Computing A2 Coursework

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Chapter 1

Analysis

1.1 Introduction

1.1.1 Client Identification

My client, Shahida Rahman, is an Author, and the Director and Secretary of Perfect Publishers Ltd, which has been a self publishing company since 2005. This means that the author pays Perfect Publishers to publish their book. She published her first book through Perfect Publishers Ltd, and this was when the company was born. She is 42 years old and is a mother of 4 children. Shahida uses computers to deal with online enquiries and to publish books from all over the world. Furthermore, she also produces the royalty statements for each book twice yearly. Aside from this, she has little experience with computers. Shahida generally uses a computer for research, social networking and reading the news. Every book is outsourced to an Editor and a Cover Designer. When the book is fully edited and formatted to the right specifications, they return the ready to print files to Shahida, who sends the books off to print. They track the books and their details manually using a database on an Excel Spreadsheet. Currently, it is difficult to keep all the data up to date and it is rather disorganised. Shahida would like to be able to look up a book/number of books in the system by using the details, such as the Author/Title/Date etc. She would also like the new system to link this database with information about the royalties of each book, and when they are needed to be paid every six months. The system could send an email to her, updating her about these.

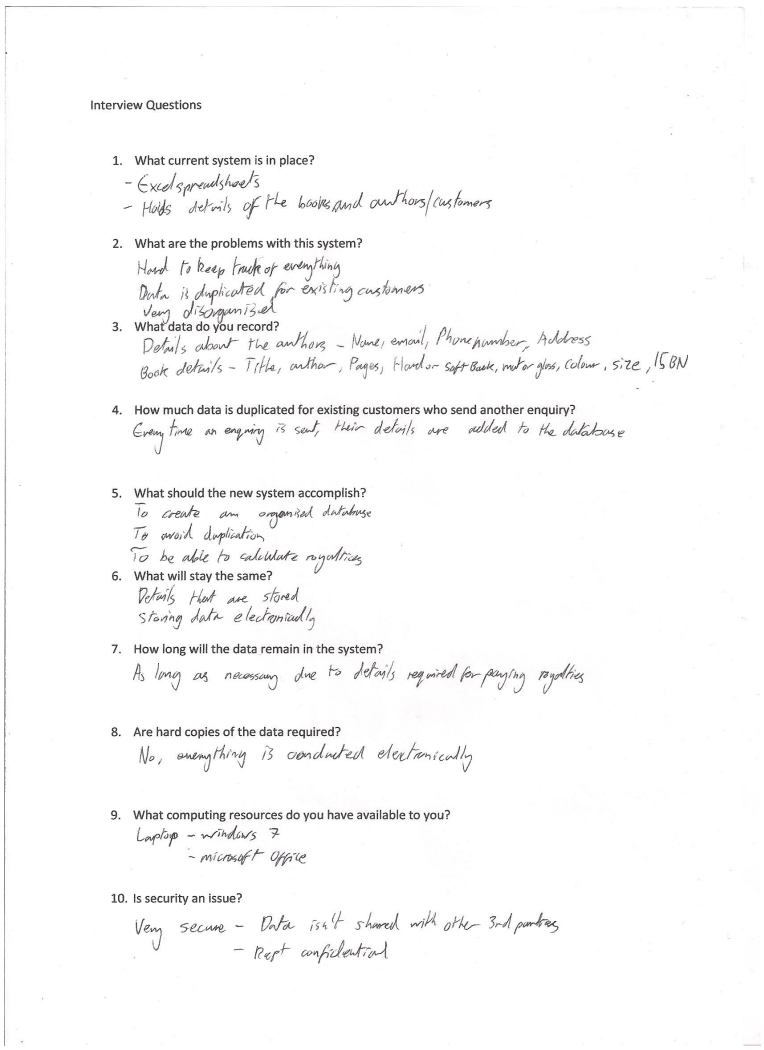
1.1.2 Define the current system

The system that is currently being used consists of Shahida entering the book and its details into the spreadsheet. These details are taken from the enquiries that she receives via email, and include; first name, last name, email, and vague details of the book. Then, the more accurate details such as; book title, size, number of pages, hardback/paperback, mat or gloss, crème or white paper, font and font size are discussed between Shahida and the customer. She also records their details in a separate spreadsheet, which includes their email, phone number, and address, upon the customer's consent. The spreadsheets are used to track current and previous customers and their books, as the details about the book and themselves are recorded in these. Subsequently, Shahida informs the customer of the price details, waits for full payment and then sends the customer an invoice. She then contacts her editor and her illustrator to start work on the book. Shahida refers to her company's website, where the calculated prices are ready for books, in order to correctly price the book, in accordance to the book's details. An ISBN number is assigned to the book, which is bought in bulks by Shahida from the ISBN Office. Once the book is finished, the book is sent off to print, and the author receives 25 copies.

1.1.3 Describe the problems

There are numerous problems with the current system. First of all, the usage of the spreadsheet makes it harder to find a customer and their details, and their book's details. This is because the spreadsheet is much disorganised. Furthermore, it is harder to keep track of the details of each book, meaning it is difficult to update the details of the book when necessary. Because there are a large number of books in the system, it is harder to find each book and then seperately find the customer that the book was written by, as they are in seperate spreadsheets, meaning that Shahida must manually search for them in both spreadsheets. Also, if the same author makes an enquiry about another book, their details must be entered into the spreadsheet again, because it is difficult to find where the customers details currently are due to there being many customers in the spreadsheet, having incorrectly entered their data from a given enquiry, or they might have been removed after having been there for a long time This could cause inconsistencies in the data, because for instance, the customer may move house, meaning their address would need changing, and it would be difficult to find and update all entries where their address is recorded.

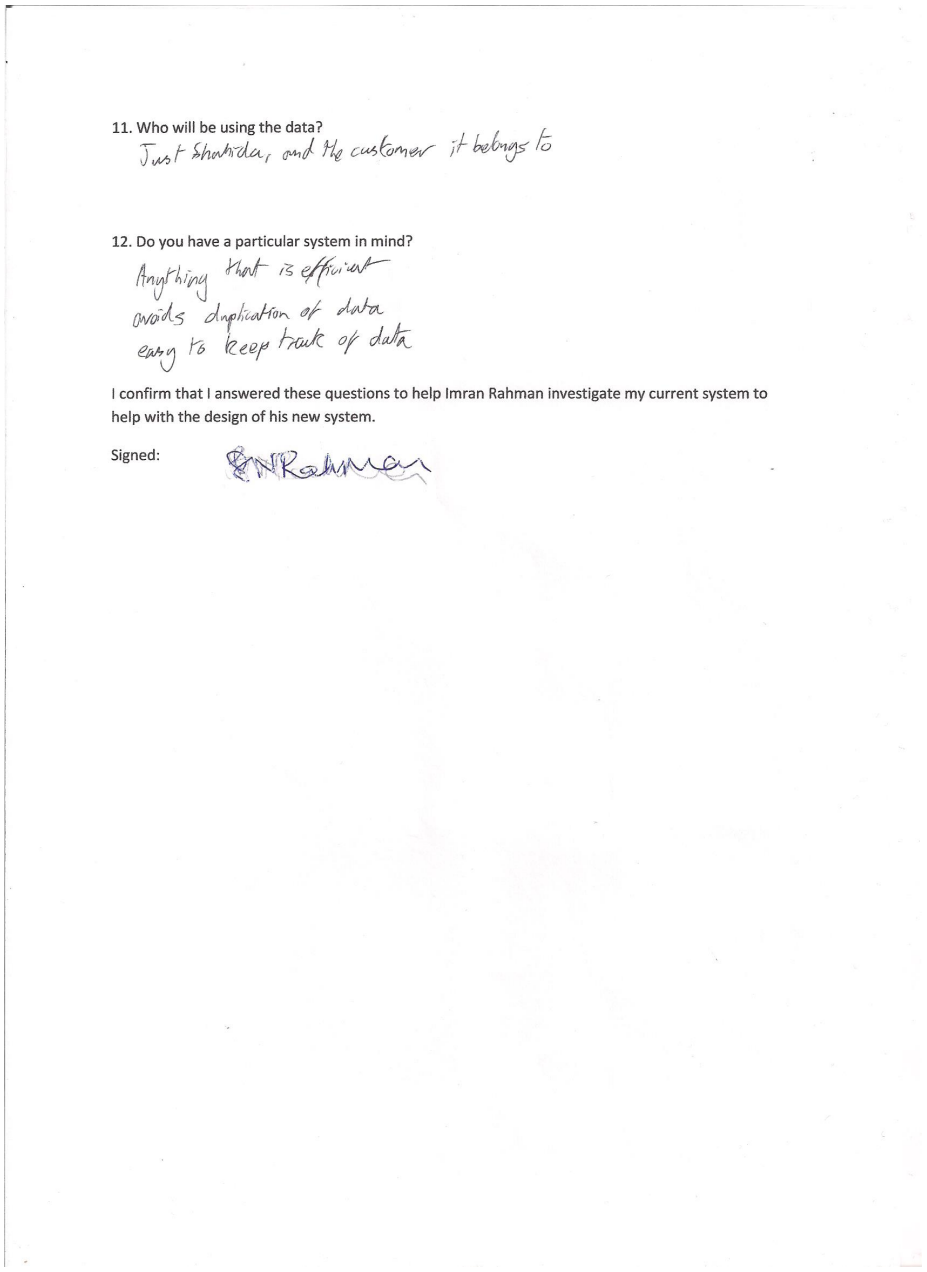
1.1.4 Section appendix



Interview Questions

1. What current system is in place?
   - Excel spreadsheets
   - Holds details of the books and authors/customers
2. What are the problems with this system?
   Hard to keep track of everything
   Data is duplicated for existing customers
   Very disorganised
3. What data do you record?
   Details about the authors - Name, email, Phone number, Address
   Book details - Title, author, Pages, Hard or Soft Back, matt or gloss, colour, size, ISBN
4. How much data is duplicated for existing customers who send another enquiry?
   Every time an enquiry is sent, their details are added to the database
5. What should the new system accomplish?
   To create an organised database
   To avoid duplication
   To be able to calculate royalties
6. What will stay the same?
   Details that are stored
   Storing data electronically
7. How long will the data remain in the system?
   As long as necessary due to details required for paying royalties
8. Are hard copies of the data required?
   No, everything is conducted electronically
9. What computing resources do you have available to you?
   Laptop - windows 7
   - microsoft office
10. Is security an issue?
    Very secure - Data isn't shared with other 3rd parties
    - Kept confidential

Figure 1.1: Interview Questions: Page 1



11. Who will be using the data?
Just Shahrida, and the customer it belongs to

12. Do you have a particular system in mind?
Anything that is efficient
avoids duplication of data
easy to keep track of data

I confirm that I answered these questions to help Imran Rahman investigate my current system to help with the design of his new system.

Signed: IRahman

Figure 1.2: Interview Questions: Page 2

1.2 Investigation

1.2.1 The current system

Data sources and destinations

In the current system there are three key data sources that are used. These are Shahida herself, the customer and the spreadsheets. The Customer sends the enquiry which is sent via email. After the details about the book have been discussed, they are stored in one spreadsheet, and the details of the customer are stored in a seperate spreadsheet, linked to the details of the book. These details are agreed seperately from the enquiry, between Shahida and the customer. Details such as the book size, page number, hardback/softback and paper type are used to calculate the cost for the customer, which is used to create an invoice which is sent to the customer. This is the first output of the system. A copy of every invoice is stored on Shahida's computer in a special folder just for invoices. Once Shahida receives full payment, the work is conducted and completed. If the customer wishes to publish another book, they send another enquiry, and their personal data is duplicated because of the details of the new book which are added. Every six months after the book has been published, the royalties must be paid to the author. The royalties are the profit that the author makes from sales of her book from bookshops. A royalty statement is created and stored in a special folder just for royalties.

Source	**Data**	**Example Data**	**Destination**
Customer Enquiry	Forename	Peter	Shahida
Customer Enquiry	Surname	Parker	Shahida
Customer Enquiry	Email	mail@example.com	Shahida
Customer	Address	1 Example Road	Shahida
Customer	Postcode	AB1 2CD	Shahida
Customer	Phone Number	07123456789	Shahida
Customer	Book Title	The Hobbit	Shahida
Customer	Size	Large	Shahida
Customer	Number of Pages	395	Shahida
Customer	Hardback/Paperback	Paperback	Shahida
Customer	Mat/Gloss	Gloss	Book Database
Customer	Creme/White Paper	White Paper	Shahida
Customer	Font	Times New Roman	Shahida
Customer	Font Size	12	Shahida
Shahida	Book Title	The Hobbit	Book Database
Shahida	Size	Large	Book Database
Shahida	Number of Pages	395	Book Database
Shahida	Hardback/Paperback	Paperback	Book Database
Shahida	Mat/Gloss	Gloss	Book Database
Shahida	Creme/White Paper	White Paper	Book Database
Shahida	Font	Times New Roman	Book Database
Shahida	Font Size	12	Book Database
Shahida	Forename	Peter	Author Database
Shahida	Surname	Parker	Author Database
Shahida	Email	mail@example.com	Author Database
Shahida	Address	1 Example Road	Author Database
Shahida	Postcode	AB1 2CD	Author Database
Shahida	PhoneNumber	07123456789	Author Database
Shahida	Invoice	-	Invoice Folder
Shahida	Invoice	-	Customer
Shahida	ISBN	9780007525492	Book Database
Shahida	Date Published	23/10/2014	Book Database

Source	Data	Example Data	Destination
Shahida	Price	£12.99	Book Database
Customer	Payment	£1000	Shahida
Shahida	Cover Preferences	-	Cover Designer
Shahida	Book	-	Editor
Editor	Completed Book	-	Shahida
Cover Designer	Completed Cover	-	Shahida
Shahida	Royalty Statement	-	Royalty Statement Folder
Shahida	Royalty Statement	-	Customer
Shahida	Royalties	£211.20	Customer

Algorithms

In the current system there are two Algorithms which are being used. The first sends an invoice to the customer and checks whether Shahida has recieved full payment. Once Shahida has received full payment, she, her cover designer and her editor can begin working on the book. The second algorithm consists of completing the work that is needed to be done, and checks whether the work has been completed, so that the completed book can then be sent off for printing.

Algorithm 1 First Algorithm - Sending an invoice and Checking for Payment

1: **SET** *Payment* **TO** $false$
2:
Check Website for Price
Create Invoice
Send Invoice
3: **WHILE** $Payment = false$ **DO**
Check For Payment
4: **IF** *PaymentReceived* **THEN**
Payment = true
5: **END IF**
6: **END WHILE**

Algorithm 2 Second Algorithm - Completing Work and Checking If Work is Completed

```
1: SET WorkComplete TO false
2: SET CoverComplete TO false
3: SET BookComplete TO false
4:
5: WHILE WorkComplete = false DO
       Get Completed Cover from Cover Designer
6:     SET CoverComplete TO true
       Get Completed Book from Editor
7:     SET BookComplete TO true
8:     IF BookComplete and CoverComplete THEN
9:         SET finished TO true
10:    END IF
11: END WHILE
```

Data flow diagrams

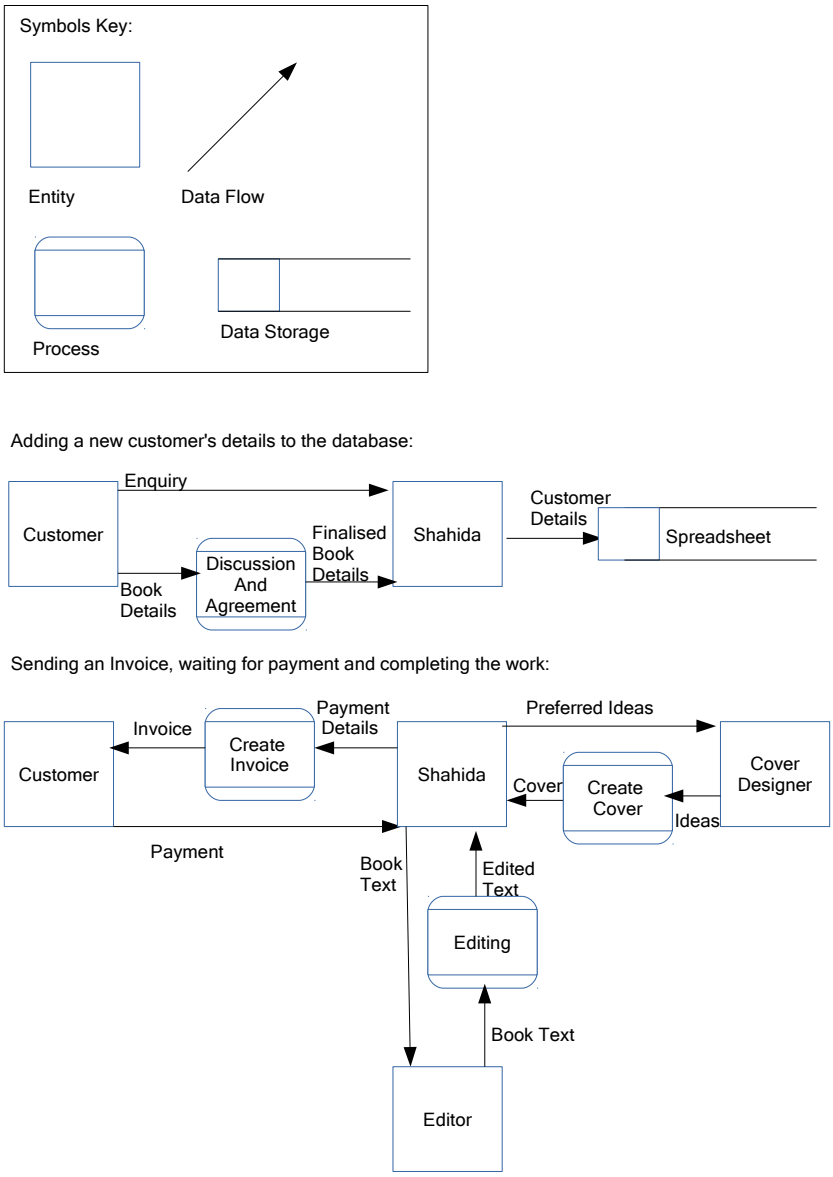


Figure 1.3: Data Flow Diagrams

Input Forms, Output Forms, Report Formats

The current system has just one input form. This is the Enquiry that is sent to the company, from an author. Also, The current system has two different output forms - The Invoice and The Royalty Statement.

The enquiry is received via email, which is sent using the company's website. The email will look like this when received:

First Name:

Last Name:

Email:

Question/Comment:

The following image is an example of the first output form, an Invoice.

PERFECT PUBLISHERS Ltd.23 MAITLAND AVENUE, CAMBRIDGE, CB4 1TA, UK.
Tel: +44 (0) 1223 424422 Fax: +44 (0) 1223 424414

Perfect Publishers Ltd

INVOICE *"Fulfil your books' potential"*

Invoice Date: 27-05-14

Author Name: Svagito Liebermeister

Title of Book: Osho Therapy

ISBN: 978-1905399-9-25

Shipping details:
Pratibha de Stoppani
via Al Marcadello 2
CH-6988 Ponte Tresa
Switzerland

Order Description		**PRICE**
12 Osho Therapy @ 50% discount. Retail price £25.99		£155.94
Shipping	Premium	£10.06
TOTAL		**£166.00**

Account details: BIC: LOYDGB21206 IBAN: GB33 LOYD 3091 7402 3570 35

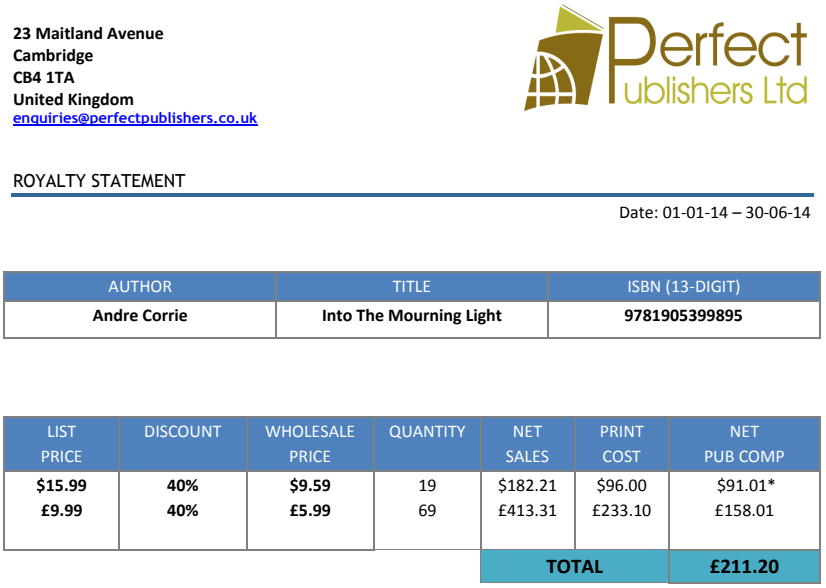
SORT CODE: 30-91-74 ACCOUNT NUMBER: 02357035

Payment within 14 days. Late payment will incur a fixed penalty of £20 for the first month and £50 per month thereafter.

Company Number 5429532. VAT Number: 857 5975 58. Registered in England.
www.perfectpublishers.co.uk

Figure 1.4: Invoice Example

The following image is an example of the second output form, a Royalty Statement.



23 Maitland Avenue
Cambridge
CB4 1TA
United Kingdom
enquiries@perfectpublishers.co.uk

Perfect Publishers Ltd

ROYALTY STATEMENT

Date: 01-01-14 – 30-06-14

AUTHOR	TITLE	ISBN (13-DIGIT)
Andre Corrie	**Into The Mourning Light**	**9781905399895**

LIST PRICE	DISCOUNT	WHOLESALE PRICE	QUANTITY	NET SALES	PRINT COST	NET PUB COMP
$15.99	**40%**	**$9.59**	19	$182.21	$96.00	$91.01*
£9.99	**40%**	**£5.99**	69	£413.31	£233.10	£158.01
				TOTAL		**£211.20**

PRINT COST PER BOOK: £3.70 UK AND $4.80 US
***$91.01 = £53.19**

1 GBP = 1.71565 USD 09-07-14

Company Number: 5429532. VAT Number: 857 5975 58. Registered in England.
www.perfectpublishers.co.uk | www.facebook.com/ppublishers | www.twitter.com/ppublishers

Figure 1.5: Royalty Statement Example

1.2.2 The proposed system

In the proposed system the Customer's information will still be received through the online form on the company's website, which Shahida receives via email. She will then enter this into the system using a new interface that will ask her for the details. This will be placed into a database. Each Customer's book will have a primary key, the ISBN number which Shahida assigns to the book. In a seperate database, the author's details will be stored and the author will have a special ID number which is used only in the databases. Every book that is published by the same author will have an attribute which is the author's ID. The ID will just be a 3 digit number. The system's interface will have a search feature, which can search for book titles, authors, and author IDs.

Data sources and destinations

Source	Data	Data Type	Destination
Customer Enquiry	Forename	String	Shahida
Customer Enquiry	Surname	String	Shahida
Customer Enquiry	Email	String	Shahida
Customer	Address	String	Shahida
Customer	Postcode	String	Shahida
Customer	Phone Number	String	Shahida
Customer	Book Title	String	Shahida
Customer	Size	String	Shahida
Customer	Number of Pages	395	Shahida
Customer	Hardback/Paperback	Paperback	Shahida
Customer	Mat/Gloss	Gloss	Shahida
Customer	Creme/White Paper	White Paper	Shahida
Customer	Font	Times New Roman	Shahida
Customer	Font Size	12	Shahida
Shahida	Book Title	The Hobbit	Database
Shahida	Size	Large	Database
Shahida	Number of Pages	395	Database
Shahida	Hardback/Paperback	Paperback	Database
Shahida	Mat/Gloss	Gloss	Database
Shahida	Creme/White Paper	White Paper	Database
Shahida	Font	Times New Roman	Database
Shahida	Font Size	12	Database
Shahida	Forename	String	Database
Shahida	Surname	String	Database
Shahida	Email	String	Database
Shahida	Address	String	Database
Shahida	Postcode	String	Database
Shahida	PhoneNumber	String	Database
Shahida	ISBN	String	Database
Shahida	Date Published	Date	Database
Shahida	Price	Real	Book Database
Database*	Author ID	Integer	Shahida
Shahida	Invoice	String	Invoice Folder
Shahida	Invoice	String	Customer

Source	**Data**	**Data Type**	**Destination**
Customer	Payment	Real	Shahida
Shahida	Cover Details	String	Cover Designer
Shahida	Book	String	Editor
Editor	Completed Book	String	Shahida
Cover Designer	Completed Cover	Image	Shahida
Shahida	DatePublished	Date	Database
Shahida	Royalty Statement	-	Royalty Statement Folder
Shahida	Royalty Statement	-	Customer
Shahida	Royalties	Real	Customer

*The Database will create a number and assign that number as an Author ID

Data flow diagram

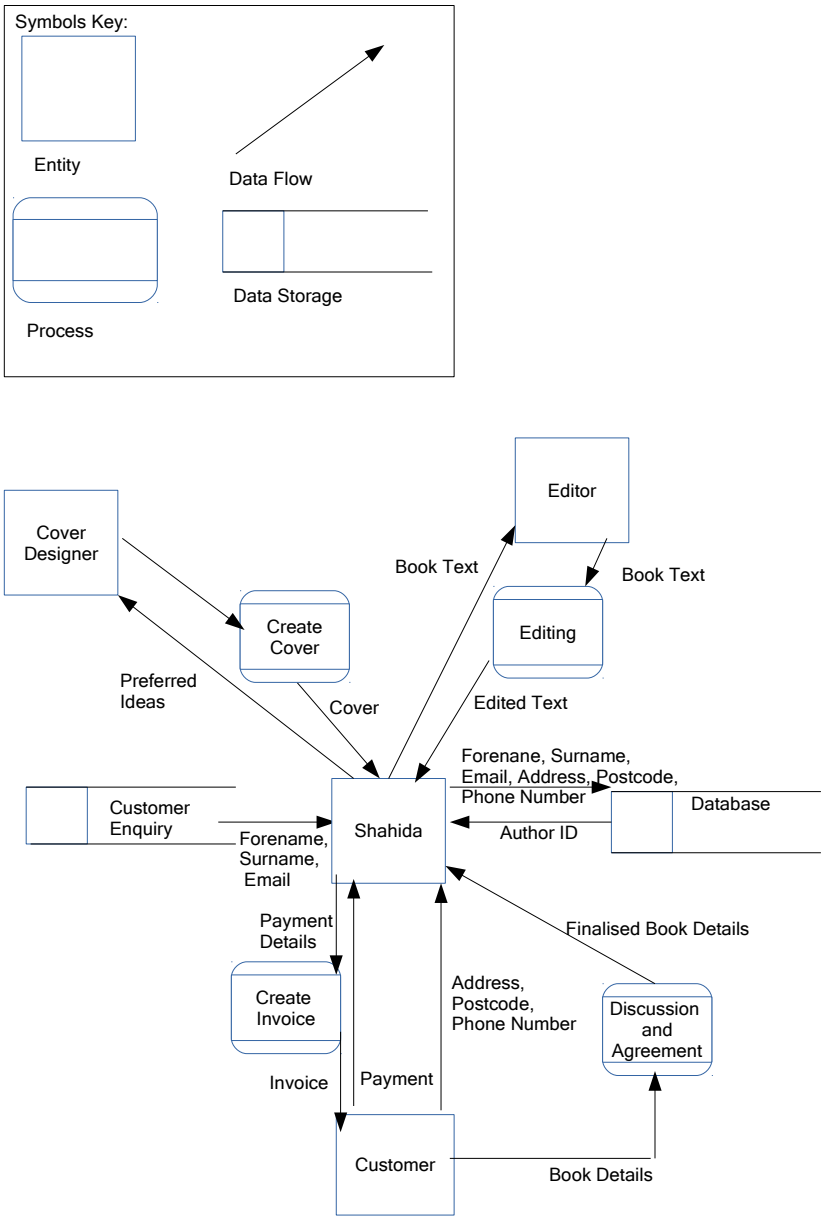


Figure 1.6: Data Flow Diagram

Data dictionary

Name	Data Type	Length	Validation	Example Data
FirstName	String	2-20 Characters	Length	Jo
LastName	String	2-20 Characters	Length	Williamson
Email	String	7-30 Characters	Length	mail@example.com
PhoneNumber	String	9-15 Characters	Format	07123456789
Address	String	5-64 Characters	Length	Example Road
Postcode	String	7 Characters	Format	AB1 2CD
Author ID	Integer	1-255	Range	17
ISBN	String	13 Characters	Length	9780007525492
BookTitle	String	1-127 Characters	Length	The Hobbit
NoOfPages	Integer	1-1023	Range	395
Size	String	5	Existence	Large
Back	String	8 or 9 Characters	Existence	Paperback
Cover	String	3 or 5 Characters	Existence	Gloss
Paper	String	11 Characters	Existence	White Paper
Font	String	1-64 Characters	Length	Arial
FontSize	Real	8-64	Numbers only	12.5
DatePublished	Date	dd/mm/yyyy	Range	23/10/2014
Price	Real	Numbers only	£12.99	

Volumetrics

I have conducted calculations to calculate the maximum possible size of 1 customer and book record, which is 275 Bytes. However, when a customer wishes to publish more than one book, more book records are required. As the most amount of books one customer has published with the company is 3, we can have 4 book records per customer record.

Each ASCII Character is 1 byte, each number up to 255 is 1 byte, and each number between 256 and 32768 is 2 bytes. Real Numbers such as 12.5 are 2 bytes, and a Date is 3 bytes.

Firstly, I have worked out the size of the customer record, which is 157 Bytes.

FirstName (20) + LastName (20) + Email (30) + PhoneNumber (15) + Address (64) + Postcode (7) + Author ID (1) = 157 Bytes.

I have then calculated the size of one book record, which is 118 Bytes. Book

Title (1), NoOfPages (2), Size (5), Back (9), Cover (5), Paper (11), Font (64), FontSize (2) + ISBN (13) + DatePublished (3) + Price (2) + Author ID (1) = 118 Bytes

If we have 4 book records per customer record, that would mean that the size for 1 customer with 4 books would be 157 + (5 * 118) = 747 Bytes.

I have chosen to use a size of 100 different customer records, which would be equivalent to 74700 bytes, and 74700 / 1024 = 72.9 Kilobytes. This is because the company rarely have more than 20 enquiries in a year. This would be a suitable number of customer records as it will last a few years before it may require resizing, which can be conducted at a later date when necessary. 72.9 KB will be not be difficult for Shahida's PC to hold, as it is a very small size.

1.3 Objectives

1.3.1 General Objectives

The general objectives are:

- Organised layout for the database.
- Prevention of unnecessary duplication of data.
- Simple interface for entering data, meaning it can be conducted quickly.
- Search function to find a specific customer in the database.
- Ability to edit existing data easily and quickly.

The System must be able to prevent unecessary duplication of data, and be able to organise data well, and this will be a priority.

1.3.2 Specific Objectives

Organising a new layout for the database:

- Be able to sort by date (ascending and descending)
- Clear tables and fields for each entity and attribute

Preventing Duplication:

- Checks to see if the data already exists
- Use of Author ID to ensure it will only be entered once

Simple interface for entering data:

- As little amount of boxes as possible

- Clearly label entry boxes

Search function and editing data:

- Data can be found using the Author ID, Author Name, or Book Title
- Can be edited upon finding the desired data

1.3.3 Core Objectives

- Organising the data using certain attributes
- Preventing Duplication

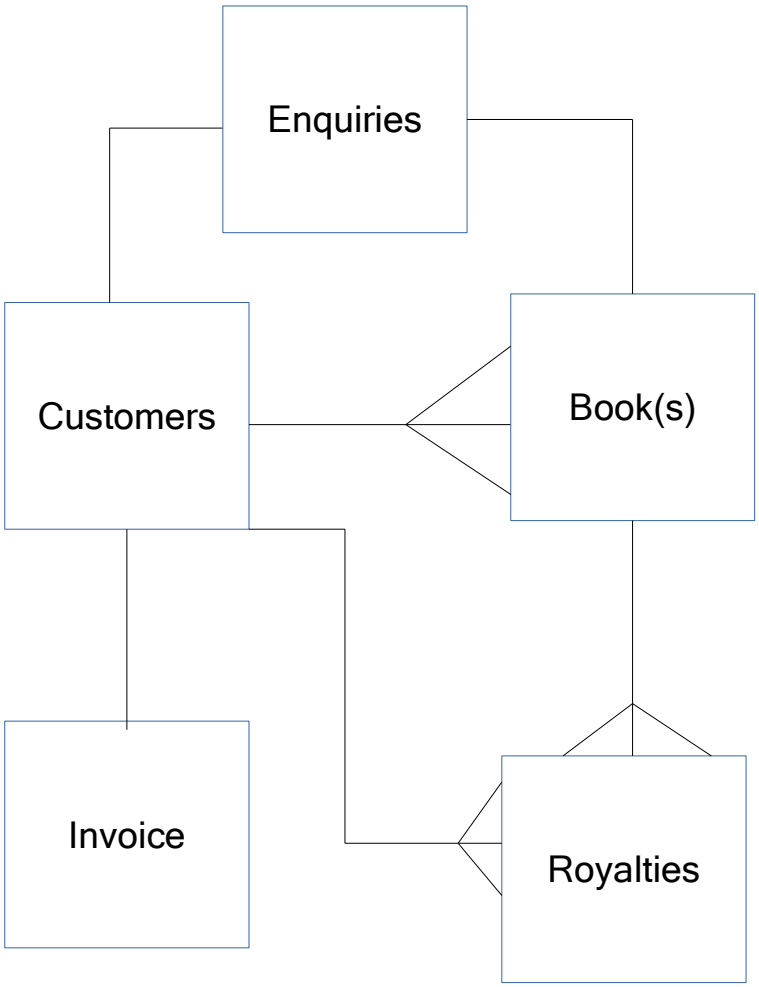
1.3.4 Other Objectives

- Searching for data using attributes
- Editing data in the database

1.4 ER Diagrams and Descriptions

1.4.1 ER Diagram

Figure 1.7: ER Diagram



1.4.2 Entity Descriptions

Customer(Author ID, *Email*, Forename, Surname, Address, Postcode, Phone Number)

Enquiry(Email, *Author ID*, Forename, Surname)

Invoice(Author ID, *ISBN Number*, Book title, Price, Forename, Surname, Address, Postcode)

Royalties(AuthorID, *ISBN Number*, Book title, Price, Forename, Surname, Address, Postcode)

Book(ISBN Number, *AuthorID*, Book Title, Pages, Size, Cover type, Colour, Back Type, Paper, Font, Font size, Date published, Price)

The database will only store data about the customers and their books, as the enquiries give details about the books and customers, and the royalties and invoices are stored seperately from the database.

