

# WRITE-UP

Candidate 5315

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## Background

Simpson's Department Store is a family-owned shopping centre in Newtown, being handed down for three generations. In the past, it has prided itself for being a one-stop shop, offering a wide range of high-quality goods. However, like many businesses, it has struggled against online shopping, and hasn't been able to make the margins it would have in previous years, especially with rising inflation and soaring household bills.

An in-depth analysis conducted by the store discovered that a very outdated management style was being practiced, and the owner, George Simpson, acts on his own, hiring and appointing people on whims, who may not be the best fit for the assigned role. He also delegates complete responsibility for each section to section heads, which includes; staff hours, finance and sales recording, stock control including ordering, organisation and layout of the section as well as any marketing and sale strategies used. As a result, there is no store-wide cohesion in advertising, stock management, etc. In addition, there is no fixed procedure for section heads to follow if the shopping tills are short on money.

In order to cut back on costs, Simpson's has limited its sections to only include;

- Wedding dresses/bride/bridesmaids, wedding suits, mother of the bride outfits, available for purchase or hire. (Wedding shoes will also be available);
- Dress making and alterations;
- Cosmetics and beauty services;
- Household goods (bedding, china, cutlery, appliances).

In addition to these sections, Simpson's has opened the top floor of its building, in a prime location in town, for office space, in order to help cover the costs of maintaining the building.

Simpson's has also insisted on a new system, which records information about stock company-wide and accurately. This will help better cohesion between departments, and better provide support to the department heads.

## Problem Identification

### Simpsons Department Store

Simpsons Department Store has currently five departments now; office and conference facility rental; wedding dresses/bride/bridesmaids, wedding suits, mother of the bride outfits, available for purchase or hire; dress making and alterations; cosmetics and beauty services; and household goods. However, the store would prefer a system to control stock, and store and manage appointments, so I have been set the task of developing a section of a system for the store.

### Office and Conference Facility Rental

The entire store has been redesigned so that the top floor can accommodate ten office suites and one conference suite. Eight of the offices can only be leased on a yearly basis, one can be leased for six months, and one can be leased for three. Tenants must pay 20% of their rental fee in advance, and then pay every 4 weeks. The maintenance will be done by the team from Simpsons, but renters of the office space must make payments monthly for the cleaning of the facilities.

The conference suite can be booked for a half-day, full day, or a series of days. Clients must pay 20% up front and arrange catering 1 week in advance. If they arrange catering within three days of the event, they incur an additional 10% fee. Catering cannot be arranged on the day before.

### Wedding Dresses

This area is being developed and expanded, so that customers can hire or buy from a full range of wedding stock. To boost sales, Simpsons will offer 10% discount to customers buying for more than one member of the wedding party.

Appointments for customers to try on dresses need to be made at least 2 weeks in advance, including how many people are attending. There is no charge for this. Attendance at preliminary bookings and any subsequent fittings should be noted on the system.

Customers can reserve a dress for £20, during which time the store will set it aside. If the customer decides otherwise, the £20 gets refunded. If the customer does not reach out within two weeks, the store keeps the £20 and the dress is available to purchase again.

### Dress Making and Alterations

When making alterations, a client must first book an appointment with the team leader, a skilled designer. The first appointment is free. A pattern will be selected or created, and measurements taken, which requires a system to book. A deposit of £50 must be paid before work can begin.

When clients wish to have alterations made to garments, a detailed form must be completed with the client details, the nature of the alteration, cost and expected completion date. Clients are given a copy order docket detailing all the information. Clients generally pay when the work is completed but can pay at any time.

### Cosmetics and Beauty Services (Chosen Subsystem)

This is my chosen subsystem, so the problems in this subsystem will be more detailed.

Simpsons has always sold designer beauty products and will continue to do so. As a new initiative, Simpsons will open a beauty salon to the public. It will have four staff, two full-time, two part-time. The part-time staff do not work Fridays, and only work half-days the rest of the week. This is a problem, since it has been noted that Fridays are remarkably busy. The designated area for the salon comprises a small reception area and three treatment rooms as well as a small nail bar area. Bookings need to be recorded on a system in advance. However, the salon will take drop-in clients

where possible. Any member of staff must be able to make bookings, and fully record all customer details, and the treatment required. The schedule must also allow manoeuvrability in bookings in case clients change their minds. The team leader is responsible for this.

Because there are a variety of treatments that a customer can choose from, different appointments will be different lengths of time. It is important that only appointments that use the same staff member or room are booked over the same time. Also, different appointments will be charged differently because each treatment is worth a certain price.

For billing, the customer will require an invoice. Since Simpsons Department Store caters heavily to weddings, an entire wedding party could be booked under the same name, so the invoice should be able to cover a range of days as well, for ease of business.

When a client first uses the salon, they must complete a questionnaire entered online by the staff. This questionnaire relates to health issues and allergies and must be recorded before any treatment can be carried out.

#### Household Goods

This area must have tightly controlled management of stock, to accurately view the sustainability of the sales of these goods. The items must be ordered through a central system, which tracks items from order to sale to delivery. In conjunction with the bridal salon, a wedding party can choose to have items on their Wedding List from Simpsons. This list is printed for anyone who wishes to purchase a gift, or it is viewable from a terminal in-store, which provides information about which items on the list have already been purchased.

It is important for the management to get accurate weekly stock and sales figures from this section as well as summarised monthly reports. Reports on wedding lists must also be available in a comparable manner. This will enable the management to keep very tight control of the section.

## Approaches to System Development

### Waterfall (Chosen Approach)

Considered to be the more “traditional” approach to systems development, the waterfall model is a popular version of the systems development life cycle. The model follows a method that rigid and linear, not revisiting any phase of development after it has been completed.

#### Advantages

- It allows for departmentalisation and managerial control, with clear planning that allows for the project to, usually, be delivered on time.
- This also allows very good documentation to be written, since the development follows a clear plan.

#### Disadvantages

- Waterfall may fall short of expectations, since the finished product is the first version the customer sees.
- Waterfall cannot adapt to fit changes for revisions of needs or legislation, making it a huge risk to the client.

I have chosen the Waterfall methodology to use for my coursework for several reasons.

- We have all the requirements for the project laid out in the case study, which means that Waterfall is a natural choice.
- Documentation for this project is very important, since the system will be implemented store-wide, and will begin being used immediately.
- Waterfall doesn't include any prototyping, which is good because I can strictly follow the methodology with need for additional input from the “client”, who does not exist.
- Making and following a strict plan is also very useful for coursework and balancing it with other subjects that I am studying at the same time. This allows me to produce my best work in a timely manner.
- Waterfall also isn't a methodology that requires other programmers, i.e. Scrum methodology. This is useful because we must work by ourselves for the coursework and cannot pursue methodologies that require teams.

## Project Plan

Task	Subtask	Estimated Start Date	Estimated Time	Actual Start Date	Actual Time	Actual Finish Date	Resources Used
Initiation	Research Business Background	29/9/21	2 days	29/9/21	3 days	1/10/21	CCEA Case Study
	Select Subsystem	1/10/21	1 day	4/10/21	1 day	5/10/21	CCEA Case Study
	Problem Analysis	4/10/21	2 days	5/10/21	3 days	8/10/21	CCEA Case Study
	Research Methodologies	6/10/21	3 days	11/10/21	2 days	13/10/21	Internet and CCEA fact file
	Decide Methodology	11/10/21	1 day	13/10/21	1 day	14/10/21	
	Compile User Requirements	12/10/21	2 days	14/10/21	1 day	15/10/21	CCEA Case Study
Analysis	Normalisation	18/10/21	1 day	20/10/21	1 day	21/10/21	
	ER Diagram	19/10/21	1 day	21/10/21	1 day	22/10/21	
	Advanced Storyboards	20/10/21	2 days	25/10/21	4 days	29/10/21	User Requirements and Enhanced Requirements
Implementation	Create SQL for tables	22/10/21	2 days	29/10/21	1 day	30/10/21	ER Diagram
	Create table classes	26/10/21	1 day	1/11/21	1 day	2/11/21	Visual Studio 2019
	Create table "data access layer" classes	27/10/21	2 days	2/11/21	2 days	4/11/21	Visual Studio 2019
	Create forms	29/10/21	5 days	8/11/21	5 days	13/11/21	Visual Studio 2019
	Create system	5/11/21	15 days	13/11/21	40 days	23/12/21	Visual Studio 2019

Testing	Create test map and test plan	24/11/21	2 days	3/1/22	6 days	9/1/22	
	Test and document testing	26/11/21	8 days	9/1/22	10 days	19/1/22	Test Plan
	Complete corrective action on failed tests	6/12/21	1 day	26/1/22	4 days	30/1/22	Testing Document
Review	Evaluate fulfilment of user requirements	7/12/21	1 day	30/1/22	2 days	1/2/22	User Requirements and Testing Document
	Evaluate project plan and time management	8/12/21	1 day	1/2/22	2 days	3/2/22	Project Plan
	Evaluation of personal performance	9/12/21	1 day	3/2/22	2 days	5/2/22	Personal journal of system creation
	Proof-read documentation	10/12/21	2 days	5/2/22	5 days	10/2/22	Entire Write-Up

## User Requirements

- A. The system must be able to record information about appointments for the cosmetics service, including pricing
- B. The system must be easily navigable
- C. You must be able to record customers, including ways to contact them (i.e. email, mobile no, address)
- D. A customer's details may change – there must be a way to edit customers in the system
- E. Customers must be at least 12 years old, and preferably 18 years old.
- F. The system must track which customers have completed the health survey
- G. If the survey is not completed, the staff should be alerted when trying to make an appointment
- H. You shouldn't allow appointments before 9 AM and appointments after 5 PM, as this is outside the working hours of the staff
- I. There should be a way to easily view appointments for the day
- J. Appointments should be sorted by staff, so they can easily see when they are free or busy when accommodating walk-in treatments
- K. The system should also display when a member of staff isn't working so work isn't allocated to them while they are off
- L. The customer, staff, room, treatments, duration and price for an appointment must all be stored and be viewable
- M. An appointment may have to be rescheduled or cancelled – there must be a way to edit and remove appointments
- N. Appointments that have happened shouldn't be able to be changed or deleted – a record of business is required
- O. However, a staff member may want to retroactively add appointments for walk-in customers, or remove those for people who don't show up – appointments that have happened in the same day should still be editable
- P. A customer may wish to be removed from the system – this should be possible without removing all past appointments for that customer
- Q. You must be able to create invoices for customers
- R. The invoices must detail all relevant information – customer, staff, room, treatments, and total cost
- S. These invoices should be able to cover several treatments over several days
- T. There should be a user guide for instructions on how to operate the system

## Normalisation

### 0<sup>th</sup> Normal Form

APPOINTMENTS(AppointmentID, AppointmentTime, CustomerID, CustomerName, CustomerAddress, CustomerEmail, CustomerPhoneNo, CustomerSurvey, CustomerArchived, StaffID, StaffName, StaffTimes, RoomNumber, NailBar, {TreatmentID, TreatmentName, TreatmentDuration, TreatmentCost})

### Not in 1NF

- Data not atomic, e.g. CustomerName
- There is a repeating group

### 1<sup>st</sup> Normal Form

APPOINTMENTS(AppointmentID, AppointmentTime, CustomerID, CustomerTitle, CustomerForename, CustomerSurname, CustomerAddressLine1, CustomerAddressLine2, CustomerAddressCounty, CustomerAddressPostcode, CustomerEmail, CustomerPhoneNo, CustomerSurvey, CustomerArchived, StaffID, StaffTitle, StaffForename, StaffSurname, StaffTimes, RoomNumber, NailBar)

TREATMENTS(TreatmentID, AppointmentID\*, TreatmentName, TreatmentDuration, TreatmentCost)

### 1NF to 1NF

- All data made atomic
- Each field is unique
- Repeating group moved new table and called TREATMENTS

### Not in 2NF

- Not all non-key attributes rely on the primary key e.g. TreatmentName, TreatmentDuration, TreatmentCost

### 2<sup>nd</sup> Normal Form

APPOINTMENTS(AppointmentID, AppointmentTime, CustomerID, CustomerTitle, CustomerForename, CustomerSurname, CustomerAddressLine1, CustomerAddressLine2, CustomerAddressCounty, CustomerAddressPostcode, CustomerEmail, CustomerPhoneNo, CustomerSurvey, CustomerArchived, StaffID, StaffTitle, StaffForename, StaffSurname, StaffTimes, RoomNumber, NailBar)

TREATMENTS(TreatmentID, TreatmentName, TreatmentDuration, TreatmentCost)

BOOKINGS(AppointmentID\*, TreatmentID\*)

### 1NF to 2NF

- Fields that do not depend on the composite key are moved to separate tables with unique primary keys i.e. TREATMENTS split into TREATMENTS and BOOKINGS

### Not in 3NF

- There are several transitive dependencies in the APPOINTMENTS table

### 3<sup>rd</sup> Normal Form

CUSTOMERS(CustomerID, CustomerTitle, CustomerForename, CustomerSurname, CustomerAddressLine1, CustomerAddressLine2, CustomerAddressCounty, CustomerAddressPostcode, CustomerEmail, CustomerPhoneNo, CustomerSurvey, CustomerArchived)

STAFF(StaffID, StaffTitle, StaffForename, StaffSurname, StaffTimes)

ROOMS(RoomNumber, NailBar)

APPOINTMENTS(AppointmentID, CustomerID\*, StaffID\*, RoomNumber\* AppointmentTime)

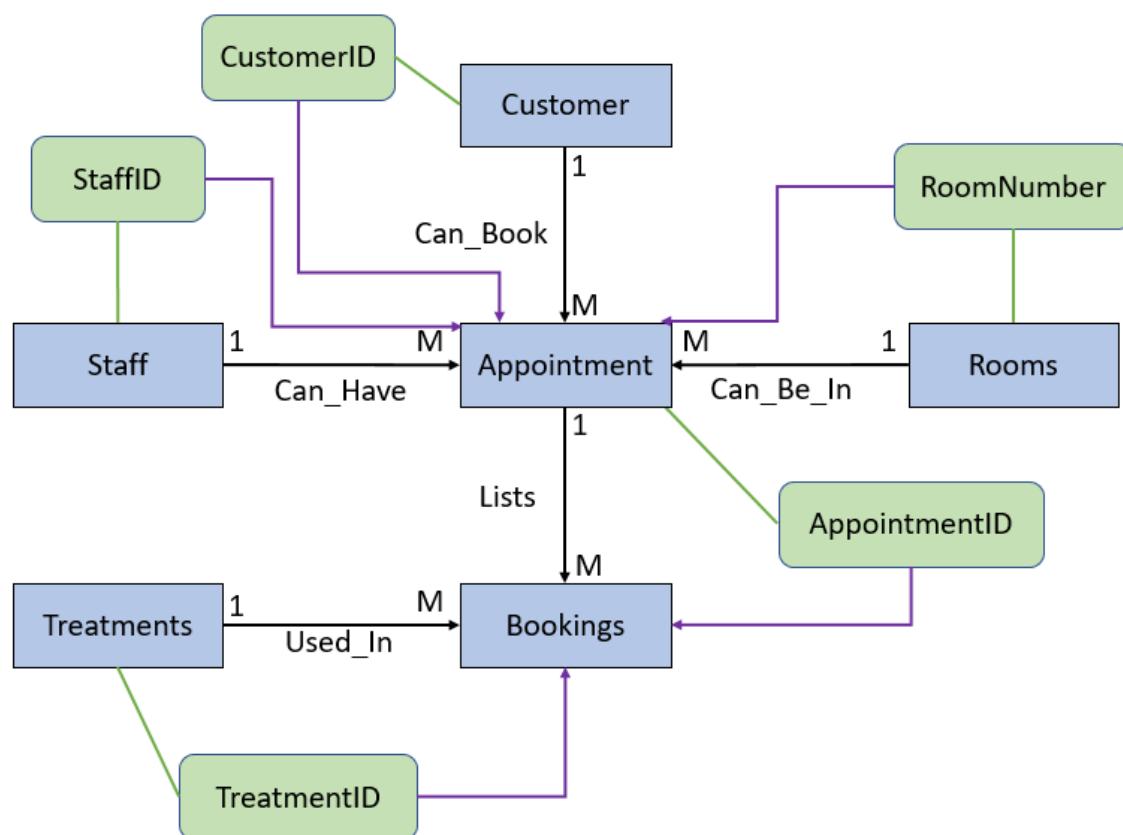
TREATMENTS(TreatmentID, TreatmentName, TreatmentDuration, TreatmentCost)

BOOKINGS(AppointmentID\*, TreatmentID\*)

### 2NF to 3NF

- No transitive dependencies i.e. Customer details moved to CUSTOMERS table, staff details moved to STAFF table, room details moved to ROOMS table

