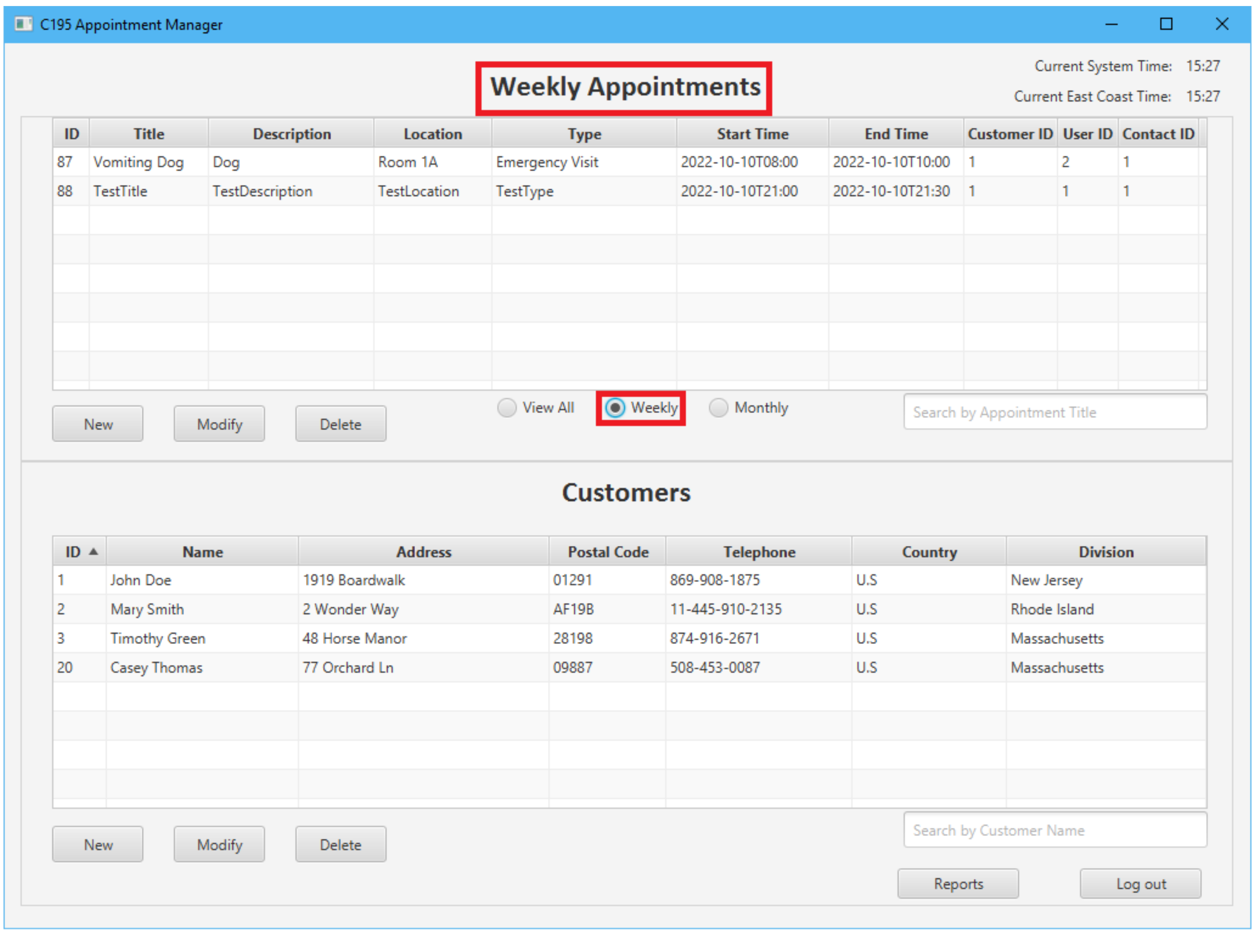


Figure 41 - Weekly appointments table

3. Weekly appointments will display.

4. To sort by monthly appointments, click on the "Monthly" button.

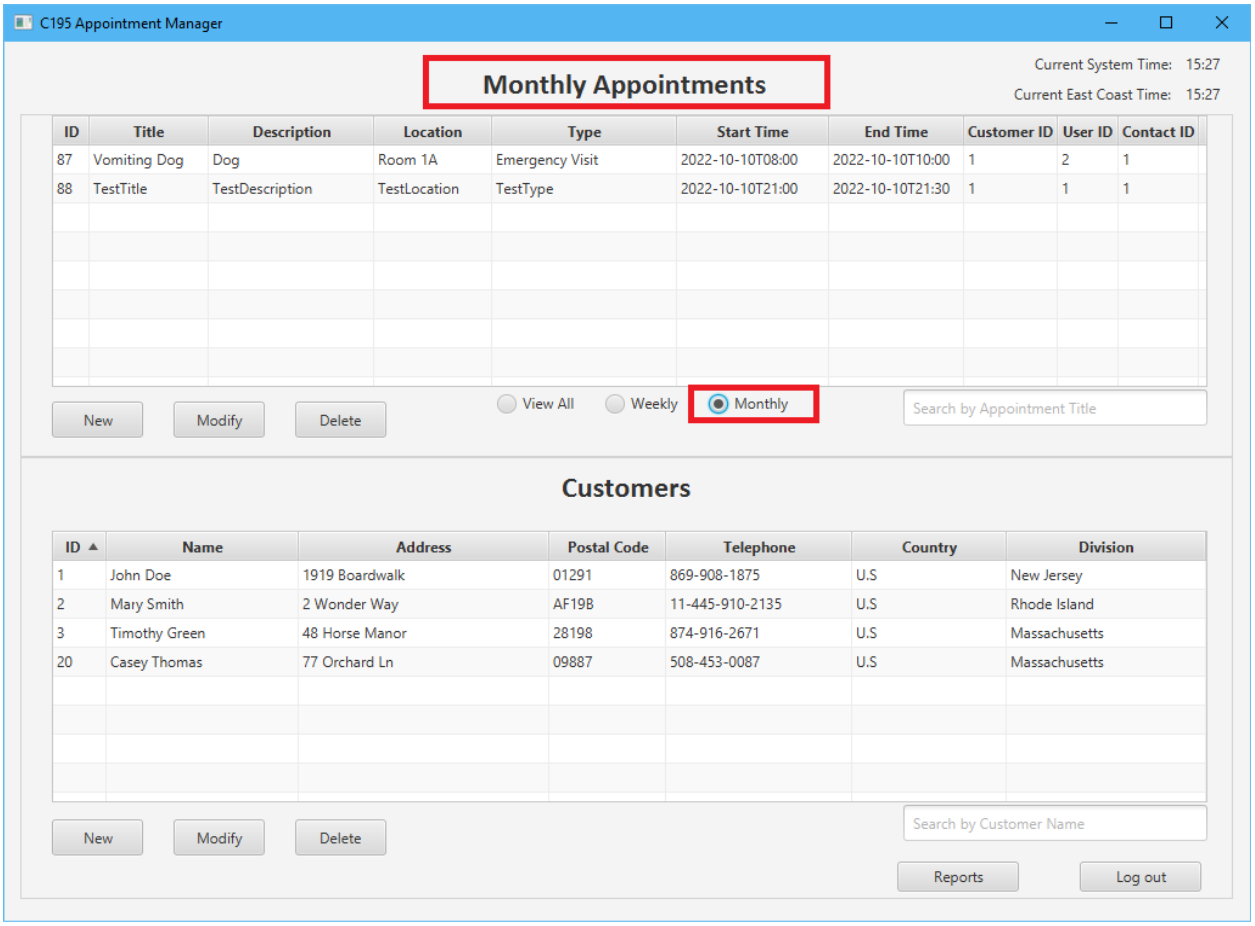


Figure 42 - Monthly appointments table

5. To return to all appointments, click the “view all” button.

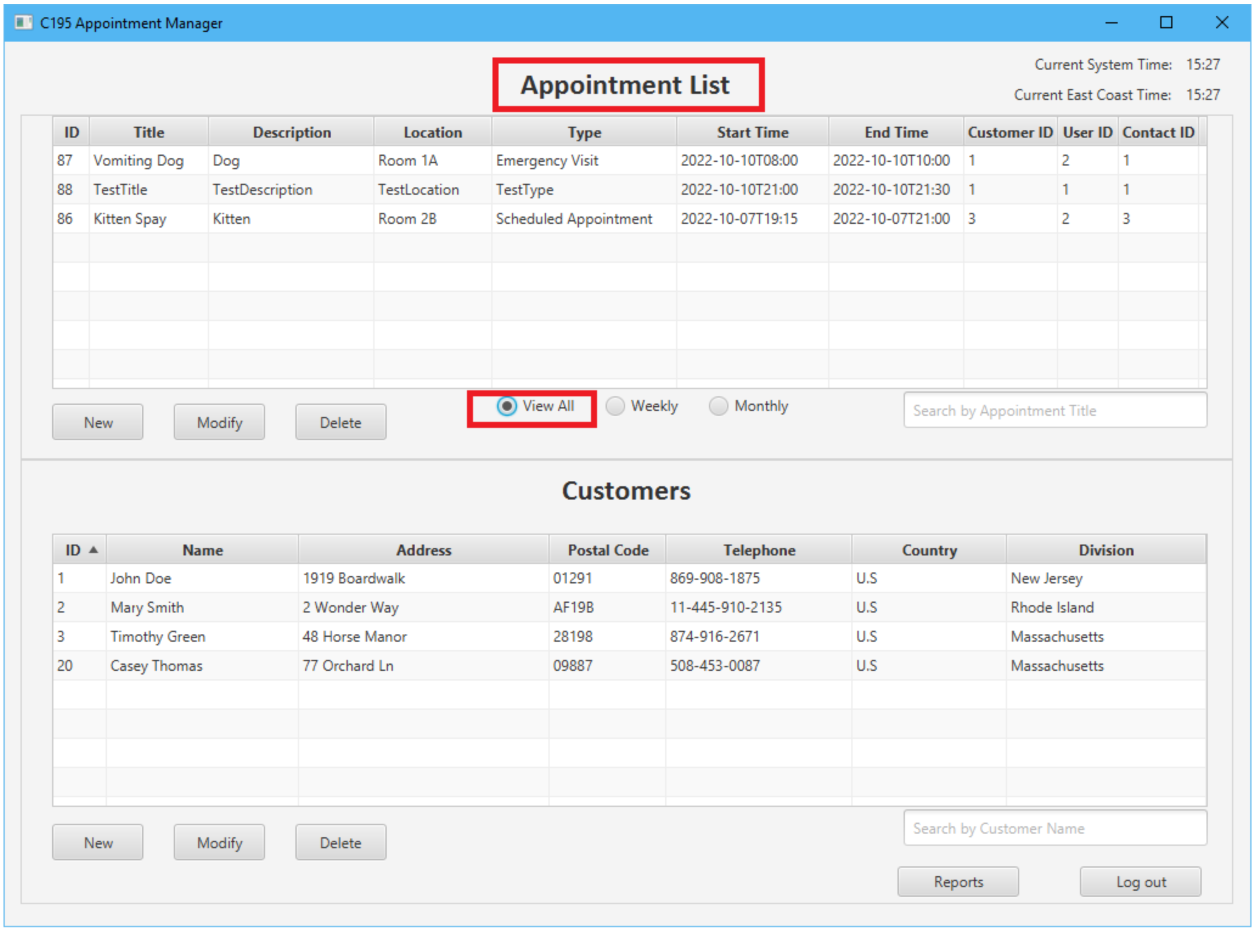