1.5 Object Analysis

1.5.1 Object Listing

- Shahida
- Customer
- Editor
- Cover Designer
- Spreadsheet

1.5.2 Relationship diagrams

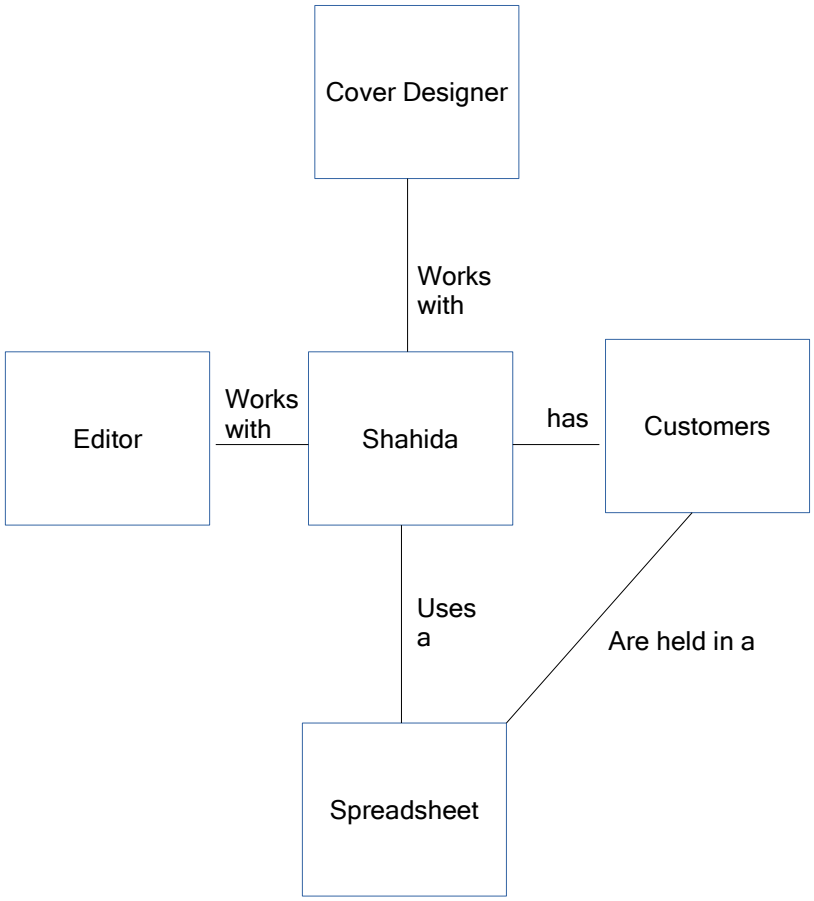


Figure 1.8: Relationship Diagram

1.5.3 Class definitions

Key:

Label
Attributes
Behaviours

Customer
Author ID
ForeName
Surname
Email
Address
Postcode
Phone Number
Add ForeName
Edit Forename
Add Surname
Edit Surname
Add Email
Edit Email
Add Address
Edit Address
Add Postcode
Edit Postcode
Add Phone Number
Edit Phone Number

Book
Title
ISBN
Pages
Size
Cover Type
Back Type
Paper
Font
Font Size
Price
Date Published
Add Title
Edit Title
Add ISBN
Edit ISBN
Add Pages
Edit Pages
Add Size
Edit Size
Add Cover Type
Edit Cover Type
Add Back Type
Edit Back Type
Add Paper
Edit Paper
Add Font
Edit Font
Add Font Size
Edit Font Size
Add Date Published
Edit Date Published
Add Price
Edit Price

1.6 Other Abstractions and Graphs

Graphs not required.

1.7 Constraints

1.7.1 Hardware

Shahida uses her laptop to run the company from home. The new system will need to be able to run on this machine.

Computer Specifications:

- 15.6" Display
- AMD Quad-Core A4-5000M APU (1.5GHz, 2MB cache)
- 4 GB DDR3 RAM
- 750 GB HDD, 5400 rpm
- AMD Radeon HD 8330 Graphics Card

The proposed system will have no problem with running on this machine, as it uses a small amount of CPU usage. A constraint would be the size of the screen. This is because the system will need to be based around the screen size of her laptop. As her laptop is portable, portability is not a constraint. The laptop will need enough RAM to hold the system. However, Shahida's laptop has more than enough memory for this, meaning this will not be a problem.

1.7.2 Software

Shahida would prefer that the system will run on Windows 7, as she uses this operating system for her laptop. Changing the operating system will cause difficulties, meaning it is best for the system to run on Windows 7, suiting her needs.

1.7.3 Time

Shahida does not need this system to be built quickly, but she would like it to be complete as soon as reasonably possible. Otherwise, the only deadline for this project is April 2015, which has been set by my teacher.

1.7.4 User Knowledge

Having worked in the publishing industry beforehand, being an author has also given Shahida the knowledge of how to run her current company. Aside from being able to perform basic tasks on a computer, browsing the internet and using social media, Shahida has small experience with computers.

1.7.5 Access restrictions

Shahida will be the only person who will have full access to all the data in the proposed system, and she will be the only one who can access it. This can be password protected for security reasons, meaning that only she can gain access to the database. This is also because she is the only necessary person to view, enter and edit data in the system, as her Editor and her Cover Designer do not need to use the database. As she is the only user of the database, it will be easier to keep secure. The authors will be able to make requests about personal data, such as having it removed, or receiving a copy of the personal data about them. The database will comply to the Data Protection Act 1998, as the company already does so with their current system.

1.8 Limitations

1.8.1 Areas which will not be included in computerisation

Generally, all actions require the use of a computer in the company. However, rarely, a customer does call Shahida about an enquiry, as this customer may not be so computer literate. In this case, Shahida will note down the details of the enquiry, and will enter it into the database.

1.8.2 Areas considered for future computerisation

The database could be used online, so that the authors can use their Author ID to log in and see just their details on the database. This would mean that the customers would not have to contact Shahida to receive the data held about them, as they can see the data by theirselves. They will also be able to access this data from anywhere where they have access to the internet. This could also enable Shahida to access the data from other machines aside from her laptop.

1.9 Solutions

1.9.1 Alternative solutions

Solution	Advantages	Disadvantages
Re-organisation of the current spreadsheet	No changes to current operating system and software required, will not cost	Current problems will still occur, Difficult to keep organised as it will require more maintenance to do so
Python Desktop Application with GUI	User Friendly, Clear and easy to interpret, Layout can be designed specificly for the client, Usage of buttons simplifies tasks, Minimal training needed for most levels of experience	Takes up more memory, Takes longer to create the application
Filing system	No electronics needed, Costs less, Minimal training needed for most levels of experience	Difficult to back up the data due to it being held on paper, data will have to be sent via post when necessary, Lots of physical space is required, more prone to damage and deteriation due to more movement

1.9.2 Justification of chosen solution

I have chosen to use the Python Desktop Application with GUI as my solution. This is because:

- I am already familiar with the Python Programming Language, whereas I have little knowledge of how to manage a Paper Filing system or with creating advance spreadsheets.
- This will keep the system using computers and software, meaning there will not be a drastic change.
- Using the application will take less time than manually entering everything into a spreadsheet.

- This will also take less time and physical space than writing details down on paper.

Chapter 2

Design

2.1 Overall System Design

2.1.1 Short description of the main parts of the system

- Log In Window
- Main Database Interface
- Adding/Removing/Editing Customers and Entries
- Calender Interface
- Changing Password
- Search Window

Log In Window

- A window is displayed which prompts the user to input their ID and password.
- Checks the entered valiues with the database to identify whether the user's credentials are correct.
- Once a correct set of values are entered, the user will be granted access to the database.
- A link will be at the bottom which says "Forgotten password?". This can be clicked on and then the user wil be prompted for the email address, and the corresponding password for the email address entered will be sent to that email.

- If there is no record of an email and password then the user will be prompted to create one for their corresponding email.

Main Database Interface

- This will be the "home" interface.
- A view of the Customer details in the database will be available.
- The user can select an author from the basic view of the database, and click view
- A user interface is presented with a set of options which are: View, Search Database, Add Entry, Remove an Entry, Edit an Entry, Change Password, and Log out.
- Clicking the Search Database Button will prompt a seperate interface to open, and shows details which can be used to search for specific items in the database.
- Customers can be searched for quickly using their first name on this screen.

View Screen

- Clicking view after having selected an customer will open a new window which will show a more in depth view of it. It will show the books that have been published with them.
- There will be buttons to expand on certain fields, including Royalties, Publishing Invoices and Book Invoices. These will show in new windows. The user can see the breakdown of various parts of the database, such as the royalties and invoices. The user will have the option to add and remove royalties and invoices.

Adding/Removing/Editing Customers and Entries

- Clicking the Add Entry Button will prompt a seperate interface to open, and contains a layout of entry boxes for required fields for entering details about the customer. After this, the user can click on the customer's new record from the menu and click edit or a book/royalties/royalty items/-book invoice/book invoice items/publication invoice, dependent on which has been selected. An existing customer can be selected using the search function.
- If a customer already exists, and details are needed to be edited or deleted, a search can be conducted to find that customer.
- Clicking the Remove Entry Button will prompt a seperate interface to open, which contains a view of the database, consisting of all the customers. Three search boxes can be used for searching for their forename,

surname or AuthorID. If an entry was selected beforehand, then upon clicking Remove Entry, The user will be prompted for confirmation, then asked to enter their password.

- Clicking the Edit Entry button will prompt a seperate interface to open, and will contain a view of the database. An entry can be searched for using the search, selected, and once the user clicks "Edit", the user will be prompted with a text box, asking for the user to enter text. Upon confirming what the user wants to enter, they are required to enter their password. This will then be saved. If a customer entry was selected before hand, a new window for adding entries will open first upon clicking Edit Entry, and the data about the customers will be in the fields already, ready for editing. Then, the data can be edited and saved, and the user will be prompted for confirmation then asked to enter their password.

Changing Password

- An interface will open, which will prompt the user to enter their Email, Old Password, and Dhen the new password twice for confirmation.
- Once this has been confirmed, the interface will close, resorting back to the log in window.

Search Window

- Clicking the Search Database Button will open a seperate interface, which contains a set options which the user can choose from in order to conduct a search.
- Once the Search Button is clicked, a list of all the data entries that match the search criteria will come up in a list in the Main Window or the Editing Window.
- The search will only use values and text strings that the user is familiar with, and will not require the user to know obscure pieces of data.

2.1.2 System flowcharts showing an overview of the complete system

The following is a flowchart representing a summary of the complete system.

Figure 2.1: Flowchart 1

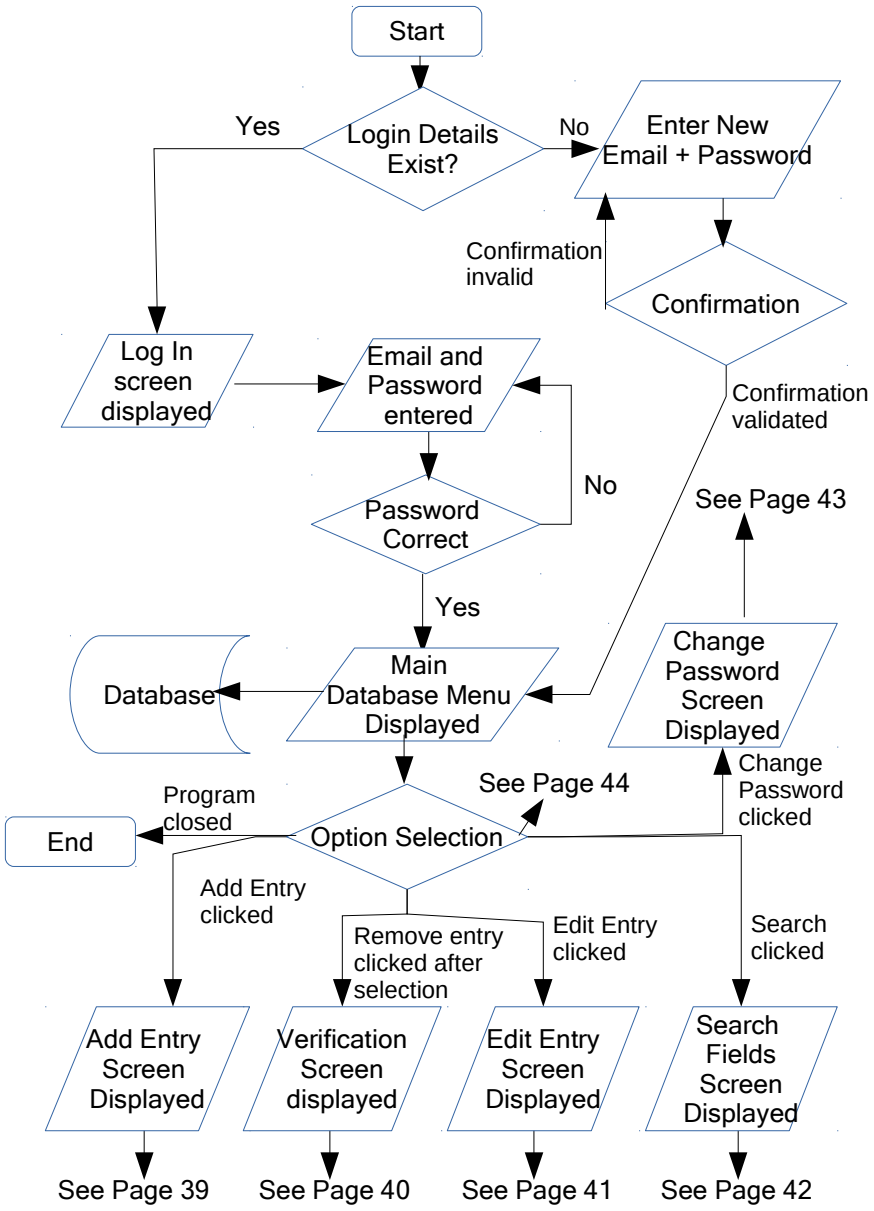


Figure 2.2: Flowchart 2

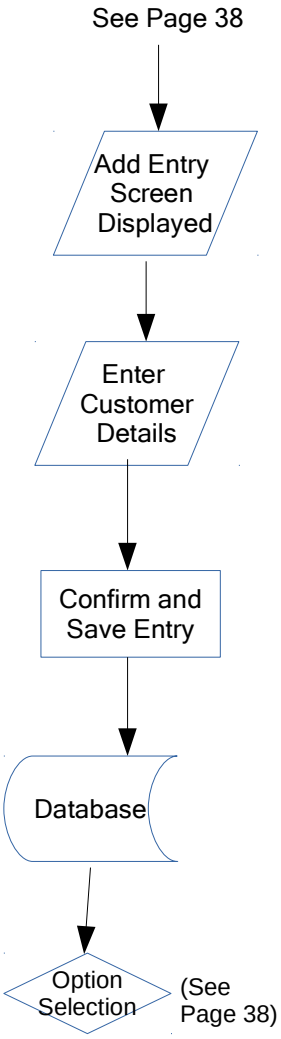


Figure 2.3: Flowchart 3

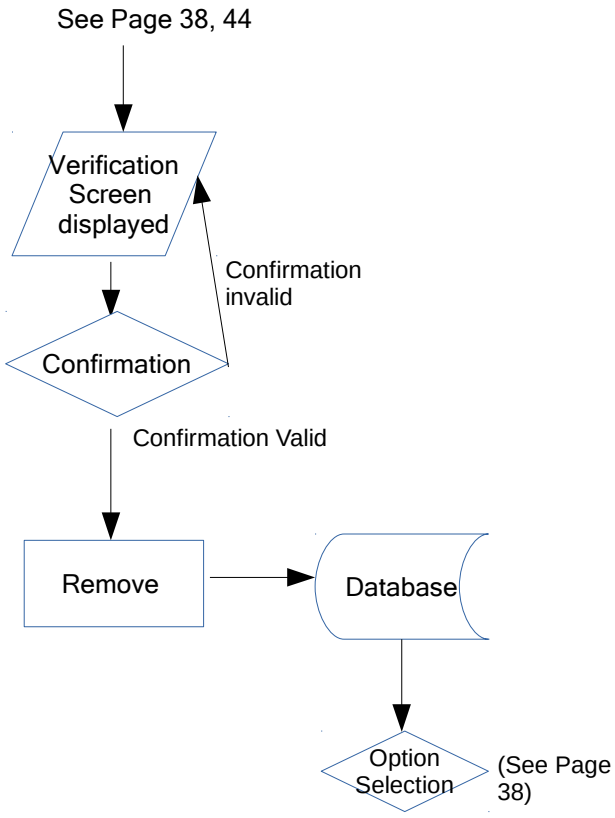


Figure 2.4: Flowchart 4

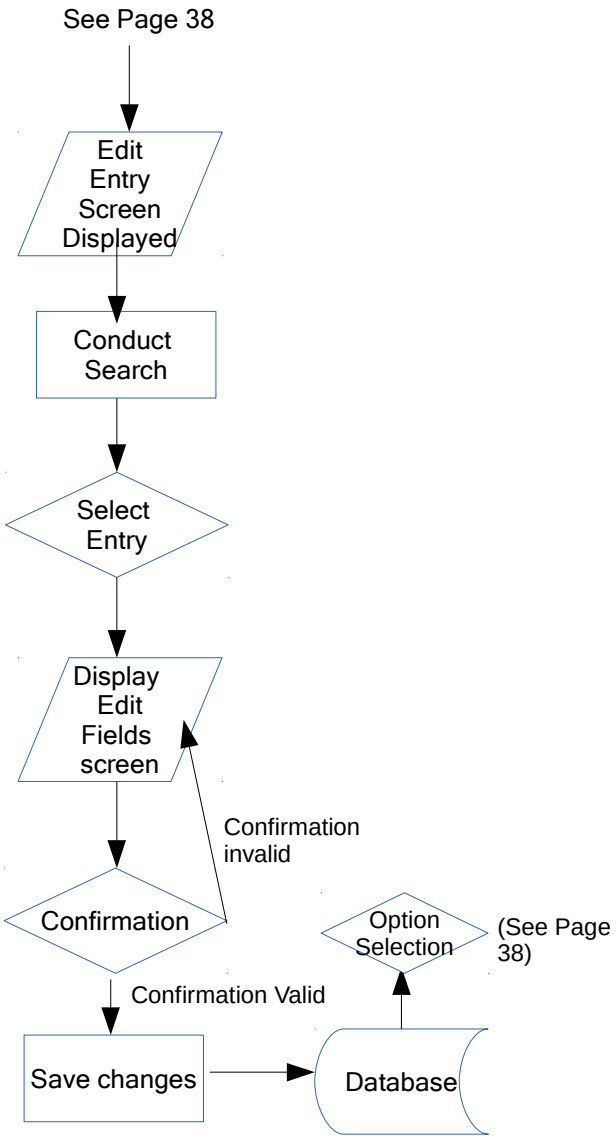


Figure 2.5: Flowchart 5

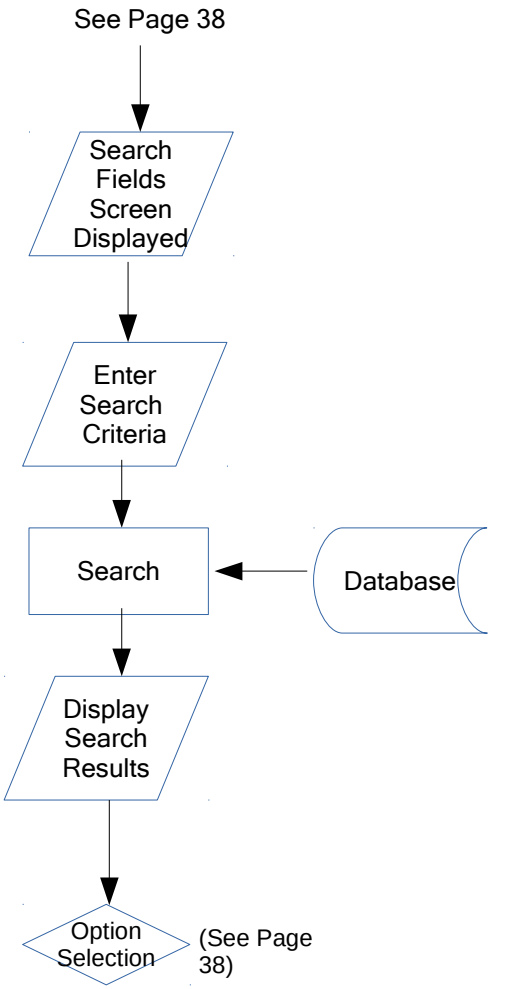


Figure 2.6: Flowchart 6

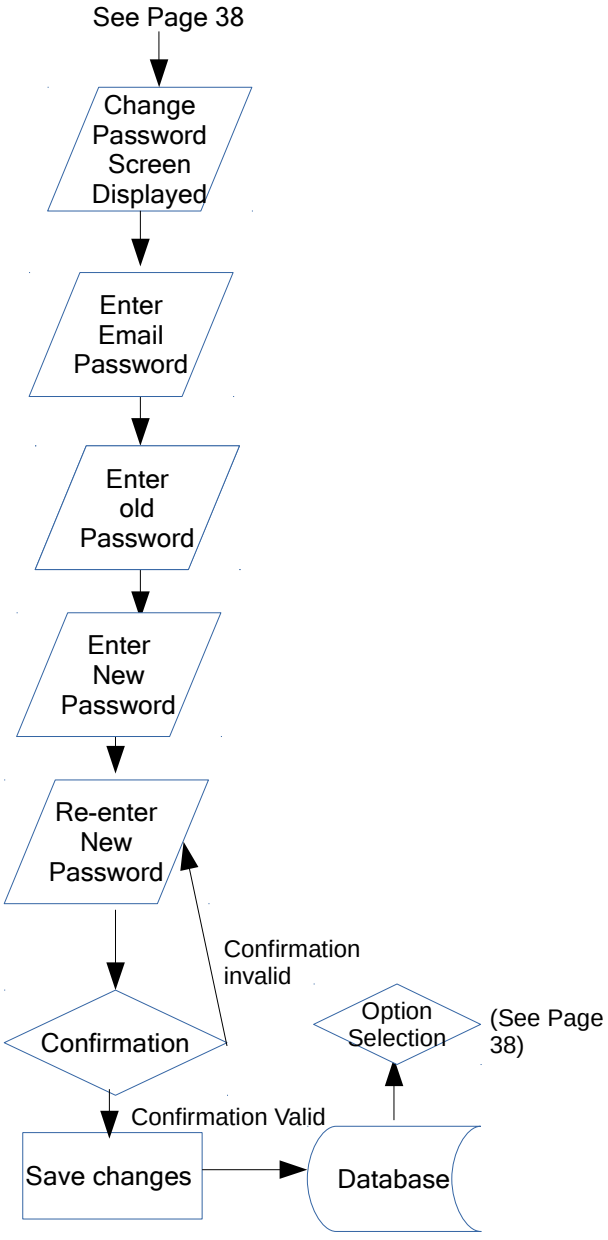
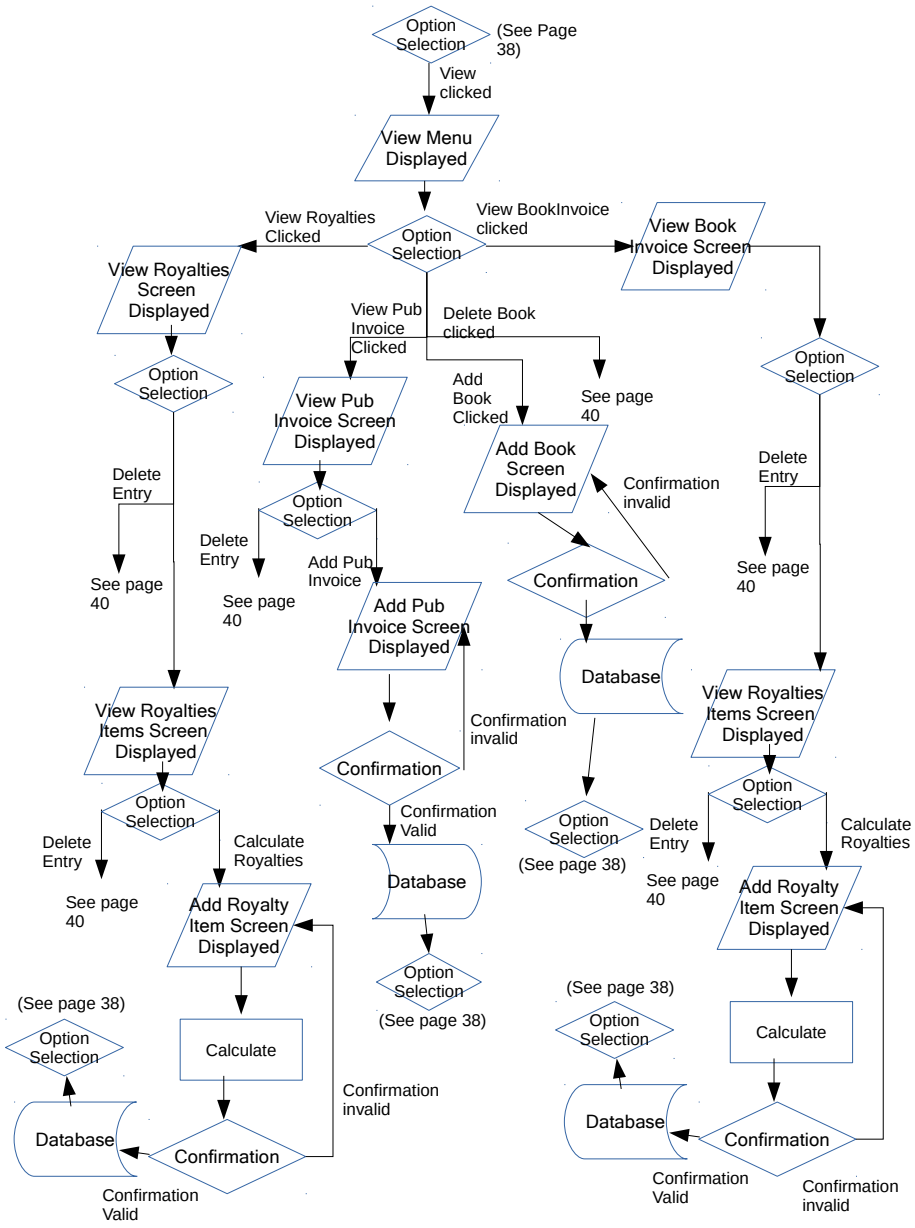