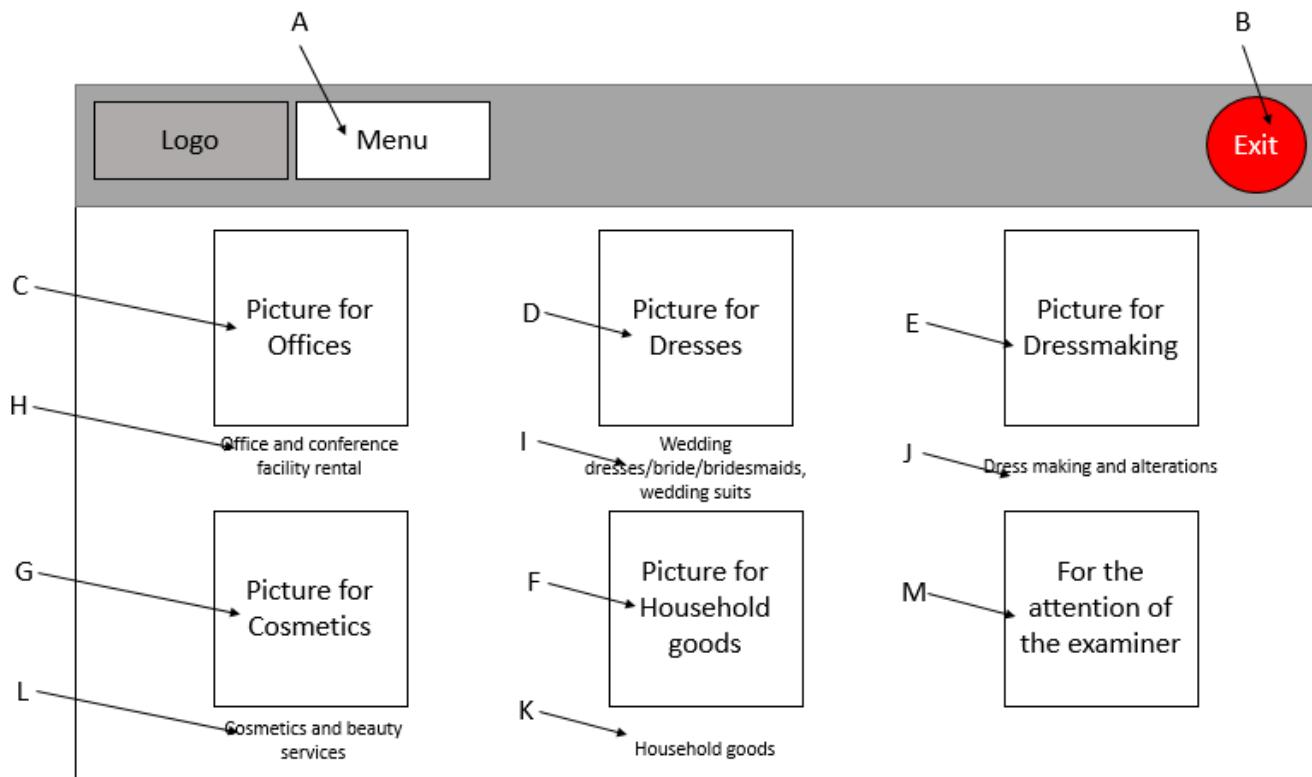
### Entity Relationship Diagram



## Advanced Storyboards

Base Menu

Storyboard



### List of Controls

Letter	Element Name	Element Type	Properties Changed	Algorithm
A	mnuMenu	Menu Strip	BackColor = 99, 99, 99 Font = Microsoft Sans Serif, 14.25pt Dock = None	1
B	picExit	Picture Box	BackColor = 99, 99, 99 Curser = Hand	2
C	picOffices	Picture Box	BackColor = 179, 236, 222 Curser = No	3
D	picDresses			
E	picAlterations			
F	picHouseholdGoods			
G	picCosmetics			4
H	lblPicOffices	Label	BackColor = 179, 236, 222 Font = Microsoft Sans Serif, 18pt	3
I	lblPicDresses			
J	lblPicAlterations			
K	lblPicHouseholdGoods			
L	lblPicCosmetics			4

M	btnExaminer	Button	Cursor = Hand Font = Microsoft Sans Serif, 14.25pt	5
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## Algorithms

1. When clicked

    Show drop-down menu

    Drop down menu item clicked

        Navigate to appropriate section of the system

2. When clicked

    Ask user if they want to exit

        If so, then exit the system

3. When clicked

    Alert user this area of the system has not been built

4. When clicked

    Bring the user to the cosmetics menu

5. When clicked

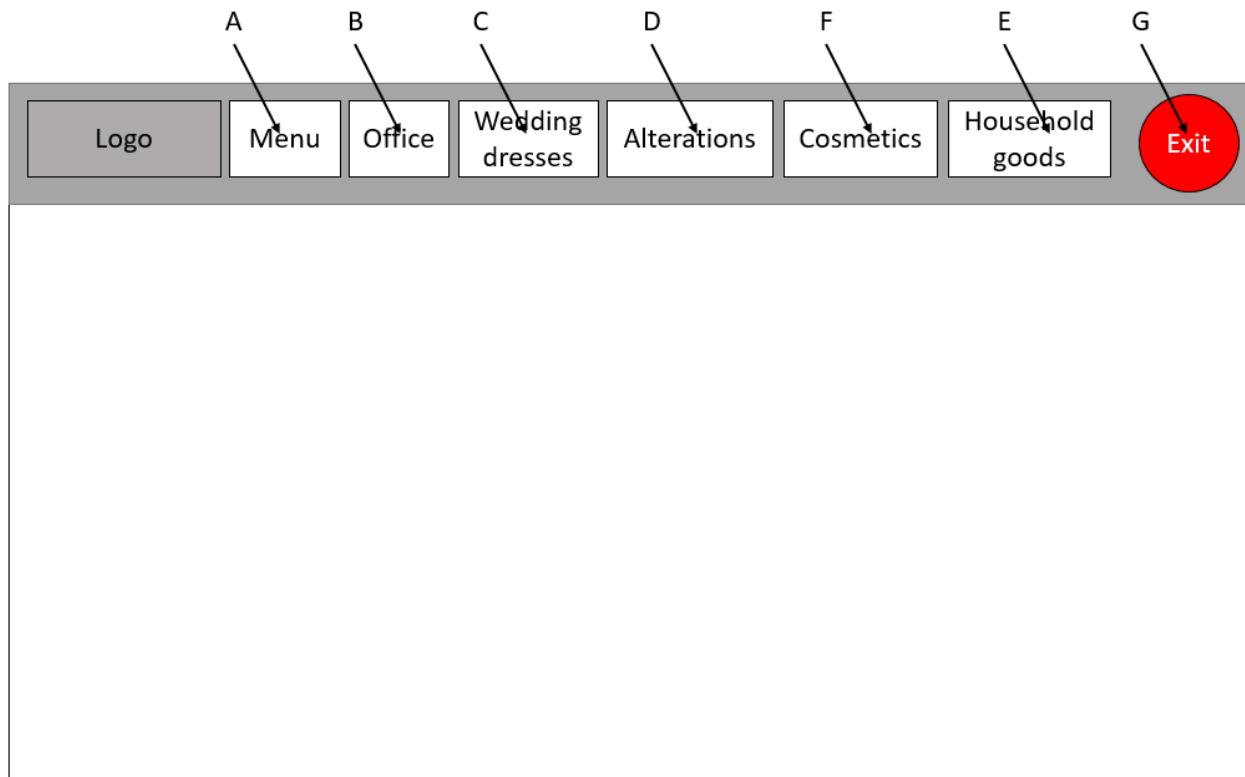
    Open the "Code Complexities" document

## Changes due to Client Feedback

- Made the labels clickable as well
- The exit button was made very easy to see – i.e. big and red

## Template form

## Storyboard



## List of Controls

Letter	Element Name	Element Type	Properties Changed	Algorithm
A	mnuMenu	Menu Strip	BackColor = 99, 99, 99 Font = Microsoft Sans Serif, 14.25pt Dock = None	1
B	picOffices	Picture Box	BackColor = 99, 99, 99 Curser = No	2
C	picDresses			
D	picAlterations			
E	picHouseholdGoods		BackColor = 99, 99, 99 Curser = Hand	3
F	picCosmetics			
G	picExit			4

## Algorithms

1. When clicked

    Show drop-down menu

    Drop down menu item clicked

        Navigate to appropriate section of the system

2. When clicked

    Alert user this area of the system has not been built

3. When clicked

    Bring the user to the cosmetics menu

4. When clicked

    Ask user if they want to exit

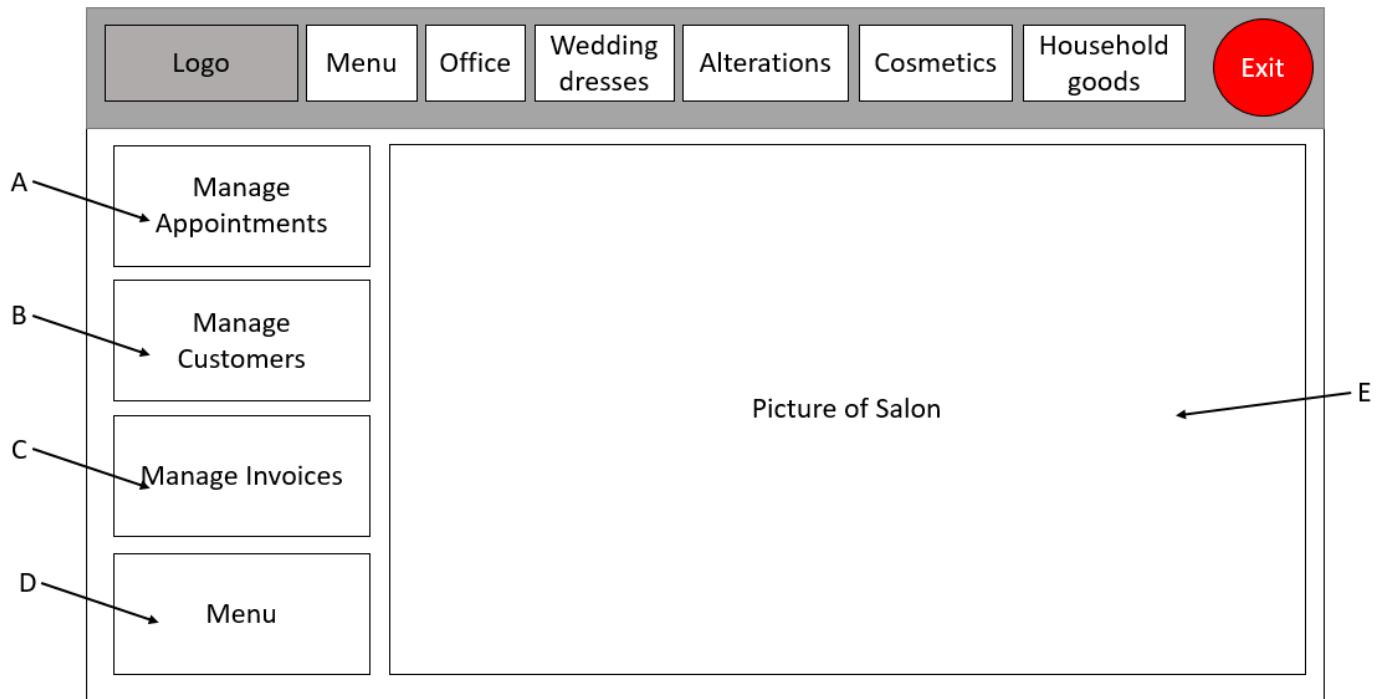
        If so, then exit the system

## Changes due to Client Feedback

- As well as the menu, have a visual representation of the different subsystems
- Made the background plain – previously was textured

## Cosmetics Menu (Inherits from Template form)

## Storyboard



## List of Controls

Letter	Element Name	Element Type	Properties Changed	Algorithm
A	btnAppointments	Button	Cursor = Hand	1
B	btnCustomers		Font = Microsoft Sans Serif, 20.25pt	2
C	btnInvoices			3
D	btnMenu			4
E	picSalon	Picture Box	BorderStyle = Fixed3D	N/A

## Algorithms

1. When clicked

Open the Manage Appointments form

2. When clicked

Open the Manage Customers form

3. When clicked

Open the Manage Invoices form

4. When clicked

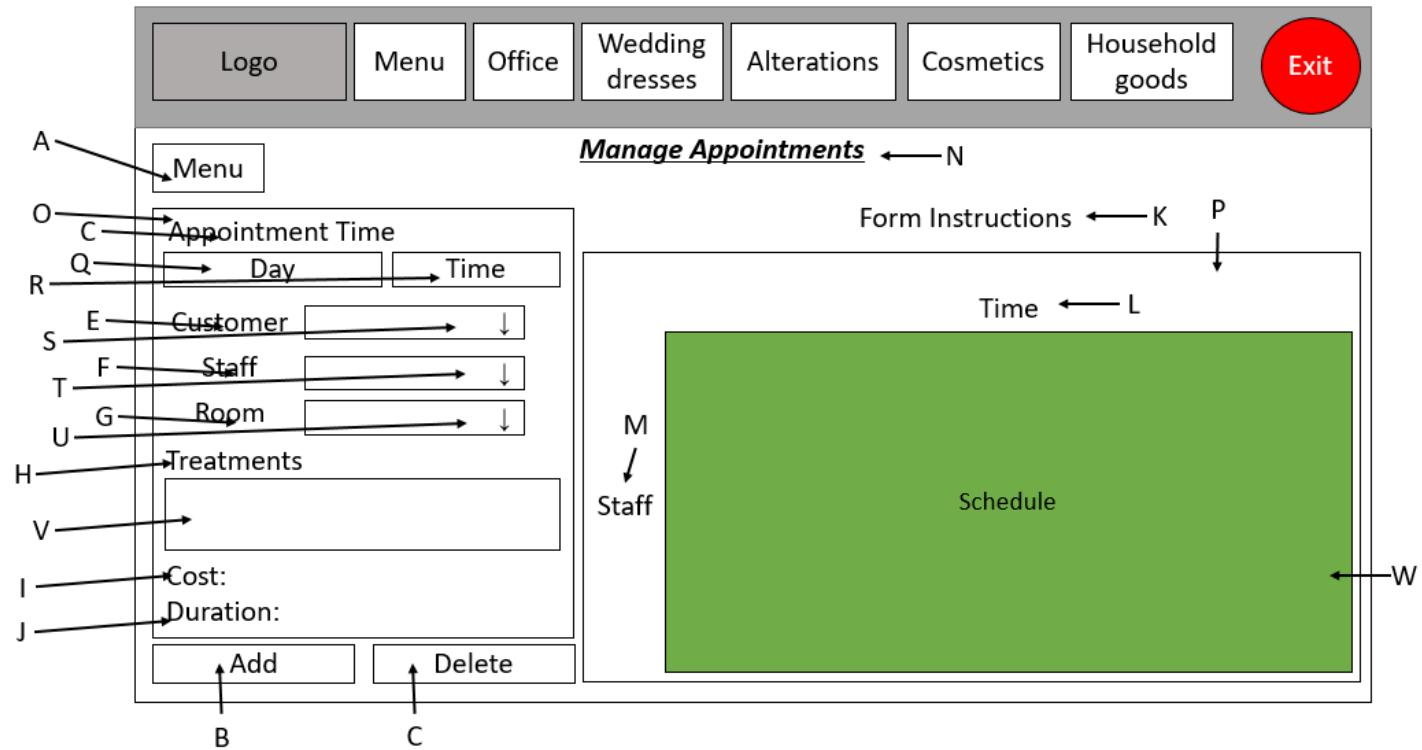
Open the Base Menu form

### Changes due to Client Feedback

- Used a picture to remove a lot of empty space
- Ordered navigation to parts of system alphabetically – with “Menu” at the bottom

## Manage Appointments (Inherits from Template form)

## Storyboard



## List of Controls

Letter	Element Name	Element Type	Properties Changed	Algorithm
A	btnMenu	Button	Cursor = Hand Font = Microsoft Sans Serif, 14.25pt	1
B	btnAddAppointment			2
C	btnDeleteAppointment			3
D	lblDptAppointmentTime	Label	BackColour = 179, 236, 222 Font = Microsoft Sans Serif, 18pt	N/A
E	lblCboCustomers			
F	lblCboStaff			
G	lblCboRoom			
H	lblCkTreatments			
I	lblCost			
J	lblDuration			
K	lblInstructions			
L	lblTime9			
	lblTime10			
	lblTime11			
	lblTime12			
	lblTime13			
	lblTime14			
	lblTime15			
	lblTime16			
M	lblStaff1			

	lblStaff2			
	lblStaff3			
	lblStaff4			
N	lblTitle			
O	picBorder1	Picture Box	BackColor = 179, 236, 222	
P	picBorder2		BorderStyle = Fixed3D	
Q	dtpAppointmentDate	Date Time Picker	Font = Microsoft Sans Serif, 14.25pt Format = Long	4
R	dtpAppointmentTime		Font = Microsoft Sans Serif, 14.25pt Format = Custom	5
S	cboCustomers	Combo Box	Font = Microsoft Sans Serif, 14.25pt	
T	cboStaff		Font = Microsoft Sans Serif, 14.25pt	
U	cboRoom		Font = Microsoft Sans Serif, 14.25pt	
V	cklTreatments	Checked List Box	Font = Microsoft Sans Serif, 14.25pt	6
W	pbgSchedule	Picture Box Grid (Custom Control)		

## Algorithms

### 1. When clicked

If fields are being edited, ask if they are sure they want to exit

If so, open Cosmetics Menu

If fields aren't being edited, open Cosmetics Menu

### 2. When clicked

If viewing an appointment, begin editing

else

Check fields are filled

If not, alert user

If adding an appointment, execute SQL to add appointment

If editing an appointment, execute SQL to edit appointment

Clear information from the fields

Reload schedule for pbgSchedule

### 3. When clicked

If adding an appointment, ask user if they're sure they want to discard appointment

If so, clear fields and exit adding an appointment

If editing an appointment, ask user if they're sure they want to discard changes

If so, clear fields and exit editing an appointment

If viewing an appointment, ask user if they're sure they want to delete appointment