Figure 43 - All appointments table

Adding a New Customer

1. Once logged in, click the “New” button below the Customers table to add a new customer.

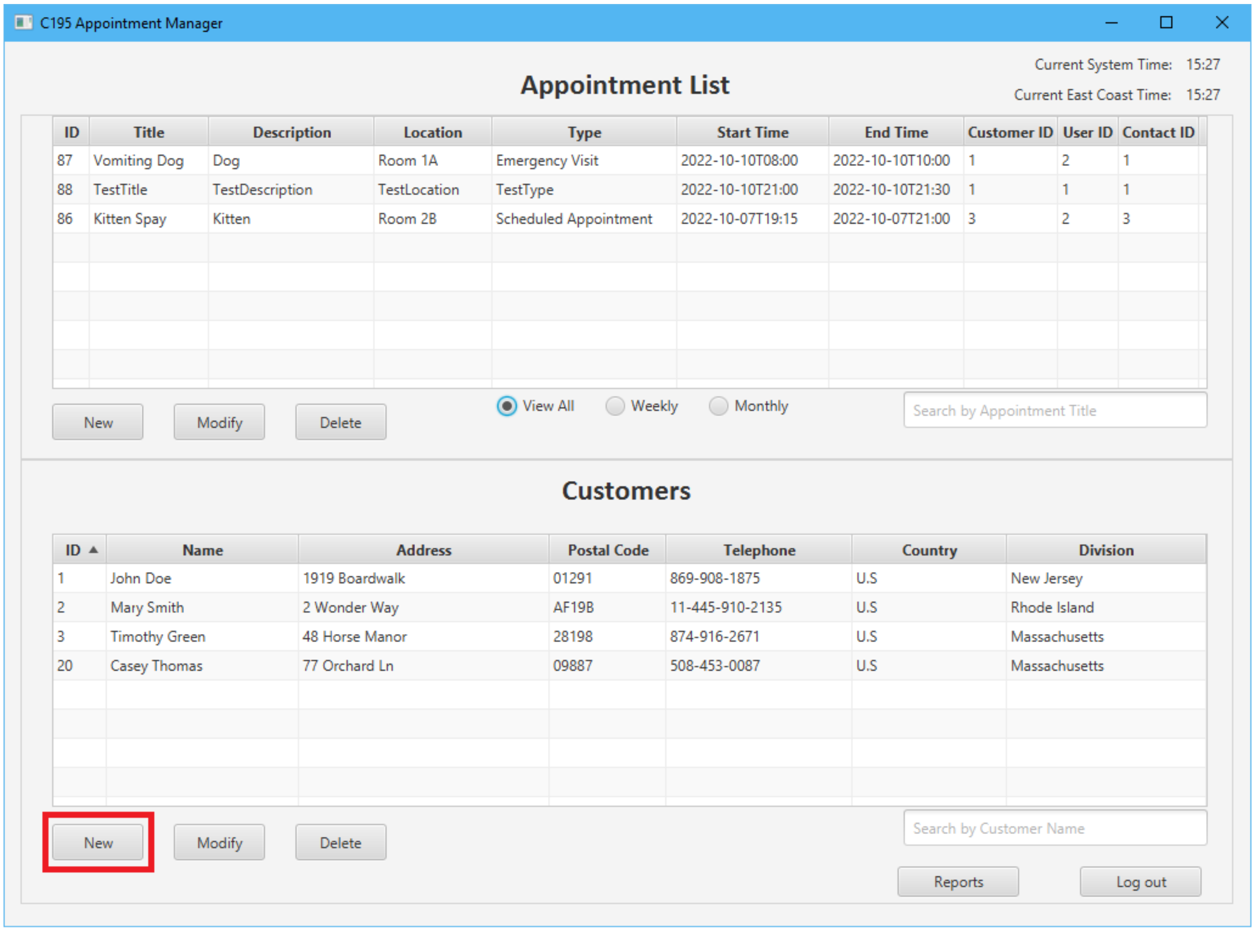


Figure 44 - New customer button

2. To create a new customer, fill out all the fields on the screen. All fields must be completed to pass validation checks.
3. Once all fields are completed, click the save button.