Figure 2.7: Flowchart 7



2.2 User Interface Designs

Figure 2.8: Login Screen and Main Menu

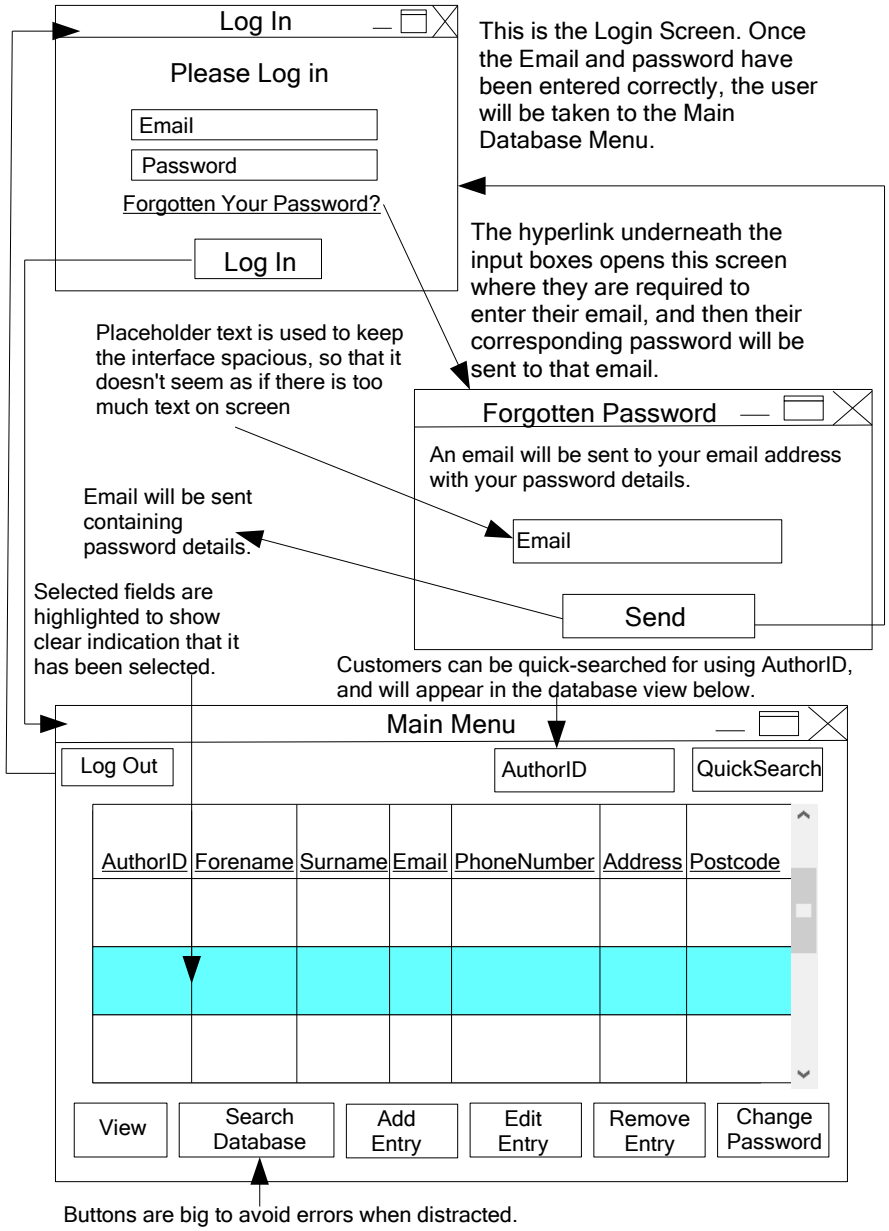


Figure 2.9: View Menu and Royalties

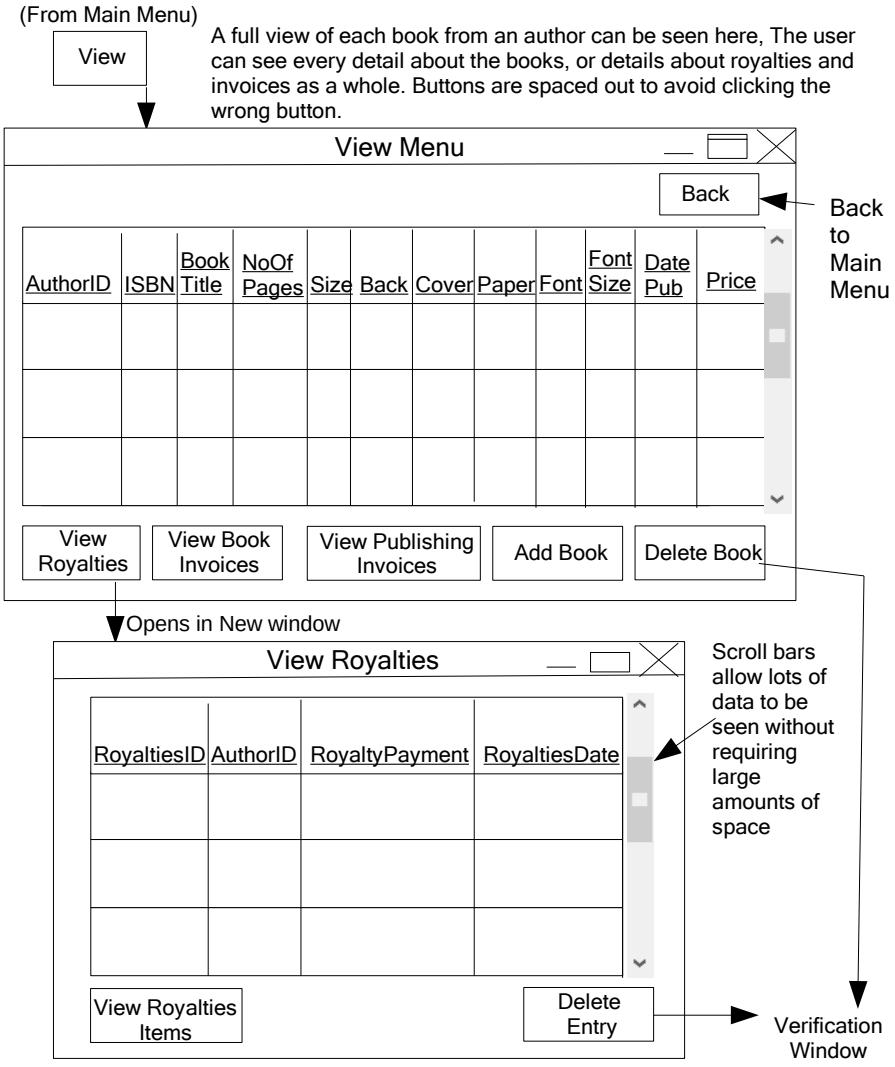


Figure 2.10: RoyaltiesItems and BookInvoice and Items

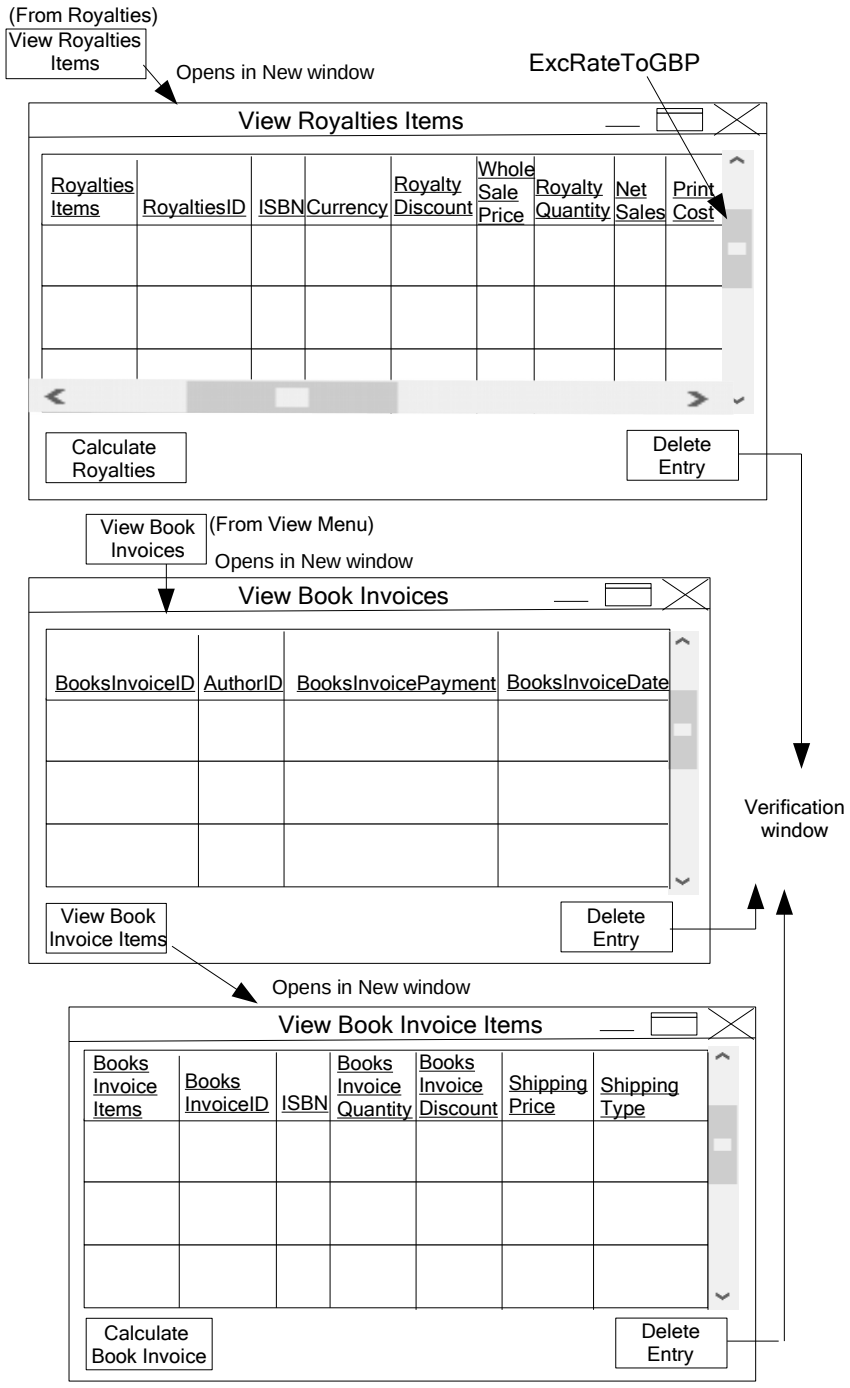


Figure 2.11: Publishing Invoice and Adding Entries

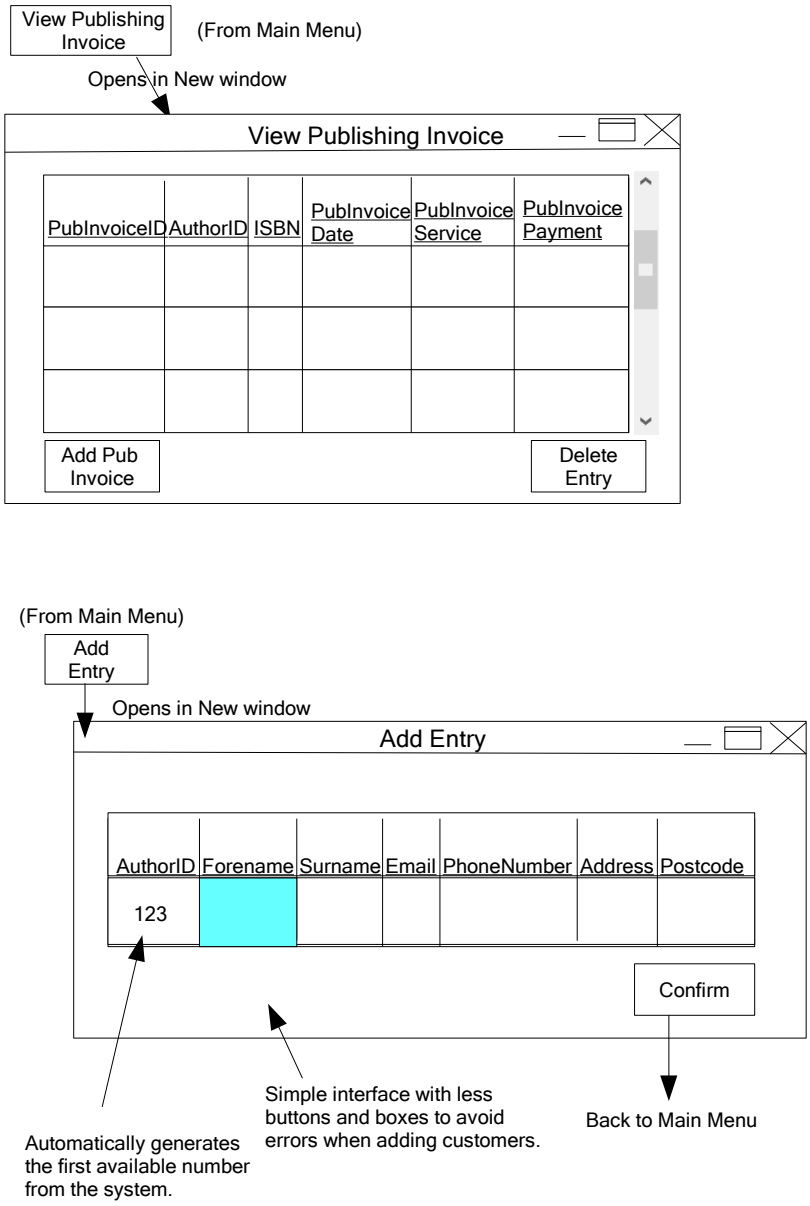


Figure 2.12: Search

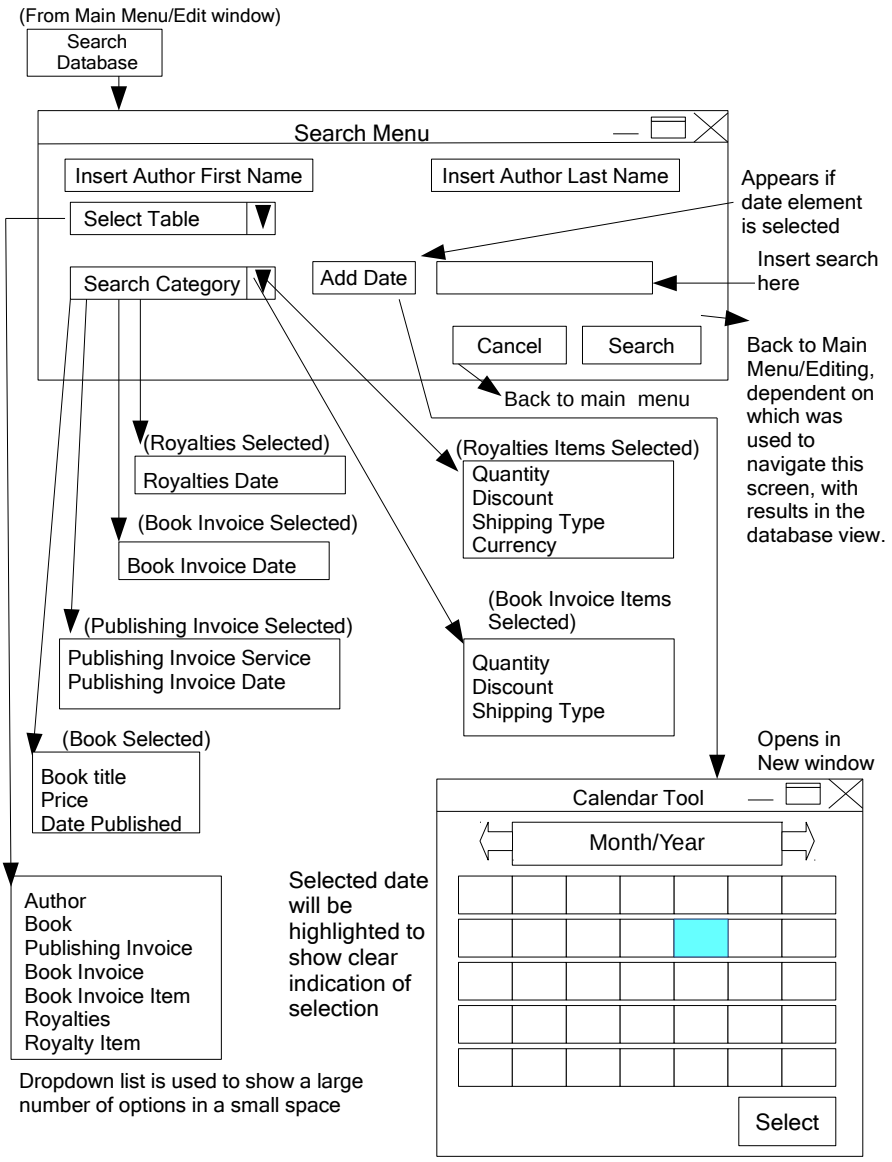


Figure 2.13: Editing Screens

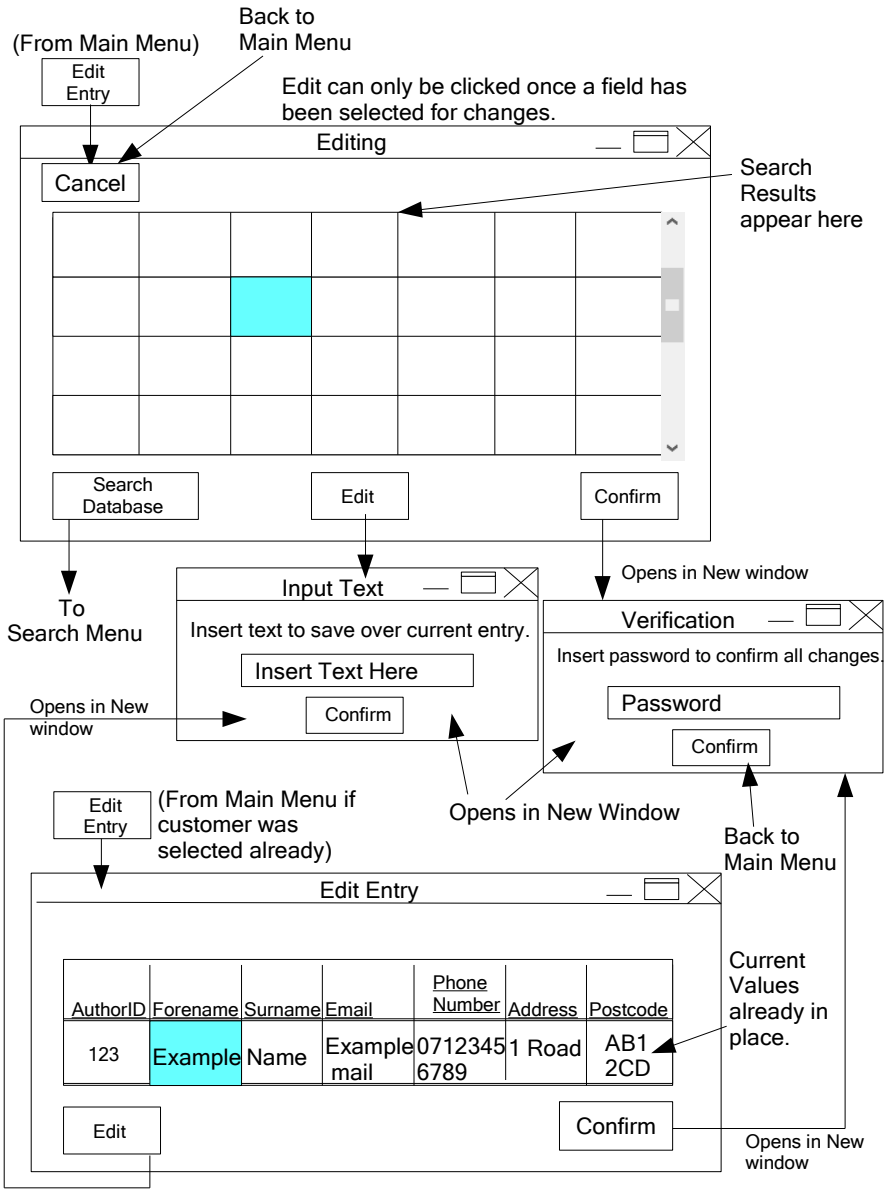


Figure 2.14: Remove Entry and Change Password

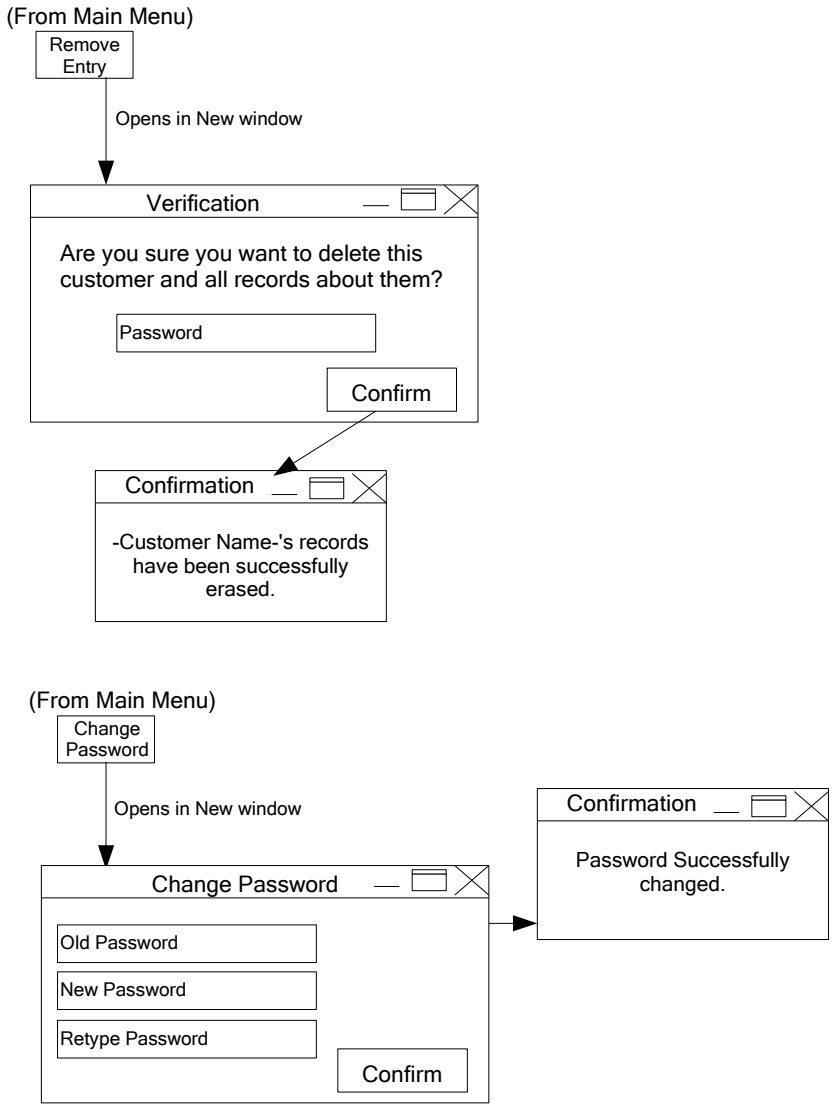


Figure 2.15: Calculations

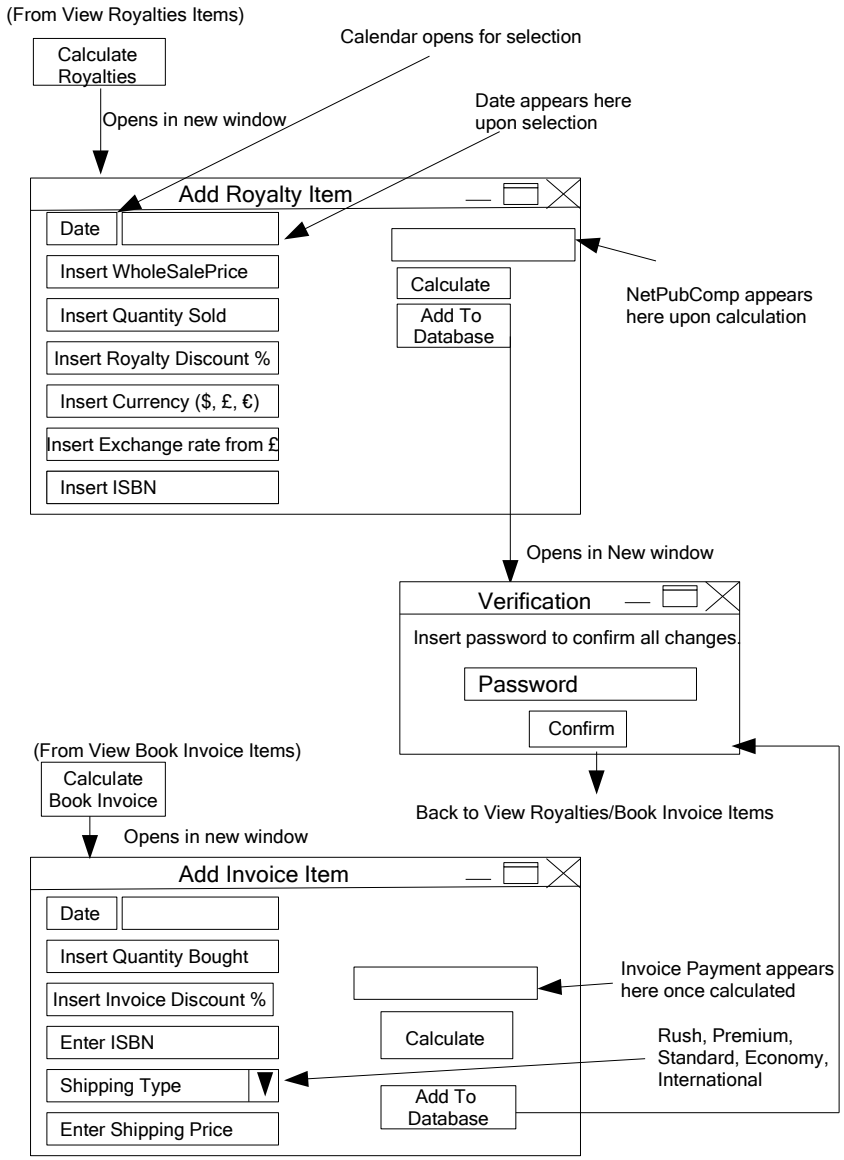


Figure 2.16: Adding Publishing Invoices

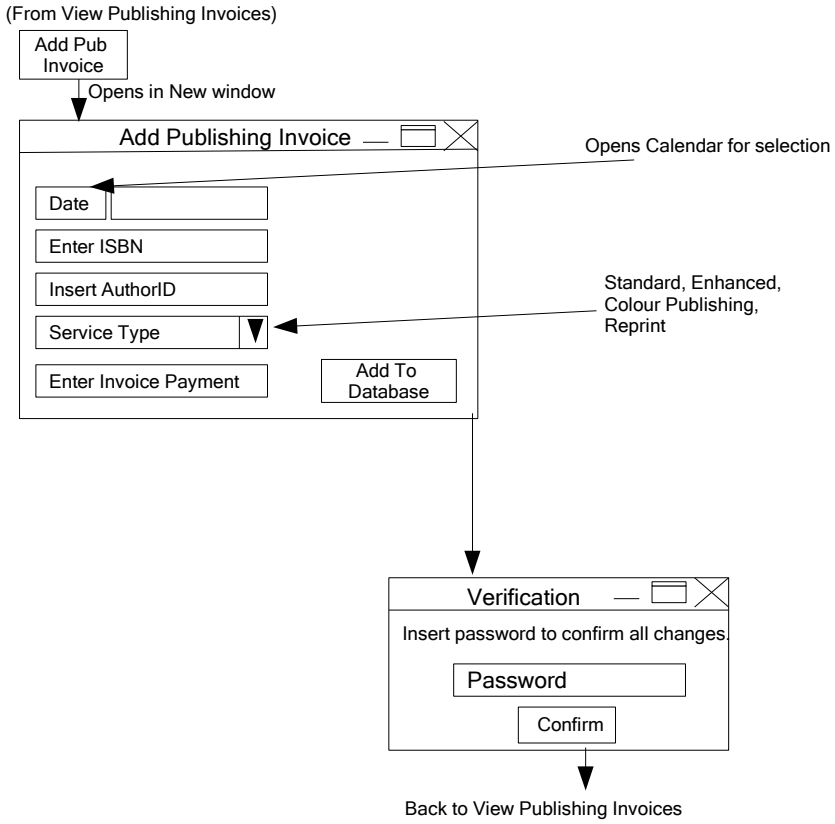
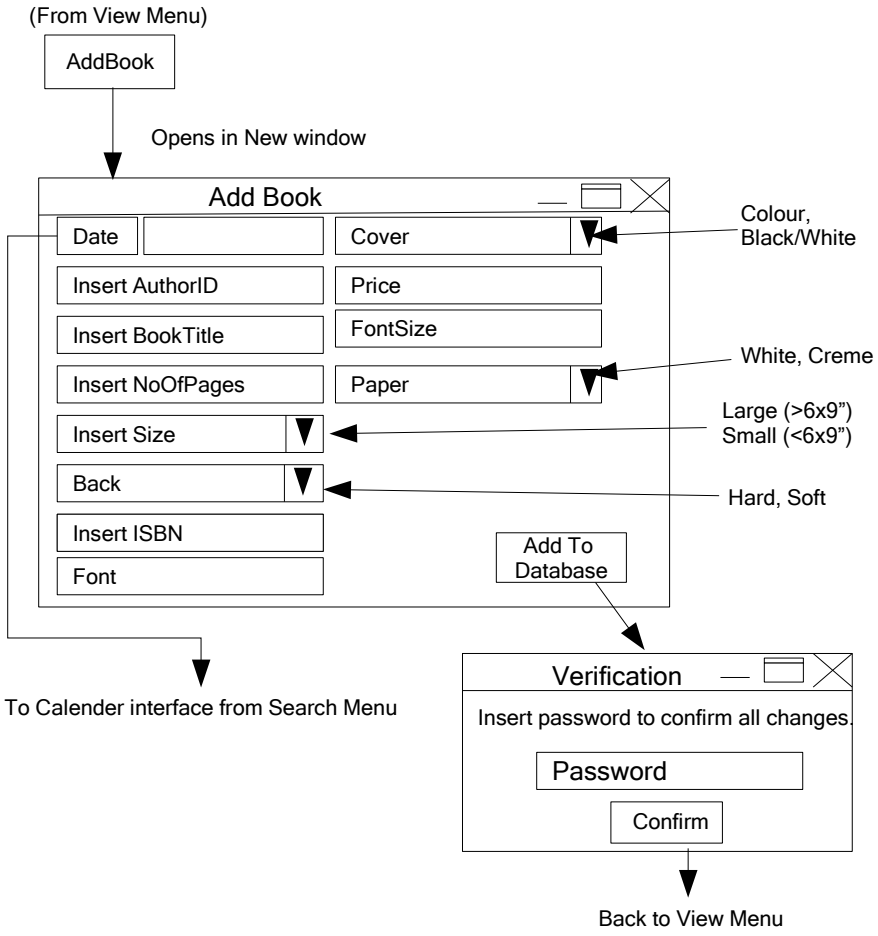


Figure 2.17: Add Book



2.3 Hardware Specification

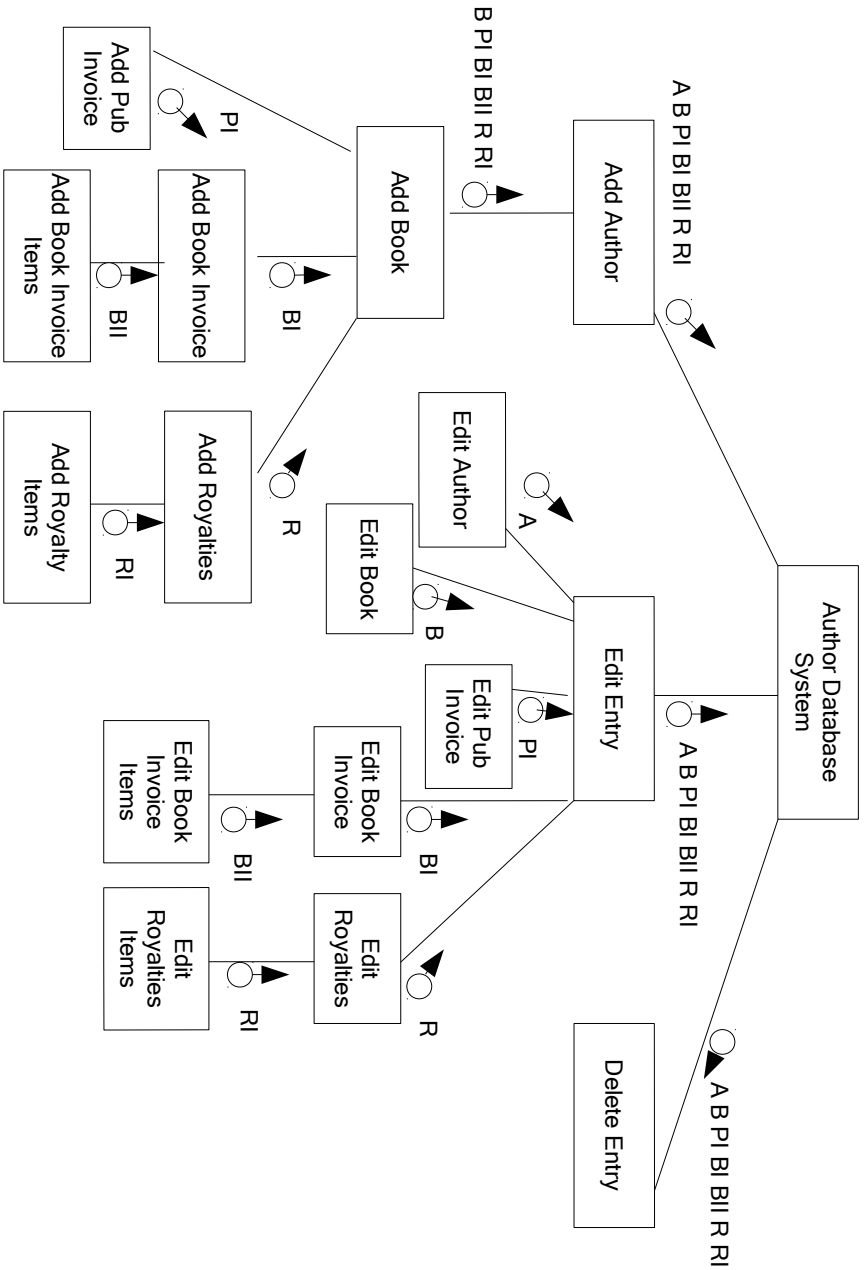
The system needs to be able to run on a laptop with a 1366 x 768, 16:9 aspect ratio screen which runs on Windows 8. This is imperative to the size of the application I will be creating because it must fit on the given screen size and can't be resizable. A mouse or touchpad will be used for navigational purposes, and for confirmation of entries. Also, a keyboard will be used for inputting information into fields for entering and editing information. All the data used by the program and its database will be held on a local hard drive, and a display is needed for the outputs of the program. These are all suitable for their purposes required, and are available to my client, as she already has all of the required input and output devices, software and hardware.

2.4 Program Structure

2.4.1 Top-down design structure charts

.

Figure 2.18: Top-down design structure chart



2.4.2 Algorithms in pseudo-code for each data transformation process

Algorithm 3 Add Customer Entry

```
1: function AddEntry(CustomerTable) Loop = 1
2:     SET GetNewAuthorID TO False
3:     SET ConfirmClicked TO False NewAuthorID = 0
4:     WHILE GetNewAuthorID = false DO
       NewAuthorID = loop Get AuthorID[loop] from CustomerTable
5:         IF NewAuthorID = AuthorID[loop] THEN
       loop = loop +1
6:         ELSE
7:             SET GetNewAuthorID TO True
8:         END IF
9:     END WHILE
       FirstName = null
       LastName = null
       Email = null
       PhoneNumber = null
       Address = null
       Postcode = null
10:    WHILE len(FirstName) <= 0 DO
       INPUT FirstName
11:    END WHILE
12:    WHILE len(LastName) <= 0 DO
       INPUT LastName
13:    END WHILE
14:    WHILE len(Email) <= 0 DO
       INPUT Email
15:    END WHILE
16:    WHILE len(PhoneNumber) <= 0 DO
       INPUT PhoneNumber
17:    END WHILE
18:    WHILE len(Address) <= 0 DO
       INPUT Address
19:    END WHILE
20:    WHILE len(Postcode) <= 0 DO
       INPUT Postcode
21:    END WHILE
22:    IF ConfirmClicked == True THEN
       CONNECT to Customer Database
23:    END IF
24: END function
```

Algorithm 4 Add and Calculate Royalty Items- part 1

```
1: SET CalculateClicked TO False
2: SET AddToDatabaseClicked TO False
       Date = null
       WholeSalePrice = null
       QuantitySold = null
       Currency = null
       ExcRateFromGBP = null
       ISBN = null
       RoyaltyDiscount = null
3: WHILE len(Date) <= 0 DO
       INPUT Date
4: END WHILE
5: WHILE len(WholeSalePrice) <= 0 DO
       INPUT WholeSalePrice
6: END WHILE
7: WHILE len(QuantitySold) <= 0 DO
       INPUT LastName
8: END WHILE
9: WHILE len(Currency) <= 0 DO
       INPUT Currency
10: END WHILE
11: IF Currency <> $ THEN
12:     WHILE len(ExcRatefromGBP) <= 0 DO
       INPUT ExcRateFromGBP
13:     END WHILE
14: END IF
15: WHILE len(ISBN) <= 0 DO
       INPUT ISBN
16: END WHILE
17: WHILE len(RoyaltyDiscount) <= 0 DO
       INPUT RoyaltyDiscount
18:     IF RoyaltyDiscount > 100 THEN
        RoyaltyDiscount = null
19:     END IF
20:     IF RoyaltyDiscount < 0 THEN
        RoyaltyDiscount = null
21:     END IF
22: END WHILE
```

Algorithm 5 Add and Calculate Royalty Items- part 2

```
1: IF Cover == Colour THEN
       Size = Small
       PagePrice = 0.06 * NoOfPages
2:     IF Back == Hard THEN
       CoverPrice = 5
3:     END IF
4:     IF Back == Soft THEN
       CoverPrice = 3
5:     END IF
6: END IF
7: IF Cover == Black/White THEN
8:     IF Size == Large THEN
       PagePrice = 0.015 * NoOfPages
9:       IF Back == Hard THEN
       CoverPrice = 5
10:      END IF
11:      IF Back == Soft THEN
       CoverPrice = 1
12:      END IF
13:    END IF
14:    IF Size == Small THEN
       PagePrice = 0.01 * NoOfPages
15:      IF Back == Hard THEN
       CoverPrice = 4
16:      END IF
17:      IF Back == Soft THEN CoverPrice = 0.7
18:      END IF
19:    END IF
20: END IF
       PrintCost = (PagePrice + CoverPrice) * RoyaltyQuantity
21: IF CalculateClicked == True THEN
       NetSales = WholeSalePrice * RoyaltyQuantity
       RoyaltyPayment = NetSales - PrintCost
       OUTPUT RoyaltyPayment
22: END IF
23: IF AddToDatabaseClicked == True THEN
       CONNECT to RoyaltyItems Database
24: END IF
```

Algorithm 6 Add and Calculate Invoice Items

```
1: function AddInvoiceItem(BookTable)
2:     SET CalculateClicked TO False
3:     SET AddToDatabaseClicked TO False
       Date = null
       QuantityBought = null
       InvoiceDiscount = null
       ShippingType= null
       ShippingPrice= null
       ISBN = null
4:     WHILE len(Date) <= 0 DO
       INPUT Date
5:     END WHILE
6:     WHILE len(QuantityBought) <= 0 DO
       INPUT QuantityBought
7:     END WHILE
8:     WHILE len(InvoiceDiscount) <= 0 DO
       INPUT InvoiceDiscount
9:       IF InvoiceDiscount > 100 THEN
       InvoiceDiscount = null
10:      END IF
11:      IF InvoiceDiscount < 0 THEN
       InvoiceDiscount = null
12:      END IF
13:    END WHILE
14:    WHILE len(ISBN) <= 0 DO
       INPUT ISBN
15:    END WHILE
16:    WHILE len(ShippingType) <= 0 DO
       INPUT ShippingType
17:    END WHILE
18:    WHILE len(ShippingPrice) <= 0 DO
       INPUT ShippingPrice
19:    END WHILE
20:    IF CalculateClicked == True THEN
       InvoicePayment = (QuantityBought * Price * InvoiceDiscount) + Shipping Price
       OUTPUT InvoicePayment
21:    END IF
22:    IF AddToDatabaseClicked == True THEN
       CONNECT to Invoice Database
23:    END IF
24: END function
```

Algorithm 7 Add Book

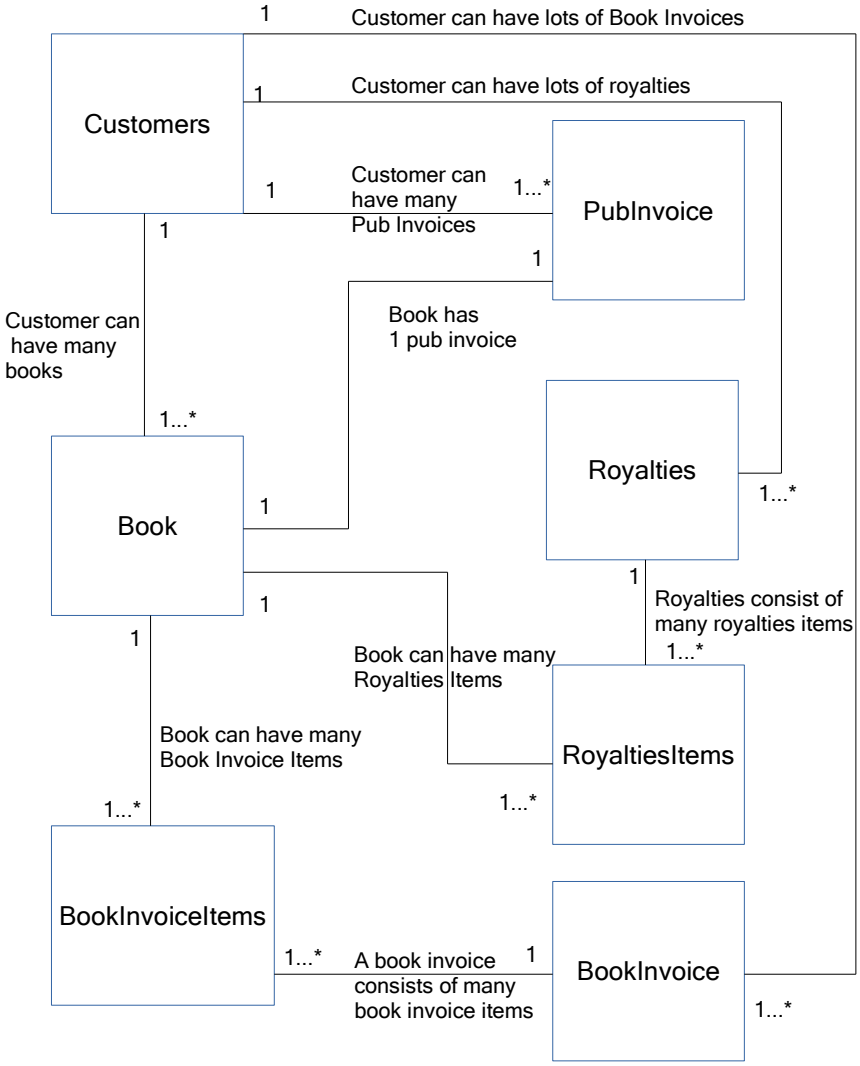
```
1: function AddInvoiceItem(CustomerTable)
2:     SET AddToDatabaseClicked TO False
       DatePublished = null
       ISBN = null
       AuthorID = null
       BookTitle = null
       NoOfPages = null
       Size = null
       Back = null
       Cover = null
       Paper = null
       Font = null
       FontSize = null
       Price = null
3:     WHILE len(DatePublished) <= 0 DO
       INPUT DatePublished
4:     END WHILE
5:     WHILE len(ISBN) <= 0 DO
       INPUT ISBN
6:     END WHILE
7:     WHILE len(BookTitle) <= 0 DO
       INPUT BookTitle
8:     END WHILE
9:     WHILE len(Size) <= 0 DO
       INPUT Size
10:    END WHILE
11:    WHILE len(BackType) <= 0 DO
       INPUT BackType
12:    END WHILE
13:    WHILE len(NoOfPages) <= 0 DO
       INPUT NoOfPages
14:    END WHILE
15:    WHILE len(Paper) <= 0 DO
       INPUT Paper
16:    END WHILE
17:    WHILE len(Font) <= 0 DO
       INPUT Font
18:    END WHILE
19:    WHILE len(FontSize) <= 0 DO
       INPUT FontSize
20:    END WHILE
21:    WHILE len(Price) <= 0 DO
       INPUT Price
22:    END WHILE
23:    IF AddToDatabaseClicked == True THEN
       CONNECT to Book Database
24:    END IF
25: END function
```

Algorithm 8 Add and Publishing Invoice

```
1:  function AddInvoiceItem(BookTable, CustomerTable)
2:      SET AddToDatabaseClicked TO False
        Date = null
        AuthorID = null
        ServiceType = null
        InvoicePayment= null
        ISBN = null
3:      WHILE len(Date) <= 0 DO
        INPUT Date
4:      END WHILE
5:      WHILE len(AuthorID) <= 0 DO
        INPUT AuthorID
6:      END WHILE
7:      WHILE len(InvoicePayment) <= 0 DO
        INPUT InvoicePayment
8:      END WHILE
9:      WHILE len(ISBN) <= 0 DO
        INPUT ISBN
10:     END WHILE
11:     WHILE len(ServiceType) <= 0 DO
        INPUT ServiceType
12:     END WHILE
13:     IF AddToDatabaseClicked == True THEN
        CONNECT to PubInvoice Database
14:     END IF
15: END function
```

2.4.3 Object Diagrams

Figure 2.19: Object Diagram



2.4.4 Class Definitions

Key:

Label
Attributes
Behaviours

Customer
Author ID
ForeName
Surname
Email
Address
Postcode
Phone Number
Add ForeName
Edit Forename
Add Surname
Edit Surname
Add Email
Edit Email
Add Address
Edit Address
Add Postcode
Edit Postcode
Add Phone Number
Edit Phone Number

Book
ISBN
AuthorID
BookTitle
NoOfPages
Size
Cover
Back
Paper
Font
FontSize
Price
DatePublished
Add ISBN
Edit ISBN
Add AuthorID
Edit AuthorID
Add BookTitle
Edit BookTitle
Add NoOfPages
Edit NoOfPages
Add Size
Edit Size
Add Cover
Edit Cover
Add Back
Edit Back
Add Paper
Edit Paper
Add Font
Edit Font
Add FontSize
Edit FontSize
Add DatePublished
Edit DatePublished
Add Price
Edit Price

Royalties
RoyaltiesID
AuthorID
RoyaltyPayment
RoyaltiesDate
Add AuthorID
Edit AuthorID
Add RoyaltiesDate
Edit Royalties Date

Royalties Items
RoyaltiesItems
RoyaltiesID
ISBN
Currency
RoyaltyDiscount
WholesalePrice
RoyaltyQuantity
NetSales
PrintCost
ExcRateFromGBP
Add RoyaltiesID
Edit RoyaltiesID
Add ISBN
Edit ISBN
Add Currency
Edit Currency
Add RoyaltyDiscount
Edit RoyaltyDiscount
Add WholesalePrice
Edit WholesalePrice
Add RoyaltyQuantity
Edit RoyaltyQuantity
Add ExcRateFromGBP
Edit ExcRateFromGBP

BookInvoice
BookInvoiceID
AuthorID
BookInvoicePayment
BookInvoiceDate
Add AuthorID
Edit AuthorID
Add BookInvoiceDate
Edit BookInvoiceDaate

BookInvoiceItems
BookInvoiceItems
BookInvoiceID
ISBN
BookInvoiceQuantity
BookInvoiceDiscount
ShippingType
ShippingPrice
Add BookInvoiceID
Edit BookInvoiceID
Add ISBN
Edit ISBN
Add BookInvoiceQuantity
Edit BookInvoiceQuantity
Add BookInvoiceDiscount
Edit BookInvoiceDiscount
Add ShippingType
Edit Shipping Type
Add ShippingPrice
Edit ShippingPrice

PubInvoice
PubInvoiceID
AuthorID
ISBN
PubInvoiceDate
PubInvoiceService
PubInvoicePayment
Add AuthorID
Edit AuthorID
Add ISBN
Edit ISBN
Add PubInvoiceDate
Edit PubInvoiceDate
Add PubInvoiceService
Edit PubInvoiceService
Add PubInvoicePayment
EditPubInvoicePayment

2.5 Prototyping

It will be helpful to create a prototype of the main menu to make sure that different windows can be navigated through without any difficulty. This would give me a good idea of the flow of control between interfaces. Also, I plan to

prototype a log in screen, because this would help me identify the difficulties involved in moving to and from the main menu and log in screen.