If so, delete appointment and all bookings for that appointment

4. When date changed

Load day's schedule into pbgSchedule

5. When changed

If was adding/editing, check for clashes

If there are any clashes, alert user and revert to old value

Check if there any clashes for that

Repeat until no more clashes

6. When clicked

If clicked on appointment

Load appointment details into fields for viewing an appointment

If it is today or after, show btnAddAppointment and btnDeleteAppointment

If clicked on empty space

Begin adding an appointment

Show btnAddAppointment and btnDeleteAppointment

If clicked on empty space and was previously viewing a booking

Stop viewing a booking

Changes due to Client Feedback

- Bordered sections off – for cleaner look
- Schedule was made green

## Manage Customers (Inherits from Template form)

## Storyboard

## List of Controls

Letter	Element Name	Element Type	Properties Changed	Algorithm
A	btnMenu	Button	Cursor = Hand Font = Microsoft Sans Serif, 14.25pt	1
B	btnAddCustomer			2
C	btnDeleteCustomer			3
D	lblTitle	Label	BackColor = 179, 236, 222 Font = Microsoft Sans Serif, 24pt, style=Bold, Italic, Underline	N/A
E	lblInstructions		BackColor = 179, 236, 222 Font = Microsoft Sans Serif, 18pt	
F	lblCboTitle			
G	lblTxtForename			
H	lblTxtSurname			
I	lblTxtAddress			
J	lblDtpBirth			
K	lblTxtPhone			
L	lblTxtEmail			
M	txtLstCustomers	Water Mark Text Box (Custom Control)	Font = Microsoft Sans Serif, 14.25pt WaterMarkColor = Grey	4
N	txtAddressLine1			
O	txtAddressLine2			
P	txtAddressCounty			
Q	txtAddressPostcode			
R	txtForename	Text Box		

S	txtSurname		Font = Microsoft Sans Serif, 14.25pt	
T	txtPhone			
U	txtEmail			
V	lstCustomers	Listbox	BackColor = Silver Cursor = Hand Font = Microsoft Sans Serif, 14.25pt	5
W	picBorder	Picture Box	BackColor = 179, 236, 222 BorderStyle = Fixed3D	N/A
X	cboTitle	Combo Box	Font = Microsoft Sans Serif, 14.25pt	4
Y	dtpBirth	Date Time Picker	Font = Microsoft Sans Serif, 14.25pt Format = Long	4
Z	lklTxtEmail	Link Label	BackColor = 179, 236, 222 Cursor = Hand Font = Microsoft Sans Serif, 18pt	6
AA	chkSurvey	Check Box	BackColor = 179, 236, 222 Font = Microsoft Sans Serif, 18pt	4

## Algorithms

### 1. When clicked

If fields are being edited, ask if they are sure they want to exit

If so, open Cosmetics Menu

If fields aren't being edited, open Cosmetics Menu

### 2. When clicked

If adding a customer

Try to add new customer

Catch custom exceptions

If editing a customer

Find customer Id from selected index of lstCustomers

Try to edit customer

Catch custom exceptions

If viewing a customer

Enable the fields, and begin editing a customer

### 3. When clicked

If adding a customer

Ask the user if they're sure they want to discard the customer

If so, clear the fields and unselect the selected index of lstCustomers

If editing a customer

Ask the user if they're sure they want to discard the changes

If so, clear the fields and unselect the selected index of lstCustomers

If viewing a customer

Ask the user if they're sure they want to delete the customer

If so, delete the customer, clear the fields and unselect the selected index of lstCustomers

#### 4. When changed

Enable btnAddCustomer

#### 5. When selected index changed

If nothing is selected

Disable and Clear the fields

If "Add New Customer" is selected

Enable and clear the fields

If any customer is selected

Find customer ID from selected index, and populate the fields with their information

#### 6. When clicked

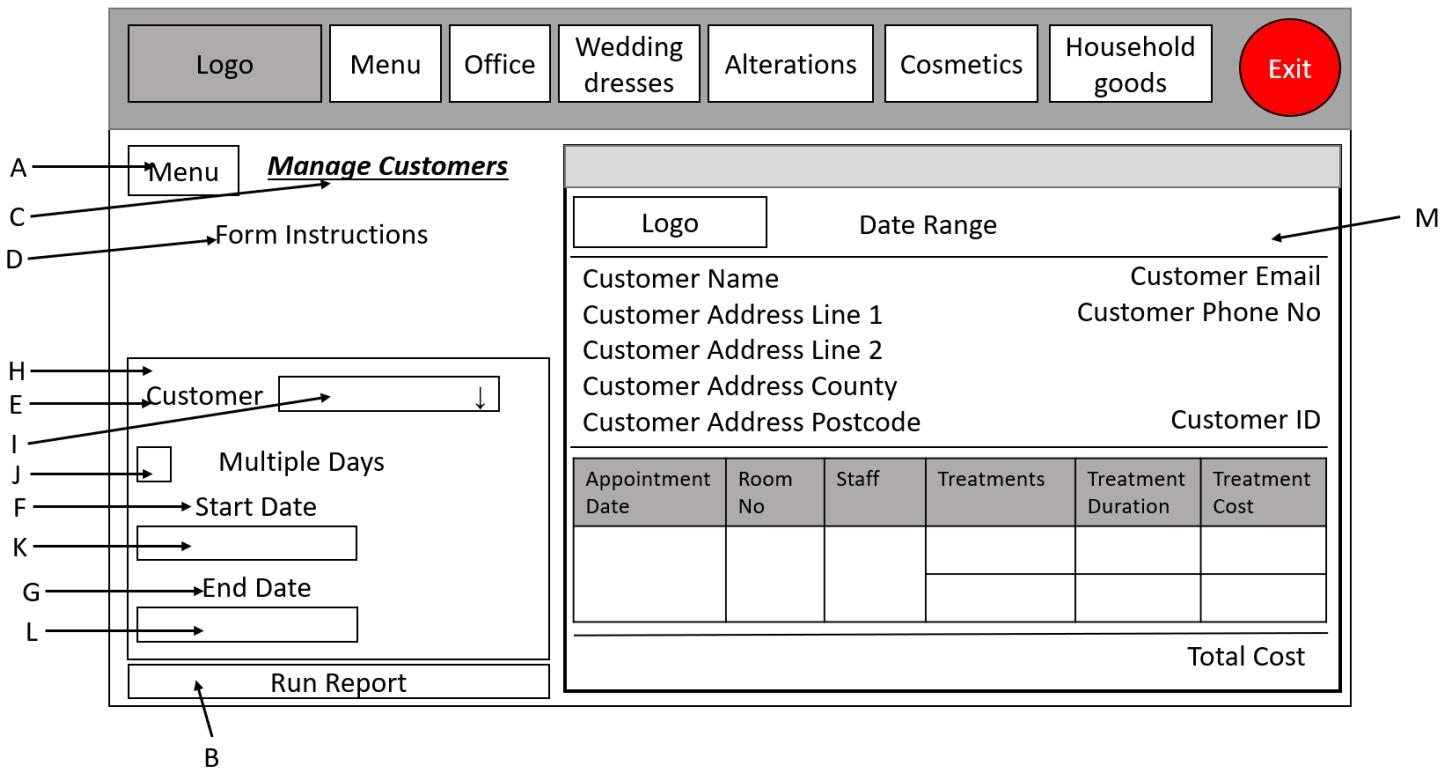
Use system to open default email program with email address autofilled

Changes due to Client Feedback

- Sections were bordered off
- Fields arranged into two vertical columns

## Manage Invoices (Inherits from Template form)

## Storyboard



## List of Controls

Letter	Element Name	Element Type	Properties Changed	Algorithm
A	btnMenu	Button	Cursor = Hand Font = Microsoft Sans Serif, 14.25pt	1
B	btnRun			2
C	lblTitle	Label	BackColor = 179, 236, 222 Font = Microsoft Sans Serif, 18pt, style=Bold, Italic, Underline	N/A
D	lblInstructions		BackColor = 179, 236, 222 Font = Microsoft Sans Serif, 18pt	
E	cboCustomers			
F	dtpDateStart			
G	dtpDateEnd			
H	picBorder	Picture Box	BackColor = 179, 236, 222 BorderStyle = Fixed3D	
I	chkDates	Check Box	BackColour = 179, 236, 222 Font = Microsoft Sans Serif, 18pt	3
K	dtpDateStart	Date Time Picker	Font = Microsoft Sans Serif, 14.25pt	N/A
L	dtpDateEnd			
M	rptInvoice	Report Viewer		

## Algorithms

1. When clicked

    Open Cosmetics Menu

2. When clicked

    Check if customer is selected

        If true, check if customer has appointment in the date range

            If true, generate report

            If customer doesn't have appointment in the date range, then alert user

        If no customer is selected, alert user

3. When check state changed

    If checked,

        Show lblDtpDateEnd and dtpDateEnd

        Change lblDtpDateStart to "Start Date"

    If not checked,

        Hide lblDtpDateEnd and dtpDateEnd

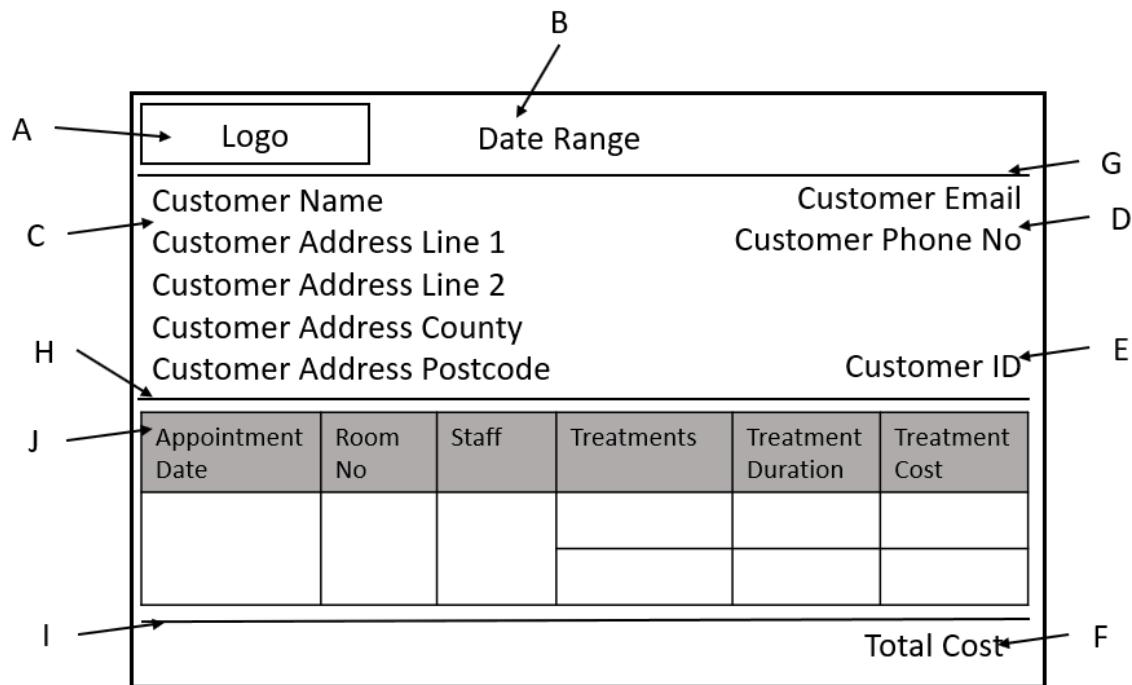
        Change lblDtpDateStart to "Date"

## Changes due to Client Feedback

- Notifies user that changes to the database will not be updated

## Report

## Storyboard

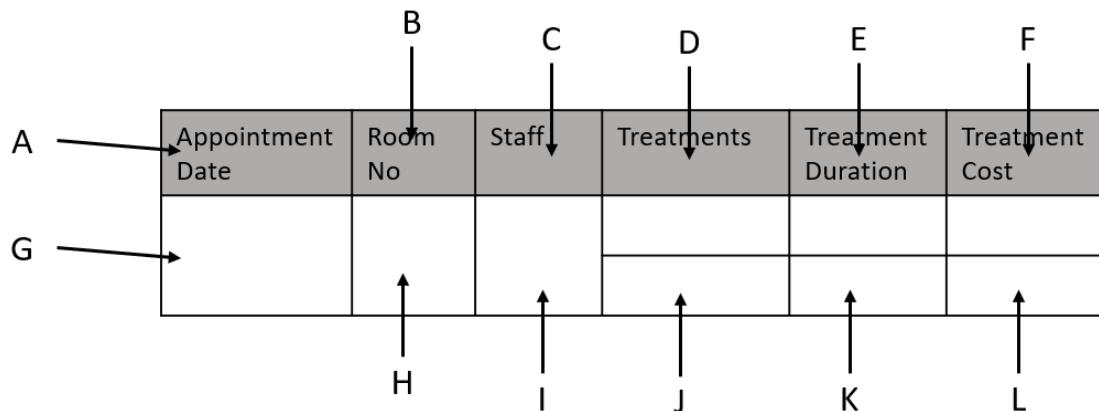


## List of Controls

Letter	Element Name	Element Type	Properties Changed	Algorithm
A	imgLogo	Image		N/A
B	txtDate	Text Box	TextAlign = Left Font = Microsoft Sans Serif, 18pt, Default, Default, Default	
C	txtNameAddress			
D	txtContactInfo		TextAlign = Right Font = Microsoft Sans Serif, 18pt, Default, Default, Default	
E	txtID			
F	txtTotalCost			
G	line1	Line		
H	line2			
I	line3			
J	tbxApointments	Tabelix		

*tbxAppointments*

## Storyboard



## List of Controls

Letter	Element Name	Element Type	Properties Changed	Algorithm	
A	txtTitleAppointmentDate	Text Box	TextAlign = Center BackgroundColor = Silver Font = Microsoft Sans Serif, 12pt, Default, Default, Default	N/A	
B	txtTitleRoomNumber				
C	txtTitleStaff				
D	txtTitleTreatments				
E	txtTitleTreatmentDuration				
F	txtTitleTreatmentCost				
G	txtAppointmentDate				TextAlign = Center Font = Microsoft Sans Serif, 12pt, Default, Default, Default
H	txtRoomNumber				
I	txtStaff				
J	tbxTreatments	Tabelix			
	→Contains txtTreatments	Label	BorderColor = Silver TextAlign = Center Font = Microsoft Sans Serif, 12pt, Default, Default, Default		
K	tbxTreatmentDuration	Tabelix			
	→Contains txtTreatmentDuration	Label	BorderColor = Silver TextAlign = Center Font = Microsoft Sans Serif, 12pt, Default, Default, Default		
L	tbxTreatmentCost	Tabelix			
	→Contains txtTreatmentCost	Label	BorderColor = Silver TextAlign = Center Font = Microsoft Sans Serif, 12pt, Default, Default, Default		

## Inputs, Processes and Outputs

### Input Specifications

Inputs for the cosmetics and beauty services will come from pre-booked appointments, likely made over the phone, or added retroactively to represent drop-in clients. Customers, if they have not used the cosmetics and beauty services before, will need their details stored in the system, including name, address, age, email, mobile phone number, and whether they have completed the survey. This information will be stored in a database.

Once a customer has their details stored in the system, they can make an appointment if they so wish. To make an appointment, the user (a member of staff) will log the details in the system, selecting the customer, staff member, room, and list of treatments that the customer wishes. They must also select a time and date and determine availability of staff and rooms by clicking a space on the schedule. When they have entered all these fields, they must click “Add Appointment” to add the appointment.

### Processes

When the user enters data for a new customer, the data will be used to make a customer object, containing name, address, contact information, survey completion and generating a new primary key. This object is then used to write the information to the database. The same process is used for editing a customer; a customer object is created, and the database is updated where the primary key in the object is the same as the primary key in the database. To delete a customer, a bit is used in the database to represent an archived customer. Deleting a customer sets this bit to 1 where the primary key matches the primary key of the selected customer.

The same principle is also implemented for appointments; the data is stored in an object, with a newly generated primary key. However, the table in the database for appointments will contain foreign keys for customer, room, and staff member, which are stored in the object. This is stored in the table, and will reference the CUSTOMERS, ROOMS, and STAFF tables respectively. When retrieving details about the appointment, the stored foreign keys will be used to find the information about the other aspects i.e. customer address, staff name, is the room the nail bar.

To store treatments, since appointments and treatments have a many-to-many relationship, a link table will be used, with the combination of the foreign keys being the primary key. This means a primary key does not need to be generated for this table. This information is used to calculate the length and cost of each appointment.

### Output Specification

The base menu will allow users to choose the department of Simpsons Department Store they would like to access. If selected, the cosmetics menu will load, displaying options to add an appointment, add a customer, generate an invoice, or return to the base menu.

When adding an appointment, when the user clicks the “Add Appointment” button, their appointment will appear on the schedule, showing that the appointment has been entered into the database. When viewing an appointment, the user has the options to edit or delete the appointment. If they are currently editing the appointment, they have the options to save changes or discard changes. If there is invalid data entered when adding or editing, the form will alert the user to the invalid data and prevent them from continuing.

There will be a visual schedule that will display all the appointments, and the times the staff aren't working, by use of picture boxes and labels. When an appointment is clicked, all the information will be populated to the fields, with the fields disabled.

When the user is using the Manage Customers form, they will see a list of all non-archived customers. When they click on a customer, their information will populate to the fields. If they are currently viewing a customer, there will be the option to edit or delete the customer. If they are editing a customer, there will be the option to save changes or to discard changes. In addition, when the user chooses the "Add New Customer" option, the fields will empty for data to be entered, and there will be add and discard options. When adding or editing a customer, if there is incorrect information, the user will be notified with a message box.

When a new customer is added, then the name will be added to the list of non-archived customers. If a customer is deleted, they are removed from the list of non-archived customers.

When the user is using the Manage Invoices form, once all of the fields have been filled with data, and the "Generate Invoice" button has been pressed, the form's report viewer will display information about the customer, all the details about appointments within the selected date range, and the total cost of the appointments.