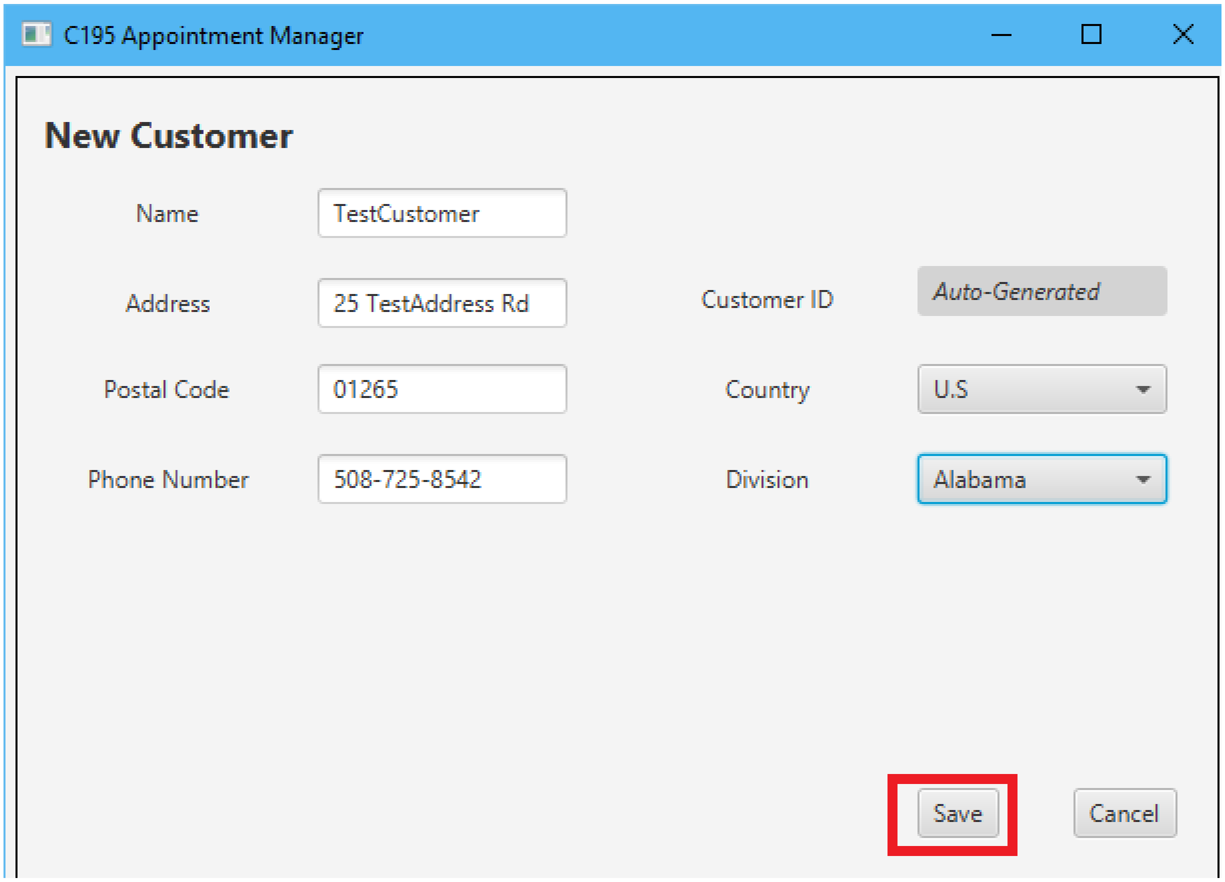


Figure 45 - Saving a new customer

4. The new customer should now display on the customer's table.

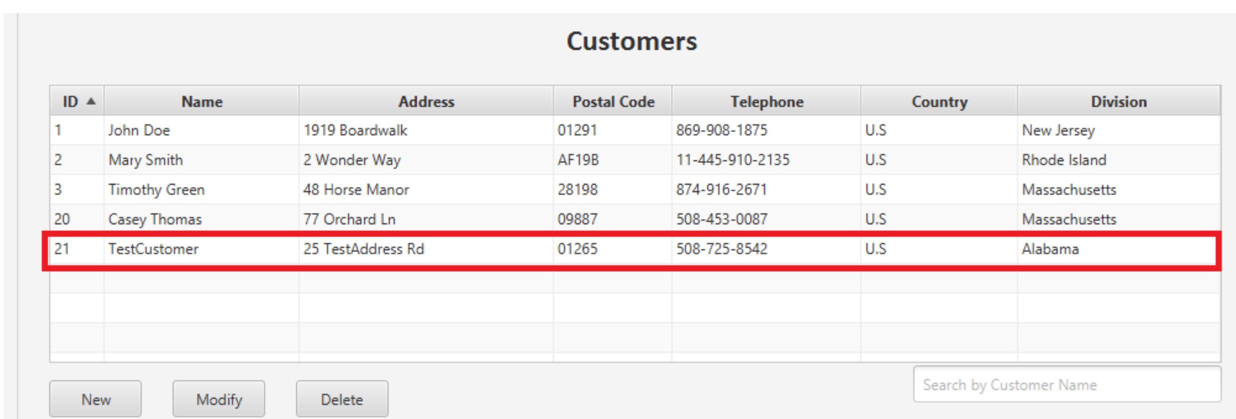


Figure 46 - New customer displayed on the table

Modifying an Existing Customer

1. Once logged in, select the existing customer to modify and click on the “Modify” button below the customer’s table.

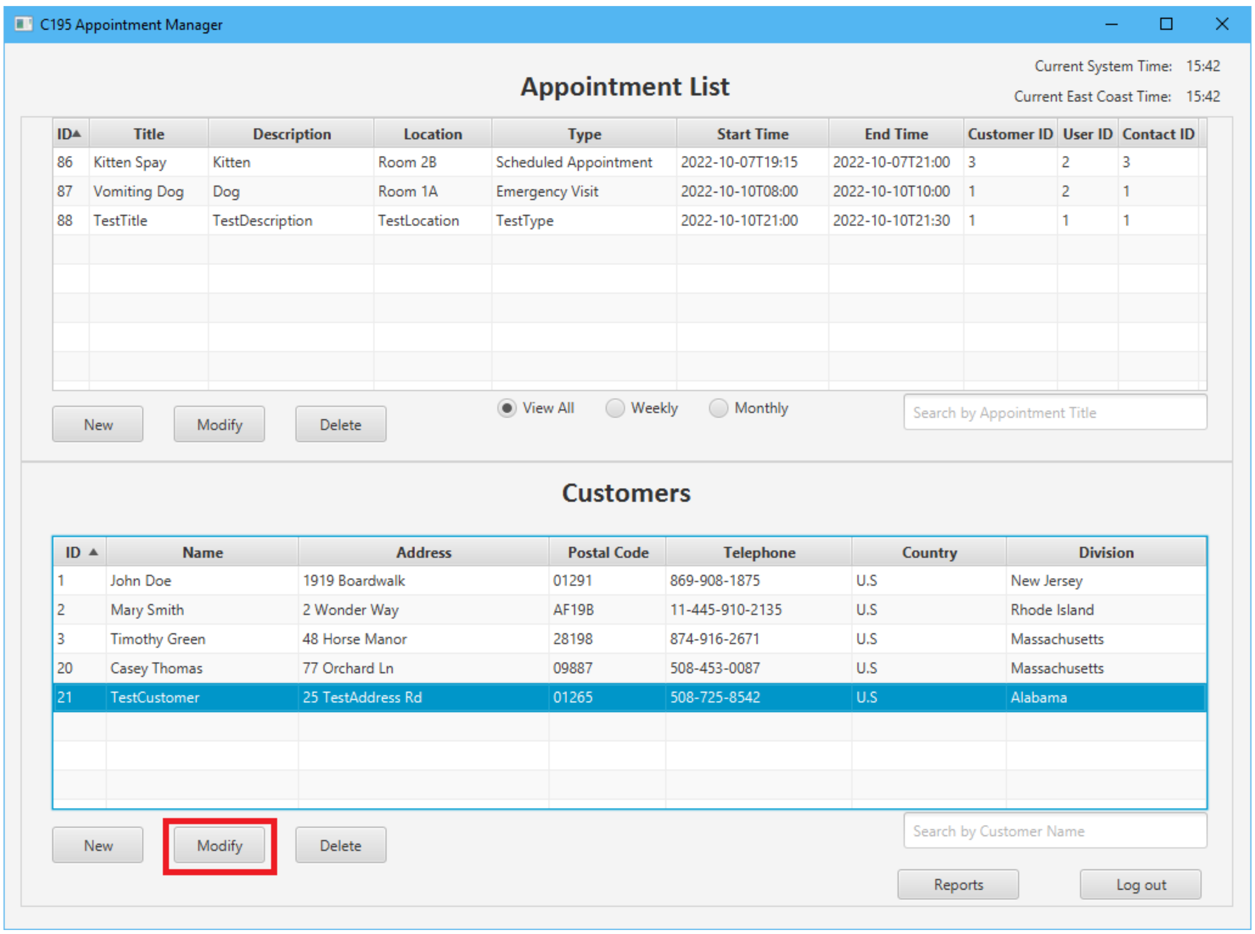


Figure 47 - Modifying an Existing Customer

2. The customer’s information will display on the modify customer screen. In this example, the customer’s name is being modified.