Furthermore, I plan to prototype the adding, editing and removal of data to and from the database. I am going to prototype this in order to make sure that data can be successfully added, edited and removed to and from the database so that it can be confirmed that this can be conducted upon creation of the program.

I have already prototyped the calendar interface used for inputting the date in a box. This is just a prototype of the basic interface, which is for selecting a date and placing it in the text box. It can switch between months with a dropdown list, or using the arrows and also years.

Figure 2.20: Calendar Interface

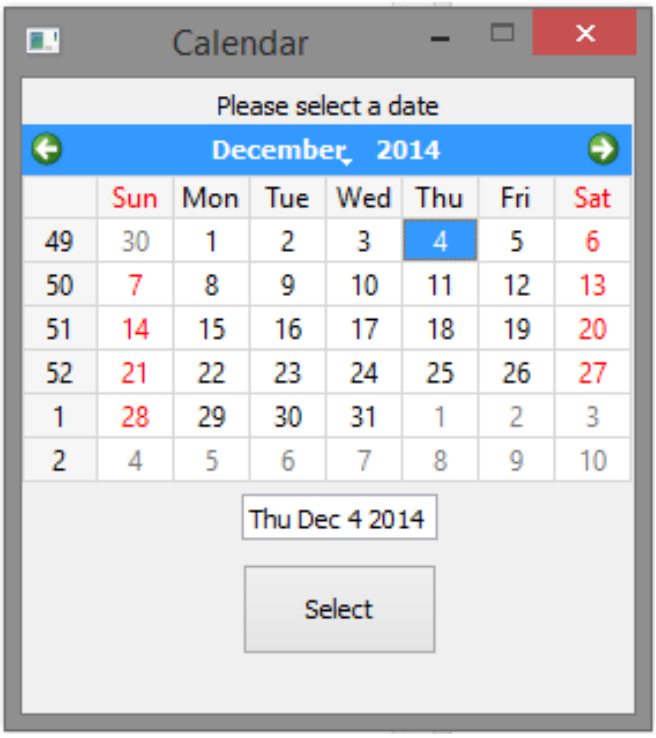
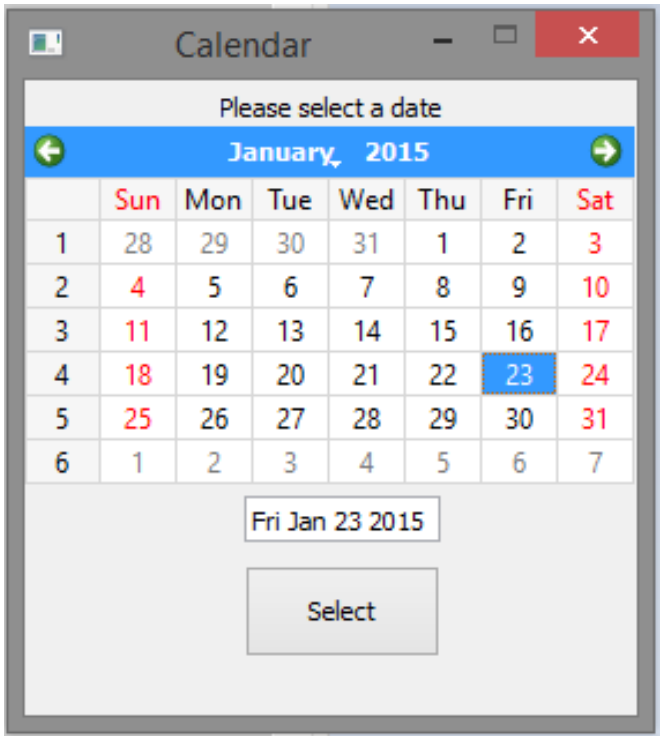


Figure 2.21: Calendar - Date Selection



2.6 Definition of Data Requirements

2.6.1 Identification of all data input items

- First Name
- Last Name
- Email
- Phone Number
- Address
- Postcode
- ISBN
- Book Title
- Number of pages
- Size
- Back type
- Cover type
- Paper type
- Font
- Font size
- Date published
- Price
- Currency
- Royalties date
- Royalty discount
- Wholesale price
- Royalty Quantity
- Exchange rate from pounds
- Publishing invoice date
- Publishing invoice service
- Publishing invoice payment
- Book invoice date

- Book invoice discount
- Book invoice quantity
- Shipping price
- Shipping type

2.6.2 Identification of all data output items

- Author ID
- Royalties ID
- Publishing Invoice ID
- Books Invoice ID
- Net Sales
- Print Cost
- Royalty Payment
- Net Publishing Compensation
- Book Invoice Payment
- Royalties Items
- Book Invoice Items

2.6.3 Explanation of how data output items are generated

Output	**How it is produced**	**Input Items Required to Produce**
Author ID	Generated by program, using first available unused number	
Royalties ID	Generated by program, using first available unused number	
Publishing Invoice ID	Generated by program, using first available unused number	
Book Invoice ID	Generated by program, using first available unused number	
Net Sales	Calculated using WholesalePrice x Quantity	Wholesale Price, Royalty Quantity
Print Cost	Calculated by program using certain criteria for some details of the book	Number of Pages, Size, Back type, Cover type, Royalty Quantity
Royalty Payment	Calculated by program using calculations of all payments under the same RoyaltiesID	
Book Invoice Payment	Calculated by program using calculations of all payments under the same BookInvoiceID	Book Invoice Quantity, Book Invoice Discount, Price, Shipping Price
Royalties Items	Generated by program, using first available unused number	
Book Invoice Items	Generated by program, using first available unused number	

2.6.4 Data Dictionary

There have been some changes to my data dictionary as a number of elements have been identified that need to be added to the system.

Name	**Data Type**	**Length**	**Validation**	**Example Data**
Firstname	String	2-20 Characters	Length	Jo
Lastname	String	2-20 Characters	Length	Williamson
Email	String	7-30 Characters	Length	jo@mail.com
Phonenumber	String	9-15 Characters	Format	07123456789
Address	String	5-64 Characters	Length	Example Road
Postcode	String	7 Characters	Format	AB1 2CD
AuthorID	Integer	1-255	Unique in table, not Null	17
ISBN	String	13 Characters	Length	9780007525492
BookTitle	String	1-127 Characters	Length	The Hobbit
NoOfPages	Integer	1-1023	Range	395
Size	String	5	Existence	Large
Back	String	8 or 9 Characters	Existence	Paperback
Cover	String	3 or 5 Characters	Existence	Gloss
Paper	String	11 Characters	Existence	White Paper
Font	String	1-64 Characters	Length	Arial
FontSize	Real	8-64	Numbers only	12.5
DatePublished	Date	dd/mm/yyyy	Range	23/10/2014
Price	Real	0.01-63.00	Numbers only	£12.99
RoyaltiesID	Integer	1-255	Unique in table, not Null	123
RoyaltiesItems	Integer	1-511	Unique in table, not Null	12
Currency	String	1 Character	Pound, Dollar or Euro sign	£
RoyaltyPayment	Real	1-32767	Numbers only	489.92
RoyaltiesDate	Date	dd/mm/yyyy	Range	03/12/2014

Name	Data Type	Length	Validation	Example Data
RoyaltyDiscount	Real	0-100	Numbers only	40
WholeSalePrice	Real	0.01-63.00	Numbers only	7.99
RoyaltyQuantity	Integer	1- 2047	Numbers only	192
NetSales	Real	0.01-32767.00	Numbers only	900.00
PrintCost	Real	0.01-32767.00	Numbers only	800.00
ExcRateFromGBP	Real	0-1027	Numbers only	1.67
PubInvoiceID	Integer	1-511	Unique in table, not Null	123
PubInvoiceDate	Date	dd/mm/yyy	Range	23/05/2014
PubInvoiceService	String	1-127 Characters	Length	Standard
PubInvoicePayment	Real	0.01-32767.00	Numbers only	700.00
BookInvoiceID	Integer	1-255	Unique in table, not Null	99
BookInvoiceItems	Integer	1-255	Unique in table, not Null	2
BookInvoicePayment	Real	0.01-32767.00	Numbers only	600.00
BookInvoiceDate	Date	dd/mm/yyyy	Range	01/01/2014
BookInvoiceDiscount	Real	0-100	Numbers only	50
BookInvoiceQuantity	Integer	1-2047	Numbers only	777
Shipping Type	String	7-8 Characters	Range	Premium
Shipping Price	Real	0.01-64.00	Numbers only	25.00

2.6.5 Identification of appropriate storage media

A hard drive, such as the hard drive in my client's laptop, would be an example of appropriate storage media. For back up purposes, an external hard disk would be the optimal solution, because it is portable, meaning it can be kept

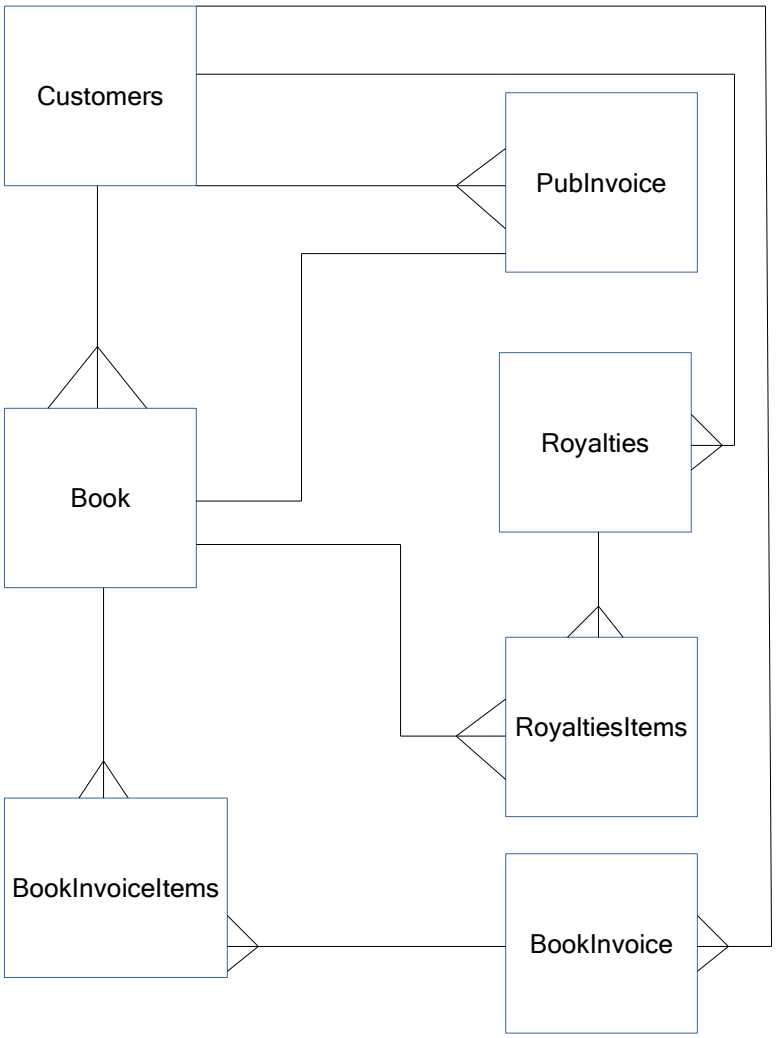
off site, as well as being able to hold all data files on it. The database will be needed to be kept for long term storage. This is the data will be required to be accessed a number of times.

2.7 Database Design

2.7.1 Normalisation

ER Diagrams

Figure 2.22: ER Diagram



Entity Descriptions

Customer(Author ID, FirstName, LastName, Email, Address, Postcode, Phone Number)

Book(ISBN, *AuthorID*, Book Title, NoOfPages, Size, Cover, Paper, Back, Paper, Font, FontSize, DatePublished, Price)

BookInvoice(BookInvoiceID, *AuthorID*, BookInvoiceDate, BookInvoicePayment)

BookInvoiceItems(BookInvoiceItems, *BookInvoiceID*, *ISBN*, BookInvoiceQuantity, BookInvoiceDiscount, ShippingPrice, ShippingType)

Royalties(RoyaltiesID, *AuthorID*, RoyaltiesDate, RoyaltyPayment)

RoyaltiesItems(RoyaltiesItems, *RoyaltiesID*, *ISBN*, Currency, RoyaltyDiscount, WholesalePrice, RoyaltyQuantity, NetSales, PrintCost, ExcRateFromGBP)

PubInvoice(PubInvoiceID, *AuthorID*, *ISBN*, PubInvoiceDate, PubInvoiceOrder, PubInvoicePayment)

UNF to 3NF

Key:

Bold Font = Primary Key

Italics = Foreign Key

Each Column represents a new group.

First of all, I have started with the data in its unnormalised form.

FirstName
LastName
Email
PhoneNumber
Address
PostCode
AuthorID
ISBN
BookTitle
NoOfPages
Size
Back
Cover
Paper
Font
FontSize
DatePublished
Price
RoyaltiesID
RoyaltiesItems
Currency
RoyaltyPayment
RoyaltiesDate
RoyaltyDiscount
WholeSalePrice
RoyaltyQuantity
NetSales
PrintCost
ExcRateFromGBP
PubInvoiceID
PubInvoicePayment
PubInvoiceDate
PubInvoiceService
BookInvoiceID
BookInvoiceItems
BookInvoicePayment
BookInvoiceDate
BookInvoiceDiscount
BookInvoiceQuantity
ShippingType
ShippingPrice

Then, I put it into the first normal form, seperating the repeating attributes and the non-repeating attributes.

AuthorID	**ISBN**
FirstName	**AuthorID**
LastName	BookTitle
Email	NoOfPages
PhoneNumber	Size
Address	Back
PostCode	Cover
	Paper
	Font
	FontSize
	DatePublished
	Price
	RoyaltiesID
	RoyaltiesItems
	Currency
	RoyaltyPayment
	RoyaltiesDate
	RoyaltyDiscount
	WholeSalePrice
	RoyaltyQuantity
	NetSales
	PrintCost
	ExcRateFromGBP
	PubInvoiceID
	PubInvoiceDate
	PubInvoiceService
	PubInvoicePayment
	BookInvoiceID
	BookInvoiceItems
	BookInvoicePayment
	BookInvoiceDate
	BookInvoiceDiscount
	BookInvoiceQuantity
	ShippingType
	ShippingPrice

After that, I put it into the second normal form.

AuthorID	**ISBN**	**ISBN**
FirstName	**AuthorID**	BookTitle
LastName	RoyaltiesID	NoOfPages
Email	Currency	Size
PhoneNumber	RoyaltyPayment	Back
Address	RoyaltiesDate	Cover
PostCode	RoyaltyDiscount	Paper
	WholeSalePrice	Font
	RoyaltyQuantity	FontSize
	NetSales	DatePublished
	PrintCost	Price
	ExcRateFromGBP	
	PubInvoiceID	
	PubInvoiceDate	
	PubInvoiceService	
	PubInvoicePayment	
	BookInvoiceID	
	BooInvoiceItems	
	BookInvoicePayment	
	BookInvoiceDate	
	BookInvoiceDiscount	
	BookInvoiceQuantity	
	ShippingType	
	ShippingPrice	

Finally, I put the data into its third normal form.

AuthorID	**ISBN**	**RoyaltiesID**	**RoyaltiesItems**
FirstName	*AuthorID*	*AuthorID*	*RoyaltiesID*
LastName	BookTitle	RoyaltyPayment	*ISBN*
Email	NoOfPages	RoyaltiesDate	Currency
PhoneNumber	Size		RoyaltyDiscount
Address	Back		WholeSalePrice
PostCode	Cover		RoyaltyQuantity
	Paper		NetSales
	Font		PrintCost
	FontSize		ExcRateFromGBP
	DatePublished		
	Price		

PubInvoiceID	**BooksInvoiceID**	**BooksInvoiceItems**
AuthorID	*AuthorID*	*BooksInvoiceID*
ISBN	BookInvoicePayment	*ISBN*
PubInvoiceDate	BookInvoiceDate	BookInvoiceQuantity
PubInvoiceService		BookInvoiceDiscount
PubInvoicePayment		ShippingType
		ShippingPrice

2.7.2 SQL Queries

I am using Python to format the SQL query text strings.

SQL	**Descriptions**
"""insert into Customer(FirstName, LastName, Email, PhoneNumber, Address, Postcode) values (Ex, ample, example@mail.com, 07123456789, 1 example road, AB1 2CD) """	An example of an SQL statement which adds customer records to the database. Here, it is entering a new customer record with the attributes: Firstname, Lastname, Email, Phonenumber, Address and Postcode.
"""create table RoyaltiesItems(RoyaltiesID INTEGER, Currency REAL, RoyaltyDiscount STRING, WholeSalePrice REAL, RoyaltyQuantity INTEGER, NetSales REAL, PrintCost REAL, ExcRateFromGBP STRING PRIMARY KEY(RoyaltiesItems) FOREIGN KEY(RoyaltiesID) REFERENCES Royalties(RoyaltiesID) """	An example of an SQL statement that creates a new table for the Royalties. There is a primary key which is RoyaltiesItems, and there is one foreign key, which is RoyaltiesID.
"""select LastName, BookTitle from Customer, Book where Price = 13.00 and Back = Paperback """	This statement will return all the LastNames and the BookTitles from the Customer table and the Book table whose book is paperback and costs £13.
"""update Customer set Firstname = 'John', Lastname = 'Smith' where AuthorID = 1 """	This statement will update the Firstname to 'John' and Lastname to 'Smith' of an entry in the Customer table where the AuthorID = 1.
"""delete from Customer where AuthorID = 1 """	This statement will delete the entry in the Customer table where the AuthorID = 1
"""select * from RoyaltiesItems where Currency = '£' and Firstname from Customer = 'John"""	This statement will fetch all the RoyaltiesItems where the Currency is in GBP, and the firstname of the corresponding author is John.

2.8 Security and Integrity of the System and Data

2.8.1 Security and Integrity of Data

The system will store personal data about the customers and will comply to the Data Protection Act. This means that the data requires sufficiently frequent checks, so there will be a way to edit and change the information using the program. All the data in the database must be kept securely, so that it can only be granted access to someone with the use of a password. To ensure that all data stored is valid, everytime the user adds data to the database, a check will be conducted to ensure that the data is valid. I need to keep referential integrity in the database so that there are never any records with missing key data upon any removals and the database will be encrypted.

2.8.2 System Security

The database will be password protected to make sure that only users who know the password can access the database. This will keep the number of users of the database to a minimum. This can prevent the data from being tampered with or stolen. The database will be encrypted in order to avoid unwanted people having access to the data without the use of the system, therefore the number of people who can access the data can be determined beforehand.

2.9 Validation

The system will check to make sure each entry is valid, in order to avoid any invalid entries into the database.

Item	**Example**	**Validation**	**Comments**
FirstName	John	Presence Check, Type Check	Makes sure that a name is entered, and that the name is just letters.
LastName	Smith	Presence Check, Type Check	Makes sure that a name is entered, and that the name is just letters.
Email	test@mail.com	Presence Check, Type Check	Makes sure that an email is entered and that the @ symbol comes before the '.' in the email.
PhoneNumber	07123456789	Presence Check	Makes sure that a phone number is entered.
Address	1 Example Road	Presence Check	Makes sure that an address is entered.
Postcode	AB1 2CD	Presence Check	Makes sure that a Postcode is entered.
ISBN	9780748782987	Presence Check, Length Check	Makes sure that an ISBN is entered and is not longer than 13 digits.
BookTitle	Computing A2 Text Book	Presence Check	Makes sure that a Book Title has been entered.
NoOfPages	395	Presence Check, Type Check	Makes sure that a positive integer has been entered.
Size	Large	Presence Check	Makes sure that a Size has been entered.
Back	Hard	Presence Check	Makes sure that a Back type has been entered.
Cover	Colour	Presence Check	Makes sure that a Cover type has been entered.
Paper	White	Presence Check	Makes sure that a Paper type has been entered.
Font	Microsoft Sans Serif	Presence Check	Makes sure that a Font has been entered.

Item	Example	Validation	Comments
FontSize	12	Presence Check, Type Check	Makes sure that a positive value has been entered, and just digits.
DatePublished	25 Dec 2014	Presence Check, Type Check	Makes sure that a Date has been entered.
Price	8.99	Presence Check, Type Check	Makes sure that a positive value has been entered, and just digits.
Currency	£	Presence Check, Type Check	Makes sure that the correct symbol has been entered.
RoyaltiesDate	25 Dec 2014	Presence Check, Type Check	Makes sure that a Date has been entered.
RoyaltyDiscount	50	Presence Check, Type Check, Range Check	Makes sure that a positive value has been entered, just digits, and it must be between 0 and 100.
WholesalePrice	5.99	Presence Check, Type Check	Makes sure that a positive value has been entered, and just digits.
RoyaltyQuantity	150	Presence Check, Type Check	Makes sure that a positive integer has been entered.
ExcRate FromGBP	1.67	Presence Check, Type Check	Makes sure that a value has been entered.
Pub Invoice Date	25 Dec 2014	Presence Check, Type Check	Makes sure that a Date has been entered.
Pub Invoice Service	Standard	Presence Check	Makes sure that a Service has been entered.
Pub Invoice Payment	£1659.99	Presence Check, Type Check	Makes sure that a positive value has been entered.

Item	Example	Validation	Comments
Book Invoice Date	25 Dec 2014	Presence Check, Type Check	Makes sure that a Date has been entered.
Book Invoice Discount	50	Presence Check, Type Check, Range Check	Makes sure that a positive value has been entered, just digits, and it must be between 0 and 100.
Book Invoice Quantity	25	PresenceCheck, Type Check	Makes sure that a positive integer has been entered.
Shipping Type	Premium	Lookup check	Makes sure that a Shipping type has been entered.
Shipping Price	4.00	Presence Check, Type Check	Makes sure that a positive value has been entered, and just digits.
AuthorID	21	Presence Check, Type Check, Look up Check	Makes sure that an integer has been entered, and will check the Customer Table to find the entry to confirm that it is valid.
RoyaltiesID	21	Presence Check, Type Check, Look up Check	Makes sure that an integer has been entered, and will check the Royalties Table to find the entry to confirm that it is valid.
PubInvoiceID	21	Presence Check, Type Check, Look up Check	Makes sure that an integer has been entered, and will check the PubInvoice Table to find the entry to confirm that it is valid.
BookInvoiceID	21	Presence Check, Type Check, Look up Check	Makes sure that an integer has been entered, and will check the Book Invoice Table to find the entry to confirm that it is valid.

2.10 Testing

2.10.1 Outline Plan

Test Series	Purpose of Test Series	Testing Strategy	Strategy Rationale
1	Testing the flow of control between user interfaces	Top-down Testing	
2	Testing the validation of input data	Bottom-up testing	All components are to be tested after development
3	Testing the algorithms' functionality	White box testing	
4	Testing that the information has been successfully stored, and in the right places	Black box testing	
5	Testing the system and whether it meets the requirements	System testing	

2.10.2 Detailed Plan

Test Series	Purpose of Test	Test Description	Test Data	Test Data Type (Normal/ Erroneous/ Boundary)	Expected Result	Actual Result	Evidence

1.1	Test the Log in button on the log in sreen	This should check whether the password and email match and exist in a record	Click the log in button	Normal	If the email and password match, the main menu should open, else the program should prompt the user with an error		
1.2	Test the View button on the main menu	This button links the main menu to the view menu.	Click the View Button	Normal	The program should open the View Menu in a new window		
1.3	Testing the Log Out button on the Main Menu	This button links to the Login screen, where the user is required to log in again	Click the Log out button	Normal	The screen should switch to the log out screen		

1.4	Testing the Search Database button on the Main Menu	This button should prompt a seperate interface to open, and show details which can be used to search for specific items in the database	Click the Search Database button	Normal	The program should open a new window consisting of the Search Database screen		
1.5	Testing the Add Entry button on the Main Menu	This button should prompt a seperate interface to open and show the Add Entry screen	Click the Add Entry button	Normal	The program should open the Add Entry screen in a new window		
1.6	Testing the Edit Entry button from the Main Menu	This button links to the Editing screen	Click the Edit Entry button	Normal	The program should switch to the Editing screen from the Main Menu		

1.7	Testing the Edit Entry button after an entry has been selected beforehand	These conditions should open the Edit Entry screen upon clicking Edit Entry, with data on the selected entry already filled in on the grid	Click on an entry, and then click Edit Entry	Normal	The program should open the Edit Entry screen in a new window		
1.8	Testing the Remove Entry Button after an entry has been selected beforehand	These conditions should prompt the user for verification on deleting a selected customer record	Click on an entry and then click Remove Entry	Normal	The program should open a Verification window, asking the user for confirmation and verification on removing the selected customer record		

1.9	Testing the Change Password Button on the Main Menu	This button prompts the Change Password window to open	Click the Change Password button	Normal	The program should open the Change Password window, with fields required to be filled in in order to change the password		
1.10	Testing the Quick Search button on the Main Menu	This button returns the customer that matches the entered AuthorID	Type in a Lastname and click QuickSearch	Normal	The program should return the customer that matches the entered Lastname and show it in the grid		
1.11	Testing the back button on the View Menu	This button returns back to the main menu	Click Back	Normal	The program should return back to the main menu		

1.12	Testing the Add Book Button on the View Menu	This button opens up a new window for adding a book	Click Add Book	Normal	The program should open a new window for adding a book		
1.13	Testing the View Publishing Invoice button on the View Menu	This button opens up a new window displaying details about the selected book's publishing invoice	Click View Publishing invoice	Normal	The program should open a new window containing details about the selected book's publishing invoice		
1.14	Testing the View Royalties button on the View Menu	This button opens up a new window displaying details about the selected book's royalties	Click View Royalties	Normal	The program should open a new window containing details about the selected book's royalties		

1.15	Testing the View Book Invoice button on the View Menu	This button opens up a new window displaying details about the selected book's book invoices	Click View Book Invoices	Normal	The program should open a new window containing details about the selected book's book invoices		
1.16	Testing the Delete book button on the View Menu	This button opens up a new window asking for verification on deleting a selected book record	Click Delete book	Normal	The program should open a Verification window, asking the user for confirmation and verification on removing the selected customer record		

2.1	Verify that some criteria has been entered when using the search	At least one set of the input boxes and drop-down lists must have been filled in or selected from, else the program will prompt the user about the error	Selected from list with names and values entered Selected from list, values entered and no names entered Just values entered Nothing	Normal Normal Erroneous Erroneous	Accept Accept Error Error		
2.2	Verify that a valid email has been entered on the log in screen	The program will prompt the user telling them they have inputted an error	test@testmail.com helloworld test @test-mail.com test.com@testmail	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		
2.3	Verify that a valid First-name has been entered when adding an entry	The user will be prompted with an error	John Jo hn Jo?hn Jo2n	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		

2.4	Verify that a valid Lastname has been entered when adding an entry	The user will be prompted with an error	Smith Sm ith Smi!th Smi1th	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		
2.5	Verify that a valid Phonenumber has been entered when adding an entry	The user will be prompted with an error	07123456789 07123123.3 071CO2	Normal Erroneous Erroneous	Accept Error Error		
2.7	Verify that a valid Address has been entered when adding an entry	The user will be prompted with an error	1 Example road @@ £! 1231231	Normal Erroneous Erroneous	Accept Error Error		
2.8	Verify that a valid ISBN has been entered when adding a book	The user will be prompted with an error	1234567890123 @@ £! 123 HelloWorld	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		
2.9	Verify that a valid NoOfPages has been entered when adding a book	The user will be prompted with an error	123 123456789 2.3 @! HelloWorld	Normal Erroneous Erroneous Erroneous	Accept Error Error		

2.10	Verify that a valid ISBN has been entered when adding a book	The user will be prompted with an error	1234567890123 @@ £! 123 HelloWorld	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		
3.1	Verify that all fields required are entered when adding a book	If all fields are filled in correctly, a book will be successfully added to the database	Fill all Fields Correctly and then click Add to Database Leave Fields Blank and then click Add to Database	Normal Erroneous	Verification screen should open User will be prompted with an error		

3.2	Verify that all fields required are entered and calculations are complete when adding an Invoice Item	If all fields are filled in correctly and the calculations are complete, then the invoice item will be added to the database	Fill all fields correctly and click calculate and then click Add to Database Leave Fields Blank and click Calculate Fill all fields correctly and click add to database	Normal Erroneuos Erroneous	Verification screen should open User will be prompted with an error User will be prompted with an error		

3.3	Verify that all fields required are entered and calculations are complete when adding a Royalty Item	If all fields are filled in correctly and the calculations are complete, then the royalty item will be added to the database	Fill all fields correctly and click calculate and then click Add to Database Leave Fields Blank and click Calculate Fill all fields correctly and click add to database	Normal Erroneous Erroneous	Verification screen should open User will be prompted with an error User will be prompted to click Calculate		
4.1	Verify that all author data has been added to the author database	All the information should be added to the correct fields in the author table	Author Information	Normal	Added to the Author Table		
4.2	Verify that all book data has been added to the book database	All the information should be added to the correct fields in the book table	Book Information	Normal	Added to the Book Table		

4.3	Verify that all royalty item data has been added to the book database	All the information should be added to the correct fields in the royalty item table	Royalty Items Information	Normal	Added to the Royalty Items Table		
4.4	Verify that all invoice items data has been added to the Invoice Items database	All the information should be added to the correct fields in the Book Invoice Items table	Invoice Items Information	Normal	Added to the Invoice Items Table		
4.5	Verify that all publishing invoice data has been added to the publishing invoice database	All the information should be added to the correct fields in the Publishing Invoice table	Publishing Invoice Information	Normal	Added to the Publishing Invoice Table		
4.6	Verify that all Royalties data has been added to the Royalties database	All the information should be added to the correct fields in the Royalties table	Royalties Information	Normal	Added to the Royalties Table		

4.7	Verify that all Book Invoice data has been added to the Book Invoice database	All the information should be added to the correct fields in the Book Invoice table	Book Invoice Information	Normal	Added to the Book Invoice Table		
5	Verify that the program meets the requirements given	Run the program testing all parts to make sure they meet all of the requirements	Add entries for all possible inputs in order to test them all, update all entries, remove the entries, conduct a search, view all windows, change password and log out.	Normal	Program is up to the required standards		

Chapter 3

Testing

3.1 Test Plan

3.1.1 Original Outline Plan

Test Series	Purpose of Test Series	Testing Strategy	Strategy Rationale
1	Testing the flow of control between user interfaces	Top-down Testing	
2	Testing the validation of input data	Bottom-up testing	All components are to be tested after development
3	Testing the algorithms' functionality	White box testing	
4	Testing that the information has been successfully stored, and in the right places	Black box testing	
5	Testing the system and whether it meets the requirements	System testing	

3.1.2 Changes to Outline Plan

Test Series	Purpose of Test Series	Testing Strategy	Strategy Rationale
1	Testing the flow of control between user interfaces	Top-down Testing	
2	Testing the validation of input data	Bottom-up testing	All components are to be tested after development
3	Testing the algorithms' functionality	White box testing	
4	Testing that the information has been successfully stored, and in the right places	Black box testing	
5	Testing the system and whether it meets the requirements	System testing	