## Testing

### Testing Strategy

My testing strategy was to test the functions present in all forms first, which included a lot of the navigation between the forms. Then I tested the system in the order a user might use the system, starting with the Base Menu, then the Cosmetics Menu, and then the Manage Appointments, Manage Customers, and Manage Invoices forms. To avoid repeated tests, tests that check functions on multiple forms, I will list the forms under the “Forms” heading in the test table. This will help in the reduction of tests which will reduce the time for testing.

### Testing Map

Area Tested	Test No.
Base menu	
• Top Menu	
○ Offices subsystem	1
○ Wedding Dresses subsystem	2
○ Alterations subsystem	3
○ Cosmetics subsystem	4
■ Manage Appointments	5
■ Manage Customers	6
■ Manage Invoices	7
○ Household Goods subsystem	8
○ Access User Guide	9
• Exit	10-12
• Offices subsystem	13-14
• Wedding Dresses subsystem	15-16
• Alterations subsystem	17-18
• Cosmetics subsystem	19-20
• Household Appliances subsystem	21-22
• For the attention of the examiner	23
Cosmetics menu	
• Manage Appointments	29
• Manage Customers	30
• Manage Invoices	31
• Menu	32
Manage Appointments	
• Displays day's appointments	43
• See appointment details when clicked on	44
• Begin adding an appointment by clicking on schedule	46-48
• Add an appointment	49
• Cancel adding an appointment	50-52
• Edit an appointment	53-58
• Cancel editing an appointment	59-61
• Deleting an appointment	62-64
• Can adjust appointment by the minute	54
• Cannot select Nail Bar when non-nail treatments are selected	74-76
• Validation	
○ Customer must be selected	71
○ Room must be selected	72

○ Treatments must be selected	73
○ If a time outside working hours is selected, then the user must be alerted, and the change should be reversed	65-66
○ If an appointment's duration would cause it to happen outside working hours, then the user must be alerted, and the change should be reversed.	67
○ If a time when a staff is not working is selected, then the user must be alerted, and the change should be reversed	68-69
○ If an appointment's duration would cause it to happen outside when a staff member is working, then the user must be alerted, and the change should be reversed	70
○ If an appointment would overlap another appointment during the same time span for the same staff member, then the user must be alerted, and the change should be reversed	80
○ If an appointment would overlap another appointment during the same time span for the same room, then the user must be alerted, and the change should be reversed	81
○ If an appointment would overlap another appointment during the same time span for the same room and that room is the Nail Bar, then the system should allow several people to be booked in there	82
○ If an appointment would overlap another appointment during the same time span for the same customer, the user should be alerted once but allowed to continue if they so wish	77-79
<b>Manage Customers</b>	
● Searching for customer with title	88
● Searching for customer with forename	89
● Searching for customer with surname	90
● Add a customer	91-92
● Edit a customer	93
● Cancel editing a customer	94
● Deleting a customer	95-97
● When customer is deleted, future bookings are deleted as well	98
<b>Validation</b>	
○ Title must be selected	99
○ Forename must be entered	100
○ Forename must not have a number in it	101
○ Surname must be entered	102
○ Surname must not have a number in it	103
○ Address Line 1 must be entered	104
○ Address Line 2 must be entered	105
○ Address County must be entered	106
○ Address Postcode must be entered	107
○ Date of birth cannot be less than 12 years ago	109
○ Mobile phone number must only have digits	110
○ Mobile phone number cannot have less than 11 digits	111
○ Mobile phone number cannot have more than 11 digits	112
○ Email must be long enough to exist	113
○ Email must have @	114
○ Email must end in a valid domain	115
<b>Manage Invoices</b>	

• Generating an invoice	116
• Generating an invoice for which there are no appointments	117
• Date text changes depending on multiple days	118
• Validation	
○ Customer must be selected	119

## Testing Summary

Test No.	Form	Reason for Test	Requirements	User Action / Test Data	Expected Outcome	Pass (T/F)	Corrective Action	Evidence Page No.
1	All Forms	Ensure that the Offices subsystem is disabled on the Top Menu	B	Click on "Top Menu", then click on "Office and Conference Facility Rental"	Nothing Happens	T		
2	All Forms	Ensure that the Wedding Dresses subsystem is disabled on the Top Menu	B	Click on "Top Menu", then click on "Wedding Dress Purchase and Hire"	Nothing Happens	T		
3	All Forms	Ensure that the Alterations subsystem is disabled on the Top Menu	B	Click on "Top Menu", then click on "Dressmaking and alterations"	Nothing Happens	T		
4	All Forms	Ensure that the Cosmetics subsystem is enabled on the Top Menu	B	Click on "Top Menu", then click on "Cosmetics and beauty services"	A second menu appears, containing the different aspects of that subsystem	T		
5	All Forms	Ensure that the Top Menu can bring you to the Manage Appointments form	B	Click on "Top Menu", then click on "Cosmetics and beauty services", then click on "Manage Appointments"	The form is switched to the Manage Appointments form	T		
6	All Forms	Ensure that the Top Menu can bring you to the Manage Customers form	B	Click on "Top Menu", then click on "Cosmetics and beauty services", then click on "Manage Customers"	The form is switched to the Manage Customers form	T		

7	All Forms	Ensure that the Top Menu can bring you to the Manage Invoices form	B	Click on “Top Menu”, then click on “Cosmetics and beauty services”, then click on “Manage Invoices”	The form is switched to the Manage Invoices form	T		
8	All Forms	Ensure that the Household Goods subsystem is disabled on the Top Menu	B	Click on “Top Menu”, then click on “Cosmetics and beauty services”	Nothing Happens	T		
9	All Forms	Ensure that the Top Menu can bring you to the User Guide	B	Click on “Top Menu”, then click on “Cosmetics and beauty services”, then click on “Access User Guide”	The User Guide is opened in the computer’s default PDF viewer	T		
10	All Forms	Ensure that the Exit button asks for confirmation		Click on the red X in the top right corner	A message box saying “Are you sure you want to exit” will appear	T		
11	All Forms	Ensure that the Exit button exits when given confirmation		Click on the red X in the top right corner, then click “Yes” in the message box	The application will close	T		
12	All Forms	Ensure that the Exit button does not exit if not given confirmation		Click on the red X in the top right corner, then click “No” in the message box	The message box will disappear	T		
13	Base Menu	Ensure that the Offices subsystem cannot be accessed		Click on the Offices picture box	A message box saying “Unfortunately, this subsystem is outside the scope of the project, given the time constraints” will appear	T		

14	Base Menu	Ensure that the Offices subsystem cannot be accessed		Click on the Offices label	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
15	Base Menu	Ensure that the Wedding Dresses subsystem cannot be accessed		Click on the Wedding Dresses picture box	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
16	Base Menu	Ensure that the Wedding Dresses subsystem cannot be accessed		Click on the Wedding Dresses label	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
17	Base Menu	Ensure that the Alterations subsystem cannot be accessed		Click on the Alterations picture box	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		

18	Base Menu	Ensure that the Alterations subsystem cannot be accessed		Click on the Alterations label	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
19	Base Menu	Ensure that the Cosmetics subsystem can be accessed		Click on the Cosmetics picture box	The form is switched to the Cosmetics Menu form	T		
20		Ensure that the Cosmetics subsystem can be accessed		Click on the Cosmetics label	The form is switched to the Cosmetics Menu form	T		
21	Base Menu	Ensure that the Household Goods subsystem cannot be accessed		Click on the Household Goods picture box	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
22	Base Menu	Ensure that the Household Goods subsystem cannot be accessed		Click on the Household Goods label	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
23	Base Menu	Ensure that the complexities		Click on the "For the attention of the examiner" button	The complexities document is opened	T		

		document can be accessed			in the computer's default PDF viewer			
24	All Forms except Base Menu	Ensure that the Offices subsystem cannot be accessed		Click on the Offices picture box at the top of the form	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
25	All Forms except Base Menu	Ensure that the Wedding Dresses subsystem cannot be accessed		Click on the Wedding Dresses picture box at the top of the form	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
26	All Forms except Base Menu	Ensure that the Alterations subsystem cannot be accessed		Click on the Alterations picture box at the top of the form	A message box saying "Unfortunately, this subsystem is outside the scope of the project, given the time constraints" will appear	T		
27	All Forms except Base Menu	Ensure that the Cosmetics subsystem can be accessed		Click on the Cosmetics picture box at the top of the form	The form will switch to the Cosmetics Menu form	T		
28	All Forms except	Ensure that the Household Goods		Click on the Household Goods picture box at the top of the form	A message box saying "Unfortunately, this	T		

	Base Menu	subsystem cannot be accessed			subsystem is outside the scope of the project, given the time constraints" will appear			
29	Cosmetics Menu	Ensure that the Manage Appointments form can be accessed		Click on "Manage Appointments"	The form will switch to the Manage Appointments form	T		
30	Cosmetics Menu	Ensure that the Manage Customers form can be accessed		Click on "Manage Customers"	The form will switch to the Manage Customers form	T		
31	Cosmetics Menu	Ensure that the Manage Invoices form can be accessed		Click on "Manage Invoices"	The form will switch to the Manage Invoices form	T		
32	Cosmetics Menu	Ensure that the Base Menu form can be accessed		Click on "Menu"	The form will switch to the Base Menu form	T		
33	Manage Appointments + Manage Customers	Ensure confirmation is asked for when "Menu" is clicked and there is unsaved data  Note: unsaved data must first be entered on Manage Customers		Click on "Menu" while adding/editing an appointment/customer	A message box saying "Are you sure you want to exit? You have unsaved data" should appear	T		
34	Manage Appointments + Manage	Ensure that the form is switched to Cosmetics menu when "Yes" is clicked		Click on "Menu" while adding/editing an appointment/customer, then click "Yes"	The message box should disappear, and the form should	T		

	Customer s				be switched to the Cosmetics menu			
35	Manage Appointments + Manage Customers	Ensure that the form is not switched to Cosmetics menu when "No" is clicked		Click on "Menu" while adding/editing an appointment/customer, then click "No"	The message box should disappear, and the form should remain the same	T		
36	Manage Appointments + Manage Customers	Ensure confirmation is asked for when the Cosmetics picture box is clicked and there is unsaved data		Click on the Cosmetics picture box while adding/editing an appointment/customer	A message box saying "Are you sure you want to exit? You have unsaved data" should appear	T		
37	Manage Appointments + Manage Customers	Ensure that the form is switched to Cosmetics menu when "Yes" is clicked		Click on the Cosmetics picture box while adding/editing an appointment/customer, then click "Yes"	The message box should disappear, and the form should be switched to the Cosmetics menu	T		
38	Manage Appointments + Manage Customers	Ensure that the form is not switched to Cosmetics menu when "No" is clicked		Click on the Cosmetics picture box while adding/editing an appointment/customer, then click "No"	The message box should disappear, and the form should remain the same	T		
39	Manage Appointments + Manage Customers	Ensure that confirmation is asked when trying to close the system and there is unsaved data		Click on the red X while adding/editing an appointment/customer	A message box saying "Are you sure you want to exit? You have unsaved data" should appear	T		

40	Manage Appointments + Manage Customers	Ensure that the system exits when "Yes" is clicked		Click on the red X while adding/editing an appointment/customer, then click "Yes"	The message box should disappear, and the system should close	T		
41	Manage Appointments + Manage Customers	Ensure that system does not exit when "No" is clicked		Click on the red X while adding/editing an appointment/customer, then click "No"	The message box should disappear, and the system should not close	T		
42	Manage Appointments	Ensure that the Cosmetics Menu form can be accessed		Click on "Menu"	The form will switch to the Cosmetics Menu form	F	Had forgotten to code button – added the code to bring user back to base menu	Pg. 66
43	Manage Appointments	Ensure that the system shows the appointments for the day	F, I	View the form	The form will display appointments	T		
44	Manage Appointments	Ensure that the appointment details are brought up when the appointment is clicked on	F, L	Click on an appointment	The fields to the left will fill with the appointment data	T		
45	Manage Appointments	Ensure that appointment details are visible when hovered over	F, I	Hover over an appointment on the schedule	A tool tip containing name, room and cost will appear	T		

46	Manage Appointments	Ensure that the correct time is calculated when the schedule is clicked on	A	Click on the 9 <sup>th</sup> slot in the 1 <sup>st</sup> row	The time should be 11:00	T		
47	Manage Appointments	Ensure that the correct staff member is calculated when the schedule is clicked on	J	Click on the 9 <sup>th</sup> slot in the 1 <sup>st</sup> row	The staff member should be Tanzi Edison	T		
48	Manage Appointments	Ensure that the fields become enabled when you click on the schedule	A	Click on the 9 <sup>th</sup> slot in the 1 <sup>st</sup> row	The fields to the left should become enabled	T		
49	Manage Appointments	Ensure that the appointment gets added to the database when “Add Appointment” is clicked	A	Click on the 9 <sup>th</sup> slot in the 1 <sup>st</sup> row. Fill in the fields with the data below: Customer: Mr. Shea McKillen Murphy Room: Nail Bar Treatments: Nails Then click on “Add Appointment”	The fields should clear, and the appointment should show up in the schedule	T		
50	Manage Appointments	Ensure that the system asks for confirmation when “Discard” is clicked	M	Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Fill in the fields with the data below: Customer: Mr. Shea McKillen Murphy Room: Nail Bar Treatments: Nails Then click on “Discard”	A message box saying, “Are you sure that you want to discard this appointment?”	T		

51	Manage Appointments	Ensure that the appointment doesn't get added to the database when "Yes" is clicked on the "Discard" message box	M	Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Fill in the fields with the data below: Customer: Mr. Shea McKillen Murphy Room: Nail Bar Treatments: Nails Then click on "Discard" and then click on Yes	The message box should disappear, the fields should clear, and the appointment should disappear	T		
52	Manage Appointments	Ensure that the appointment doesn't get discarded when "No" is clicked on the "Discard" message box	M	Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Fill in the fields with the data below: Customer: Mr. Shea McKillen Murphy Room: Nail Bar Treatments: Nails Then click on "Discard" and then click on No	The message box should disappear	T		
53	Manage Appointments	Ensure that when viewing an appointment and "Edit Appointment" is clicked, the fields enable to be edited	M	Click on any appointment, then click on "Edit Appointment"	The fields should enable	T		
54	Manage Appointments	Ensure that when editing an appointment, changing the time field changes the time on the schedule	M	Click on any appointment, then click on "Edit Appointment", then add 6 minutes to the Appointment Time	The appointment should move forward 6 minutes on the schedule	T		
55	Manage Appointments	Ensure that when editing an appointment,	M	Click on any appointment, then click on "Edit Appointment", then add or	The appointment should get longer or	T		

		changing the length by adding or removing treatments changes the length on the timetable		remove the “Nails” treatment	shorter on the schedule			
56	Manage Appointments	Ensure that when editing an appointment, changing the details of the appointment update the text on the appointment label	M	Click on any appointment, then click on “Edit Appointment”, then change the customer	The text on the appointment label should update on the schedule	F	No corrective action was taken – due to time constraints, I was unable to fix this error	Pg. 68
57	Manage Appointments	Ensure that when editing an appointment, changing the details of the appointment update the tool tip on the appointment label	M	Click on any appointment, then click on “Edit Appointment”, then change the customer, then hover over the appointment	The text on the tool tip should update	F	No corrective action was taken – due to time constraints, I was unable to fix this error	Pg. 70
58	Manage Appointments	Ensure when saving changes to an appointment, the changes get saved to the database	M	Click on any appointment, then click on “Edit Appointment”, then change the customer, then click “Save Changes”	The label should update on the schedule	T		
59	Manage Appointments	Ensure when discarding changes to the appointment, the system asks for confirmation	M	Click on any appointment, then click on “Edit Appointment”, then change the customer, then click “Discard Changes”	A message box saying, “Are you sure you want to discard changes to this appointment?”	T		

60	Manage Appointments	Ensure that changes are discarded when “Yes” is clicked	M	Click on any appointment, then click on “Edit Appointment”, then change the customer, then click “Discard Changes”, then click “Yes”	The message box should disappear, the fields should clear, and the customer should revert on the schedule	T		
61	Manage Appointments	Ensure that changes are not discarded when “No” is clicked		Click on any appointment, then click on “Edit Appointment”, then change the customer, then click “Discard Changes”, then click “No”	The fields should not clear, and the change should not be reverted	T		
62	Manage Appointments	Ensure that confirmation is asked for when trying to delete an appointment	M	Click on any appointment, then click on “Delete Appointment”	A message box saying, “Are you sure you want to delete?” should appear	T		
63	Manage Appointments	Ensure that the appointment is deleted when “Yes” is clicked	M	Click on any appointment, then click on “Delete Appointment”, then click “Yes”	The message box should disappear, and the appointment should disappear from the schedule	T		
64	Manage Appointments	Ensure that the appointment is not deleted when “No” is clicked	M	Click on any appointment, then click on “Delete Appointment”, then click “No”	The message box should disappear, and the appointment should still be present on the schedule	T		
65	Manage Appointments	Ensure that a time cannot be selected before the store opens	H	Click on any slot in the schedule, and set the time to 8:00	A message box saying, “You cannot book a time before the store opens.	F	Stored the current time as a datetime in the form.	Pg. 72