3. Make the desired changes to the customer, and click the “Save” button

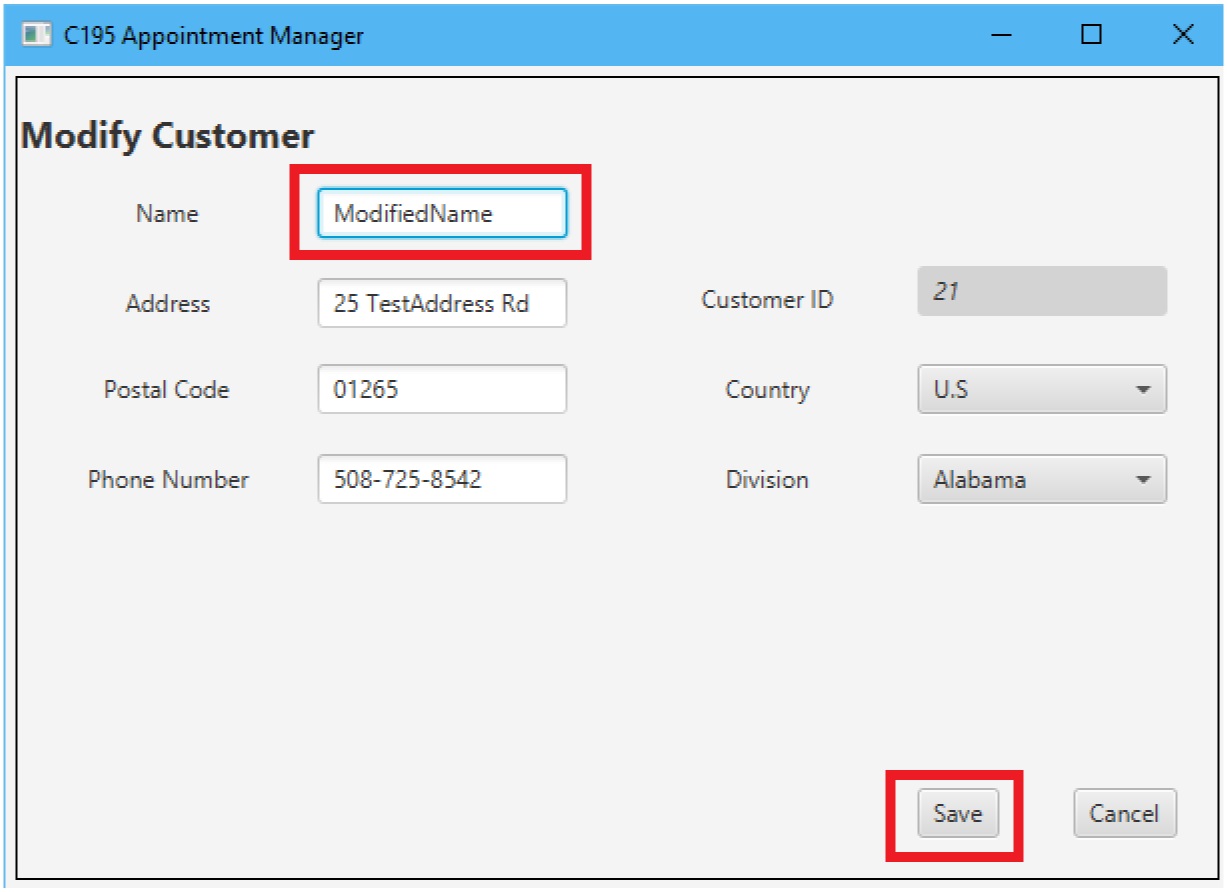


Figure 48 - Making the modifications and saving them on the modify customer screen

4. The updated customer information should be displayed on the customer's table.

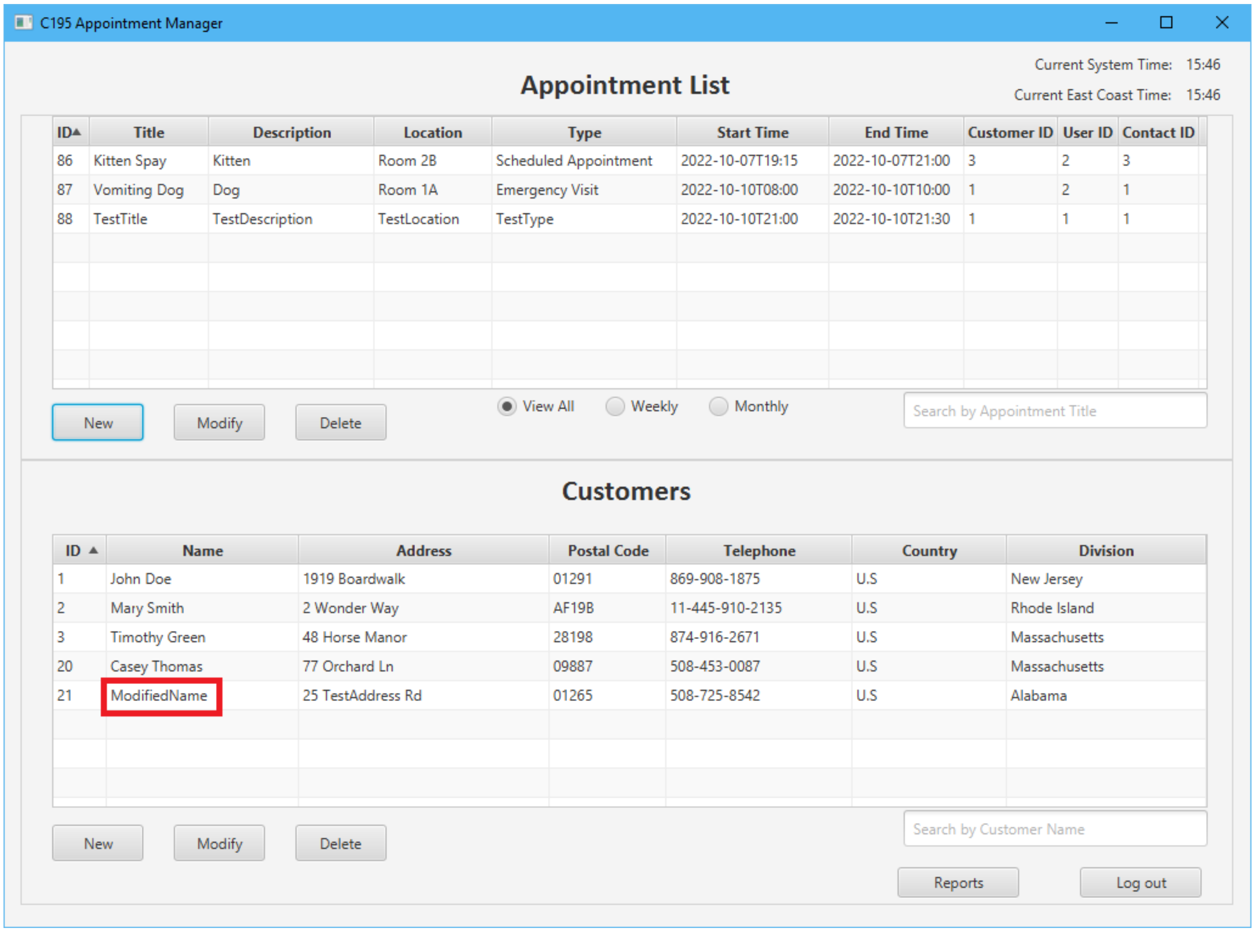


Figure 49 - Successfully modified customer

Deleting a customer

1. Log in to the application and view the main screen. Observe the Customer table and locate the customer to be deleted.
2. Select the customer and click on the “Delete” button.