3.1.3 Original Detailed Plan

Test Series	Purpose of Test	Test Description	Test Data	Test Data Type (Normal/ Erroneous/ Boundary)	Expected Result	Actual Result	Evidence

1.1	Test the Log in button on the log in screen	This should check whether the password and email match and exist in a record	Click the log in button	Normal	If the email and password match, the main menu should open, else the program should prompt the user with an error		
1.2	Test the View button on the main menu	This button links the main menu to the view menu.	Click the View Button	Normal	The program should open the View Menu in a new window		
1.3	Testing the Log Out button on the Main Menu	This button links to the Login screen, where the user is required to log in again	Click the Log out button	Normal	The screen should switch to the log out screen		

1.4	Testing the Search Database button on the Main Menu	This button should prompt a seperate interface to open, and show details which can be used to search for specific items in the database	Click the Search Database button	Normal	The program should open a new window consisting of the Search Database screen		
1.5	Testing the Add Entry button on the Main Menu	This button should prompt a seperate interface to open and show the Add Entry screen	Click the Add Entry button	Normal	The program should open the Add Entry screen in a new window		
1.6 (removed)	Testing the Edit Entry button from the Main Menu	This button links to the Editing screen	Click the Edit Entry button	Normal	The program should switch to the Editing screen from the Main Menu		

1.7	Testing the Edit Entry button after an entry has been selected beforehand	These conditions should open the Edit Entry screen upon clicking Edit Entry, with data on the selected entry already filled in on the grid	Click on an entry, and then click Edit Entry	Normal	The program should open the Edit Entry screen in a new window		
1.8	Testing the Remove Entry Button after an entry has been selected beforehand	These conditions should prompt the user for verification on deleting a selected customer record	Click on an entry and then click Remove Entry	Normal	The program should open a Verification window, asking the user for confirmation and verification on removing the selected customer record		

1.9	Testing the Change Password Button on the Main Menu	This button prompts the Change Password window to open	Click the Change Password button	Normal	The program should open the Change Password window, with fields required to be filled in in order to change the password		
1.10	Testing the Quick Search button on the Main Menu	This button returns the customer that matches the entered AuthorID	Type in a Lastname and click QuickSearch	Normal	The program should return the customer that matches the entered Lastname and show it in the grid		
1.11	Testing the back button on the View Menu	This button returns back to the main menu	Click Back	Normal	The program should return back to the main menu		

1.12	Testing the Add Book Button on the View Menu	This button opens up a new window for adding a book	Click Add Book	Normal	The program should open a new window for adding a book		
1.13	Testing the View Publishing Invoice button on the View Menu	This button opens up a new window displaying details about the selected book's publishing invoice	Click View Publishing invoice	Normal	The program should open a new window containing details about the selected book's publishing invoice		
1.14	Testing the View Royalties button on the View Menu	This button opens up a new window displaying details about the selected book's royalties	Click View Royalties	Normal	The program should open a new window containing details about the selected book's royalties		

1.15	Testing the View Book Invoice button on the View Menu	This button opens up a new window displaying details about the selected book's book invoices	Click View Book Invoices	Normal	The program should open a new window containing details about the selected book's book invoices		
1.16	Testing the Delete book button on the View Menu	This button opens up a new window asking for verification on deleting a selected book record	Click Delete book	Normal	The program should open a Verification window, asking the user for confirmation and verification on removing the selected customer record		

2.1	Verify that some criteria has been entered when using the search	At least one set of the input boxes and drop-down lists must have been filled in or selected from, else the program will prompt the user about the error	Selected from list with names and values entered Selected from list, values enteredand no names entered Just values entered Nothing	Normal Normal Erroneous Erroneous	Accept Accept Error Error		
2.2	Verify that a valid email has been entered on the log in screen	The program will prompt the user telling them they have inputted an error	test@testmail.com helloworld test @test-mail.com test.com@testmail	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		
2.3	Verify that a valid First-name has been entered when adding an entry	The user will be prompted with an error	John Jo hn Jo?hn Jo2n	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		

2.4	Verify that a valid Lastname has been entered when adding an entry	The user will be prompted with an error	Smith Sm ith Smi?th Smi1th	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		
2.5	Verify that a valid Phonenumber has been entered when adding an entry	The user will be prompted with an error	07123456789 07123123.3 071CO2	Normal Erroneous Erroneous	Accept Error Error		
2.7	Verify that a valid Address has been entered when adding an entry	The user will be prompted with an error	1 Example road @@ £! 1231231	Normal Erroneous Erroneous	Accept Error Error		
2.8	Verify that a valid ISBN has been entered when adding a book	The user will be prompted with an error	1234567890123 @@ £! 123 HelloWorld	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		

2.9	Verify that a valid NoOf-Pages has been entered when adding a book	The user will be prompted with an error	123 123456789 2.3 @! HelloWorld	Normal Erroneous Erroneous Erroneous	Accept Error Error		
3.1	Verify that all fields required are entered when adding a book	If all fields are filled in correctly, a book will be successfully added to the database	Fill all Fields Correctly and then click Add to Database Leave Fields Blank and then click Add to Database	Normal Erroneous	Verification screen should open User will be prompted with an error		
3.2	Verify that all fields required are entered and calculations are complete when adding an Invoice Item	If all fields are filled in correctly and the calculations are complete, then the invoice item will be added to the database	Fill all fields correctly and click calculate and then click Add to Database Leave Fields Blank and click Calculate Fill all fields correctly and click add to database	Normal Erroneuos Erroneous	Verification screen should open User will be prompted with an error User will be prompted with an error		

3.3	Verify that all fields required are entered and calculations are complete when adding a Royalty Item	If all fields are filled in correctly and the calculations are complete, then the royalty item will be added to the database	Fill all fields correctly and click calculate and then click Add to Database Leave Fields Blank and click Calculate Fill all fields correctly and click add to database	Normal Erroneous Erroneous	Verification screen should open User will be prompted with an error User will be prompted to click Calculate		
4.1	Verify that all author data has been added to the author database	All the information should be added to the correct fields in the author table	Author Information	Normal	Added to the Author Table		
4.2	Verify that all book data has been added to the book database	All the information should be added to the correct fields in the book table	Book Information	Normal	Added to the Book Table		

4.3	Verify that all royalty item data has been added to the book database	All the information should be added to the correct fields in the royalty item table	Royalty Items Information	Normal	Added to the Royalty Items Table		
4.4	Verify that all invoice items data has been added to the Invoice Items database	All the information should be added to the correct fields in the Book Invoice Items table	Invoice Items Information	Normal	Added to the Invoice Items Table		
4.5	Verify that all publishing invoice data has been added to the publishing invoice database	All the information should be added to the correct fields in the Publishing Invoice table	Publishing Invoice Information	Normal	Added to the Publishing Invoice Table		

4.6	Verify that all Royalties data has been added to the Royalties database	All the information should be added to the correct fields in the Royalties table	Royalties Information	Normal	Added to the Royalties Table		
4.7	Verify that all Book Invoice data has been added to the Book Invoice database	All the information should be added to the correct fields in the Book Invoice table	Book Invoice Information	Normal	Added to the Book Invoice Table		
5	Verify that the program meets the requirements given	Run the program testing all parts to make sure they meet all of the requirements	Add entries for all possible inputs in order to test them all, update all entries, remove the entries, conduct a search, view all windows, change password and log out.	Normal	Program is up to the required standards		

3.1.4 Changes to Detailed Plan

Test Series	**Purpose of Test**	**Test Description**	**Test Data**	**Test Data Type (Normal/ Erroneous/ Boundary)**	**Expected Result**	**Actual Result**	**Evidence**
1.1	Test the Log in button on the log in screen	This should check whether the password and email match and exist in a record	Click the log in button	Normal	If the email and password match, the main menu should open, else the program should prompt the user with an error	Works as expected	Figure 3.1 on page 145, and Figure **??** on page **??**.

1.2	Test the View button on the main menu	This button links the main menu to the view menu.	Click the View Button after selecting an author.	Normal	The program should open the View Menu in a new window, displaying the selected Customer's Books.	Works as expected	Figure 3.4 on page 148
1.3	Testing the Log Out button on the Main Menu	This button links to the Login screen, where the user is required to log in again	Click the Log out button	Normal	The screen should switch to the log out screen	Works as expected	
1.4	Testing the Search Database button on the Main Menu	This button should prompt a seperate interface to open, and show details which can be used to search for specific items in the database	Click the Search Database button	Normal	The program should open a new window consisting of the Search Database screen	Works as expected	Figure **??** on page **??**

1.5	Testing the Add Entry button on the Main Menu	This button should prompt a seperate interface to open and show the Add Entry screen	Click the Add Entry button	Normal	The program should open the Add Entry screen in a new window	Works as expected	Figure 3.6 on page 150
1.7	Testing the Update Entry button after an entry has been selected beforehand	These conditions should open the Update Entry screen upon clicking Update Entry, with data on the selected entry already filled in on the grid	Click on an entry, and then click Update Entry	Normal	The program should open the Update Entry screen in a new window	Works as expected	Figure 3.7 on page 151

1.8	Testing the Remove Entry Button after an entry has been selected beforehand	These conditions should prompt the user for verification on deleting a selected customer record	Click on an entry and then click Remove Entry	Normal	The program should open a Verification window, asking the user for confirmation and verification on removing the selected customer record	Works as expected	Figure 3.8 on page 152
1.9	Testing the Change Password/Username Button on the Main Menu	This button prompts a window to open, with a set of buttons asking what the user wishes to changes	Click the Change Password/Username button	Normal	The program should open the Change Password/Username window, with buttons giving options of what is needed to be changed.	Works as expected	Figure 3.9 on page 153

1.10	Testing the Quick Search button on the Main Menu	This button returns the customer that matches the entered Name	Type in a Firstname, Lastname or both and click QuickSearch	Normal	The program should return any customers that match the entered name(s) and show it in the grid	Works as expected	Figure 3.10 on page 154
1.11	Testing the back button on the View Menu	This button returns back to the main menu	Click Back	Normal	The program should return back to the main menu	Works as expected	
1.12	Testing the Add Book Button on the View Menu	This button opens up a new window for adding a book	Click Add Book	Normal	The program should open a new window for adding a book	Works as expected	Figure 3.11 on page 155

1.13	Testing the View Publishing Invoice button on the View Menu	This button opens up a new window displaying details about the selected book's publishing invoice	Click View Publishing invoice	Normal	The program should open a new window containing details about the selected book's publishing invoice	Works as expected	Figure 3.12 on page 156
1.14	Testing the View Royalties button on the View Menu	This button opens up a new window displaying details about the selected book's royalties	Click View Royalties	Normal	The program should open a new window containing details about the selected book's royalties	Works as expected	Figure 3.13 on page 157

1.15	Testing the View Book Invoice button on the View Menu	This button opens up a new window displaying details about the selected book's book invoices	Click View Book Invoices	Normal	The program should open a new window containing details about the selected book's book invoices	Works as expected	Figure 3.14 on page 158
1.16	Testing the Delete book button on the View Menu	This button opens up a new window asking for verification on deleting a selected book record	Click Delete book	Normal	The program should open a Verification window, asking the user for confirmation and verification on removing the selected customer record	Works as expected	Figure 3.15 on page 159

1.17	Testing the 'Forgotten Password' label on the log in screen	This opens a window, giving the user the default username and password if it's the first time of usage, or it opens an input box where an email is asked for, if the default credentials have been changed.	Click 'Forgotten Password'	Normal	This should open a window, giving the user the default username and password if it's the first time of usage, or it will open a input box where an email is asked for, if the default credentials have been changed	Works as expected	Figure 3.16 on page 160
1.18	Testing the Change Password Button	This button opens a new window, where the user is presented with fields required for changing their password	Click Change Password	Normal	The program should open the Change Password window and present the necessary fields to the user	Works as expected	Figure 3.17 on page 161

1.19	Testing the Confirm button for changing passwords	This button should accept the entries the user has entered if the old password matches, and the new and retyped passwords matches otherwise the user will be prompted with an error.	Fill the necessary fields and click Confirm	Normal	This should accept the user's input, successfully changing the password if the criteria is met, else the user is prompted with an error	Works as expected	Figure 3.18 on page 162
1.20	Testing the View Royalty Items button on the Royalties Menu	This button opens up a new window displaying details about the selected Royalty's items	Select a Royalty and click View Royalty Items	Normal	The program should open a new window containing details about the selected Royalty's Items	Works as expected	Figure 3.19 on page 163

1.21	Testing the View Book Invoice Items button on the Book Invoice Menu	This button opens up a new window displaying details about the selected Book Invoice's items	Select a Book Invoice and click View Book Invoice Items	Normal	The program should open a new window containing details about the selected Book Invoice's Items	Works as expected	Figure 3.20 on page 163
1.22	Testing the Log Out button on the Menubar	This button links to the Login screen, where the user is required to log in again	Click the Log out button on the Menubar	Normal	The screen should switch to the log out screen	Works as expected	
1.23	Testing the Add Entry button on the Menubar	This button should prompt a seperate interface to open and show the Add Entry screen	Click the Add Entry button on the Menubar	Normal	The program should open the Add Entry screen in a new window	Works as expected	Figure 3.21 on page 164

1.24	Testing the Confirm button on the Search window	This button checks whether the entries are valid then conducts the search if they are, presenting results in the main window	Click the Confirm button on the search window	Normal	The program should validate the entries then conduct the search and present search results in the main menu, or prompt the user with an error.	Works as expected	Figure 3.22 on page 164
1.25	Testing the Cancel button on the Add Entry window	This button should reject and close the window	Click the cancel button on the add entry window	Normal	The program should reject the window and close it	Works as expected	
1.26	Testing the Cancel button on the Search window	This button should reject and close the window	Click the cancel button on the Search window	Normal	The program should reject the window and close it	Works as expected	

1.27	Testing the Update book button on the View Menu	This button opens up a new window with entries already filled in with the selected book's data.	Select an entry then click Update book	Normal	The program should open a window for updating the entry, with the selected data already filled in the entry boxes	Works as expected	Figure 3.23 on page 165
2.1	Verify that some criteria has been entered when using the search	Firstname and surname must be filled in, and if a different category has been selected, the final input box must also be filled in.	Author selected, Firstname and Surname entered. Author Selected, boxes left blank Publishing Invoice selected, Service selected, boxes filled with appropriate data Publishing Invoice selected, No boxes filled.	Normal Erroneous Normal Erroneous	Accept Error Accept Error	Works as expected	Figure 3.24 on page 165

2.2 (removed)	Verify that a valid email has been entered on the log in screen	The program will prompt the user telling them they have inputted an error	test@testmail.com helloworld test @testmail.com test.com@testmai	Normal Erroneous Erroneous Erroneous	Accept Error Error Error		
2.3	Verify that a valid First-name has been entered when adding an entry	The user will be prompted with an error	John Jo hn Jo?hn Jo2n	Normal Erroneous Erroneous Erroneous	Accept Error Error Error	Works as expected - User is unable to enter 'Jo?hn', 'Jo hn' or 'Jo2n'	Figure 3.25 on page 166
2.4	Verify that a valid Last-name has been entered when adding an entry	The user will be prompted with an error	Smith Sm ith Smi?th Smi1th	Normal Erroneous Erroneous Erroneous	Accept Error Error Error	Works as expected - User is unable to enter 'Sm ith', 'Smi?th', or 'Smi1th'.	Figure 3.25 on page 166
2.5	Verify that a valid Phonenumber has been entered when adding an entry	The user will be prompted with an error	07123456789 07123123.3 071CO2	Normal Erroneous Erroneous	Accept Error Error	Works as expected - User is unable to enter '07123123.3' or '071CO2'	Figure 3.25 on page 166

2.6	Verify that a valid Address has been entered when adding an entry	The user will be prompted with an error	1 Example road @@ £! 1231231	Normal Erroneous Erroneous	Accept Error Error	Works as expected - User is unable to enter '@@ £!', but is prompted with an error when entering '1231231'.	Figure 3.25 on page 166 and Figure **??** on page **??**
2.7	Verify that a valid ISBN has been entered when adding a book	The user will be prompted with an error	1234567890123 @@ £! 123456789012345(0123	Normal Erroneous Erroneous Erroneous	Accept Error Error	Works as expected - unable to enter '@@ £!'. '123456789012 and '0123' are rejected and the user is prompted with an error.	Figure 3.26 on page 167

2.8	Verify that a valid NoOfPages has been entered when adding a book	The user will be prompted with an error	123 123456789 2.3 @! HelloWorld	Normal Erroneous Erroneous Erroneous	Accept Error Error Error	Works as expected - User is unable to type '2.3', '@!' and 'HelloWorld'. User is prompted with an error when entering '123456789'.	Figure 3.27 on page 168

2.9	Verify that a valid Discount has been entered when adding Book Invoice items	The user will be prompted with an error	50 5.5 0 -1 100 101 abc	Normal Normal Boundary Erroneous Boundary Erroneous Erroneous	Accept Error Accept Error Accept Error Error	Works mostly - User is unable to type 'abc'. User is prompted with an error if '-1', or '101' is entered, but when calculate has been clicked and user clicks confirm, window is unexpectedly closed straight after the error prompt.	Figure 3.28 on page 169

2.10	Verify that a valid Discount has been entered when adding Royalty items	The user will be prompted with an error	50 5.5 0 -1 100 101 abc	Normal Normal Boundary Erroneous Boundary Erroneous Erroneous	Accept Error Accept Error Accept Error Error	Works mostly - User is unable to type 'abc'. User is prompted with an error if '-1', or '101' is entered, but when calculate has been clicked and user clicks confirm, window is unexpectedly closed straight after the error prompt.	Figure 3.29 on page 170

3.1	Verify that all fields required are entered when adding a book	If all fields are filled in correctly, a book will be successfully added to the database	Fill all Fields Correctly and then click Add to Database Leave Fields Blank and then click Add to Database	Normal Erroneous	Data is added to the database. User will be prompted with an error	Works as expected	Figure 3.30 on page 171
3.2	Verify that all fields required are entered and calculations are complete when adding an Invoice Item	If all fields are filled in correctly and the calculations are complete, then the invoice item will be added to the database	Fill all fields correctly and click calculate and then click Add to Database Leave Fields Blank and click Calculate Fill all fields correctly and click add to database	Normal Erroneous Erroneous	Data should be successfully added to the database. User will be prompted with an error User will be prompted with an error	Works mostly as expected - when calculate has been clicked with the invalid entry, and user clicks confirm, window is unexpectedly closed straight after the error prompt.	Figure 3.31 on page 172 and Figure 3.28 on page 169

3.3	Verify that all fields required are entered and calculations are complete when adding a Royalty Item	If all fields are filled in correctly and the calculations are complete, then the royalty item will be added to the database	Fill all fields correctly and click calculate and then click Add to Database Leave Fields Blank and click Calculate Fill all fields correctly and click add to database	Normal Erroneous Erroneous	Verification screen should open User will be prompted with an error User will be prompted to click Calculate	Works mostly as expected - when calculate has been clicked with the invalid entry, and user clicks confirm, window is unexpectedly closed straight after the error prompt.	Figure 3.32 on page 173 and Figure 3.29 on page 170

3.4	Verify that the calculations function for working out the print cost	The calculations should be conducted and the result should be displayed	Enter values for the Royalty Items Leave fields blank Enter negative numbers into the required fields.	Normal Erroneous Erroneous	Accept Error Error	Calculations are correct, but when a negative number is entered, the calculation is still conducted. User is prompted with the error when they wish to confirm entry, and then the window is unexpectedly closed afterwards.	Figure ?? on page ??

3.5	Verify that the calculations function for working out the total Royalty Payment for a set of payments.	The calculations should be conducted and the result should be displayed in the Royalties table	Enter values for the Royalty Items and add it to the database Leave fields blank Enter negative numbers into the required fields.	Normal Erroneous Erroneous	Accept Error Error	Works as expected - User is prompted when Fields are invalid/blank.	Figure 3.34 on page 175
3.6	Verify that the calculations function for working out the total Book Invoice Payment	The calculations should be conducted and the result should be displayed in the Book Invoice table	Enter values for the Book Invoice Items and add them to the database Leave fields blank Enter negative numbers into the required fields.	Normal Erroneous Erroneous	Accept Error Error	Works as expected - User is prompted when Fields are invalid/blank.	Figure 3.35 on page 175
4.1	Verify that all author data has been added to the author database	All the information should be added to the correct fields in the author table	Author Information	Normal	Added to the Author Table	Works as expected	Figure 3.36 on page 175

4.2	Verify that all book data has been added to the book database	All the information should be added to the correct fields in the book table	Book Information	Normal	Added to the Book Table	Works as expected	Figure 3.37 on page 176
4.3	Verify that all publishing invoice data has been added to the publishing invoice database	All the information should be added to the correct fields in the Publishing Invoice table	Publishing Invoice Information	Normal	Added to the Publishing Invoice Table	Works as expected	Figure 3.38 on page 176
4.4	Verify that all Royalties data has been added to the Royalties database	All the information should be added to the correct fields in the Royalties table	Royalties Information	Normal	Added to the Royalties Table	Works as expected	Figure 3.41 on page 178

4.5	Verify that all Book Invoice data has been added to the Book Invoice database	All the information should be added to the correct fields in the Book Invoice table	Book Invoice Information	Normal	Added to the Book Invoice Table	Works as expected	Figure 3.39 on page 177
4.6	Verify that all royalty item data has been added to the book database	All the information should be added to the correct fields in the royalty item table	Royalty Items Information	Normal	Added to the Royalty Items Table	Works as expected	Figure 3.42 on page 178
4.7	Verify that all invoice items data has been added to the Invoice Items database	All the information should be added to the correct fields in the Book Invoice Items table	Invoice Items Information	Normal	Added to the Invoice Items Table	Works as expected	Figure 3.40 on page 177

4.8	Verify that all author data has been successfully edited afted editing and saving changes	All the data should be changed to what the user's inputs were, and should still be in the correct fields in the Author Table	Author Information	Normal	Changes made to the Author Table	Works as expected	Figure 3.43 on page 179
4.9	Verify that all book data has been successfully edited afted editing and saving changes	All the data should be changed to what the user's inputs were, and should still be in the correct fields in the Book Table	Book Information	Normal	Changes made to the Book Table	Works as expected	Figure 3.44 on page 180

4.10	Verify that all Book Invoice data has been successfully edited afted editing and saving changes	All the data should be changed to what the user's inputs were, and should still be in the correct fields in the Book Invoice Table	Book Invoice Information	Normal	Changes made to the Book Invoice Table	Works as expected	Figure 3.45 on page 181
4.11	Verify that all Book Invoice Items data has been successfully edited afted editing and saving changes	All the data should be changed to what the user's inputs were, and should still be in the correct fields in the Book Invoice Items Table	Book Invoice Items Information	Normal	Changes made to the Book Invoice Items Table	Works as expected	Figure 3.46 on page 182
4.12	Verify that a set of royalty items are deleted when a deletion is requested by the user	The royalty items are deleted, and should no longer be in the table	Deleting the data	Normal	The royalty items should no longer exist in the database	Works as expected	Figure **??** on page **??**

4.13	Verify that a royalty payment is deleted when a deletion is requested by the user	The royalty payment is deleted, and should no longer be in the table	Deleting the data	Normal	The royalty payment should no longer exist in the database	Works as expected	Figure 3.48 on page 184
4.14	Verify that all data linked with an author is deleted when a deletion is requested by the user	All data linked with the user is deleted, and should no longer be in the table	Deleting the data	Normal	The data linked with that athor shoiuld no longer be in their respective tables	Works as expected	Figure 3.49 on page 185

5	Verify that the program meets the requirements given	Run the program testing all parts to make sure they meet all of the requirements	Add entries for all possible inputs in order to test them all, update all entries, remove the entries, conduct a search, view all windows, change password and log out.	Normal	Program is up to the required standards	Program is up to the required standards. Minor exception of Add Royalties/-BookInvoice Items window closing when an invalid entry is entered.	

3.2 Test Data

3.2.1 Original Test Data

The data is shown in the previous table.

3.2.2 Changes to Test Data

Some changes were made to the plan, as the implementation of the program made me decide to change some aspects of the system. The tests removed are highlighted in the changed table in grey, and the tests that were modified are highlighted in light grey.

3.3 Annotated Samples

3.3.1 Actual Results

The data is shown in the previous table.

3.3.2 Evidence

Figure 3.1: Test 1.1

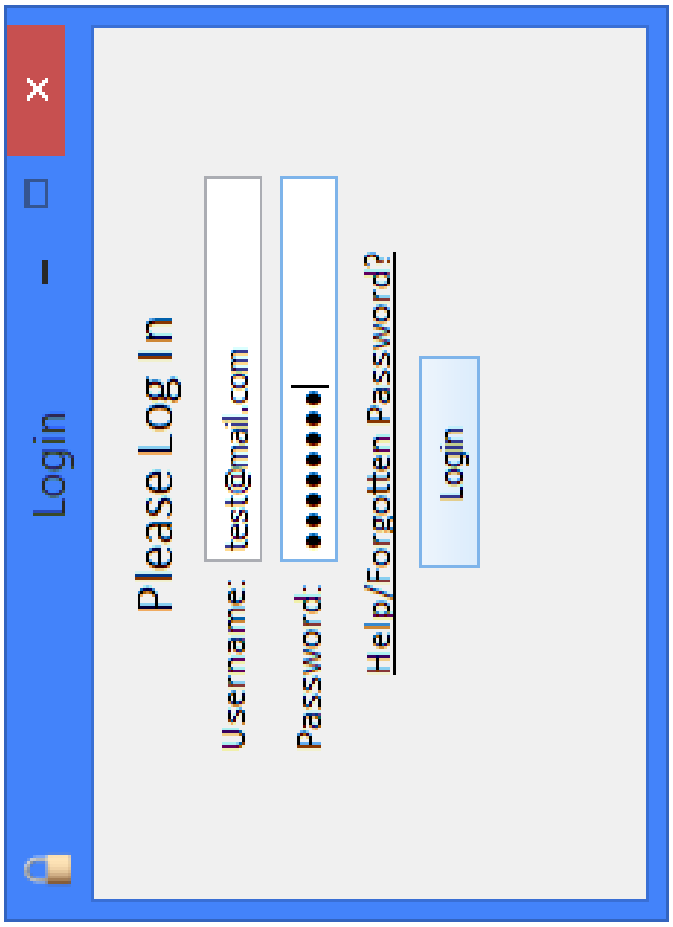


Figure 3.2: Test 1.1

Figure 3.3: Test 1.1

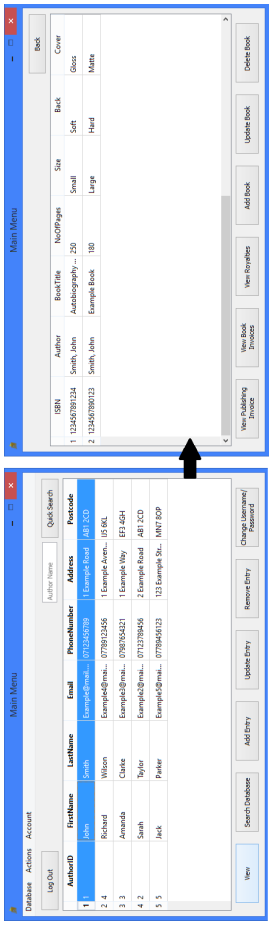


Figure 3.4: Test 1.2

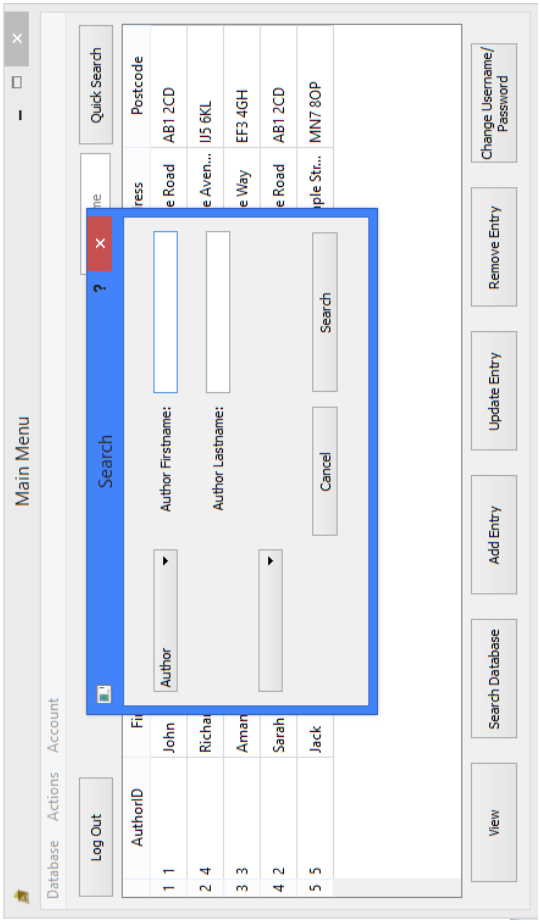


Figure 3.5: Test 1.4

Figure 3.6: Test 1.5

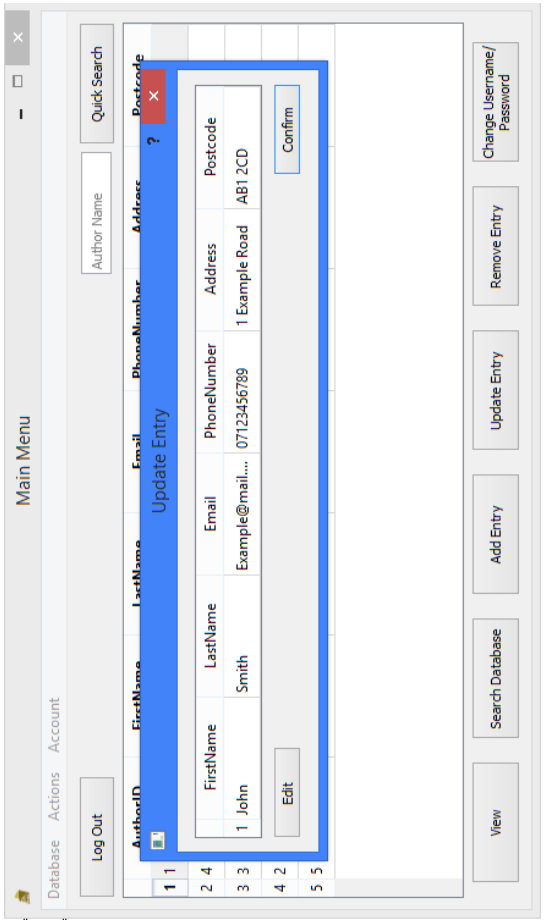
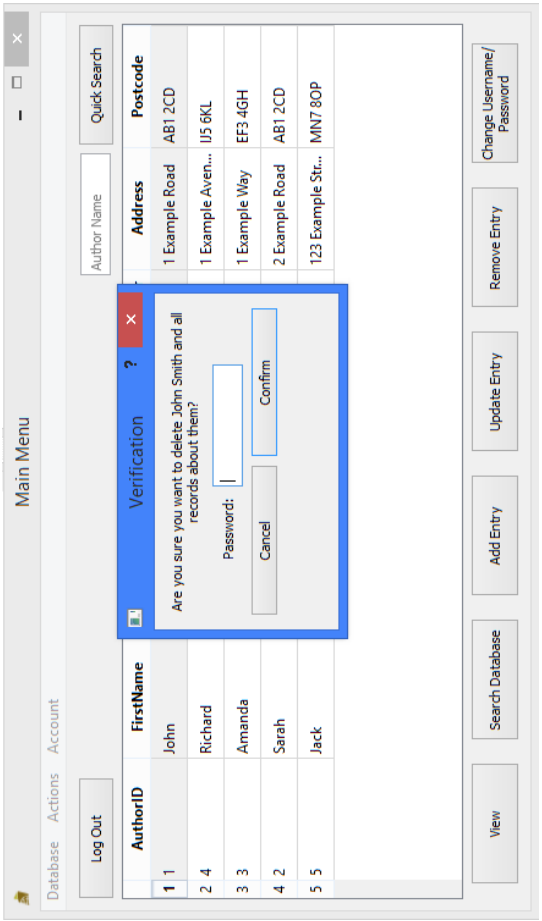


Figure 3.7: Test 1.7



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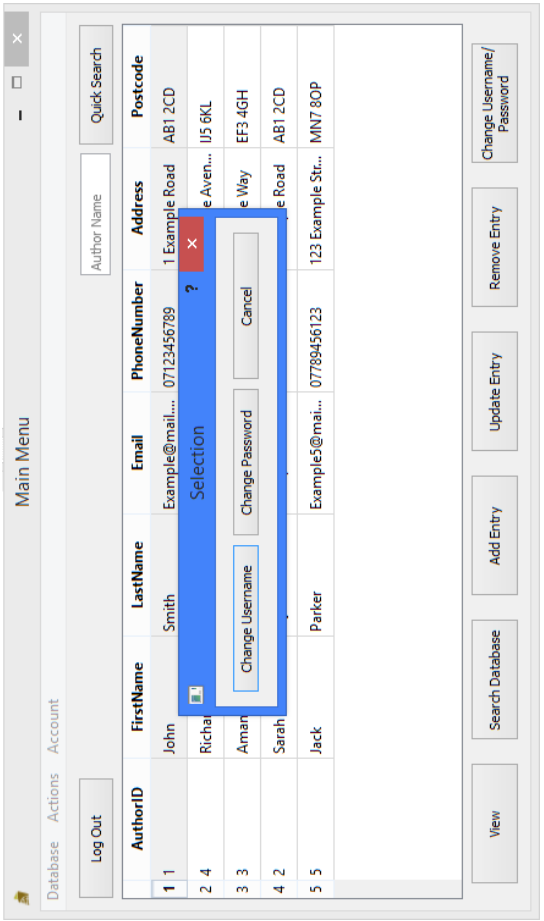

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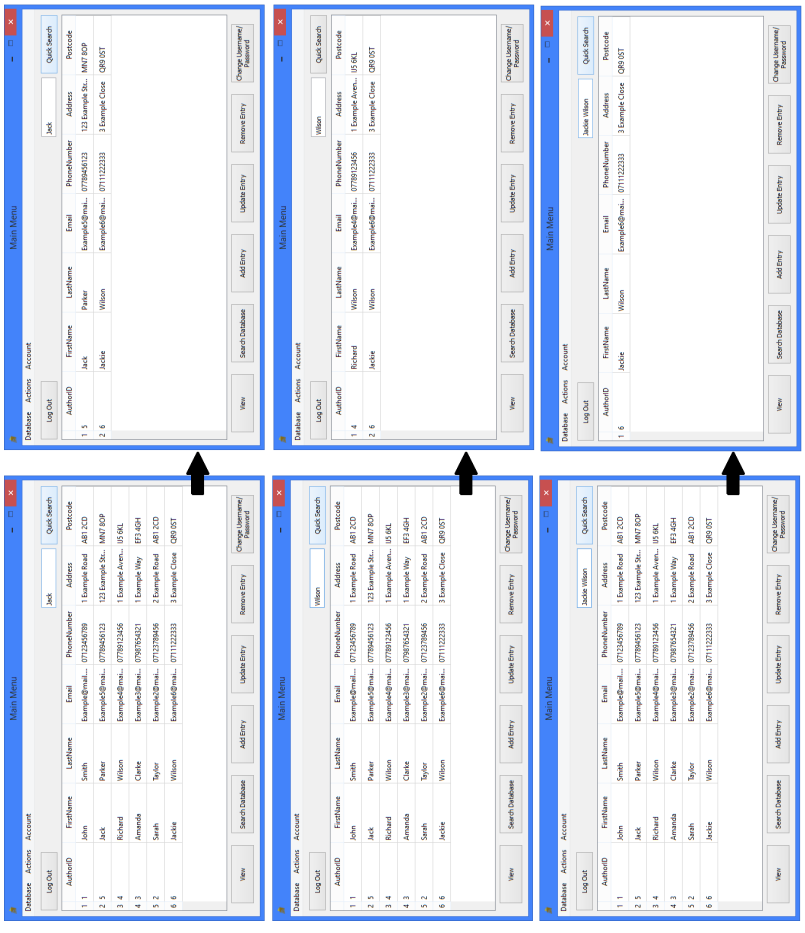