					Please select another time." should appear, and the change should be reversed		When the date time picker for the time was changed, it checked if it was before 9:00, and if so, let the user know and set the time to be the datetime stored. Otherwise, set the new time to be the date time.	
66	Manage Appointments	Ensure that a time cannot be selected after the store has closed	H	Click on any slot in the schedule, and set the time to 17:45	A message box saying, "You cannot book an appointment that runs into closing time. Please select an earlier time." should appear, and the change should be reversed	T		
67	Manage Appointments	Ensure that an appointment's duration cannot cause it to happen when the store is closed	H	Click on the 16:45 slot in the schedule, and select the hair treatment	A message box saying, "You cannot book an appointment that runs into closing time. Please select an earlier time."	T		

					should appear, and the change should be reversed			
68	Manage Appointments	Ensure that a time cannot be selected where a staff member is not working	K	Click on a time when a staff member is not working (the grey sections) on the schedule	A message box saying, "Sorry, [staff member] is not working at this time. Please select another time or date." should appear	T		
69	Manage Appointments	Ensure that a time cannot be selected where a staff member is not working	K	Change the time when adding/editing an appointment so that it coincides with a time a staff member is not working	A message box saying, "Sorry, [staff member] is not working at this time. Please select another time or date." should appear, and the change should be reversed	T		
70	Manage Appointments	Ensure that an appointment's duration cannot cause it to overlap with a time where a staff member is not working	K	Add a treatment when adding/editing an appointment so that it coincides with a time a staff member is not working	A message box saying, "Sorry, [staff member] is not working at this time. Please select another time or date." should appear, and the change should be reversed	T		
71	Manage Appointments	Ensure that a customer must be selected when adding/editing an appointment	L	Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Fill in the fields with the data below: Customer: Leave blank Room: Nail Bar	A message box saying, "You have not selected a customer. Please select one to	T		

				Treatments: Nails Then click on "Add Appointment"	"continue" should appear			
72	Manage Appointments	Ensure that a room must be selected when adding/editing an appointment	L	Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Fill in the fields with the data below: Customer: Mr. Shea McKillen Murphy Room: Leave blank Treatments: Nails Then click on "Add Appointment"	A message box saying, "You have not selected a room. Please select one to continue" should appear	T		
73	Manage Appointments	Ensure that at least one treatment must be selected to make an appointment	L	Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Fill in the fields with the data below: Customer: Mr. Shea McKillen Murphy Room: Nail Bar Treatments: Leave blank Then click on "Add Appointment"	A message box saying, "You have not selected a treatment. Please select one to continue" should appear	T		
74	Manage Appointments	Ensure that when a non-nails treatment is selected, then the Nail Bar option is removed		Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Select the Haircut treatment, then click on the rooms drop-down list	The Nail Bar option should not be present	T		
75	Manage Appointments	Ensure that when there are no treatments, the Nail Bar option is present		Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Then click on the rooms drop-down list	The Nail Bar option should be present	F	This error arose because the Nail Bar option was removed in some previously	Pg. 75

							edited/added appointment, then when creating this one, it was never added back. When adding an appointment, it automatically adds back the Nail Bar option if it's missing.	
76	Manage Appointments	Ensure that when only the nails treatment is selected, then the Nail Bar option is present		Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Select the Nails treatment, then click on the rooms drop-down list	The Nail Bar option should be present	T		
77	Manage Appointments	Ensure that the user is notified if there are two appointments that overlap that have the same customer		Click on the 9 <sup>th</sup> slot in the 1 <sup>st</sup> row. Fill in the fields with the data below: Customer: Mr. Shea McKillen Murphy Room: Nail Bar Treatments: Nails Then click on "Add Appointment"  Click on the 9 <sup>th</sup> slot in the 3 <sup>rd</sup> row. Fill in the fields with the data below:	A message box saying "This customer already has an appointment at the same time. Are you sure you want to double book this customer?" should appear	T		

				Customer: Mr. Shea McKillen Murphy				
78	Manage Appointments	Ensure that the user can continue if they select "Yes"		<p>Click on the 9<sup>th</sup> slot in the 1<sup>st</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Shea McKillen Murphy</p> <p>Room: Nail Bar</p> <p>Treatments: Nails</p> <p>Then click on "Add Appointment"</p> <p>Click on the 9<sup>th</sup> slot in the 3<sup>rd</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Shea McKillen Murphy</p> <p>Then click "Yes"</p>	The message box disappears, the fields clear and the appointment gets added to the schedule	T		
79	Manage Appointments	Ensure that the changes are reverted if the user selects "No"		<p>Click on the 9<sup>th</sup> slot in the 1<sup>st</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Shea McKillen Murphy</p> <p>Room: Nail Bar</p> <p>Treatments: Nails</p> <p>Then click on "Add Appointment"</p> <p>Click on the 9<sup>th</sup> slot in the 3<sup>rd</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Shea McKillen Murphy</p>	The message box disappears and the change is reverted	T		

				Then click "No"				
80	Manage Appointments	Ensure that two appointments cannot overlap when they have the same staff member		<p>Click on the 9<sup>th</sup> slot in the 1<sup>st</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Shea McKillen Murphy</p> <p>Room: Nail Bar</p> <p>Treatments: Nails</p> <p>Then click on "Add Appointment"</p> <p>Click on the 8<sup>th</sup> slot in the 1<sup>st</sup> row. Then set the time to be 15 minutes later</p>	A message box saying "You cannot book an appointment that overlaps with another appointment. Please select a different time." should appear	T		
81	Manage Appointments	Ensure that two appointments cannot happen during the same time when they have the same room		<p>Click on the 9<sup>th</sup> slot in the 1<sup>st</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Shea McKillen Murphy</p> <p>Room: Room 2</p> <p>Treatments: Nails</p> <p>Then click on "Add Appointment"</p> <p>Click on the 9<sup>th</sup> slot in the 3<sup>rd</sup> row. Fill in the fields with the data below:</p> <p>Room: Room 2</p>	A message box saying "You cannot book an appointment for the same room at the same time. Please select another room." should appear	T		
82	Manage Appointments	Ensure that two appointments that have the same room can happen during the same time when		<p>Click on the 9<sup>th</sup> slot in the 1<sup>st</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Shea McKillen Murphy</p>	Nothing happens	F	The room check was happening regardless of the Nail Bar. I	Pg. 77

		the room is the Nail Bar		<p>Room: Nail Bar Treatments: Nails Then click on "Add Appointment"</p> <p>Click on the 9<sup>th</sup> slot in the 3<sup>rd</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Andrew Totten Room: Nail Bar Treatments: Nails</p>			introduced a second check that prevented this from happening if the room object was the Nail Bar.	
83	Manage Customers	Ensure that the Cosmetics Menu form can be accessed		Click on "Menu"	The form will switch to the Cosmetics Menu form	T		
84	Manage Customers	Ensure that a list of the non-archived customers is viewable	C	View the form	The form will show a list of the non-archived customers	T		
85	Manage Customers	Ensure that the customer details are viewable when they are clicked on	C	Click on a customer	The fields to the right will fill with the selected customer's name (and other details)	T		
86	Manage Customers	Ensure that the fields are disabled when being viewed		Click on a customer	The fields to the right should be disabled	T		
87	Manage Customers	The fields on the right are enabled when "Add New Customer" is selected		Click on "Add New Customer"	The fields to the right should be enabled	F	I had forgot to call the method to enable all the fields. The	Pg. 80

							method is now executed.	
88	Manage Customers	When searching for a customer, if the title matches, then the customer will show up		Enter "Mr." in the Search bar above the list	The customer "Mr. Jude Hinds" should show up	T		
89	Manage Customers	When searching for a customer, if the forename matches, then the customer will show up		Enter "Jude" in the Search bar above the list	The customer "Mr. Jude Hinds" should show up	T		
90	Manage Customers	When searching for a customer, if the surname matches, then the customer will show up		Enter "Hinds" in the Search bar above the list	The customer "Mr. Jude Hinds" should show up	T		
91	Manage Customers	Ensure that the buttons don't enable until a change has been made for adding/editing customers		Select "Add New Customer"	The buttons should be disabled	T		
92	Manage Customers	Ensure when fields are filled out and "Add Customer" is clicked, the customer is added to the database	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield" Address County: "Co. Down"	The fields will clear, and the name "Mr. Ben Johnston" will appear at the end of the list	T		

				Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnston@gmail.com Then click "Add Customer"				
93	Manage Customers	Ensure that when a customer is edited, the changes are saved to the database	D	Click on any customer, click "Edit Customer", and change the title. Then click "Save Changes"	The customer's new title should show up on the list of customers	T		
94	Manage Customers	Ensure that when the user cancels editing a customer, the changes are not saved to the database		Click on any customer, click "Edit Customer", and change the title. Then click "Discard Changes", then on "Yes"	The customer's old title should show up on the list of customers	T		
95	Manage Customers	Ensure that when the user wants to delete a customer, the system asks for confirmation first	P	Click on any customer, then click "Delete Customer"	A message box saying "Are you sure you want to delete this customer? All future bookings will also be deleted." should appear	F	Put in the message box.	Pg. 82
96	Manage Customers	Ensure that when the user clicks "Yes", the customer is archived	P	Click on any customer, then click "Delete Customer", then click on "Yes"	The customer should be removed from the list of customers	T		
97	Manage Customers	Ensure that when the user clicks "No",	P	Click on any customer, then click "Delete Customer", then click on "No"	The customer should still be on the list of customers	T		

		the customer is not archived						
98	Manage Customers + Manage Appointments	Ensure that if a customer becomes archived, all previous appointments remain but all future ones are removed	P	<p>First, make any appointment for any customer before your current time. Next make another appointment for the same customer after your current time.</p> <p>Click on the customer and delete them.</p>	The appointment before your time should still be present and the appointment after your time should be removed	T		
99	Manage Customers	Ensure that when adding/deleting a customer, they must have a title selected	C	<p>Select “Add New Customer” and enter the following data:</p> <p>Title: Leave blank            Forename: “Ben”            Surname: “Johnston”            Address Line 1: “12 Midnight Lane”            Address Line 2: “12 Saintfield”            Address County: “Co. Down”            Address Postcode: “BT24 9GH”            Date of Birth: 31/3/1999            Phone Number: 07856855854            Email: bjohnston@gmail.com            Then click “Add Customer”</p>	A message box saying “You have not selected a title. Please select one to continue.” Should appear	T		
100	Manage Customers	Ensure that when adding/deleting a customer, they must	C	<p>Select “Add New Customer” and enter the following data:</p> <p>Title: Mr.            Forename: Leave blank</p>	A message box saying “You have not entered a forename. Please enter one to	T		

		have a forename entered		Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield" Address County: "Co. Down" Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnston@gmail.com Then click "Add Customer"	continue." Should appear			
101	Manage Customers	Ensure that a user cannot put a number in a customer's forename	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben6" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield" Address County: "Co. Down" Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnston@gmail.com Then click "Add Customer"	A message box saying "The forename you entered has a number in it. Please remove it to continue." Should appear	T		

102	Manage Customers	Ensure that when adding/deleting a customer, they must have a surname entered	C	Select “Add New Customer” and enter the following data: Title: Mr. Forename: “Ben” Surname: Leave blank Address Line 1: “12 Midnight Lane” Address Line 2: “12 Saintfield” Address County: “Co. Down” Address Postcode: “BT24 9GH” Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnston@gmail.com Then click “Add Customer”	A message box saying “You have not entered a surname. Please enter one to continue.” Should appear	T		
103	Manage Customers	Ensure that a user cannot put a number in a customer’s surname	C	Select “Add New Customer” and enter the following data: Title: Mr. Forename: “Ben” Surname: “Johnston6” Address Line 1: “12 Midnight Lane” Address Line 2: “12 Saintfield” Address County: “Co. Down” Address Postcode: “BT24 9GH” Date of Birth: 31/3/1999 Phone Number: 07856855854	A message box saying “The surname you entered has a number in it. Please remove it to continue.” Should appear	T		

				Email: bjohnston@gmail.com Then click "Add Customer"				
104	Manage Customers	Ensure that when adding/deleting a customer, they must have an address line 1 entered	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: Leave blank Address Line 2: "12 Saintfield" Address County: "Co. Down" Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnston@gmail.com Then click "Add Customer"	A message box saying "You have not entered the first line of the address. Please enter it to continue." Should appear	T		
105	Manage Customers	Ensure that when adding/deleting a customer, they must have an address line 2 entered	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: Leave blank Address County: "Co. Down" Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999	A message box saying "You have not entered the second line of the address. Please enter it to continue." Should appear	T		

				Phone Number: 07856855854 Email: bjohnston@gmail.com Then click "Add Customer"				
106	Manage Customers	Ensure that when adding/deleting a customer, they must have an address county entered	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield" Address County: Leave blank Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnston@gmail.com Then click "Add Customer"	A message box saying "You have not entered the county of the address. Please enter it to continue." Should appear	T		
107	Manage Customers	Ensure that when adding/deleting a customer, they must have an address postcode entered	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield" Address County: "Co. Down"	A message box saying "You have not entered the postcode of the address. Please enter it to continue." Should appear	T		

				Address Postcode: Leave blank Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnston@gmail.com Then click "Add Customer"				
108	Manage Customers	Ensure that when adding/deleting a customer, the date of birth defaults to 18 years ago	C, E	Select "Add New Customer"	The date of birth should read today's date 18 years ago	T		
109	Manage Customers	Ensure that when adding/deleting a customer, the date of birth stops itself at 12 years ago	C, E	Select "Add New Customer" and select the latest date of birth you can	The latest date you could select is today's date 12 years ago	T		
110	Manage Customers	Ensure that when adding/deleting a customer, the user can only put digits into the mobile phone number	C	Select "Add New Customer" and put "a" in the mobile phone number field	The "a" is removed	T		
111	Manage Customers	Ensure that when adding/deleting a customer, the user cannot have a mobile phone number that is shorter than 11 digits	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield"	A message box saying "The entered phone number is too short. Please check it again." Should appear	T		

				Address County: "Co. Down" Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855 Email: bjohnston@gmail.com Then click "Add Customer"				
112	Manage Customers	Ensure that when adding/deleting a customer, the user cannot have a mobile phone number that is longer than 11 digits	C	Select "Add New Customer" and enter "078568558548"	When the last 8 is entered, it's removed	T		
113	Manage Customers	Ensure that when adding/deleting a customer, the entered email is long enough to exist	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield" Address County: "Co. Down" Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: Leave blank Then click "Add Customer"	A message box saying "The entered email is too short to actually exist. Please check it again." Should appear	T		

114	Manage Customers	Ensure that when adding/deleting a customer, the entered email has an "@"	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield" Address County: "Co. Down" Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnstongmail.com Then click "Add Customer"	A message box saying, "The email you entered has no @". Please enter a valid email address" Should appear	T		
115	Manage Customers	Ensure that when adding/deleting a customer, the entered email has a valid domain	C	Select "Add New Customer" and enter the following data: Title: Mr. Forename: "Ben" Surname: "Johnston" Address Line 1: "12 Midnight Lane" Address Line 2: "12 Saintfield" Address County: "Co. Down" Address Postcode: "BT24 9GH" Date of Birth: 31/3/1999 Phone Number: 07856855854 Email: bjohnston@gmail.cm	A message box saying "The email you have entered does not belong to a valid website – please check again." Should appear	T		

116	Manage Invoices	Ensure that the report is run when “Generate Invoice” is clicked	Q	Select “Mr. Jude Hinds” for customer and 1/5/2022 for the date (leave “multiple date” unchecked), then click “Generate Invoice”	The report runs	T		
117	Manage Invoices	Ensure that the user is notified if they try to generate an invoice for which there are no appointments		Select “Mr. Jude Hinds” for customer and 2/5/2022 for the date (leave “multiple date” unchecked), then click “Generate Invoice”	A message box saying, “The selected customer has no appointments in the given date range.” Should appear	T		
118	Manage Invoices	Ensure that the date at the top of the invoice changes if there are multiple dates included in the invoice	S	Select “Mr. Jude Hinds” for customer and 1/5/2022 for the date (leave “multiple date” unchecked), then click “Generate Invoice”.  Select “Mr. Jude Hinds” for customer and check “multiple dates”. Set the date range from 1/5/2022 to 5/5/2022	The text at the top of the first invoice should say “01 May 2022”. The text at the top of the second invoice should say “From 01 May 2022 to 05 May 2022”	T		
119	Manage Invoices	Ensure that a customer is selected before an invoice is generated		Select no customer and click “Generate Invoice”	A message box saying, “You have not selected a customer.” Should appear	T		
120	Manage Invoices	Ensure that a user cannot choose a start date that is after the selected end date		Check “multiple dates”. Set the start date to be 1 May 2022. Set the end date to be 20 April 2022	A message box saying “You cannot have an end date after the start date. Please select a later	F	No corrective action was taken – due to time constraints, I	Pg. 85