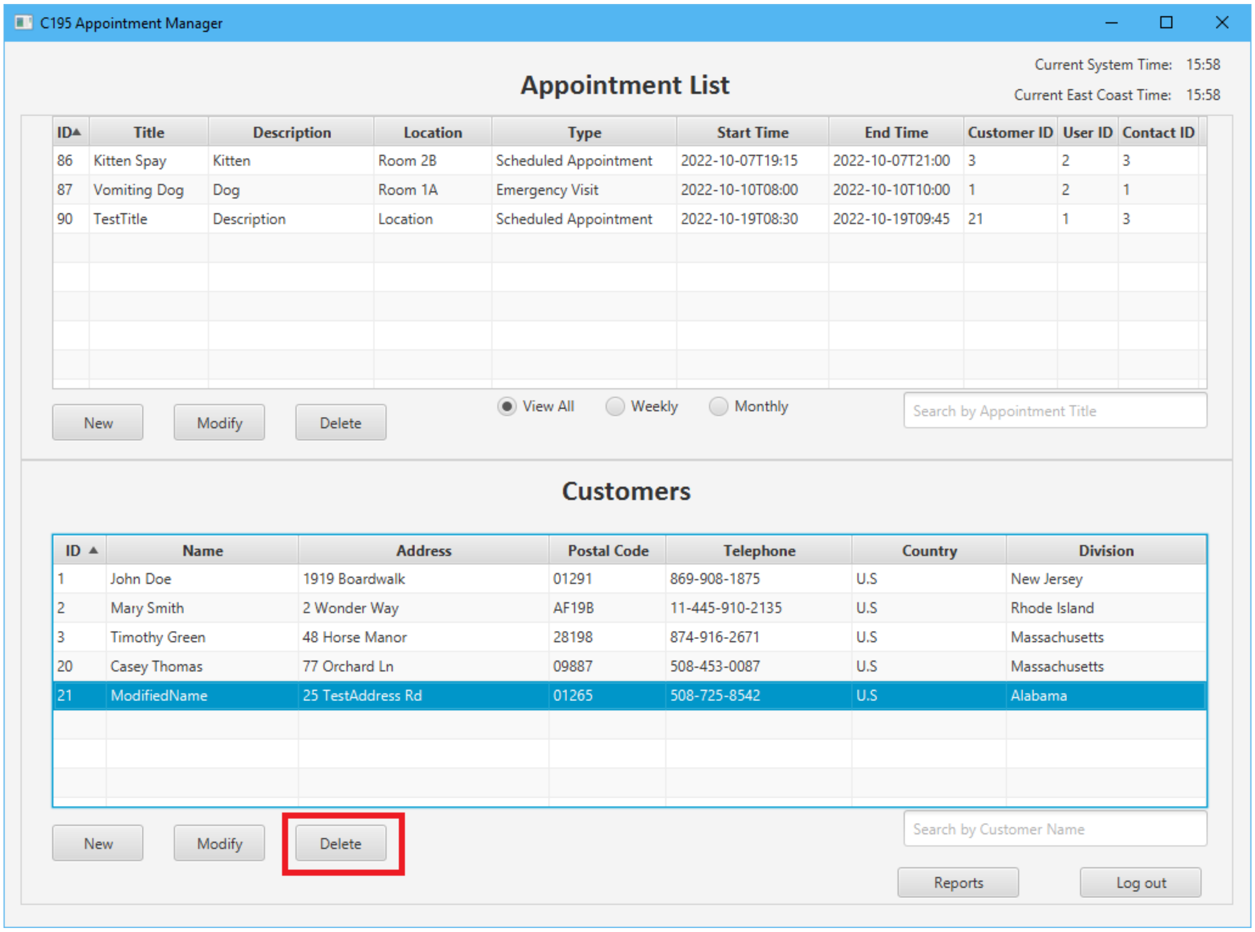


Figure 50 - Delete customer button

3. A dialog box will display letting the user know that the customer has scheduled appointments and deleting the customer will also remove any of their appointments.