Figure 3.10: Test 1.10

Figure 3.11: Test 1.12

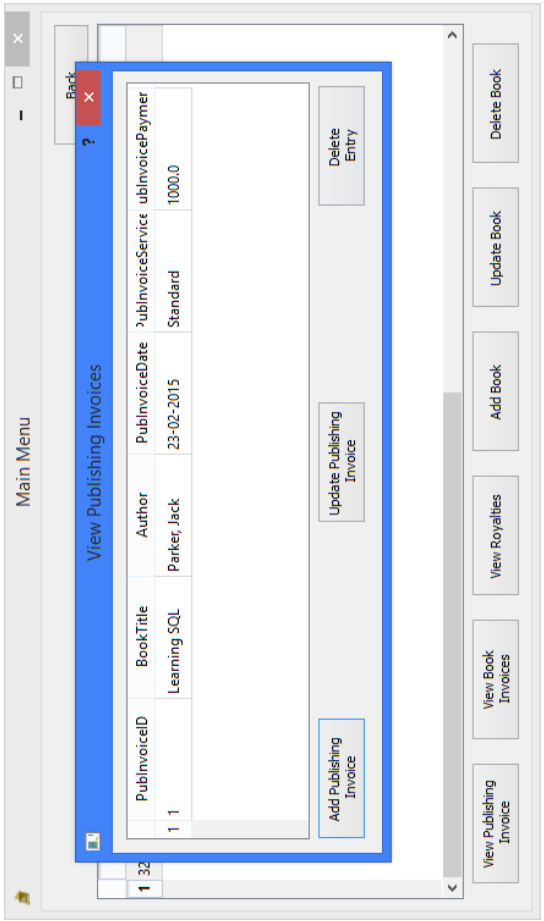


Figure 3.12: Test 1.13

Figure 3.13: Test 1.14

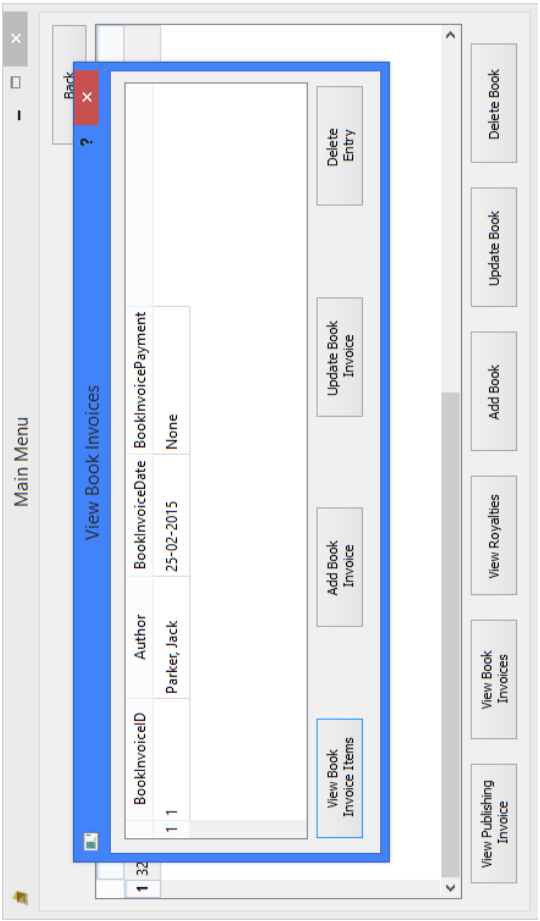
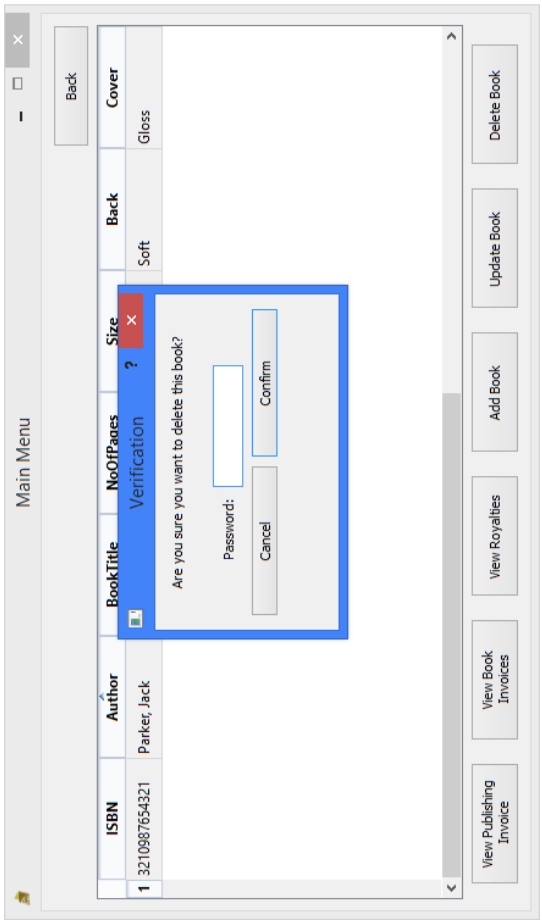


Figure 3.14: Test 1.15



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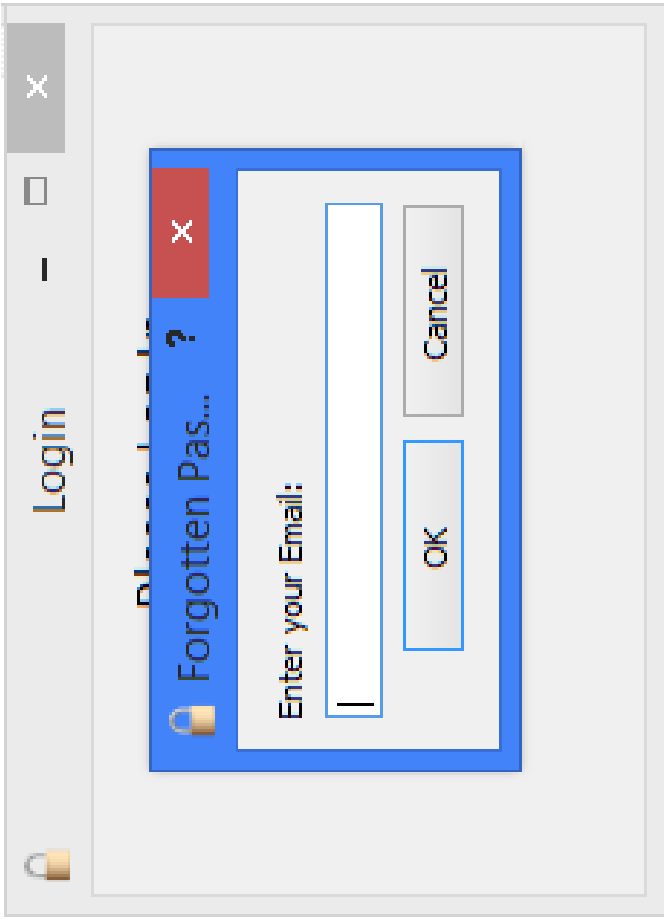