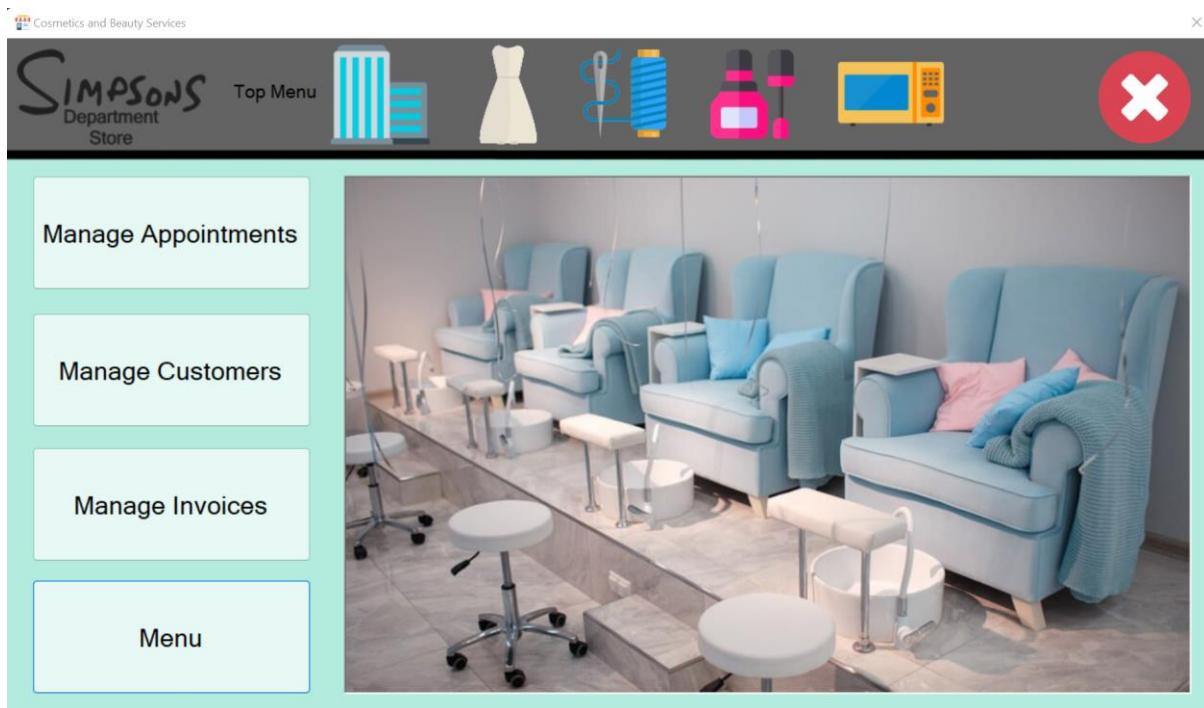
					end date." Should appear and the change should be reversed		was unable to fix this error	
121	Manage Appointments + Manage Invoices	Ensure that appointments added within the same system session can be generated invoices for		Add any appointment for the current day, then try to generate the invoice for that appointment.	The invoice generates	F	No corrective action was taken – due to time constraints, and the complicated nature of reports, I was unable to fix this error	Pg. 87

## Testing Evidence

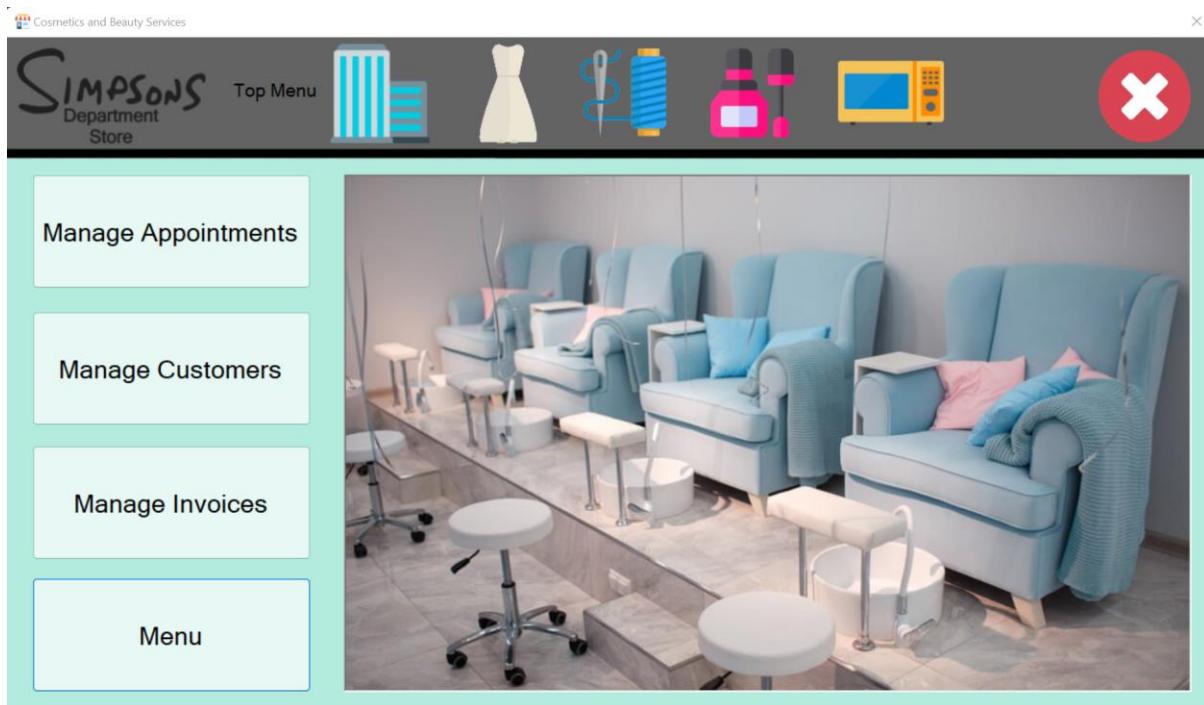
Test No. 42

<b>Reason for Test</b>	Ensure that the Cosmetics Menu form can be accessed
<b>User Action / Test Data</b>	Click on "Menu"
<b>Expected Outcome</b>	The form will switch to the Cosmetics Menu form

Before:



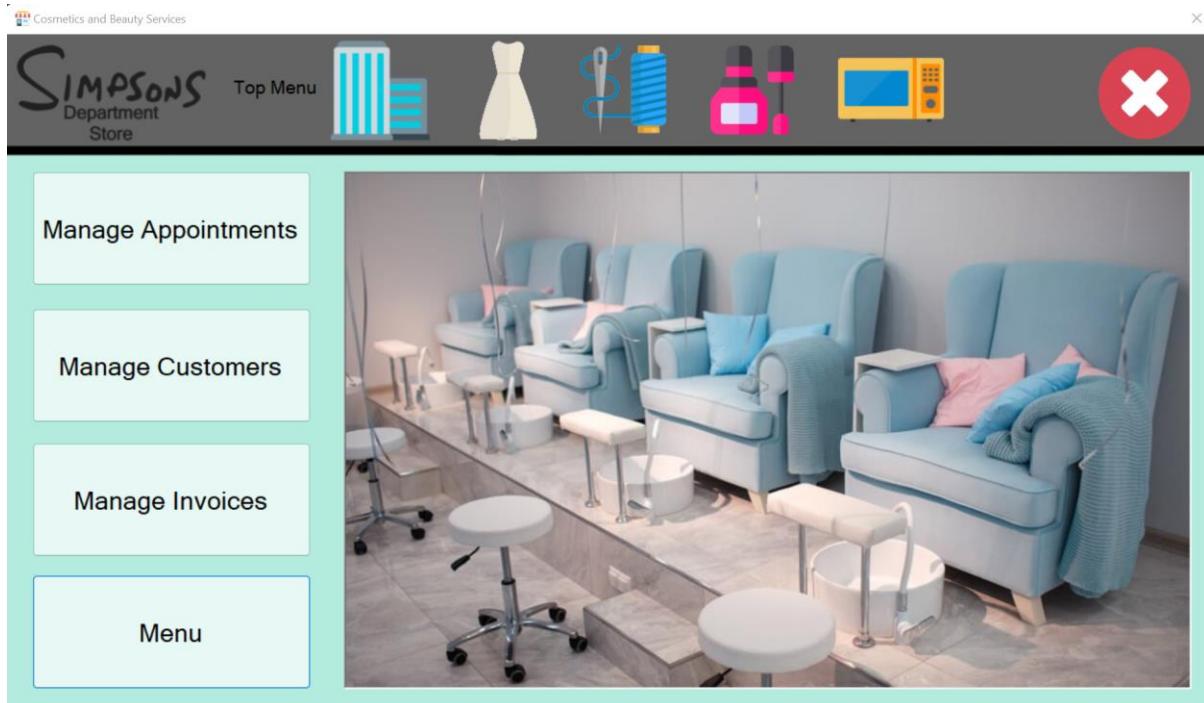
After:



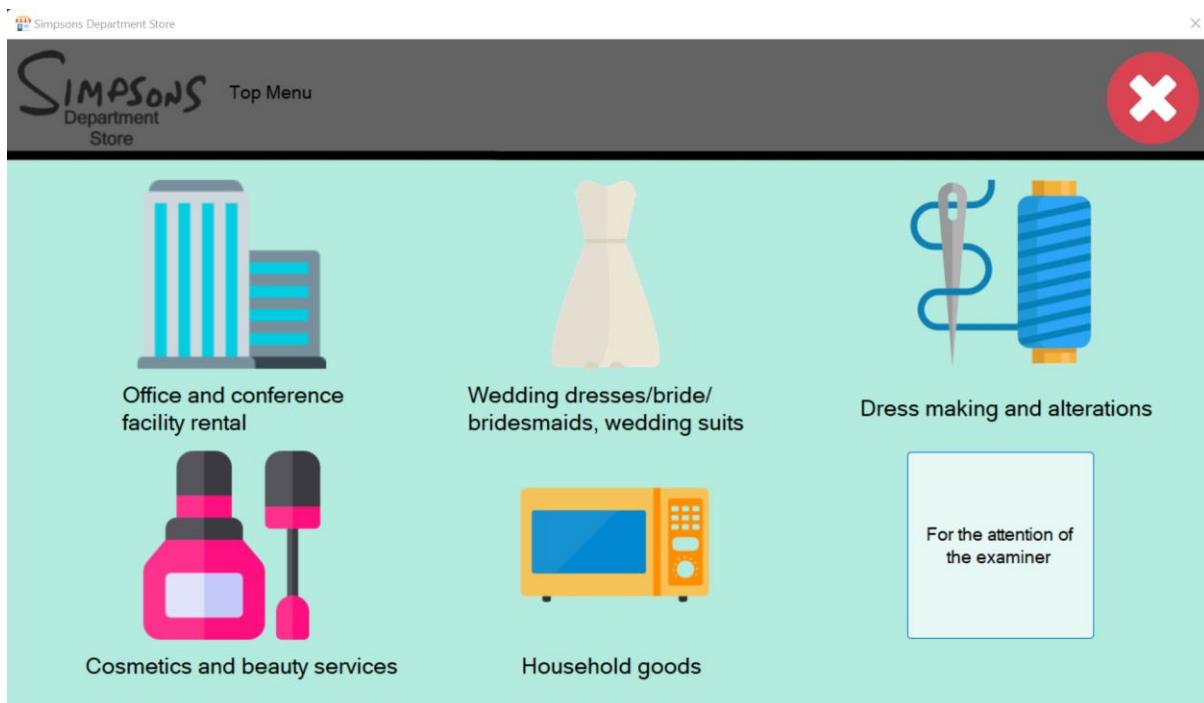
*Corrective Action*

Had forgotten to code button – added the code to bring user back to base menu

Before:



After:



## Test No. 56

<b>Reason for Test</b>	Ensure that when editing an appointment, changing the details of the appointment update the text on the appointment label
<b>User Action / Test Data</b>	Click on any appointment, then click on "Edit Appointment", then change the customer
<b>Expected Outcome</b>	The text on the appointment label should update on the schedule

Before:

The screenshot shows the 'Manage Appointments' software interface. At the top, there's a navigation bar with icons for 'Manage Appointments', 'Top Menu', and a red 'X'. Below the bar, the 'SIMPSONS Department Store' logo is visible. On the left, a sidebar contains fields for 'Appointment Time' (set to 16 June 2022 at 13:45), 'Customer' (Mr. Andrew Totten), 'Staff' (Ms. Tanzi Edison), and 'Room' (2). Under 'Treatments', four services are selected: Haircut, Hair wash, Hair Dye, and Nails. It also displays a total cost of £105.00 and a duration of 93 min. At the bottom of the sidebar are 'Save Changes' and 'Discard Changes' buttons. The main area is titled 'Manage Appointments' and instructs users to start making an appointment by clicking a time on the schedule. A 2x8 grid schedule is shown, with rows labeled Tanzi, Annice, Kae, and Blanid. The grid has columns from 9:00 to 16:00. A red box highlights an appointment for Andrew Totten in Room 2 at 13:00.

After:

The screenshot shows the 'Manage Appointments' screen for SIMPSONS Department Store. The top menu includes icons for a barcode scanner, a white dress, a spool of blue thread, a pink bottle, and a yellow microwave, along with a red circular 'X' button. The main area has a light green background with a title 'Manage Appointments' in bold. A message instructs users to start making an appointment by clicking a time on the schedule for the current date, selecting staff, room, and treatments, and confirming by clicking 'add appointment'. It also mentions viewing and editing existing appointments.

**Appointment Time:** 16 June 2022 13:45

**Customer:** Ms. Cassandra Livings

**Staff:** Ms. Tanzi Edison

**Room:** 2

**Treatments:**  Haircut,  Hair wash,  Hair Dye,  Nails

**Cost:** £105.00  
**Duration:** 93 min

**Buttons:** Save Changes, Discard Changes

**Schedule Grid:** A 4x8 grid representing staff availability from 9:00 to 16:00. Rows are labeled Tanzi, Annice, Kae, and Blanid. The grid shows various colored blocks (green, grey, red) indicating availability and booked appointments. A red block at 14:00 for Tanzi contains the text 'Andrew Totten Room 2 £105.00'.

#### Corrective Action

No corrective action was taken – due to time constraints, I was unable to fix this error

Test No. 57

<b>Reason for Test</b>	Ensure that when editing an appointment, changing the details of the appointment update the tool tip on the appointment label
<b>User Action / Test Data</b>	Click on any appointment, then click on "Edit Appointment", then change the customer, then hover over the appointment
<b>Expected Outcome</b>	The text on the tool tip should update

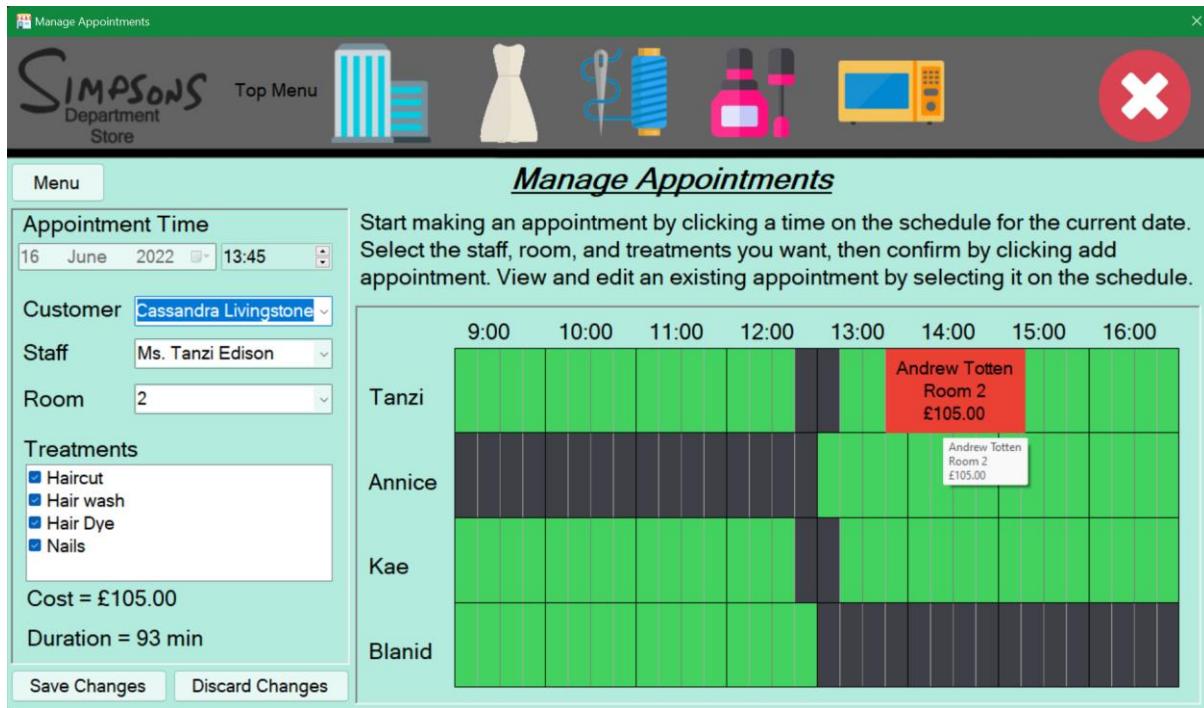
Before:

The screenshot shows the 'Manage Appointments' interface. At the top, there is a navigation bar with icons for a barbershop, a dress, a hairdryer, a bottle, a computer monitor, and a red 'X'. Below this is a sub-navigation bar with a 'Top Menu' icon, a 'Menu' button, and a red 'X' button.

The main area is titled 'Manage Appointments'. It includes a sidebar with 'Appointment Time' (set to 16 June 2022 at 13:45), 'Customer' (Mr. Andrew Totten), 'Staff' (Ms. Tanzi Edison), 'Room' (2), 'Treatments' (Haircut, Hair wash, Hair Dye, Nails), and summary information: 'Cost = £105.00' and 'Duration = 93 min'. There are 'Save Changes' and 'Discard Changes' buttons.

The main part of the screen is a 4x8 grid representing staff availability. The columns represent time slots from 9:00 to 16:00. The rows represent staff members: Tanzi, Annice, Kae, and Blanid. The grid uses green and grey colors to indicate availability. A red tooltip is overlaid on the cell for Andrew Totten at 14:00, Room 2, containing the text: 'Andrew Totten Room 2 £105.00'.

After:



#### Corrective Action

No corrective action was taken – due to time constraints, I was unable to fix this error

## Test No. 65

<b>Reason for Test</b>	Ensure that a time cannot be selected before the store opens
<b>User Action / Test Data</b>	Click on any slot in the schedule, and set the time to 8:00
<b>Expected Outcome</b>	A message box saying, "You cannot book a time before the store opens. Please select another time." should appear, and the change should be reversed

Before:

Manage Appointments

Start making an appointment by clicking a time on the schedule for the current date. Select the staff, room, and treatments you want, then confirm by clicking add appointment. View and edit an existing appointment by selecting it on the schedule.