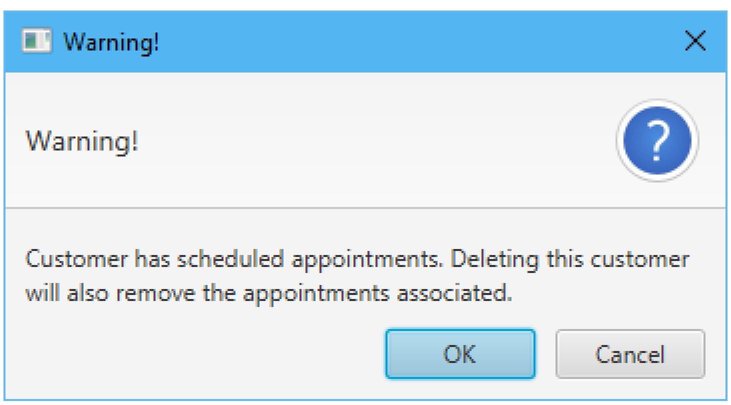


Figure 51 - Deletion warning notification

4. To continue, click “OK”, another dialog box will appear to show success.

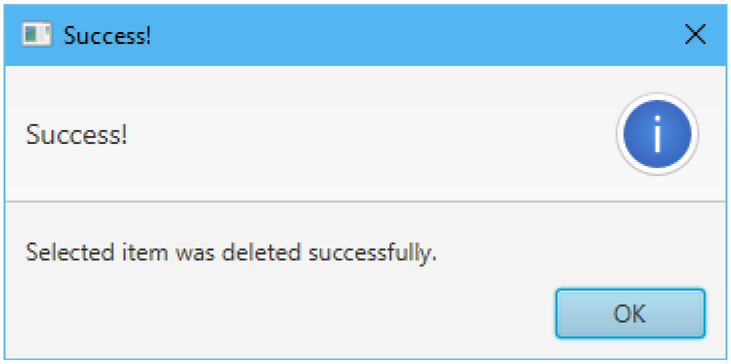


Figure 52 - Successful deletion notification

5. Both the customer and associated appointments will be removed.

Searching for a Customer/Appointment using the search field

1. Log in to the main screen and observe the two tables. Each has built-in search functionality.

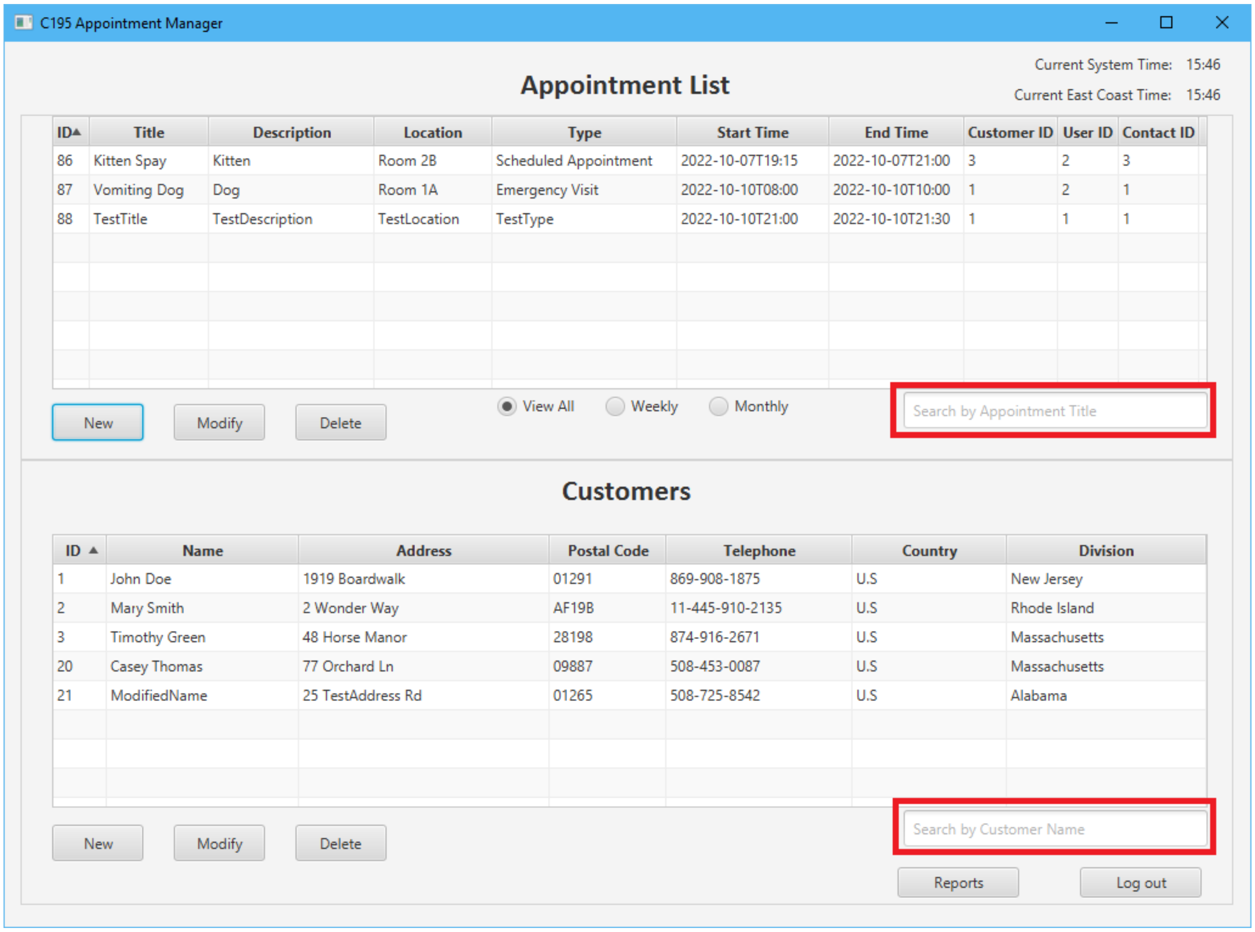


Figure 53 - Search fields for appointment and customer tables

2. To search for an appointment, enter the appointment title in the search field.

3. The appointment list will filter and display the results based on the search.