Figure 3.16: Test 1.17

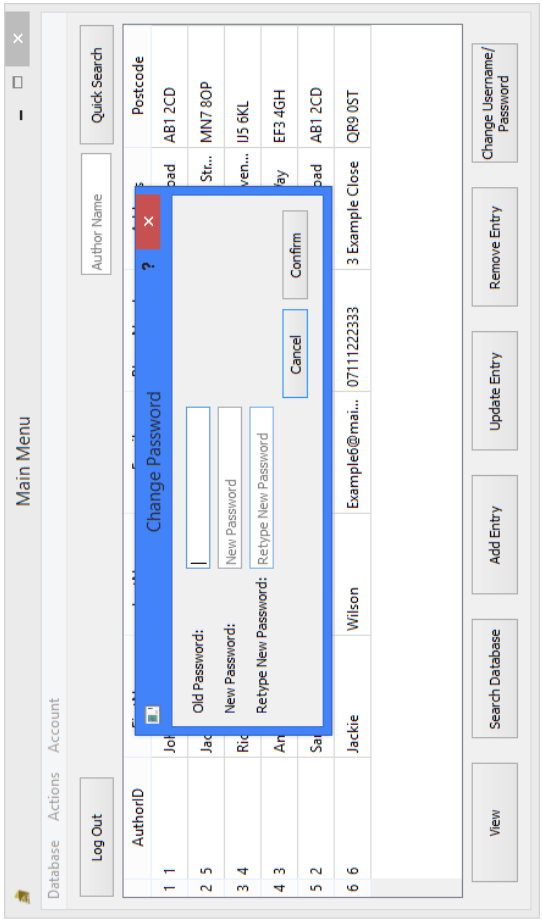

Figure 3.17: Test 1.18

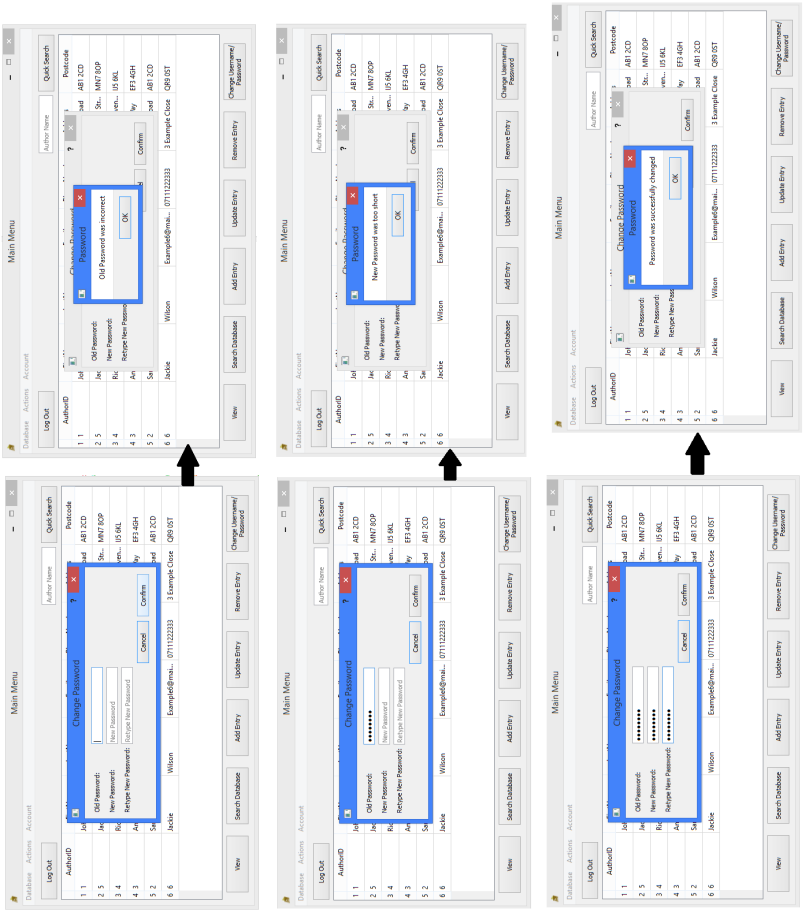

Figure 3.18: Test 1.19

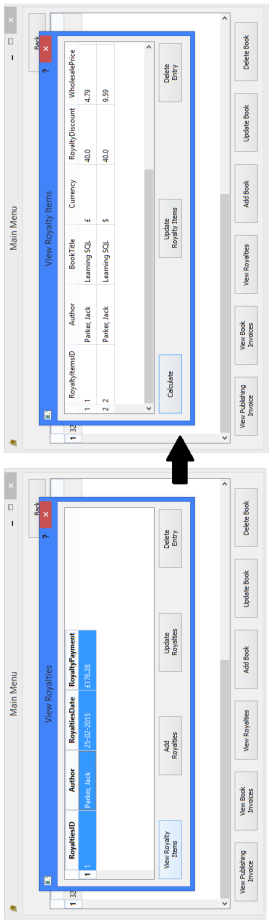

Figure 3.19: Test 1.20

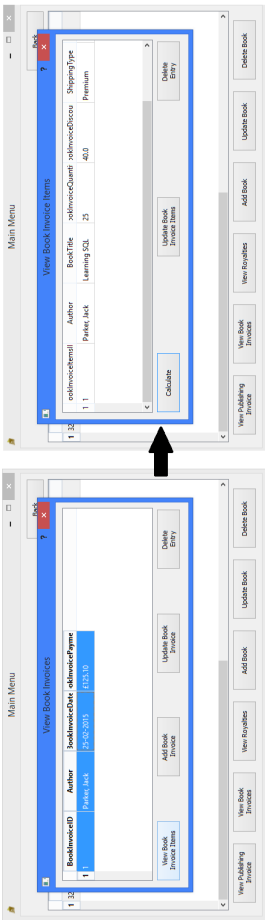

Figure 3.20: Test 1.21

Figure 3.21: Test 1.23

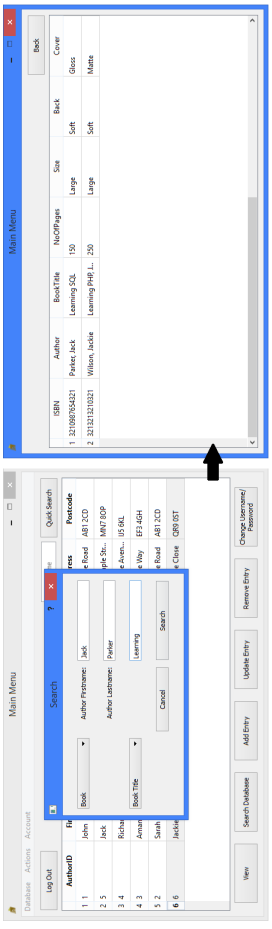

Figure 3.22: Test 1.24

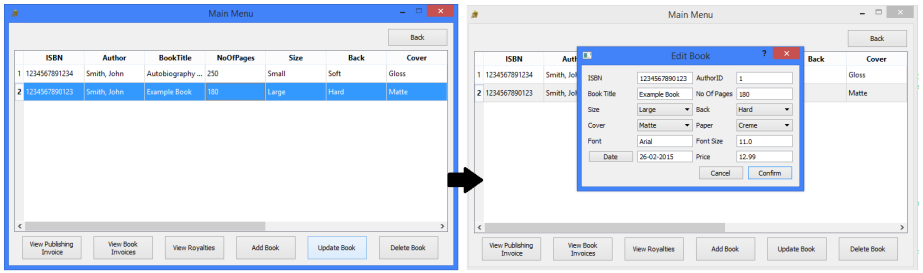

Figure 3.23: Test 1.27

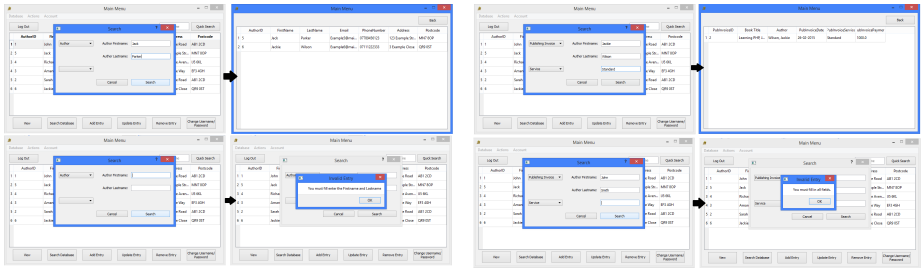

Figure 3.24: Test 2.1

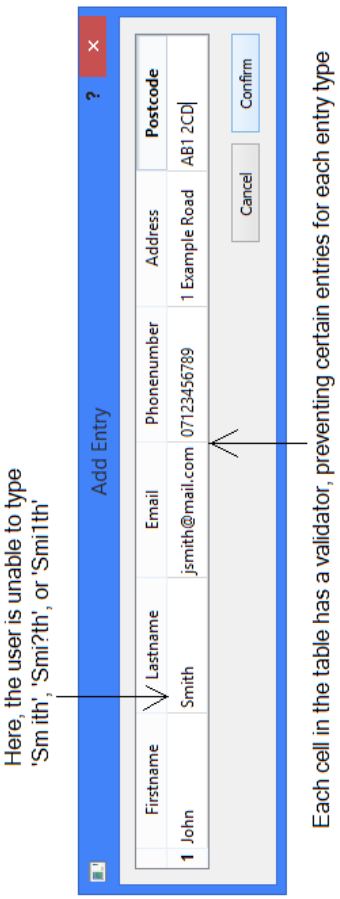

Figure 3.25: Test 2.3, 2.4, 2.5, 2.6

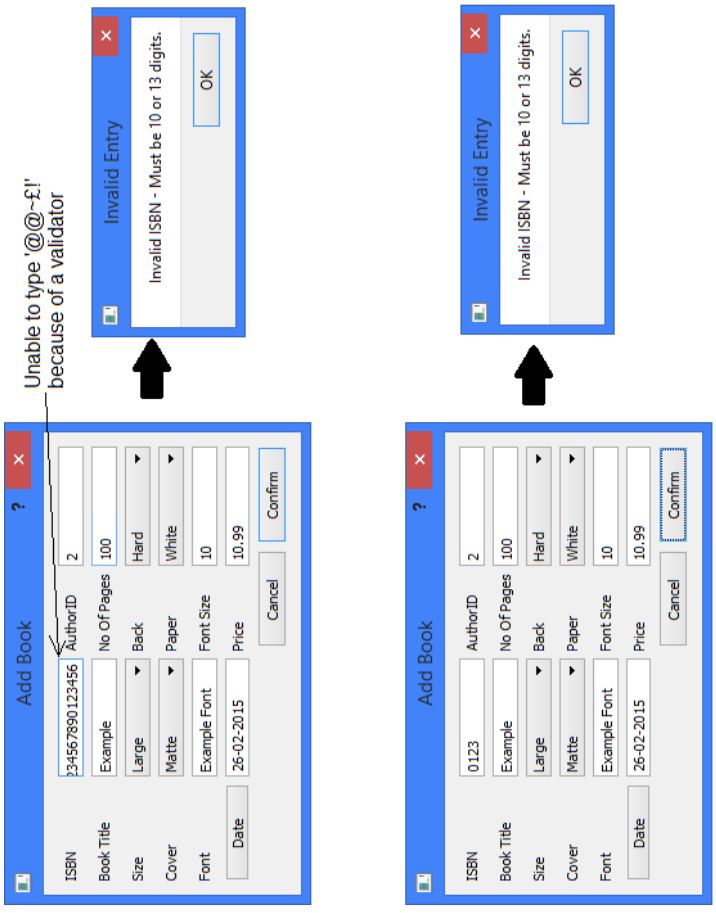

Figure 3.26: Test 2.7

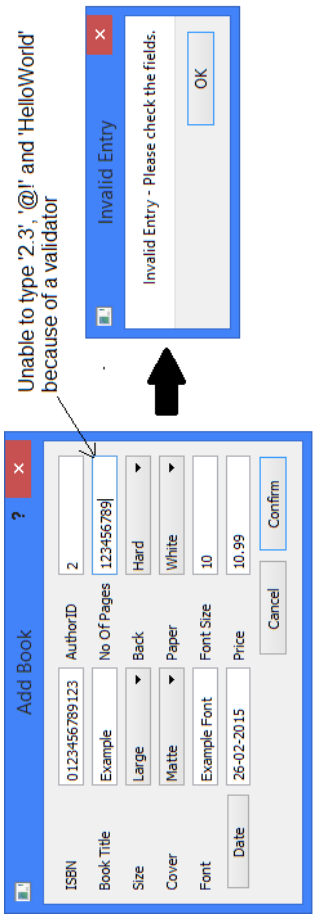

Figure 3.27: Test 2.8

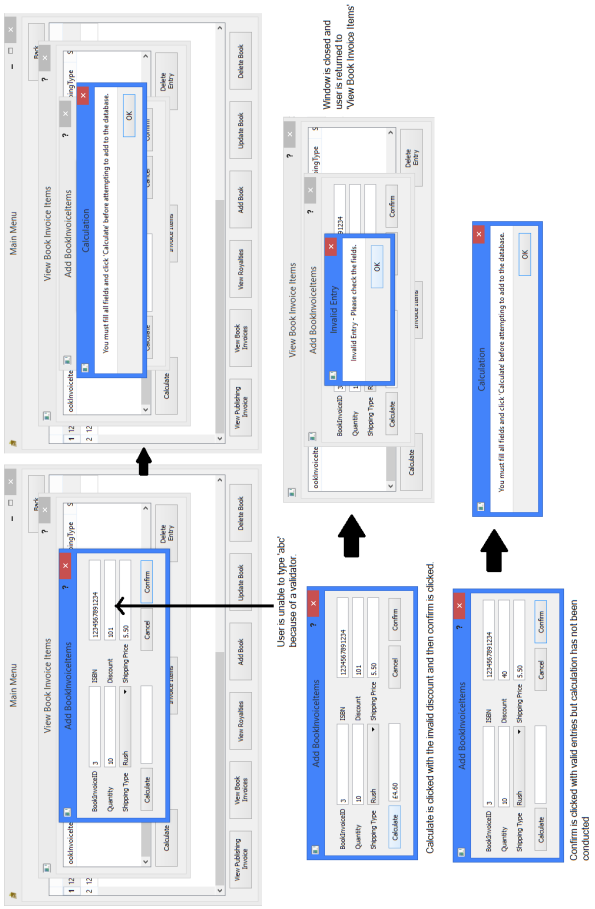

Figure 3.28: Test 2.9

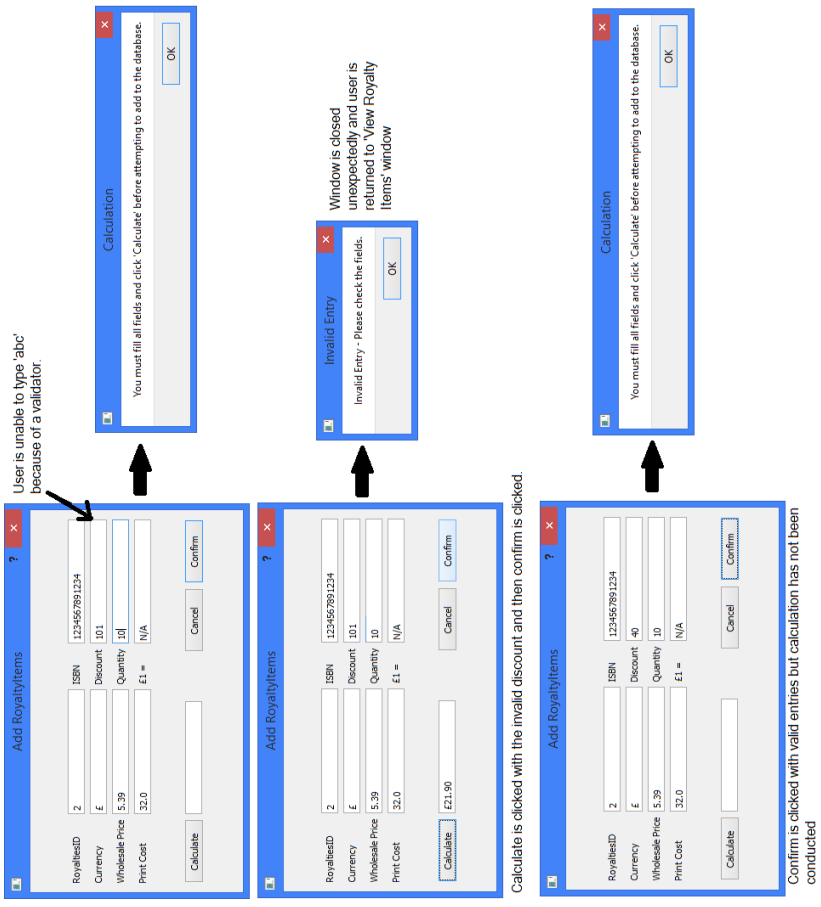

Figure 3.29: Test 2.10

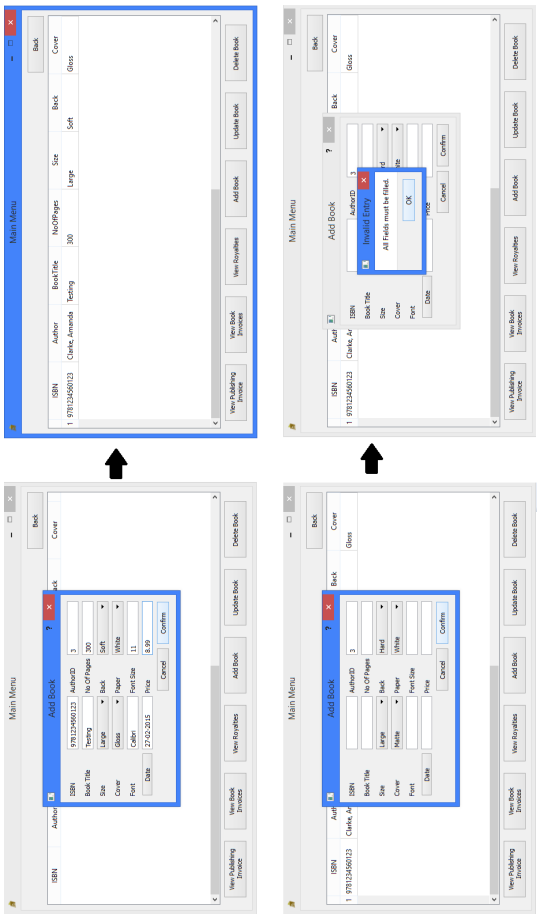

Figure 3.30: Test 3.1

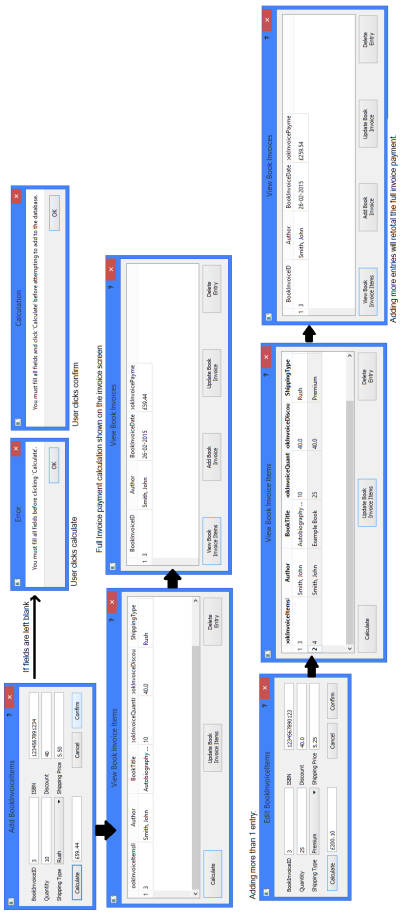

Figure 3.31: Test 3.2

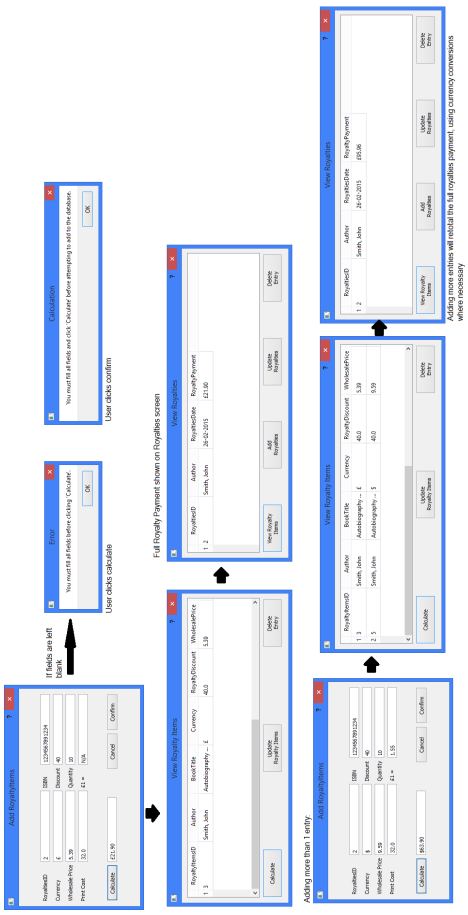

Figure 3.32: Test 3.3

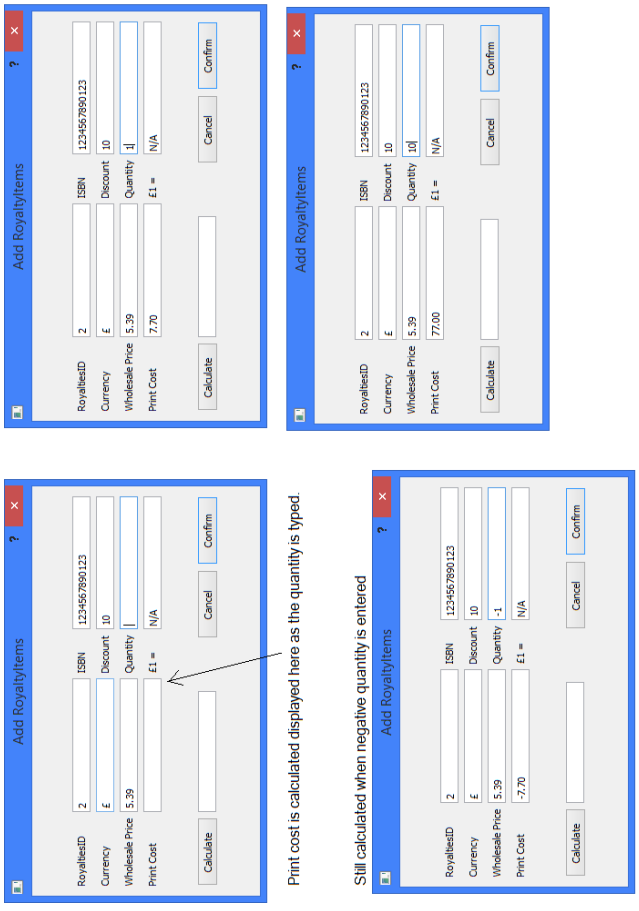

Figure 3.33: Test 3.4

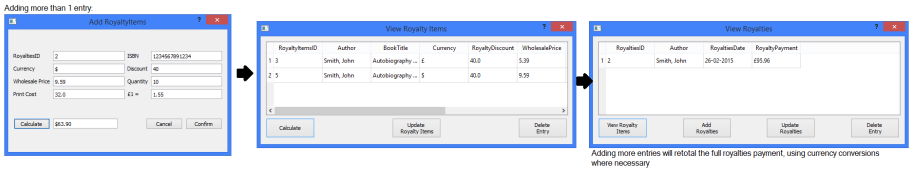

Figure 3.34: Test 3.5

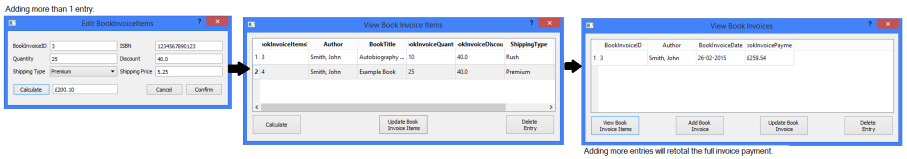

Figure 3.35: Test 3.6

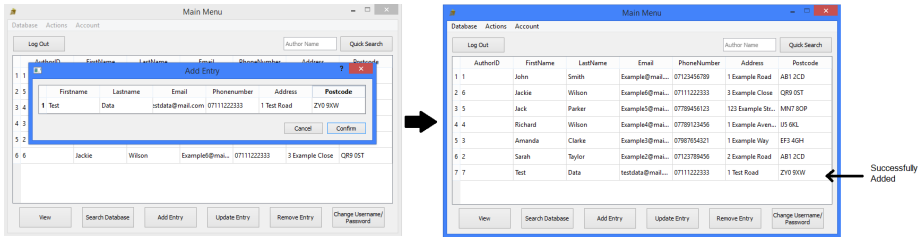

Figure 3.36: Test 4.1

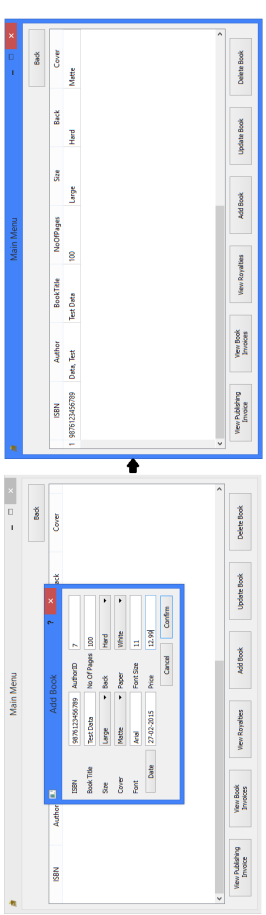

Figure 3.37: Test 4.2

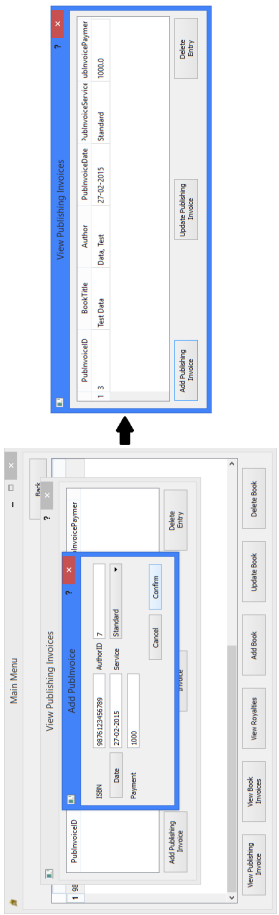

Figure 3.38: Test 4.3

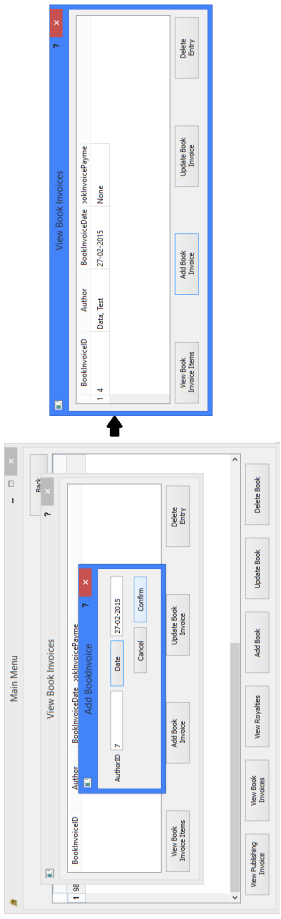

Figure 3.39: Test 4.4

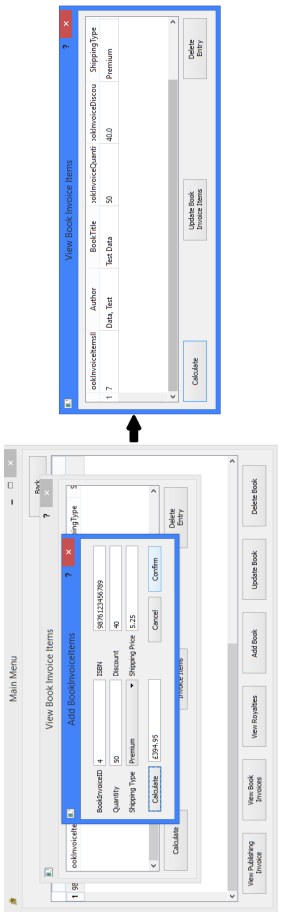

Figure 3.40: Test 4.5

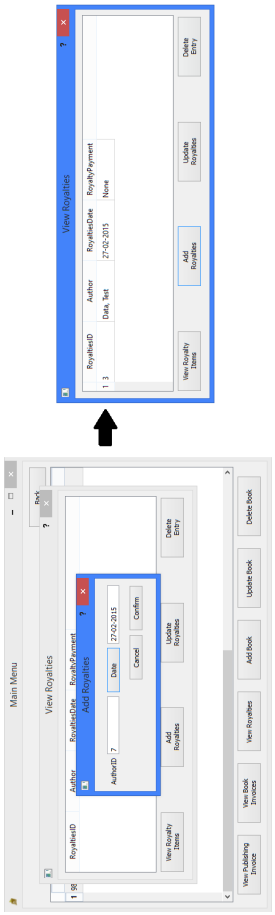

Figure 3.41: Test 4.6

Figure 3.42: Test 4.7

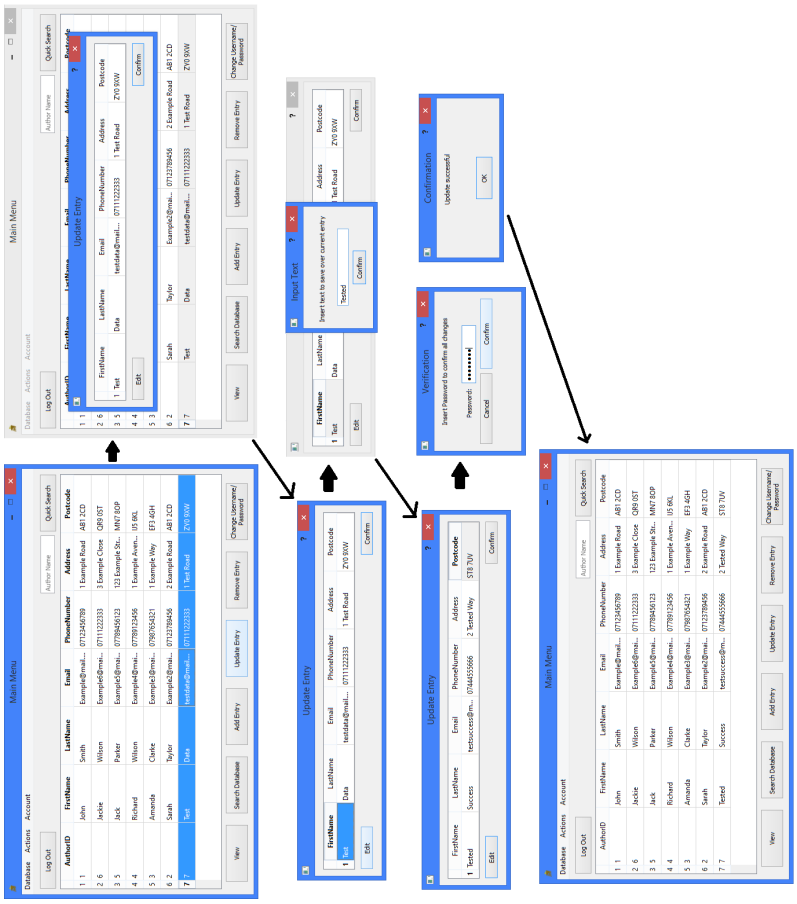

Figure 3.43: Test 4.8

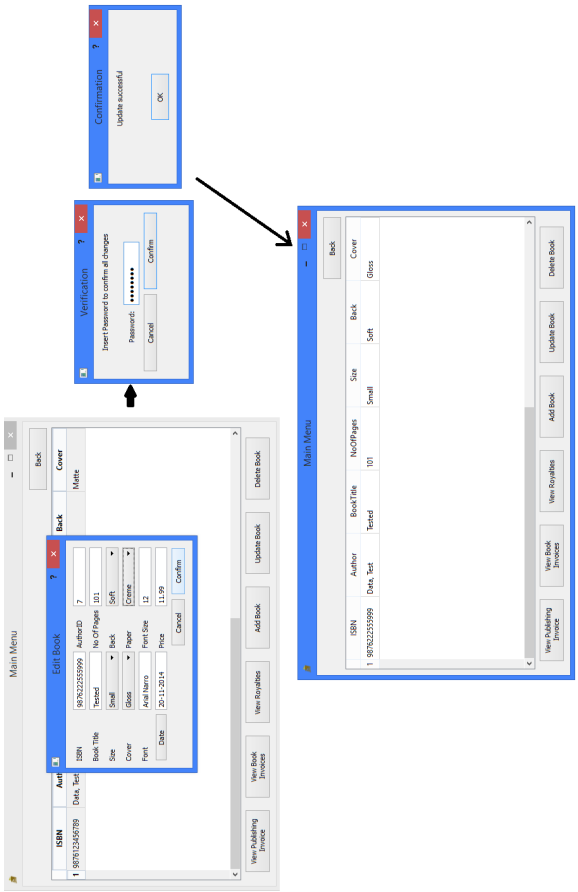

Figure 3.44: Test 4.9

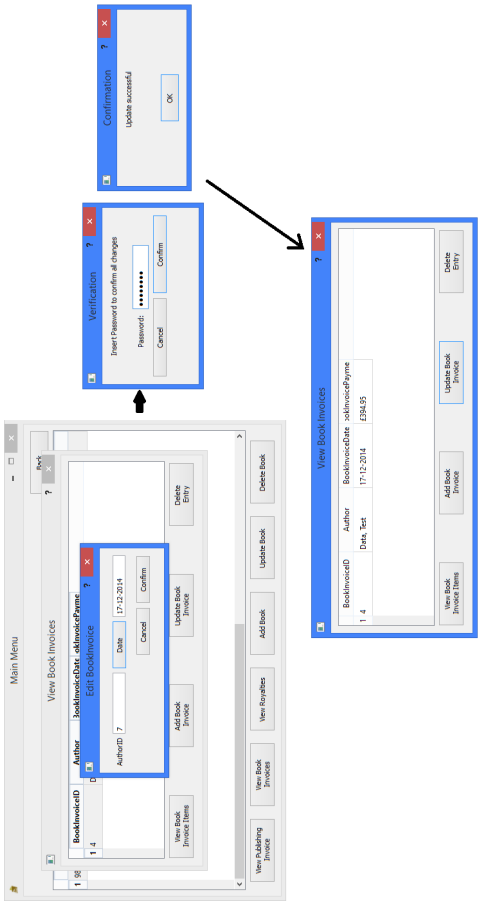

Figure 3.45: Test 4.10

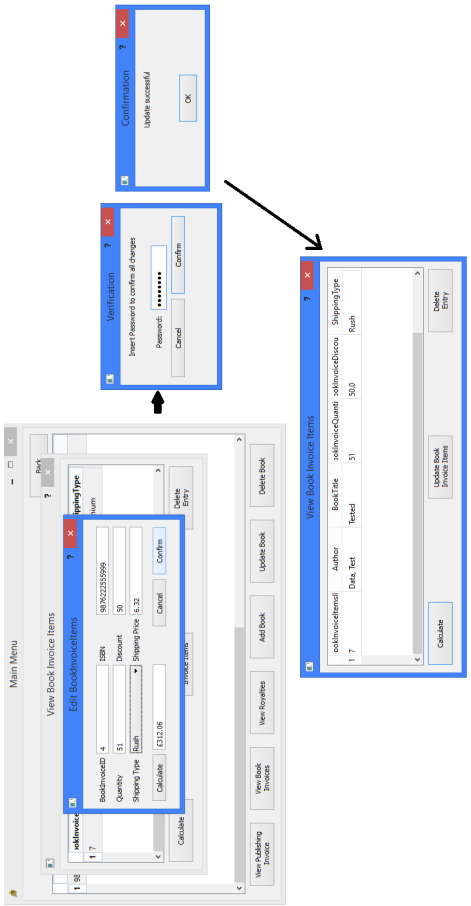

Figure 3.46: Test 4.11

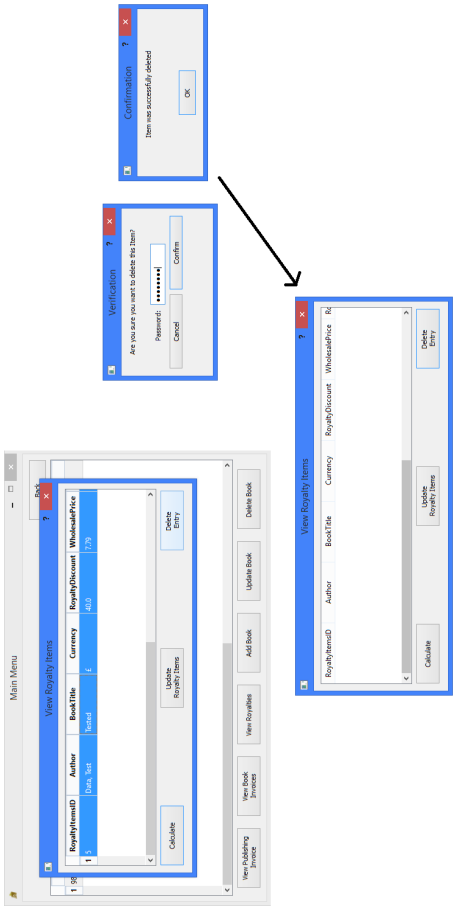

Figure 3.47: Test 4.12

Figure 3.48: Test 4.13

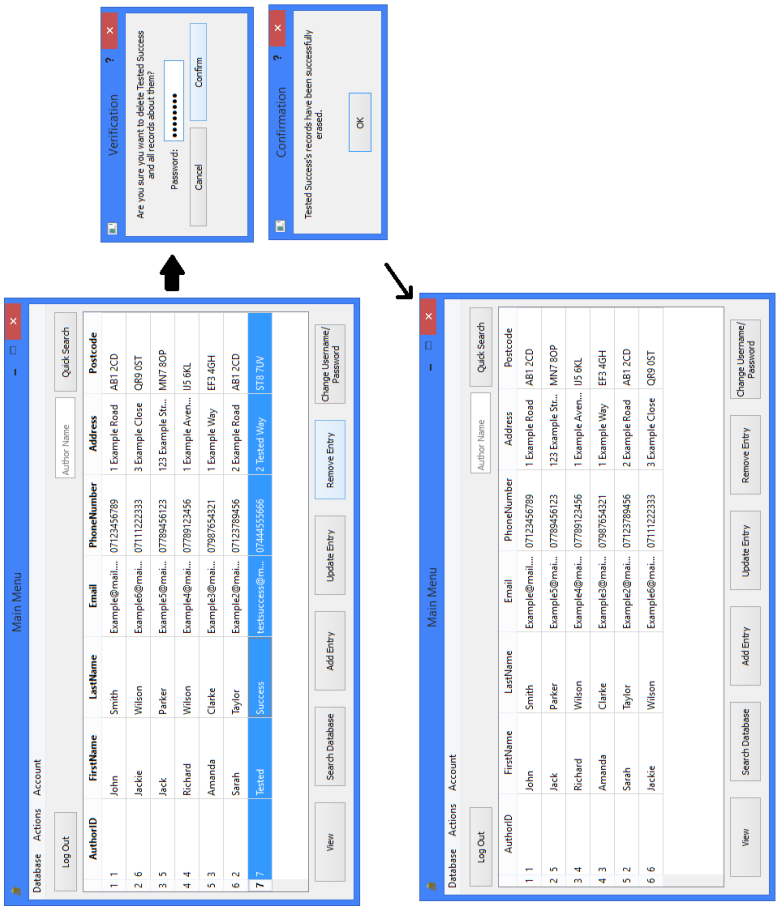

Figure 3.49: Test 4.14

3.4 Evaluation

3.4.1 Approach to Testing

I have chosen to use a range of testing strategies. For instance, series 1 of of the tests is testing the flow of control, making sure that the user navigates to the correct areas of the interface. Series 2 of the tests ensures that the validation of user inputs is performed correctly, whilst series 3 certifies that the calculations and algorithms in the system function correctly. Series 4 makes sure that the added data is stored correctly, updated data is saved to the correct tables and fields, and the deletion of data is performed on the correct data.

3.4.2 Problems Encountered

I encountered a few minor problems whilst testing my program.

Tests 2.9 and 2.10:

These tests encountered a minor problem, where if the user were to enter an invalid value for an entry, proceed to calculate using their inputs and confirm that they wish to add it to the database, the user would be correctly prompted with an error. However, upon dismissing the error, the window that they were using to add data to the database would close, forcing them to reopen the window and start entering data again. I have a vague idea of where the problem is, but as it isn't a serious problem for the user, this will be considered as an area for future updates.

This is the only problem my tests encountered, which also affected a few of the tests in series 3, causing the same issue.

3.4.3 Strengths of Testing

The strengths of my testing program consisted mainly of the consistency of the flow of data, and the flow of control. This proved that there wouldn't be any problem with the navigation of the user interface, and also no problems would be encountered when interacting with the data. Also, the testing program concluded that the user was limited to certain inputs for certain fields. For example, the user was required to enter a quantity for the Book Invoice Item, and was limited to being able to enter integers alone. Also, dropdown lists were used to prevent the user from incorrectly spelling certain inputs. This showed that the testing program would not be limited to identifying specific errors as the user was prevented from entering incorrect data in some parts of the program.

3.4.4 Weaknesses of Testing

A weakness of my testing program was that it did not test every single component of the system. because most of the program used similar coding for its functionality. Therefore, after testing a few of the components, others were not tested because of the similar functionality. This means that I am unable to establish that the system is entirely robust.

3.4.5 Reliability of Application

All inputs, outputs and changes function as the should do, and as they were planned to. The system mostly prevents te user from entering inaccurate data, so that the inputs and outputs would not malfunction. Although, test 3.4 shows that a calculation would still be conducted if the user had entered a negative number, which is invalid. This happened because the calculation is conducted immediately after the user types. However, the program would not allow the user to confirm their entry with this invalid data, despite the calculations being conducted. Consequently, the system is generally reliable as it is moderately effective in preventing invalid entries.

3.4.6 Robustness of Application

The testing program used proves that the system is fairly robust. The program never encounters runtime errors or index errors, which were carefully prevented. Also, the system prevents invalid entries so that the program doesn't crash, and my test program did not cause my program to crash once.

Chapter 4

System Maintenance

4.1 Environment

4.1.1 Software

I have used the following software in the creation of my system:

- Python 3.4
- IDLE
- PyQt4
- SQLite 3

4.1.2 Usage Explanation

I have used Python because it is the only programming language that I have knowledge of. Also, it was easy for me to learn and familiarise myself with, making it the most appropriate for me to use.

4.1.3 Features Used

4.2 System Overview

4.2.1 System Component

4.3 Code Structure

4.3.1 Particular Code Section

4.4 Variable Listing

4.5 System Evidence

4.5.1 User Interface

4.5.2 ER Diagram

4.5.3 Database Table Views

4.5.4 Database SQL

4.5.5 SQL Queries

4.6 Testing

4.6.1 Summary of Results

4.6.2 Known Issues

4.7 Code Explanations

4.7.1 Difficult Sections

4.7.2 Self-created Algorithms

4.8 Settings

4.9 Acknowledgements

4.10 Code Listing

4.10.1 Module 1

Figure 4.1: The print() function

```
from PyQt4.QtCore import *
from PyQt4.QtGui import *
import sqlite3
import sys
import smtplib
import email
import time
from MainMenu import *

class dbLogin(QMainWindow):
    """db for login"""

    def __init__(self):
        #self.initSplashScreen()
        self.initDetails()
        self.details = ("Username", "Password")
        if self.details == ("Username", "Password"):
            self.customer_table()
            self.book_table()
            self.pub_invoice_table()
            self.book_invoice_table()
            self.book_invoice_items_table()
            self.royalties_table()
            self.royalty_items_table()
            self.MainProgram = MainWindow("Username")
                #runs main window if Username/Password
                haven't been changed before
            self.MainProgram.show()
        else:
            super().__init__() #runs login screen if
                they have been changed
            self.initLoginScreen()

    def initDetails(self):
        with sqlite3.connect("dbLogin.db") as db:
            cursor = db.cursor()

            self.sql = "select name from
                sqlite_master WHERE type='table' and
                name='LoginDetails'"
            cursor.execute(self.sql) #checking
                whether the login table exists
            try:
                self.Exists =
                    list(cursor.fetchone())[0]
            except:
                self.Exists = False

            self.sql = "create table if not exists
```