	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
Tanzi	Green	Green	Green	Green	Dark Grey			
Annice	Dark Grey							
Kae	Green	Green	Green	Dark Grey	Dark Grey			
Blanid								

After:

The screenshot shows the 'Manage Appointments' interface. The appointment time is now correctly set to 08:00. The staff dropdown shows 'Ms. Tanzi Edison'. The treatments dropdown includes 'Haircut', 'Hair wash', 'Hair Dye', and 'Nails'. The cost is £0.00 and duration is 0 min. The appointment grid shows available slots for staff Tanzi, Annice, Kae, and Blanid from 9:00 to 16:00.

#### *Corrective Action*

Stored the current time as a datetime in the form. When the date time picker for the time was changed, it checked if it was before 9:00, and if so, let the user know and set the time to be the datetime stored. Otherwise, set the new time to be the date time.

Before:

The screenshot shows the 'Manage Appointments' interface. The appointment time is incorrectly set to 09:00. The staff dropdown shows 'Ms. Tanzi Edison'. The treatments dropdown includes 'Haircut', 'Hair wash', 'Hair Dye', and 'Nails'. The cost is £0.00 and duration is 0 min. The appointment grid shows available slots for staff Tanzi, Annice, Kae, and Blanid from 9:00 to 16:00.

After:

Manage Appointments

**SIMPSONS**  
Department Store

Top Menu

**Manage Appointments**

Start making an appointment by clicking a time on the schedule for the current date. Select the staff, room, and treatments you want, then confirm by clicking add appointment. View and edit an existing appointment by selecting it on the schedule.

**Appointment Time**  
16 June 2022 08:00

**Customer**

**Staff** Ms. Tanzi Edison

**Room**

**Treatments**

- Haircut
- Hair wash
- Hair Dye
- Nails

Cost = £0.00  
Duration = 0 min

Add Appointment Discard

Manage Appointments

**SIMPSONS**  
Department Store

Top Menu

**Manage Appointments**

Start making an appointment by clicking a time on the schedule for the current date. Select the staff, room, and treatments you want, then confirm by clicking add appointment. View and edit an existing appointment by selecting it on the schedule.

**Appointment Time**  
16 June 2022 09:00

**Customer**

**Staff** Ms. Tanzi Edison

**Room**

**Treatments**

- Haircut
- Hair wash
- Hair Dye
- Nails

Cost = £0.00  
Duration = 0 min

Add Appointment Discard

## Test No. 75

<b>Reason for Test</b>	Ensure that when there are no treatments, the Nail Bar option is present
<b>User Action / Test Data</b>	Click on the 11 <sup>th</sup> slot in the 1 <sup>st</sup> row. Then click on the rooms drop-down list
<b>Expected Outcome</b>	The Nail Bar option should be present

Before:

Manage Appointments

**Manage Appointments**

Start making an appointment by clicking a time on the schedule for the current date. Select the staff, room, and treatments you want, then confirm by clicking add appointment. View and edit an existing appointment by selecting it on the schedule.

	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
Tanzi	Green			Green	Dark			
Annice	Dark			Dark	Dark			
Kae	Green		Green	Green	Dark			
Blanid	Green			Green	Dark			

After:

Manage Appointments

**Manage Appointments**

Start making an appointment by clicking a time on the schedule for the current date. Select the staff, room, and treatments you want, then confirm by clicking add appointment. View and edit an existing appointment by selecting it on the schedule.

	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
Tanzi	Green			Green	Dark			
Annice	Dark			Dark	Dark			
Kae	Green		Green	Green	Dark			
Blanid	Green			Green	Dark			

*Corrective Action*

This error arose because the Nail Bar option was removed in some previously edited/added appointment, then when creating this one, it was never added back. When adding an appointment, it automatically adds back the Nail Bar option if it's missing.

Before:

After:

Test No. 82

<b>Reason for Test</b>	Ensure that two appointments that have the same room can happen during the same time when the room is the Nail Bar
<b>User Action / Test Data</b>	<p>Click on the 9<sup>th</sup> slot in the 1<sup>st</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Shea McKillen Murphy  Room: Nail Bar  Treatments: Nails  Then click on “Add Appointment”</p> <p>Click on the 9<sup>th</sup> slot in the 3<sup>rd</sup> row. Fill in the fields with the data below:</p> <p>Customer: Mr. Andrew Totten  Room: Nail Bar  Treatments: Nails</p>
<b>Expected Outcome</b>	Nothing happens

Before:

The screenshot shows the 'Manage Appointments' interface. On the left, there is a sidebar with a 'Menu' button, an 'Appointment Time' section (set to 16 June 2022, 11:00), and a 'Treatments' section where 'Nails' is selected. The main area displays a 4x8 grid representing staff availability. The grid has columns for 9:00, 10:00, 11:00, 12:00, 13:00, 14:00, 15:00, and 16:00. Rows represent staff: Tanzi, Annice, Kae, and Blanid. A red vertical bar is positioned over the 11:00 slot for Tanzi, with the letters 'She' written vertically above it, indicating an appointment for that specific staff and time.

After:

**Manage Appointments**

Start making an appointment by clicking a time on the schedule for the current date. Select the staff, room, and treatments you want, then confirm by clicking add appointment. View and edit an existing appointment by selecting it on the schedule.

	13:00	14:00	15:00	16:00
Tanzi				
Annice				
Kae				
Blanid				

**Room Error**

You cannot book an appointment for the same room at the same time. Please select another room.

**Appointment Time**  
16 June 2022 11:00

**Customer** Mr. Andrew Totten  
**Staff** Ms. Kae Clarke  
**Room** Nail Bar

**Treatments**  
 Haircut  
 Hair wash  
 Hair Dye  
 Nails

Cost = £15.00  
Duration = 8 min

Add Appointment Discard

#### Corrective Action

The room check was happening regardless of the Nail Bar. I introduced a second check that prevented this from happening if the room object was the Nail Bar.

Before:

**Manage Appointments**

Start making an appointment by clicking a time on the schedule for the current date. Select the staff, room, and treatments you want, then confirm by clicking add appointment. View and edit an existing appointment by selecting it on the schedule.

	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
Tanzi								
Annice								
Kae			She					
Blanid								

**Appointment Time**  
16 June 2022 11:00

**Customer** Mr. Andrew Totten  
**Staff** Ms. Kae Clarke  
**Room**

**Treatments**  
 Haircut  
 Hair wash  
 Hair Dye  
 Nails

Cost = £15.00  
Duration = 8 min

Add Appointment Discard

After:

Manage Appointments

SIMPSONS Department Store Top Menu

**Manage Appointments**

Start making an appointment by clicking a time on the schedule for the current date. Select the staff, room, and treatments you want, then confirm by clicking add appointment. View and edit an existing appointment by selecting it on the schedule.

Appointment Time  
16 June 2022 11:00

Customer Mr. Andrew Totten

Staff Ms. Kae Clarke

Room Nail Bar

Treatments  
 Haircut  
 Hair wash  
 Hair Dye  
 Nails

Cost = £15.00  
Duration = 8 min

Add Appointment Discard

	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
Tanzi	Green		Red (Sh)	Green	Dark Grey			
Annice								
Kae	Green		Red	Green	Dark Grey			
Blanid								

Test No. 87

<b>Reason for Test</b>	The fields on the right are enabled when "Add New Customer" is selected
<b>User Action / Test Data</b>	Click on "Add New Customer"
<b>Expected Outcome</b>	The fields to the right should be enabled

Before:

After:

*Corrective Action*

I had forgot to call the method to enable all the fields. The method is now executed.

Before:

**Manage Customers**

Either select "Add new customer" to store a new customer's details in the system, or select an existing customer to edit their details or delete them.

Title	Forename	Date of Birth
<input type="text"/>	<input type="text"/>	16 June 2010
Surname		Mobile Phone Number
<input type="text"/>		<input type="text"/>
Address		Email
<input type="text"/> Address Line 1		<input type="text"/>
<input type="text"/> Address Line 2		<input type="text"/>
<input type="text"/> County		<input type="text"/>
<input type="text"/> Postcode		<input type="checkbox"/> Survey Completed

Add Customer      Delete Customer

After:

**Manage Customers**

Either select "Add new customer" to store a new customer's details in the system, or select an existing customer to edit their details or delete them.

Title	Forename	Date of Birth
<input type="text"/>	<input type="text"/>	16 June 2004
Surname		Mobile Phone Number
<input type="text"/>		<input type="text"/>
Address		Email
<input type="text"/> Address Line 1		<input type="text"/>
<input type="text"/> Address Line 2		<input type="text"/>
<input type="text"/> County		<input type="text"/>
<input type="text"/> Postcode		<input type="checkbox"/> Survey Completed

Add Customer      Discard

Test No. 95

<b>Reason for Test</b>	Ensure that when the user wants to delete a customer, the system asks for confirmation first
<b>User Action / Test Data</b>	Click on any customer, then click "Delete Customer"
<b>Expected Outcome</b>	A message box saying "Are you sure you want to delete this customer? All future bookings will also be deleted." should appear

Before:

The screenshot shows the 'Manage Customers' page of the SIMPSONS Department Store application. The top navigation bar includes icons for Home, Top Menu, and a red 'X'. The main content area has a title 'Manage Customers' and a descriptive message: 'Either select "Add new customer" to store a new customer's details in the system, or select an existing customer to edit their details or delete them.' On the left, a sidebar lists customer names: Mr. Andrew Totten, Mr. Jude Hinds, Ms. Edna Russell, Mr. Shea McKillen Murphy, Ms. Jacky O'Bride, and Ms. Cassandra Livingstone, with Ms. Cassandra Livingstone selected. The main form contains the following data for Ms. Cassandra Livingstone:

Title	Forename	Date of Birth
Ms.	Cassandra	25 December 1970
Surname	Mobile Phone Number	
Livingstone	07456392732	
Address	Email	
7 Rowallane Avenue	clivingstone@hotmail.com	
Saintfield	<a href="#">Contact Now via Email</a>	
Co. Down		
BT24 7EL	<input type="checkbox"/> Survey Completed	

At the bottom are two buttons: 'Edit Customer' and 'Delete Customer'.

After:

The screenshot shows the 'Manage Customers' interface. On the left, there's a sidebar with a 'Menu' button and a search bar containing 'Search...'. Below the search bar is a list of customer names: Add New Customer, Mr. Andrew Totten, Mr. Jude Hinds, Ms. Edna Russell, Mr. Shea McKillen Murphy, and Ms. Jacky O'Bride. The main area has a heading 'Manage Customers' and instructions: 'Either select "Add new customer" to store a new customer's details in the system, or select an existing customer to edit their details or delete them.' Below this are input fields for Title (dropdown), Forename (text box), Date of Birth (date picker set to 16 June 2004), Surname (text box), Mobile Phone Number (text box), Address (Address Line 1 and 2, County, Postcode), Email (text box), and a Survey Completed checkbox. At the bottom are 'Add Customer' and 'Delete Customer' buttons.

#### *Corrective Action*

Put in the message box.

Before:

The screenshot shows the 'Manage Customers' interface. The layout is identical to the 'After' version, but the 'Edit Customer' button at the bottom of the form is highlighted with a blue selection bar, while the other buttons ('Add Customer' and 'Delete Customer') are white. The rest of the page, including the sidebar and input fields, appears normal.

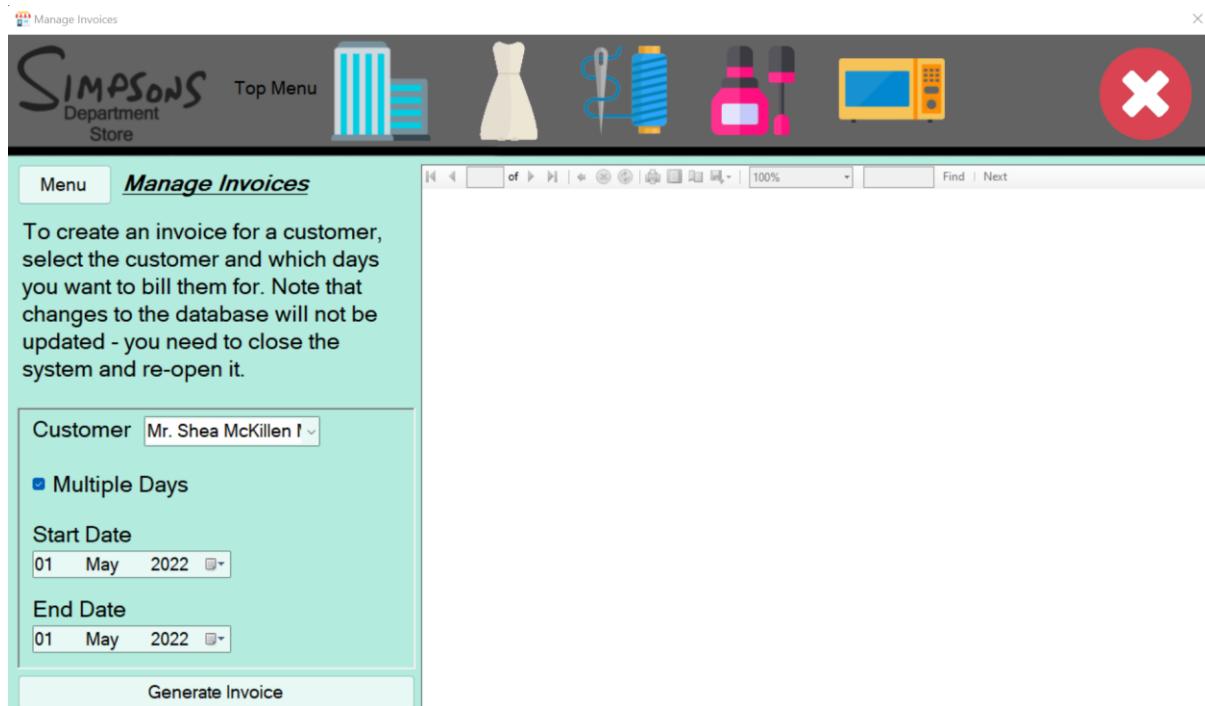
After:

The screenshot shows the 'Manage Customers' page of the SIMPSONS Department Store software. On the left, a sidebar lists customer names: Add New Customer, Mr. Andrew Totten, Mr. Jude Hinds, Ms. Edna Russell, Mr. Shea McKillen Murphy, Ms. Jacky O'Bride, and Ms. Cassandra Livingstone. 'Ms. Cassandra Livingstone' is selected and highlighted with a blue border. The main area contains fields for Title (Ms.), Forename (Cassandra), Date of Birth (5 December 1970), Surname (Livingstone), Mobile Phone Number (7456392732), Address (7 Rowallane Avenue, Saintfield, Co. Down, BT24 7EL), Email (clivingstone@hotmail.com), and a checkbox for Survey Completed (unchecked). A modal dialog box is centered over the form, asking 'Are you sure you want to delete this customer? All future bookings will also be removed.' with 'Yes' and 'No' buttons. The top menu bar includes icons for Home, Top Menu, and a red circular 'X' button.

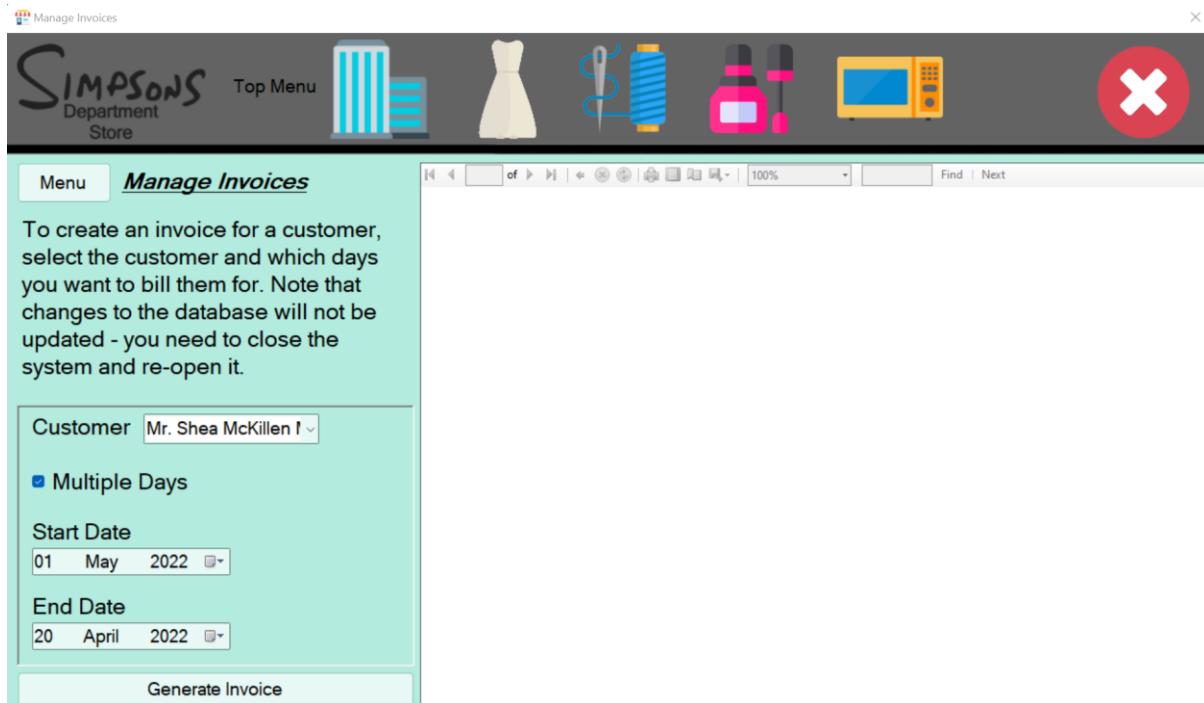
Test No. 120

<b>Reason for Test</b>	Ensure that a user cannot choose a start date that is after the selected end date
<b>User Action / Test Data</b>	Check “multiple dates”. Set the start date to be 1 May 2022. Set the end date to be 20 April 2022
<b>Expected Outcome</b>	A message box saying “You cannot have an end date after the start date. Please select a later end date.” Should appear and the change should be reversed