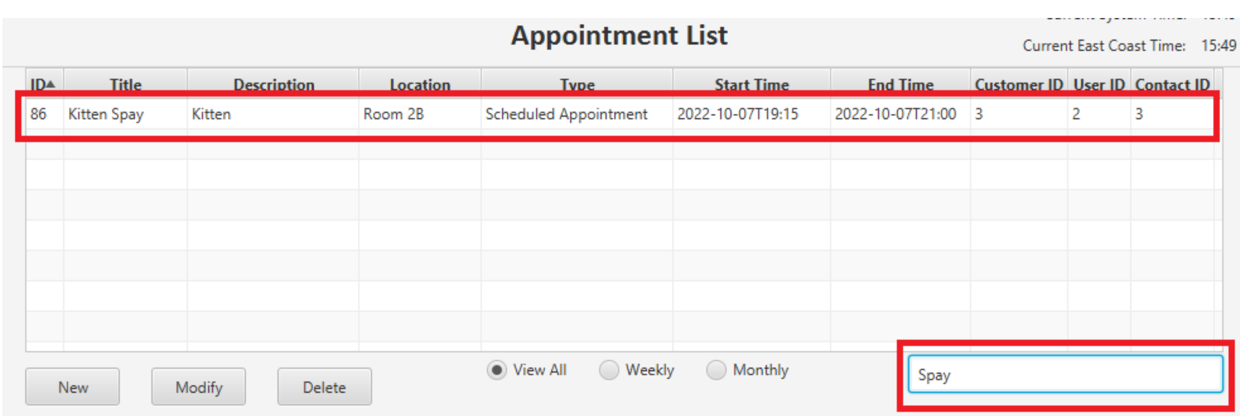


Figure 54 - Filtering appointments by the search text

4. To search for a customer, the process is the same, but now we are searching by customer name. Enter the customer's name in the search field.

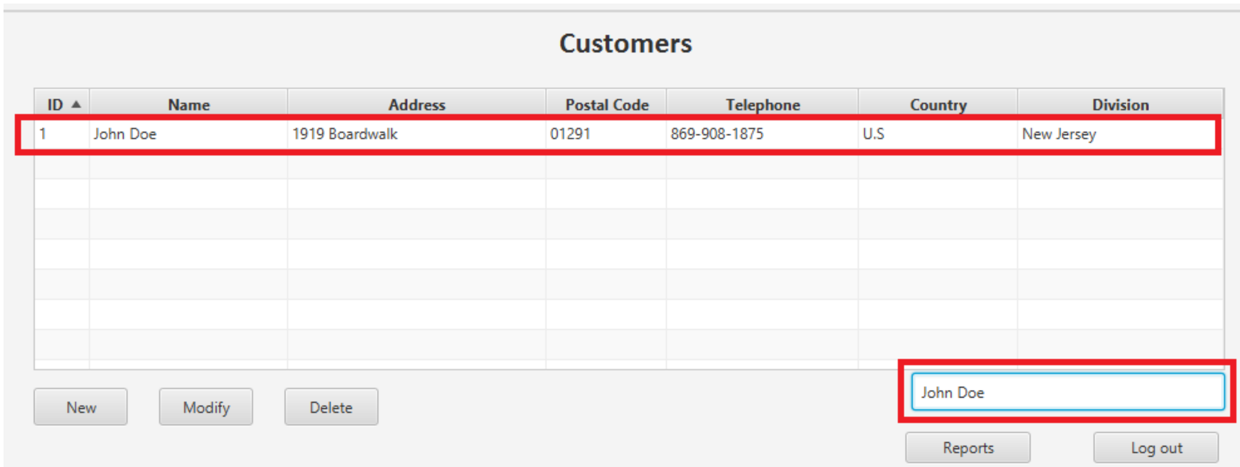


Figure 55- Filtering customers by the search text

5. The customer list will filter and display the results based on the search.
6. To clear the search criteria and return the table to default, simply delete the text in the search field.

Reports

1. Log into the application using valid credentials.
2. To view reports, click on the "Reports" button located at the bottom right of the application.