Before:



After:



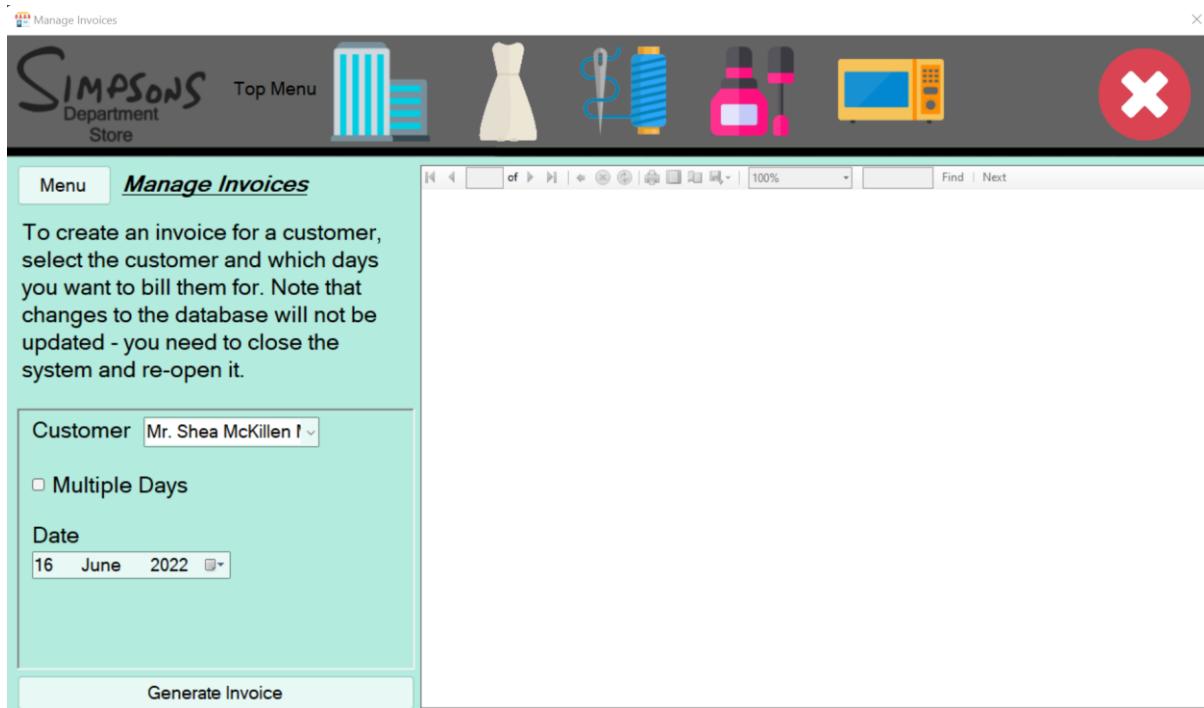
*Corrective Action*

No corrective action was taken – due to time constraints, I was unable to fix this error

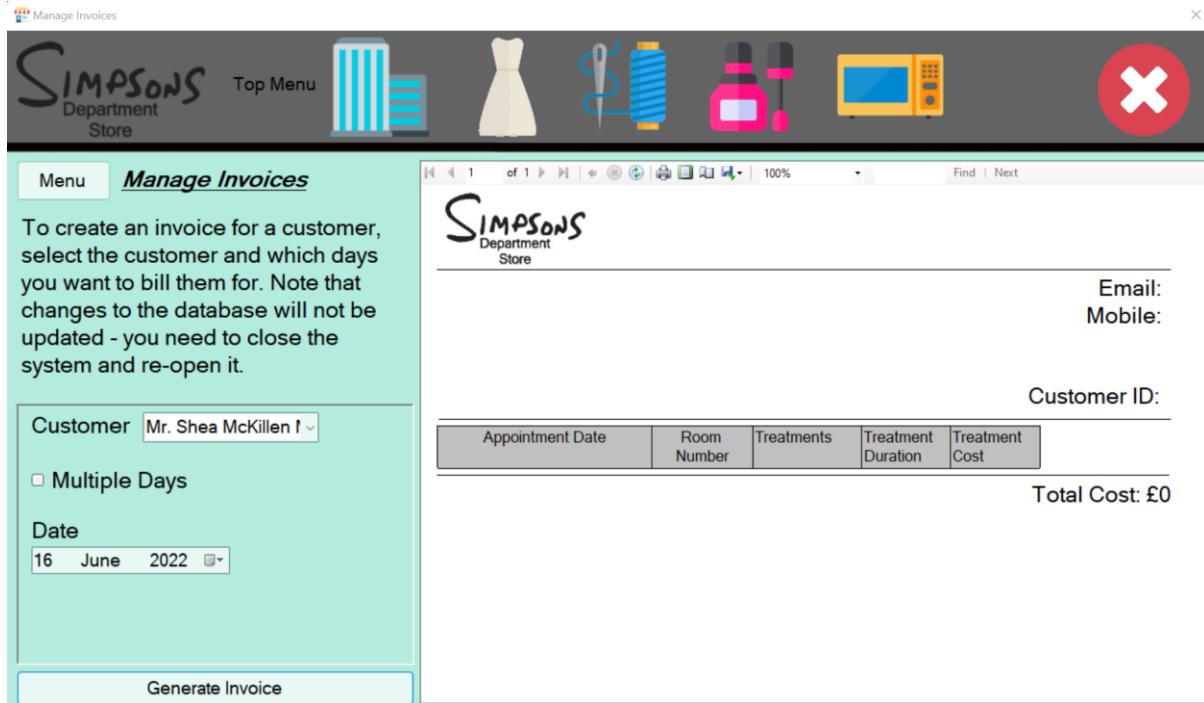
Test No. 121

<b>Reason for Test</b>	Ensure that appointments added within the same system session can be generated invoices for
<b>User Action / Test Data</b>	Add any appointment for the current day, then try to generate the invoice for that appointment.
<b>Expected Outcome</b>	The invoice generates

Before:



After:



#### *Corrective Action*

No corrective action was taken – due to time constraints, and the complicated nature of reports, I was unable to fix this error

## Evaluation

### Evaluation of User Requirements

- A. The system must be able to record information about appointments for the cosmetics service, including pricing

The system records data for appointments in a database, so it can be easily recalled and viewed, as seen in tests 43-45. This allows the cosmetics system to adjust timings when a client changes their mind about the treatments they'd like, as was noted in the case study.

- B. The system must be easily navigable

The system contains a "Top Menu", which allows access to every part of the system, including a user guide, displayed in tests 1-9. If the full system had been developed, then this feature would have been an absolute necessity to navigate the system with.

- C. You must be able to record customers, including ways to contact them (i.e. email, mobile no, address)

The system uses a database to easily store information about customers, and tests 84-85 show that the data can easily be viewed. Contacting customers is very important for safety reasons, and for invoicing unpaid appointments.

- D. A customer's details may change – there must be a way to edit customers in the system

Every attribute of a customer can be changed, as verified in test 93. This is necessary for reasons like moving house, getting a new phone number, divorce, etc.

- E. Customers must be at least 12 years old, and preferably 18 years old.

When the user starts adding a customer, the date of birth defaults to 18 years ago from today, but can be selected up to 12 years ago from today, as seen in tests 108-109. This prevents the staff from taking on clients that may have undiscovered allergies.

- F. The system must track which customers have completed the health survey

When the user adds a customer, they have the option to mark that the user has completed the survey, along with all the other data stored in tests 43-45. Again, this ensures that no allergic reactions happen in the store, as the staff may not be equipped to deal with such a situation.

- G. If the survey is not completed, the staff should be alerted when trying to make an appointment

This requirement is fulfilled, as if a user tries to book an appointment for a customer that has not completed the survey, then the user is alerted, and allowed to continue if the customer completes the survey. This is so that no allergic reactions happen.

- H. You shouldn't allow appointments before 9 AM and appointments after 5 PM, as this is outside the working hours of the staff

Any user that tries to select a time outside working hours has that change immediately reverted, as displayed in tests 65-67. This ensures that no member of staff will be forced to come in early or stay late due to errors with scheduling.

I. There should be a way to easily view appointments for the day

When the user opens the Manage Appointments form, a custom control displays the appointments that have been made for this day, as shown in test 43. This allows for busy periods of the day to be easily recognised, so that managers can organise leave for days without much hassle.

J. Appointments should be sorted by staff, so they can easily see when they are free or busy when accommodating walk-in treatments

The horizontal direction for this custom control shows time throughout the day, while the vertical direction shows staff (tested as part of test 43). As staff may not be working later in the day, this is useful for them to see if they can take on a walk-in client or not.

K. The system should also display when a member of staff isn't working so work isn't allocated to them while they are off

When staff are not working, it is denoted on the custom control with grey squares. If any work is allocated to them during this time, the system alerts the user and reverts the changes, shown in tests 68-70. A staff member being allocated work while they are not working creates lots of problems and backlog for the staff that are working, so obviously this should be prevented.

L. The customer, staff, room, treatments, duration and price for an appointment must all be stored and be viewable

When an appointment is clicked on, the details are fetched from the database and populated in the form for the user to see. This is demonstrated in tests 44-45. A staff member needs to see what treatments a customer has been booked in for, and which room, so that they can fulfil the appointment.

M. An appointment may have to be rescheduled or cancelled – there must be a way to edit and remove appointments

When viewing an appointment, the user has the option to edit or delete the appointment, as shown in tests 53-64. This allows the system to be flexible, and provide a much more accurate record of business.

N. Appointments that have happened shouldn't be able to be changed or deleted – a record of business is required

The editing and deleting facilities are removed for viewing bookings in the past – but you can still add, edit and delete bookings that have happened in the same working day (see below). This helps preserve the record of business, so that nothing has to be kept on paper copies.

O. However, a staff member may want to retroactively add appointments for walk-in customers, or remove those for people who don't show up – appointments that have happened in the same day should still be editable

This is implemented and tested as part of add, edit and delete (tests 53-64). The case study noted that the store wanted to take in as many walk-in clients as possible, and since the salon can be very busy, staff may not have the time to log each appointment as it happens, but it can be easily recorded at the end of the day.

- P. A customer may wish to be removed from the system – this should be possible without removing all past appointments for that customer

This is shown in test 98, where two appointments are present in the same day. If a customer is no longer having appointments in the salon, having them appear on the list of customers is redundant, as they will never be selected for an appointment again. This prevents a slew of customers that don't need to be displayed.

- Q. You must be able to create invoices for customers

Printable invoices are available by customer, demonstrated by test 116. It is important to bill customers for the appointments, as Simpsons Department Store is a for-profit company.

- R. The invoices must detail all relevant information – customer, staff, room, treatments, and total cost

Information like that, and the dates that these appointments happened, are present on the invoice (tested as part of test 116). It is important that a customer is aware of the treatments they are being billed for, for full transparency.

- S. These invoices should be able to cover several treatments over several days

Not only can the system generate an invoice for multiple days, but the date text also changes due to number of days covered, as in test 118. This is implemented in case of several people being booked in under the same name for billing purposes, as the case study stated that the salon has close working ties with the Wedding Dress department, and this may be the case for wedding parties.

- T. There should be a user guide for instructions on how to operate the system

A comprehensive user guide can be accessed from the top menu, as shown in test 9. As a new system for a currently operating business, it is important that little to no staff training is required to operate the system, so a facility describing the system means that any issues are described, and the staff always have a quick reference.

## Evaluation of Project Plan and Time Management

The first step in my system development was the development of the project plan. This plan would outline the tasks necessary for completion and testing of the system, how long they would take, and what order to do them. I believe that I underestimated the time scales in the initial creation of the project plan, and as a by-product, could not adequately meet the deadlines I had set for myself near the end of the system development.

The initial tasks that required completion before any other work could commence were researching the company background, selecting the subsystem for development, and problem analysis. This area was well kept to, but schoolwork from my other subjects meant that start dates and end dates had to be pushed out over the weekend, and by the time it came to research system methodologies and choose one, I was a bit behind, but had still stuck to the plan well.

My biggest weakness came in the development of the system itself, taking over two weeks longer than I had anticipated in the initial planning. The creation of the forms and methods to manage the forms wasn't difficult, but I had failed to manage my time well. This went on to have a knock-on effect to the testing. As I had much more code written than expected, the testing took a little longer than expected as well, as did the proof-reading of the documentation.

However, with the extra time dedicated to coding and testing, the system is fairly bug-free, and any bugs that remain within the system have been identified and documented in the testing.

The resources I used consisted of Visual Studio 2019, with reference from the internet to help with certain complexities, like the Water Mark Text Box found in the Manage Customers form. The Write-Up, User Guide and Complexities documents were all written in Microsoft Word, which allowed for quick formatting, helping speed up some of the process.

If I were to do it again, I would leave a lot more time in the plan, allowing me to follow through with plan, even if my workload from other subjects were to increase without warning. This would allow me to follow the plan and deliver the software on time, even if it's later.

## Evaluation of Personal Performance

During the development of this system, I have improved a few skills, as well as shedding light on a few skills that could use improvement. I feel I have progressed from my AS coursework, and I am proud of the improvements I have made.

In the problem analysis, I was able to correctly identify the key areas that required attention and create a comprehensive list of user requirements. I referred to this list at all stages of the system development, and it helped me immensely throughout the system life cycle.

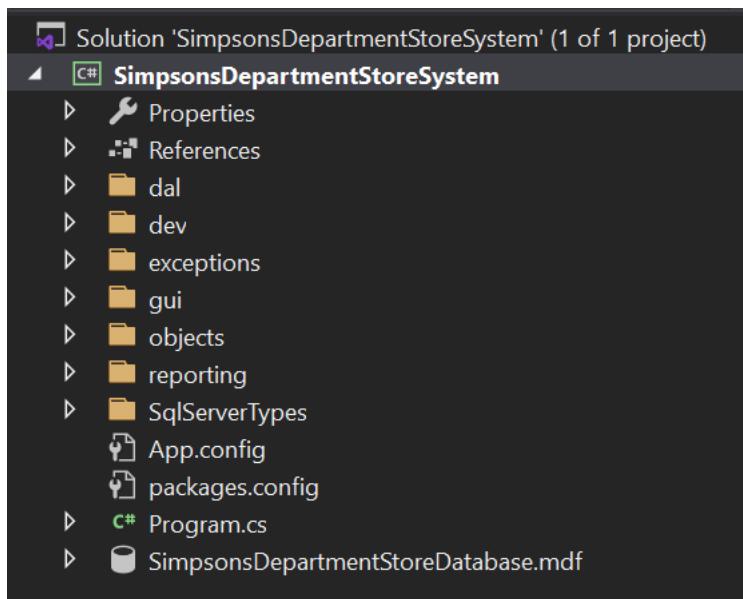
In addition, I feel my SQL has greatly improved since starting this system. I am much more competent, especially after working with the datasets required to create reports. As well as this, I found I was able to manage Microsoft's Report Definition Language (RDL) aptly, showing that I have also developed the skill of learning new programming languages.

My organisational skills were greatly improved, taking copies of the system every time something was changed, and organising them by date. These copies were also stored on a USB, my home laptop, and the OneDrive associated with my C2K account.

 21.09.21	21/09/2021 13:22	File folder
 21.09.23	23/09/2021 17:32	File folder
 21.09.24	24/09/2021 08:27	File folder
 21.09.24.2	24/09/2021 11:24	File folder
 21.09.26	26/09/2021 15:50	File folder
 21.09.27	27/09/2021 10:10	File folder
 21.09.28	28/09/2021 11:28	File folder
 21.09.29	29/09/2021 08:31	File folder
 21.09.30	30/09/2021 08:31	File folder
 21.10.01	01/10/2021 08:28	File folder
 21.10.02	02/10/2021 12:30	File folder
 21.10.04	04/10/2021 10:13	File folder
 21.10.05	05/10/2021 11:27	File folder
 21.10.06	06/10/2021 09:09	File folder
 21.10.13	09/10/2021 11:20	File folder
 21.10.14	14/10/2021 10:50	File folder
 21.10.15	15/10/2021 08:26	File folder
 21.10.18	18/10/2021 17:33	File folder
 21.10.19	19/10/2021 11:26	File folder
 21.10.20	20/10/2021 08:26	File folder
 21.10.21	21/10/2021 17:21	File folder
 21.10.22	22/10/2021 08:24	File folder
 21.11.01	01/11/2021 10:24	File folder
 21.11.02	02/11/2021 11:27	File folder
 21.11.02.2	02/11/2021 17:43	File folder

These are just a few of the versions of the system I kept.

These skills were also developed inside the system, where the different types of objects were all sorted into folders.



One thing I believe I could work on, however, is my time management. Due to my inability to correctly gauge the length of some of the tasks, it put me under undue stress near the end of development. The system didn't suffer, but I failed to meet the deadline by a few months, which I should have anticipated and will work on in the future.

Another issue I had was managing the scope of the project. I had plans for the system that I decided could not be implemented due to time constraints at the design phase. (i.e. the Manage Appointments form could have taken the user to the Manage Customers form, added a customer, and brought them back). I'm lucky I did, but it was difficult deciding between what must be implemented, what can be implemented, and what cannot be implemented.

Reflecting on my progress, I am very satisfied with what I have created for Simpsons Department Store, and my own performance in doing so. I was able to fulfil all user requirements, become adept at not one but two new languages, and organised my work well. However, if I were to do this differently, I would have given myself much more time for system development to create a wider-scope system.