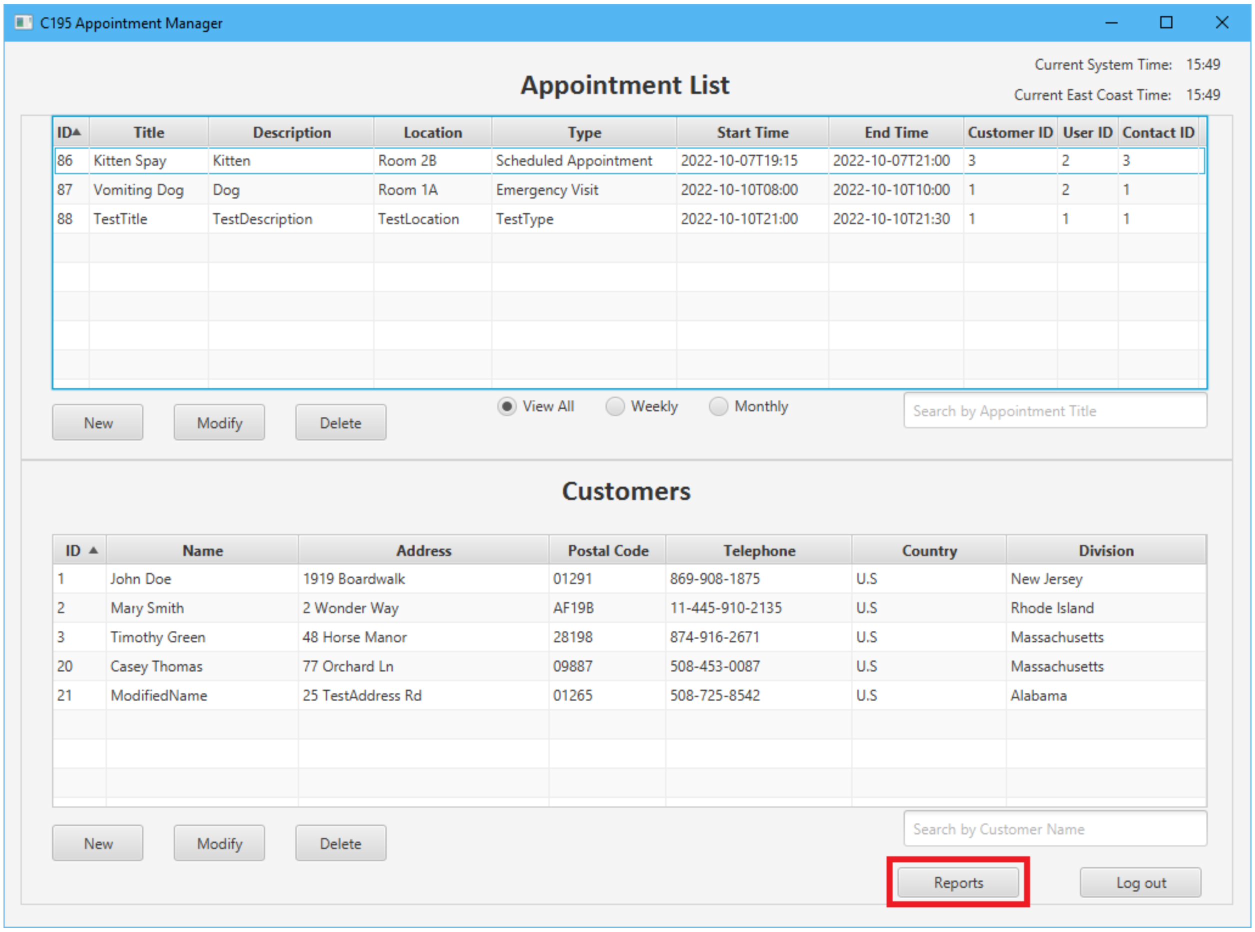
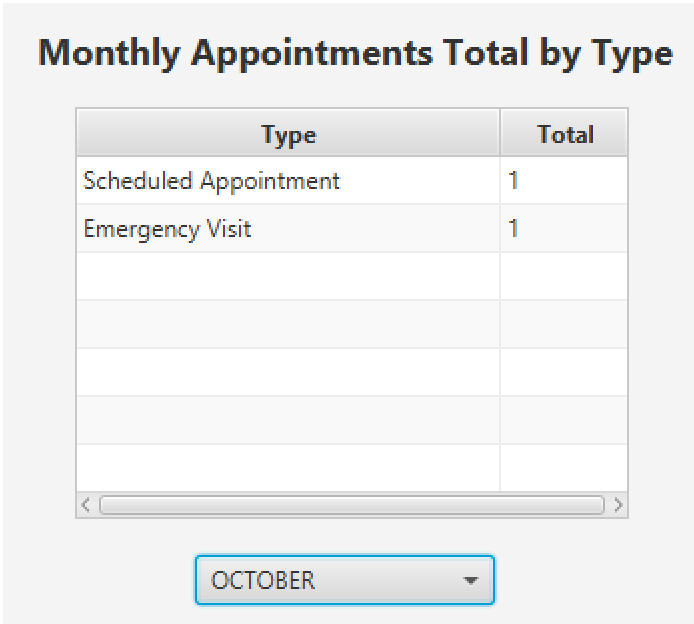


Figure 56 - Reports button

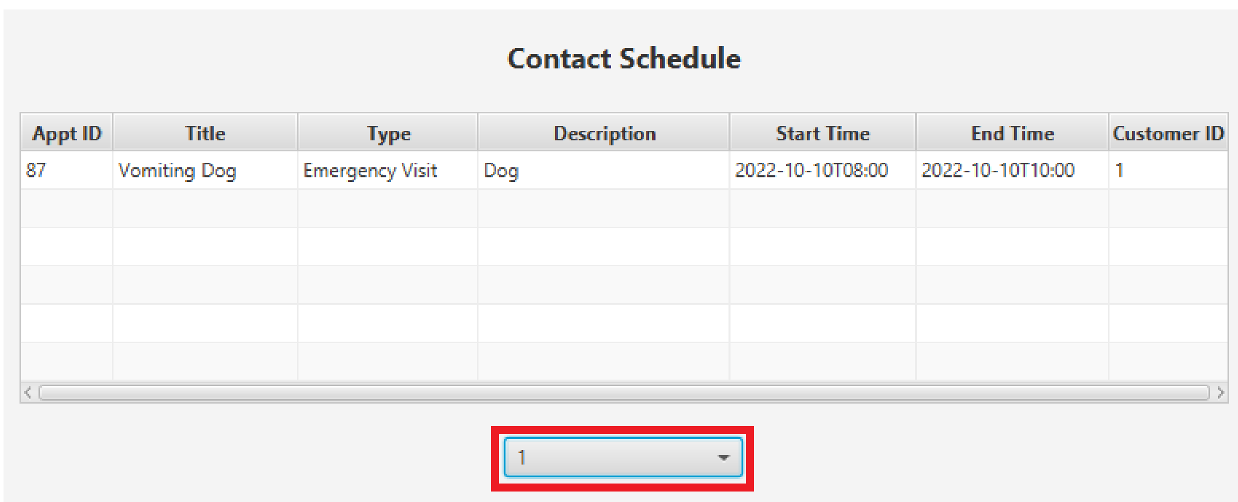
3. The reports page will display. To display monthly appointment totals by type, select the month from the month dropdown.
4. The monthly appointment totals will display



Type	Total
Scheduled Appointment	1
Emergency Visit	1

Figure 57 - Monthly Appointment Totals by Type Report

5. The steps are the same for the Contact Schedule report, but for this report, the user will select the contact ID.



Appt ID	Title	Type	Description	Start Time	End Time	Customer ID
87	Vomiting Dog	Emergency Visit	Dog	2022-10-10T08:00	2022-10-10T10:00	1

Figure 58 - Contact Schedule Report

6. No user interaction is needed for the total customer report. It will display the total number of customers in the system by default.

Figure 59 - Total Customers Report