4.10.2 Module 2

```
from PyQt4.QtCore import *
from PyQt4.QtGui import *
import sqlite3
import sys
import subprocess

from MenuBar import *
from initMainMenuButtons import *
from AddEntryWindow import *
from TableWidget import *
from ConfirmationDialog import *
from ViewWindow import *
from AddItemWindow import *
from ViewRoyaltiesAndInvoices import *
from UpdateEntryWindow import *
from CalendarWidget import *
from Items import *
from SearchDatabase import *
from LoginDB import *
from ChangePassword import *
from UsernameOrPassword import *
from ChangeUsername import *
from SearchResults import *

class MainWindow(QMainWindow):
    """main window"""

    def __init__(self, Username):
        super().__init__()
        self.Username = Username
        self.setWindowTitle("Main Menu")
        self.setWindowIcon(QIcon("PPIcon.png"))
        self.setFixedSize(735,400)
        self.MenuBar = dbMenuBar()
        self.setMenuBar(self.MenuBar)

        self.TableWidget = dbTableWidget()
        self.TableWidget.sql = "select * from
            Customer"
        self.TableWidget.initTable()
        self.MainMenuButtons = initMainMenuButtons()
        self.MainMenuButtons.vertical.addLayout(self.MainMenuButtons.horizon
        self.MainMenuButtons.vertical.addWidget(self.TableWidget)
        self.MainMenuButtons.vertical.addLayout(self.MainMenuButtons.horizon
```

```
44          self.CurrentTable = "Customer"
45          self.MainMenuButtons.setLayout(self.MainMenuButtons.vertical)
46
47          self.StackedLayout = QStackedLayout()
48
49          self.centralWidget = QWidget()
50          self.centralWidget.setLayout(self.StackedLayout)
51          self.setCentralWidget(self.centralWidget)
52
53          self.StackedLayout.addWidget(self.MainMenuButtons)
54
55          self.ViewWindow = dbViewWindow()
                #instantiating view window
56          self.ViewWindow.View()
57          self.ViewWindow.vertical.addLayout(self.ViewWindow.horizontalTop)
58          self.ViewWindow.table = dbTableWidget()
59          self.ViewWindow.vertical.addWidget(self.ViewWindow.table)
60          self.ViewWindow.vertical.addLayout(self.ViewWindow.horizontalBottom)
61          self.ViewWindow.setLayout(self.ViewWindow.vertical)
62
63          self.StackedLayout.addWidget(self.ViewWindow)
64
65          self.SearchResults = initSearchResultsMenu()
66          self.StackedLayout.addWidget(self.SearchResults)
67          self.SearchTable = dbTableWidget()
68          self.SearchResults.vertical.addWidget(self.SearchTable)
69
70          #connections
71          self.MainMenuButtons.btnAddEntry.clicked.connect(self.AddEntry)
72          self.MainMenuButtons.btnRemoveEntry.clicked.connect(self.RemoveEntry
73          self.MainMenuButtons.btnView.clicked.connect(self.ViewCustomer)
74          self.MainMenuButtons.btnUpdateEntry.clicked.connect(self.UpdateCusto
75          self.MainMenuButtons.btnQuickSearch.clicked.connect(self.QuickSearch
76          self.MainMenuButtons.btnSearchdb.clicked.connect(self.Search)
77          self.MainMenuButtons.btnLogOut.clicked.connect(self.LogOut)
78          self.MainMenuButtons.btnChangePassword.clicked.connect(self.ChangeUs
79          self.MenuBar.search_database.triggered.connect(self.Search)
80          self.MenuBar.add_entry.triggered.connect(self.AddEntry)
81          self.MenuBar.remove_entry.triggered.connect(self.RemoveEntry)
82          self.MenuBar.update_entry.triggered.connect(self.UpdateCustomerEntry
83          self.MenuBar.log_out.triggered.connect(self.LogOut)
84          self.MenuBar.change_password.triggered.connect(self.ChangeUsernameOr
85          self.ViewWindow.btnBack.clicked.connect(self.Back)
86          self.ViewWindow.btnAddBook.clicked.connect(self.AddItem)
87          self.ViewWindow.btnUpdateBook.clicked.connect(self.UpdateEntry)
88          self.ViewWindow.btnDeleteBook.clicked.connect(self.RemoveFromDB)
```

```
89          self.ViewWindow.btnViewPubInvoice.clicked.connect(self.ViewPubInvoic
90          self.ViewWindow.btnViewBookInvoices.clicked.connect(self.ViewBookInv
91          self.ViewWindow.btnViewRoyalties.clicked.connect(self.ViewRoyalties)
92          self.SearchResults.btnBack.clicked.connect(self.Back)
93
94
95      def AddEntry(self): #adding customer entry
96          self.AddEntryWindow = dbAddEntryWindow()
97          self.AddEntryWindow.Added = False
98          self.AddEntryWindow.initAddEntryWindow()
99          self.RefreshTables()
100
101
102
103     def AddItem(self): #initialising an add window
            for getting inputs for other entries
104         self.AddWindow = dbAddItemWindow()
105         self.AddWindow.setFixedSize(360,200)
106         self.AddWindow.AddType = self.CurrentTable
107         self.AddWindow.AnswerButtons()
108         self.AddWindow.Editing = False
109
110         if self.CurrentTable == "Book":
111             self.AddWindow.sql = "select * from Book"
112
113         elif self.CurrentTable == "PubInvoice":
114             self.AddWindow.setFixedSize(400,150)
115             self.AddWindow.sql = "select ISBN,
                    AuthorID, PubInvoiceDate,
                    PubInvoiceService, PubInvoicePayment
                    from PubInvoice"
116             self.AddWindow.selectedISBN =
                    self.SelectedISBN
117
118         elif self.CurrentTable == "BookInvoice":
119             self.AddWindow.sql = "select AuthorID,
                    BookinvoiceDate from BookInvoice"
120             self.AddWindow.setFixedSize(350,100)
121
122         elif self.CurrentTable == "Royalties":
123             self.AddWindow.sql = "select AuthorID,
                    RoyaltiesDate from Royalties"
124             self.AddWindow.setFixedSize(350,100)
125
126         elif self.CurrentTable == "BookInvoiceItems":
```

```
127             self.AddWindow.sql = "select
                    BookInvoiceID, ISBN,
                    BookInvoiceQuantity,
                    BookInvoiceDiscount, ShippingType,
                    ShippingPrice from BookInvoiceItems"
128             self.AddWindow.setFixedSize(450, 150)
129             self.AddWindow.selectedISBN =
                    self.SelectedISBN
130             self.Editing = False
131             self.AddWindow.btnCalculate.clicked.connect(self.BookInvoiceItem
132
133         elif self.CurrentTable == "RoyaltyItems":
134             self.AddWindow.sql = "select RoyaltiesID,
                    ISBN, Currency, RoyaltyDiscount,
                    WholesalePrice, RoyaltyQuantity,
                    PrintCost, ExcRateFromGBP from
                    RoyaltyItems"
135             self.AddWindow.setFixedSize(450, 250)
136             self.AddWindow.selectedISBN =
                    self.SelectedISBN
137             self.Editing = False
138             self.AddWindow.btnCalculate.clicked.connect(self.RoyaltyItemCalc
139
140         self.AddWindow.selectedID = self.SelectedID
141         self.AddWindow.CalendarWidget =
                dbCalendarWidget()
142         self.AddWindow.CalendarWidget.Calendar()
143
144         self.AddWindow.initAddItemWindow()
145         try:
146             if self.AddWindow.Valid == True: #inputs
                    must pass validation before being added
147                 self.AddToDB()
148         except AttributeError:
149             pass #exception of window being closed
150         self.RefreshTables()
151
152     def RecalculateItems(self): #recalculates after
            changes
153         if self.CurrentTable == "BookInvoiceItems":
154             self.BookInvoiceItemsWindow.CalculateBookInvoiceItems()
155             self.CurrentTable = "BookInvoice"
156             self.RefreshTables()
157             self.CurrentTable = "BookInvoiceItems"
158             self.RefreshTables()
159
```

```
160             elif self.CurrentTable == "RoyaltyItems" or
                    self.BookEdited == True:
161                 self.RoyaltyItemsWindow.CalculateRoyaltyItems()
162                 self.CurrentTable = "Royalties"
163                 self.RefreshTables()
164                 self.CurrentTable = "RoyaltyItems"
165                 self.RefreshTables()
166
167
168         def AddToDB(self): #Adding Entries to database
169             self.input_data = []
170             if self.CurrentTable == "Book":
171                 self.TableValues = "Book (ISBN, AuthorID,
                        BookTitle, NoOfPages, Size, Back,
                        Cover, Paper, Font, FontSize,
                        DatePublished, Price)"
172                 self.Placeholders = "(?, ?, ?, ?, ?, ?,
                        ?, ?, ?, ?, ?, ?)"
173                 self.NoOfEntries = 12
174
175             elif self.CurrentTable == "PubInvoice":
176                 self.TableValues = "PubInvoice (ISBN,
                        AuthorID, PubInvoiceDate,
                        PubInvoiceService, PubInvoicePayment)"
177                 self.Placeholders = "(?, ?, ?, ?, ?)"
178                 self.NoOfEntries = 5
179
180             elif self.CurrentTable == "BookInvoice":
181                 self.TableValues = "BookInvoice
                        (AuthorID, BookInvoiceDate)"
182                 self.Placeholders = "(?, ?)"
183                 self.NoOfEntries = 2
184
185             elif self.CurrentTable == "Royalties":
186                 self.TableValues = "Royalties (AuthorID,
                        RoyaltiesDate)"
187                 self.Placeholders = "(?, ?)"
188                 self.NoOfEntries = 2
189
190             elif self.CurrentTable == "BookInvoiceItems":
191                 self.TableValues = "BookInvoiceItems
                        (BookInvoiceID, ISBN,
                        BookInvoiceQuantity,
                        BookInvoiceDiscount, ShippingType,
                        ShippingPrice)"
192                 self.Placeholders = "(?, ?, ?, ?, ?, ?)"
```

```
193             self.NoOfEntries = 6
194
195         elif self.CurrentTable == "RoyaltyItems":
196             self.TableValues = "RoyaltyItems
                   (RoyaltiesID, ISBN, Currency,
                   RoyaltyDiscount, WholesalePrice,
                   RoyaltyQuantity, PrintCost,
                   ExcRateFromGBP, NetSales)"
197             self.Placeholders = "(?, ?, ?, ?, ?, ?,
                   ?, ?, ?)"
198             self.NoOfEntries = 9
199
200         for count in range(0, self.NoOfEntries):
201             try: #putting the input data in a list
202                 self.input_data.append(str(self.AddWindow.inputList[count].c
203             except:
204                 if count == 8 and self.CurrentTable
                       == "RoyaltyItems":
205                     self.input_data.append(self.NetSales)
                           #Net sales are calculated, as
                           opposed to being entered
206                 else:
207                     self.input_data.append(self.AddWindow.inputList[count].t
208
209         with sqlite3.connect("PP.db") as db:
210             cursor = db.cursor()
211             cursor.execute("PRAGMA foreign_keys = ON")
212             self.sql = "insert into {} values
                   {}".format(self.TableValues,
                   self.Placeholders)
213             cursor.execute(self.sql, self.input_data)
214             db.commit()
215
216         self.RefreshTables()
217
218         try:
219             self.RecalculateItems()
220         except:
221             pass
222
223     def RemoveEntry(self): #removing a customer
224         self.SelectedRow =
               self.TableWidget.currentRow()
225         self.ConfirmDialog = dbConfirmationDialog()
226         self.ConfirmDialog.Username = self.Username
```

```
227             self.ConfirmDialog.SelectedAuthorID =
                    QTableWidgetItem(self.TableWidget.item(self.SelectedRow,
                    0)).text() #getting AuthorID of a row
228             if self.ConfirmDialog.SelectedAuthorID != "":
229                 self.Firstname =
                        QTableWidgetItem(self.TableWidget.item(self.SelectedRow,
                        1)).text()
230                 self.Lastname =
                        QTableWidgetItem(self.TableWidget.item(self.SelectedRow,
                        2)).text()
231                 self.ConfirmDialog.Name = "{}
                        {}".format(self.Firstname,
                        self.Lastname)
232                 self.ConfirmDialog.Msg = "Are you sure
                        you want to delete {} and all records
                        about
                        them?".format(self.ConfirmDialog.Name)
233                 self.ConfirmDialog.ConfirmedMsg = "{}'s
                        records have been successfully
                        erased.".format(self.ConfirmDialog.Name)
234                 self.ConfirmDialog.VerifyDlg()
235
236                 if
                        self.ConfirmDialog.ConfirmedDialog.Accepted
                        == True:
237                     with sqlite3.connect("PP.db") as db:
238                         cursor = db.cursor()
239                         cursor.execute("PRAGMA
                                foreign_keys = ON")
240                         sql = "select ISBN from Book
                                where AuthorID =
                                {}".format(self.ConfirmDialog.SelectedAuthorID)
241                         cursor.execute(sql)
242                         self.ISBNDeletion =
                                list(cursor.fetchall())
243                         for count in range(0,
                                len(self.ISBNDeletion)):
                                #removes all customer details,
                                starting with foreign keys for
                                referential integrity
244                             sql = "delete from
                                    BookInvoiceItems where
                                    ISBN =
                                    {}".format(list(list(self.ISBNDeletion)[count])[0
245                             cursor.execute(sql)
```

```
246                         sql = "delete from
                                RoyaltyItems where ISBN =
                                {}".format(list(list(self.ISBNDeletion)[count])[0
247                         cursor.execute(sql)
248                     sql = "delete from PubInvoice
                            where AuthorID =
                            {}".format(self.ConfirmDialog.SelectedAuthorID)
249                     cursor.execute(sql)
250                     sql = "delete from BookInvoice
                            where AuthorID =
                            {}".format(self.ConfirmDialog.SelectedAuthorID)
251                     cursor.execute(sql)
252                     sql = "delete from Royalties
                            where AuthorID =
                            {}".format(self.ConfirmDialog.SelectedAuthorID)
253                     cursor.execute(sql)
254                     sql = "delete from Book where
                            AuthorID =
                            {}".format(self.ConfirmDialog.SelectedAuthorID)
255                     cursor.execute(sql)
256                     sql = "delete from Customer where
                            AuthorID =
                            {}".format(self.ConfirmDialog.SelectedAuthorID)
257                     cursor.execute(sql)
258                     db.commit()
259                     self.RefreshTables()
260
261
262
263         def RemoveFromDB(self): #removing other entries
264             #getting primary key of the row
265             self.ConfirmDialog = dbConfirmationDialog()
266             self.ConfirmDialog.Username = self.Username
267             self.ConfirmDialog.DeleteMsg =
                    self.CurrentTable
268             self.SelectedAuthorID = self.SelectedID
269
270             if self.CurrentTable == "Book":
271                 self.ForeignKeyMsg = "Royalties and
                        Invoices"
272                 self.SelectedRow =
                        self.ViewWindow.table.currentRow()
273                 self.SelectedID =
                        QTableWidgetItem(self.ViewWindow.table.item(self.SelectedRow,
                        0)).text()
274                 self.SelectedIDName = "ISBN"
```

```
275             self.ConfirmDialog.Msg = "Are you sure
                    you want to delete this book?"
276             self.ConfirmDialog.ConfirmedMsg = "Book
                    was successfully deleted"
277
278         elif self.CurrentTable == "PubInvoice":
279             self.SelectedRow =
                    self.PubInvoiceWindow.table.currentRow()
280             self.SelectedID =
                    QTableWidgetItem(self.PubInvoiceWindow.table.item(self.Select
                    0)).text()
281             self.SelectedIDName = "PubInvoiceID"
282             self.ConfirmDialog.Msg = "Are you sure
                    you want to delete this Invoice?"
283             self.ConfirmDialog.ConfirmedMsg =
                    "Invoice was successfully deleted"
284
285         elif self.CurrentTable == "BookInvoice":
286             self.ForeignKeyMsg = "Book Invoice Items"
287             self.SelectedRow =
                    self.BookInvoiceWindow.table.currentRow()
288             self.SelectedID =
                    QTableWidgetItem(self.BookInvoiceWindow.table.item(self.Selec
                    0)).text()
289             self.SelectedIDName = "BookInvoiceID"
290             self.ConfirmDialog.Msg = "Are you sure
                    you want to delete this Invoice?"
291             self.ConfirmDialog.ConfirmedMsg =
                    "Invoice was successfully deleted"
292
293         elif self.CurrentTable == "Royalties":
294             self.ForeignKeyMsg = "Royalty Items"
295             self.SelectedRow =
                    self.RoyaltiesWindow.table.currentRow()
296             self.SelectedID =
                    QTableWidgetItem(self.RoyaltiesWindow.table.item(self.Selecte
                    0)).text()
297             self.SelectedIDName = "RoyaltiesID"
298             self.ConfirmDialog.Msg = "Are you sure
                    you want to delete this Entry?"
299             self.ConfirmDialog.ConfirmedMsg = "Entry
                    was successfully deleted"
300
301         elif self.CurrentTable == "BookInvoiceItems":
302             self.SelectedRow =
                    self.BookInvoiceItemsWindow.table.currentRow()
```

```
303             self.SelectedID =
                    QTableWidgetItem(self.BookInvoiceItemsWindow.table.item(self.
                    0)).text()
304             self.SelectedIDName = "BookInvoiceItemsID"
305             self.ConfirmDialog.Msg = "Are you sure
                    you want to delete this Item?"
306             self.ConfirmDialog.ConfirmedMsg = "Item
                    was successfully deleted"
307
308         elif self.CurrentTable == "RoyaltyItems":
309             self.SelectedRow =
                    self.RoyaltyItemsWindow.table.currentRow()
310             self.SelectedID =
                    QTableWidgetItem(self.RoyaltyItemsWindow.table.item(self.Sele
                    0)).text()
311             self.SelectedIDName = "RoyaltyItemsID"
312             self.ConfirmDialog.Msg = "Are you sure
                    you want to delete this Item?"
313             self.ConfirmDialog.ConfirmedMsg = "Item
                    was successfully deleted"
314         self.ConfirmDialog.Prevention = True
                #deletion may be prevented if integrity
                error occurs
315         if self.SelectedRow != -1:
316             self.ConfirmDialog.VerifyDlg()
                    #verification
317             try:
318                 if
                        self.ConfirmDialog.ConfirmedDialog.Accepted
                        == True:
319                  with sqlite3.connect("PP.db") as
                            db:
320                      cursor = db.cursor()
321                      cursor.execute("PRAGMA
                                foreign_keys = ON")
322                      sql = "delete from {} where
                                {} =
                                '{}'".format(self.CurrentTable,
                                self.SelectedIDName,
                                self.SelectedID)
323                      cursor.execute(sql)
324                      db.commit()
325                      self.ConfirmDialog.ConfirmedDialog.Confirmed()
326                      self.SelectedID =
                                self.SelectedAuthorID
327                      self.RefreshTables()
```

```
328             except sqlite3.IntegrityError:
329                 self.Msg = QMessageBox()
330                 self.Msg.setWindowTitle("Error")
331                 self.Msg.setText("You must delete all
                        the {}
                        first.".format(self.ForeignKeyMsg))
332                 self.Msg.exec_() #informs user that
                        selected entry cannot be deleted
                        and what must be done for it to be
                        deleted
333
334
335             try:
336                 self.RecalculateItems()
337             except:
338                 pass
339
340
341
342     def ViewCustomer(self): #displaying customer data
343         self.SelectedRow =
                self.TableWidget.currentRow()
344         self.SelectedID =
                QTableWidgetItem(self.TableWidget.item(self.SelectedRow,
                0)).text()
345         self.Firstname =
                QTableWidgetItem(self.TableWidget.item(self.SelectedRow,
                1)).text()
346         self.Lastname =
                QTableWidgetItem(self.TableWidget.item(self.SelectedRow,
                2)).text()
347
348         if self.SelectedID != "":
349             self.SelectedAuthorID = self.SelectedID
350             self.CurrentTable = "Book"
351             self.RefreshTables()
352             self.StackedLayout.setCurrentIndex(1)
353             self.MenuBar.setVisible(False)
354
355
356
357     def ViewPubInvoice(self): #initialising the view
            publishing invoice window
358         self.CurrentTable = "PubInvoice"
359         self.ViewWindow.SelectedRow =
                self.ViewWindow.table.currentRow()
```

```
360             self.SelectedISBN =
                    QTableWidgetItem(self.ViewWindow.table.item(self.ViewWindow.Selec
                    0)).text()
361             self.SelectedID =
                    QTableWidgetItem(self.TableWidget.item(self.TableWidget.currentRo
                    0)).text()
362             self.SelectedAuthorID = self.SelectedID
363             if self.SelectedISBN != "":
364                 self.PubInvoiceWindow =
                        dbRoyaltiesAndInvoices()
365                 self.PubInvoiceWindow.PubInvoiceButtons()
366                 self.PubInvoiceWindow.btnAddPubInvoice.clicked.connect(self.AddI
367                 self.PubInvoiceWindow.btnUpdatePubInvoice.clicked.connect(self.U
368                 self.PubInvoiceWindow.btnDeleteEntry.clicked.connect(self.Remove
369                 self.PubInvoiceWindow.table =
                        dbTableWidget()
370                 self.RefreshTables()
371                 self.PubInvoiceWindow.table.setFixedSize(620,
                        150)
372                 self.PubInvoiceWindow.PubInvoice()
373             self.CurrentTable = "Book"
374
375
376
377     def ViewBookInvoice(self): #initialising the view
            book invoice window
378             self.CurrentTable = "BookInvoice"
379             self.ViewWindow.SelectedRow =
                    self.ViewWindow.table.currentRow()
380             self.SelectedISBN =
                    QTableWidgetItem(self.ViewWindow.table.item(self.ViewWindow.Selec
                    0)).text()
381             self.SelectedAuthorID =
                    QTableWidgetItem(self.TableWidget.item(self.TableWidget.currentRo
                    0)).text()
382
383             if self.SelectedISBN != "":
384                 self.BookInvoiceWindow =
                        dbRoyaltiesAndInvoices()
385                 self.BookInvoiceWindow.BookInvoiceButtons()
386                 self.BookInvoiceWindow.btnViewBookInvoiceItems.clicked.connect(s
387                 self.BookInvoiceWindow.btnAddBookInvoice.clicked.connect(self.Ad
388                 self.BookInvoiceWindow.btnUpdateBookInvoice.clicked.connect(self
389                 self.BookInvoiceWindow.btnDeleteEntry.clicked.connect(self.Remov
390                 self.BookInvoiceWindow.table =
                        dbTableWidget()
```

```
391             self.RefreshTables()
392             self.BookInvoiceWindow.table.setFixedSize(620,
                    150)
393             self.BookInvoiceWindow.BookInvoice()
394         self.CurrentTable = "Book"
395
396
397
398     def ViewBookInvoiceItems(self): #initialising the
            view book invoice items window
399         self.CurrentTable = "BookInvoiceItems"
400         self.BookInvoiceWindow.SelectedRow =
                self.BookInvoiceWindow.table.currentRow()
401         self.holder = self.SelectedAuthorID
402         self.SelectedAuthorID = self.SelectedID
403         self.BookInvoiceWindow.selectedISBN =
                self.SelectedISBN
404         self.SelectedID =
                QTableWidgetItem(self.BookInvoiceWindow.table.item(self.BookInvoi
                0)).text()
405
406         if self.SelectedID != "":
407             self.BookInvoiceItemsWindow = dbItems()
408             self.BookInvoiceItemsWindow.selectedID =
                    self.SelectedID
409             self.BookInvoiceItemsWindow.selectedISBN
                    = self.SelectedISBN
410             self.BookInvoiceItemsWindow.BookInvoiceItemsButtons()
411             self.BookInvoiceItemsWindow.btnCalculate.clicked.connect(self.Ad
412             self.BookInvoiceItemsWindow.btnUpdateBookInvoiceItems.clicked.co
413             self.BookInvoiceItemsWindow.btnDeleteEntry.clicked.connect(self.
414             self.BookInvoiceItemsWindow.table =
                    dbTableWidget()
415             self.RefreshTables()
416             self.BookInvoiceItemsWindow.table.setFixedSize(620,
                    150)
417             self.BookInvoiceItemsWindow.BookInvoiceItems()
418         self.SelectedID = self.SelectedAuthorID
419         self.SelectedAuthorID = self.holder
420         self.CurrentTable = "BookInvoice"
421         self.RefreshTables()
422
423
424
425     def ViewRoyalties(self): #initialising the view
            royalties window
```

```
426             self.CurrentTable = "Royalties"
427             self.ViewWindow.SelectedRow =
                    self.ViewWindow.table.currentRow()
428             self.SelectedISBN =
                    QTableWidgetItem(self.ViewWindow.table.item(self.ViewWindow.Selec
                    0)).text()
429             self.SelectedAuthorID =
                    QTableWidgetItem(self.TableWidget.item(self.TableWidget.currentRo
                    0)).text()
430             if self.SelectedISBN != "":
431                 self.RoyaltiesWindow =
                        dbRoyaltiesAndInvoices()
432                 self.RoyaltiesWindow.RoyaltiesButtons()
433                 self.RoyaltiesWindow.btnViewRoyaltyItems.clicked.connect(self.Vi
434                 self.RoyaltiesWindow.btnAddRoyalties.clicked.connect(self.AddIte
435                 self.RoyaltiesWindow.btnUpdateRoyalties.clicked.connect(self.Upd
436                 self.RoyaltiesWindow.btnDeleteEntry.clicked.connect(self.RemoveF
437                 self.RoyaltiesWindow.table =
                        dbTableWidget()
438                 self.RefreshTables()
439                 self.RoyaltiesWindow.table.setFixedSize(620,
                        150)
440                 self.RoyaltiesWindow.Royalties()
441             self.CurrentTable = "Book"
442
443         def ViewRoyaltyItems(self): #initialising the
                view royalty items window
444             self.CurrentTable = "RoyaltyItems"
445             self.RoyaltiesWindow.SelectedRow =
                    self.RoyaltiesWindow.table.currentRow()
446             self.holder = self.SelectedAuthorID
447             self.SelectedAuthorID = self.SelectedID
448             self.RoyaltiesWindow.selectedISBN =
                    self.SelectedISBN
449             self.SelectedID =
                    QTableWidgetItem(self.RoyaltiesWindow.table.item(self.RoyaltiesWi
                    0)).text()
450
451             if self.SelectedID != "":
452                 self.RoyaltyItemsWindow = dbItems()
453                 self.RoyaltyItemsWindow.selectedID =
                        self.SelectedID
454                 self.RoyaltyItemsWindow.selectedISBN =
                        self.SelectedISBN
455                 self.RoyaltyItemsWindow.RoyaltyItemsButtons()
456                 self.RoyaltyItemsWindow.btnCalculate.clicked.connect(self.AddIte
```

```
457             self.RoyaltyItemsWindow.btnUpdateRoyaltyItems.clicked.connect(se
458             self.RoyaltyItemsWindow.btnDeleteEntry.clicked.connect(self.Remo
459             self.RoyaltyItemsWindow.table =
                    dbTableWidget()
460             self.RefreshTables()
461             self.RoyaltyItemsWindow.table.setFixedSize(620,
                    150)
462             self.RoyaltyItemsWindow.RoyaltiesItems()
463         self.SelectedID = self.SelectedAuthorID
464         self.SelectedAuthorID = self.holder
465         self.CurrentTable = "Royalties"
466         self.RefreshTables()
467
468
469
470     def BookInvoiceItemCalculation(self):
            #calculating the bookinvoicepayment
471         try:
472             if self.Editing == False:
473                 self.Quantity =
                        int(self.AddWindow.inputList[2].text())
474                 self.Discount =
                        float(self.AddWindow.inputList[3].text())
                        / 100
475                 self.ShippingPrice =
                        float(self.AddWindow.inputList[5].text())
476                 self.ISBN =
                        self.AddWindow.inputList[1].text()
477             elif self.Editing == True:
478                 self.Quantity =
                        int(self.EditWindow.inputList[2].text())
479                 self.Discount =
                        float(self.EditWindow.inputList[3].text())
                        / 100
480                 self.ShippingPrice =
                        float(self.EditWindow.inputList[5].text())
481                 self.ISBN =
                        self.EditWindow.inputList[1].text()
482
483             with sqlite3.connect("PP.db") as db:
                    #fetching data from db
484                 cursor = db.cursor()
485                 cursor.execute("select Price from
                        Book where ISBN =
                        {}".format(self.ISBN))
```

```
486                 self.Price =
                        list(cursor.fetchone())[0]
487                 db.commit()
488
489             self.BookInvoiceItemPayment =
                    (self.Quantity * self.Price)
490             self.Discount =
                    self.BookInvoiceItemPayment *
                    self.Discount
491             self.BookInvoiceItemPayment -=
                    self.Discount
492             self.BookInvoiceItemPayment +=
                    self.ShippingPrice
493             self.BookInvoiceItemPayment =
                    "£{0:.2f}".format(self.BookInvoiceItemPayment)
494             if self.Editing == False:
495                 self.AddWindow.btnConfirm.clicked.connect(self.AddWindow.acc
496                 self.AddWindow.qleCalculation.setText(self.BookInvoiceItemPa
497             elif self.Editing == True:
498                 if self.EditWindow.Calculated ==
                        False:
499                     self.EditWindow.Calculated = True
                            #prevents duplicate connections
500                     self.EditWindow.btnConfirm.clicked.connect(self.VerifyUp
501                 self.EditWindow.qleCalculation.setText(self.BookInvoiceItemP
502         except:
503             self.Msg = QMessageBox()
504             self.Msg.setWindowTitle("Error")
505             self.Msg.setText("You must fill all
                    fields before clicking 'Calculate'.")
506             self.Msg.exec_()
507
508     def RoyaltyItemCalculation(self): #calculating
            the royalty payment
509         try:
510             if self.Editing == False:
511                 self.Currency =
                        self.AddWindow.inputList[2].text()
512                 self.WholesalePrice =
                        float(self.AddWindow.inputList[4].text())
513                 self.Quantity =
                        int(self.AddWindow.inputList[5].text())
514                 self.PrintCost =
                        float(self.AddWindow.inputList[6].text())
515             elif self.Editing == True:
```

```
516                 self.Currency =
                        self.EditWindow.inputList[2].text()
517                 self.WholesalePrice =
                        float(self.EditWindow.inputList[4].text())
518                 self.Quantity =
                        int(self.EditWindow.inputList[5].text())
519                 self.PrintCost =
                        float(self.EditWindow.inputList[6].text())
520
521             self.NetSales = self.WholesalePrice *
                    self.Quantity
522             self.RoyaltyItemPayment = self.NetSales -
                    self.PrintCost
523             self.RoyaltyItemPayment =
                    "{0:.2f}".format(self.RoyaltyItemPayment)
524             if self.Editing == False:
525                 self.AddWindow.btnConfirm.clicked.connect(self.AddWindow.acc
526                 self.AddWindow.qleCalculation.setText("{}{}".format(self.Cur
                        self.RoyaltyItemPayment))
527                 self.AddWindow.NetSales =
                        self.NetSales
528             elif self.Editing == True:
529                 if self.EditWindow.Calculated ==
                        False:
530                     self.EditWindow.Calculated = True
                            #prevents duplicate connections
531                     self.EditWindow.btnConfirm.clicked.connect(self.VerifyUp
532                 self.EditWindow.qleCalculation.setText("{}{}".format(self.Cu
                        self.RoyaltyItemPayment))
533                 self.EditWindow.NetSales =
                        self.NetSales
534         except:
535             self.Msg = QMessageBox()
536             self.Msg.setWindowTitle("Error")
537             self.Msg.setText("You must fill all
                    fields before clicking 'Calculate'.")
538             self.Msg.exec_()
539
540
541     def UpdateCustomerEntry(self): #updating customer
            entries only
542         self.SelectedRow =
                self.TableWidget.currentRow()
543         self.SelectedAuthorID =
                QTableWidgetItem(self.TableWidget.item(self.SelectedRow,
                0)).text()
```

```
544
545             if self.SelectedAuthorID != "":
546                 self.UpdateEntryWindow =
                        dbUpdateEntryWindow()
547                 self.UpdateEntryWindow.setFixedSize(640,
                        115)
548                 self.UpdateEntryWindow.selectedID =
                        self.SelectedAuthorID
549                 self.UpdateEntryWindow.table =
                        dbTableWidget()
550                 self.selectText = "Firstname, Lastname,
                        Email, Phonenumber, Address, Postcode"
551                 self.UpdateEntryWindow.table.sql =
                        "select {} from Customer where
                        AuthorID = {}".format(self.selectText,
                        self.SelectedAuthorID)
552                 self.SelectedID = self.SelectedAuthorID
553                 self.UpdateEntryWindow.table.initTable()
554                 self.UpdateEntryWindow.table.setFixedSize(617,
                        55)
555                 self.UpdateEntryWindow.Verify =
                        dbConfirmationDialog()
556                 self.UpdateEntryWindow.Verify.Username =
                        self.Username
557                 self.UpdateEntryWindow.initConfirmBtn()
558                 self.UpdateEntryWindow.btnConfirm.clicked.connect(self.VerifyCus
559                 self.UpdateEntryWindow.initUpdateEntryWindowDlg()
560                 self.TableWidget.sql = "select * from
                        Customer"
561                 self.RefreshTables()
562
563
564
565     def UpdateEntry(self): #getting the update input
566         self.Selection = False
567         self.EditWindow = dbAddItemWindow() #uses the
                add window to init same interface but fill
                boxes with data
568         self.EditWindow.setFixedSize(360, 200)
569         self.EditWindow.AddType = self.CurrentTable
570         self.EditWindow.AnswerButtons()
571         self.EditWindow.ReadyToVerify = False
572         self.EditWindow.originalItemList = []
573
574         if self.CurrentTable == "Book":
575             self.EditWindow.sql = "select * from Book"
```

```
576                 self.ViewWindow.SelectedRow =
                        self.ViewWindow.table.currentRow()
577                 if self.ViewWindow.SelectedRow != -1:
578                     self.Selection = True
579                     with sqlite3.connect("PP.db") as db:
580                         cursor = db.cursor() #fetching
                            data from database for the
                            edit window
581                         sql = "select * from Book where
                            ISBN =
                            {}".format(self.ViewWindow.table.item(self.ViewWindow
                            0).text())
582                         cursor.execute(sql)
583                         self.EditWindow.originalItemList
                            = list(cursor.fetchone())
584
585             elif self.CurrentTable == "PubInvoice":
586                 self.EditWindow.setFixedSize(400,150)
587                 self.EditWindow.selectedISBN =
                        self.SelectedISBN
588                 self.EditWindow.sql = "select ISBN,
                        AuthorID, PubInvoiceDate,
                        PubInvoiceService, PubInvoicePayment
                        from PubInvoice"
589                 self.PubInvoiceWindow.SelectedRow =
                        self.PubInvoiceWindow.table.currentRow()
590                 if self.PubInvoiceWindow.SelectedRow !=
                        -1:
591                     self.Selection = True
592                     with sqlite3.connect("PP.db") as db:
593                         cursor = db.cursor() #fetching
                            data from database for the
                            edit window
594                         sql = "select ISBN, AuthorID,
                            PubInvoiceDate,
                            PubInvoiceService,
                            PubInvoicePayment from
                            PubInvoice where PubInvoiceID
                            =
                            {}".format(self.PubInvoiceWindow.table.item(self.PubI
                            0).text())
595                         cursor.execute(sql)
596                         self.EditWindow.originalItemList
                            = list(cursor.fetchone())
597
598             elif self.CurrentTable == "BookInvoice":
```

```
599             self.EditWindow.setFixedSize(350, 100)
600             self.EditWindow.selectedID =
                    self.SelectedID
601             self.EditWindow.sql = "select AuthorID,
                    BookInvoiceDate from BookInvoice"
602             self.BookInvoiceWindow.SelectedRow =
                    self.BookInvoiceWindow.table.currentRow()
603             if self.BookInvoiceWindow.SelectedRow !=
                    -1:
604                 self.Selection = True
605                 with sqlite3.connect("PP.db") as db:
606                     cursor = db.cursor() #fetching
                            data from database for the
                            edit window
607                     sql = "select AuthorID,
                            BookInvoiceDate from
                            BookInvoice where
                            BookInvoiceID =
                            {}".format(self.BookInvoiceWindow.table.item(self.Boo
                            0).text())
608                     cursor.execute(sql)
609                     self.EditWindow.originalItemList
                            = list(cursor.fetchone())
610
611         elif self.CurrentTable == "Royalties":
612             self.EditWindow.setFixedSize(350, 100)
613             self.EditWindow.selectedID =
                    self.SelectedID
614             self.EditWindow.sql = "select AuthorID,
                    RoyaltiesDate from Royalties"
615             self.RoyaltiesWindow.SelectedRow =
                    self.RoyaltiesWindow.table.currentRow()
616             if self.RoyaltiesWindow.SelectedRow != -1:
617                 self.Selection = True
618                 with sqlite3.connect("PP.db") as db:
619                     cursor = db.cursor() #fetching
                            data from database for the
                            edit window
620                     sql = "select AuthorID,
                            RoyaltiesDate from Royalties
                            where RoyaltiesID =
                            {}".format(self.RoyaltiesWindow.table.item(self.Royal
                            0).text())
621                     cursor.execute(sql)
622                     self.EditWindow.originalItemList
                            = list(cursor.fetchone())
```

```
623
624         elif self.CurrentTable == "BookInvoiceItems":
625             self.EditWindow.setFixedSize(450, 150)
626             self.EditWindow.selectedID =
                    self.SelectedID
627             self.Editing = True
628             self.EditWindow.btnCalculate.clicked.connect(self.BookInvoiceIte
629             self.EditWindow.selectedISBN =
                    self.SelectedISBN
630             self.EditWindow.sql = "select
                    BookInvoiceID, ISBN,
                    BookInvoiceQuantity,
                    BookInvoiceDiscount, ShippingType,
                    ShippingPrice from BookInvoiceItems"
631             self.BookInvoiceItemsWindow.SelectedRow =
                    self.BookInvoiceItemsWindow.table.currentRow()
632             if
                    self.BookInvoiceItemsWindow.SelectedRow
                    != -1:
633                  self.Selection = True
634                  with sqlite3.connect("PP.db") as db:
635                      cursor = db.cursor() #fetching
                            data from database for the
                            edit window
636                      sql = "select BookInvoiceID,
                            ISBN, BookInvoiceQuantity,
                            BookInvoiceDiscount,
                            ShippingType, ShippingPrice
                            from BookInvoiceItems where
                            BookInvoiceItemsID =
                            {}".format(self.BookInvoiceItemsWindow.table.item(sel
                            0).text())
637                      cursor.execute(sql)
638                      self.EditWindow.originalItemList
                            = list(cursor.fetchone())
639
640         elif self.CurrentTable == "RoyaltyItems":
641             self.EditWindow.setFixedSize(450, 250)
642             self.EditWindow.selectedID =
                    self.SelectedID
643             self.Editing = True
644             self.EditWindow.btnCalculate.clicked.connect(self.RoyaltyItemCal
645             self.EditWindow.selectedISBN =
                    self.SelectedISBN
646             self.EditWindow.sql = "select
                    RoyaltiesID, ISBN, Currency,
```

```
                RoyaltyDiscount, WholesalePrice,
                RoyaltyQuantity, PrintCost,
                ExcRateFromGBP from RoyaltyItems"
647             self.RoyaltyItemsWindow.SelectedRow =
                    self.RoyaltyItemsWindow.table.currentRow()
648             if self.RoyaltyItemsWindow.SelectedRow !=
                    -1:
649                 self.Selection = True
650                 with sqlite3.connect("PP.db") as db:
651                     cursor = db.cursor() #fetching
                            data from database for the
                            edit window
652                     sql = "select RoyaltiesID, ISBN,
                            Currency, RoyaltyDiscount,
                            WholesalePrice,
                            RoyaltyQuantity, PrintCost,
                            ExcRateFromGBP from
                            RoyaltyItems where
                            RoyaltyItemsID =
                            {}".format(self.RoyaltyItemsWindow.table.item(self.Ro
                            0).text())
653                     cursor.execute(sql)
654                     self.EditWindow.originalItemList
                            = list(cursor.fetchone())
655
656         self.EditWindow.Editing = True
657
658         if self.Selection == True: #initialising the
                edit window
659             self.EditWindow.btnConfirm.clicked.connect(self.EditWindow.Valid
660             if self.CurrentTable in ["RoyaltyItems",
                    "BookInvoiceItems"]:
661                 self.EditWindow.btnConfirm.clicked.connect(self.EditWindow.C
662             else:
663                 self.EditWindow.btnConfirm.clicked.connect(self.VerifyUpdate
664             self.EditWindow.AddType =
                    self.CurrentTable
665             self.EditWindow.selectedID =
                    self.SelectedID
666
667             self.EditWindow.CalendarWidget =
                    dbCalendarWidget()
668             self.EditWindow.CalendarWidget.Calendar()
669             self.EditWindow.initAddItemWindow()
670
671
```

```
672
673     def VerifyCustomerUpdate(self):
674         self.UpdateEntryWindow.Verify =
                dbConfirmationDialog()
675         #new instance for customer verification
676
677
678
679     def VerifyUpdate(self): #verification dialog
680         if self.EditWindow.ReadyToVerify == True:
681             self.EditWindow.Verify =
                    dbConfirmationDialog()
682             self.EditWindow.Verify.Msg = "Insert
                    Password to confirm all changes"
683             self.EditWindow.Verify.ConfirmedMsg =
                    "Update successful"
684             self.EditWindow.Verify.VerifyDlg()
685             if
                    self.EditWindow.Verify.ConfirmedDialog.Accepted
                    == True:
686                 self.UpdateChanges()
687                 self.EditWindow.accept()
688
689
690
691     def UpdateChanges(self): #committing changes
692         self.UpdateList = []
693
694         with sqlite3.connect("PP.db") as db:
695             cursor = db.cursor()
696             if self.CurrentTable == "Book":
697                 self.NoOfEntries = 12
698                 cursor.execute("select * from Book")
699                 self.ID = "ISBN"
700                 self.SelectedISBN =
                        QTableWidgetItem(self.ViewWindow.table.item(self.ViewWind
                        0)).text()
701                 self.SelectedID = self.SelectedISBN
702                 self.BookEdited = True
703
704             elif self.CurrentTable == "PubInvoice":
705                 cursor.execute("select ISBN,
                        AuthorID, PubInvoiceDate,
                        PubInvoiceService,
                        PubInvoicePayment from PubInvoice")
706                 self.NoOfEntries = 5
```

```
707                     self.ID = "PubInvoiceID"
708                     self.OldID = self.SelectedID
709                     self.SelectedID =
                            QTableWidgetItem(self.PubInvoiceWindow.table.item(self.Pu
                            0)).text()
710
711                 elif self.CurrentTable == "BookInvoice":
712                     cursor.execute("select AuthorID,
                            BookInvoiceDate from BookInvoice")
713                     self.NoOfEntries = 2
714                     self.ID = "BookInvoiceID"
715                     self.OldID = self.SelectedID
716                     self.SelectedID =
                            QTableWidgetItem(self.BookInvoiceWindow.table.item(self.B
                            0)).text()
717
718                 elif self.CurrentTable == "Royalties":
719                     cursor.execute("select AuthorID,
                            RoyaltiesDate from Royalties")
720                     self.NoOfEntries = 2
721                     self.ID = "RoyaltiesID"
722                     self.OldID = self.SelectedID
723                     self.SelectedID =
                            QTableWidgetItem(self.RoyaltiesWindow.table.item(self.Roy
                            0)).text()
724
725                 elif self.CurrentTable ==
                        "BookInvoiceItems":
726                     cursor.execute("select BookInvoiceID,
                            ISBN, BookInvoiceQuantity,
                            BookInvoiceDiscount, ShippingType,
                            ShippingPrice from
                            BookInvoiceItems")
727                     self.NoOfEntries = 6
728                     self.ID = "BookInvoiceItemsID"
729                     self.OldID = self.SelectedID
730                     self.SelectedID =
                            QTableWidgetItem(self.BookInvoiceItemsWindow.table.item(s
                            0)).text()
731
732                 elif self.CurrentTable == "RoyaltyItems":
733                     cursor.execute("select RoyaltiesID,
                            ISBN, Currency, RoyaltyDiscount,
                            WholesalePrice, RoyaltyQuantity,
                            PrintCost, ExcRateFromGBP from
                            RoyaltyItems")
```

```
734                 self.NoOfEntries = 6
735                 self.ID = "RoyaltyItemsID"
736                 self.OldID = self.SelectedID
737                 self.SelectedID =
                        QTableWidgetItem(self.RoyaltyItemsWindow.table.item(self.
                        0)).text()
738
739         for count in range(0, self.NoOfEntries):
                #creating the update string for sql
740             try:
741                 self.UpdateList.append(str(self.EditWindow.inputList[count].
742             except:
743                 if count == 8 and self.CurrentTable
                        == "RoyaltyItems":
744                     self.UpdateList.append(str(self.NetSales))
745                 else:
746                     self.UpdateList.append(self.EditWindow.inputList[count].
747
748         self.Update = ""
749
750         self.Headers = list(cursor.description)
751         for count in range(0, len(self.UpdateList)):
752             self.Update += "{} =
                    '{}'".format(list(self.Headers[count])[0],
                    self.UpdateList[count])
753             if count != len(self.UpdateList) - 1:
754                 self.Update += ", "
755
756         with sqlite3.connect("PP.db") as db: #update
757             cursor = db.cursor()
758             if self.CurrentTable == "Book": #ISBN is
                    primary key which may be changed, so
                    all foreign keys will change first for
                    it
759                 try:
760                     sql = "update PubInvoice set ISBN
                            = {0} where ISBN =
                            {1}".format(self.UpdateList[0],
                            self.SelectedID)
761                     cursor.execute(sql)
762                     sql = "update BookInvoiceItems
                            set ISBN = {0} where ISBN =
                            {1}".format(self.UpdateList[0],
                            self.SelectedID)
763                     cursor.execute(sql)
```

```
764                     sql = "update RoyaltyItems set
                            ISBN = {0} where ISBN =
                            {1}".format(self.UpdateList[0],
                            self.SelectedID)
765                     cursor.execute(sql)
766                 except:
767                     pass # error if no entry is there
                            for
                            pubinvoice/bookinvoiceitems/royaltyitems
768             sql = "update {} set {} where {} =
                    {}".format(self.CurrentTable,
                    self.Update, self.ID, self.SelectedID)
769             cursor.execute(sql)
770             db.commit()
771
772         if self.CurrentTable in ["Royalties",
                "BookInvoice", "PubInvoice",
                "BookInvoiceItems", "RoyaltyItems"]:
773             self.SelectedID = self.OldID
774
775         self.RefreshTables()
776
777         try:
778             self.RecalculateItems()
779             self.BookEdited = False
780         except:
781             pass
782
783
784
785     def RefreshTables(self): #refreshing tables
786         if self.CurrentTable == "Customer":
787             self.TableWidget.sql = "select * from
                    Customer"
788             self.TableWidget.initTable()
789
790         if self.CurrentTable == "Book":
791             self.ViewWindow.table.sql = "select *
                    from Book where AuthorID =
                    {}".format(self.SelectedAuthorID)
792             self.ViewWindow.table.initTable()
793             with sqlite3.connect("PP.db") as db:
794                 cursor = db.cursor()
795                 cursor.execute("select Firstname,
                        Lastname from Customer where
                        AuthorID =
```

```
                    {}".format(self.SelectedAuthorID))
796                 self.Name = list(cursor.fetchone())
797                 self.Name = "{},
                    {}".format(self.Name[1],
                    self.Name[0])
798                 for count in range(0,
                    self.TableWidget.rowCount()+1):
799                  self.ViewWindow.table.setItem(count,
                        1, QTableWidgetItem(self.Name))
800                 self.ViewWindow.table.setHorizontalHeaderItem(1,
                    QTableWidgetItem("Author"))
801                 db.commit()
802         elif self.CurrentTable == "PubInvoice":
803             self.PubInvoiceWindow.table.sql = "select
                    * from PubInvoice where ISBN =
                    {}".format(self.SelectedISBN)
804             self.PubInvoiceWindow.table.initTable()
805             with sqlite3.connect("PP.db") as db:
806                 cursor = db.cursor()
807                 cursor.execute("select BookTitle from
                    Book where ISBN =
                    {}".format(self.SelectedISBN))
808                 self.Title =
                    "{}".format(list(cursor.fetchone())[0])
809                 for count in range(0,
                    self.TableWidget.rowCount()+1):
810                  self.PubInvoiceWindow.table.setItem(count,
                        1,
                        QTableWidgetItem(self.Title))
811                 self.PubInvoiceWindow.table.setHorizontalHeaderItem(1,
                    QTableWidgetItem("BookTitle"))
812                 cursor.execute("select Firstname,
                    Lastname from Customer where
                    AuthorID =
                    {}".format(self.SelectedAuthorID))
813                 self.Name = list(cursor.fetchone())
814                 self.Name = "{},
                    {}".format(self.Name[1],
                    self.Name[0])
815                 for count in range(0,
                    self.TableWidget.rowCount()+1):
816                  self.PubInvoiceWindow.table.setItem(count,
                        2, QTableWidgetItem(self.Name))
817                 self.PubInvoiceWindow.table.setHorizontalHeaderItem(2,
                    QTableWidgetItem("Author"))
818                 db.commit()
```

```
819
820             elif self.CurrentTable == "BookInvoice":
821                 self.BookInvoiceWindow.table.sql =
                        "select * from BookInvoice where
                        AuthorID =
                        {}".format(self.SelectedAuthorID)
822                 self.BookInvoiceWindow.table.initTable()
823                 with sqlite3.connect("PP.db") as db:
824                     cursor = db.cursor()
825                     cursor.execute("select Firstname,
                            Lastname from Customer where
                            AuthorID =
                            {}".format(self.SelectedAuthorID))
826                     self.Name = list(cursor.fetchone())
827                     self.Name = "{},
                            {}".format(self.Name[1],
                            self.Name[0])
828                     for count in range(0,
                            self.TableWidget.rowCount()+1):
829                         self.BookInvoiceWindow.table.setItem(count,
                                1, QTableWidgetItem(self.Name))
830                     self.BookInvoiceWindow.table.setHorizontalHeaderItem(1,
                            QTableWidgetItem("Author"))
831                     db.commit()
832
833             elif self.CurrentTable == "Royalties":
834                 self.RoyaltiesWindow.table.sql = "select
                        * from Royalties where AuthorID =
                        {}".format(self.SelectedAuthorID)
835                 self.RoyaltiesWindow.table.initTable()
836                 with sqlite3.connect("PP.db") as db:
837                     cursor = db.cursor()
838                     cursor.execute("select Firstname,
                            Lastname from Customer where
                            AuthorID =
                            {}".format(self.SelectedAuthorID))
839                     self.Name = list(cursor.fetchone())
840                     self.Name = "{},
                            {}".format(self.Name[1],
                            self.Name[0])
841                     for count in range(0,
                            self.TableWidget.rowCount()+1):
842                         self.RoyaltiesWindow.table.setItem(count,
                                1, QTableWidgetItem(self.Name))
843                     self.RoyaltiesWindow.table.setHorizontalHeaderItem(1,
                            QTableWidgetItem("Author"))
```

```
844                 db.commit()
845             elif self.CurrentTable == "BookInvoiceItems":
846                 self.BookInvoiceItemsWindow.table.sql =
                        "select * from BookInvoiceItems where
                        BookInvoiceID =
                        {}".format(self.SelectedID)
847
848                 self.BookInvoiceItemsWindow.table.initTable()
849                 with sqlite3.connect("PP.db") as db:
850                     cursor = db.cursor()
851                     self.ID = []
852                     sql = "select BookInvoiceItemsID from
                            BookInvoiceItems where
                            BookInvoiceID =
                            {}".format(self.SelectedID)
853                     cursor.execute(sql)
854                     self.IDList = list(cursor.fetchall())
855                     for count in range(0,
                            len(self.IDList)):
856                         self.temp =
                                list(self.IDList[count])[0]
857                         self.ID.append(self.temp)
858
859                     for count in range(0, len(self.ID)):
860                         try:
861                             cursor.execute("select
                                    Book.BookTitle,
                                    BookInvoiceItems.ISBN,
                                    Firstname, Lastname,
                                    BookInvoiceItems.BookInvoiceID
                                    from Book,
                                    BookInvoiceItems,
                                    Customer, BookInvoice
                                    where
                                    BookInvoiceItems.BookInvoiceID
                                    = {} and
                                    BookInvoiceItems.BookInvoiceItemsID
                                    = {} and Book.ISBN =
                                    BookInvoiceItems.ISBN and
                                    BookInvoice.BookInvoiceID
                                    =
                                    BookInvoiceItems.BookInvoiceID
                                    and Customer.AuthorID =
                                    BookInvoice.AuthorID".format(self.SelectedID,
                                    self.ID[count]))
```

```
862                             self.Title =
                                    list(cursor.fetchone())
863                             self.Name = "{},
                                    {}".format(self.Title[3],
                                    self.Title[2])
864                             self.Title = self.Title[0]
865                             self.BookInvoiceItemsWindow.table.setItem(count,
                                    2,
                                    QTableWidgetItem(str(self.Title)))
866                             self.BookInvoiceItemsWindow.table.setItem(count,
                                    1,
                                    QTableWidgetItem(str(self.Name)))
867                         except:
868                             pass
869                 self.BookInvoiceItemsWindow.table.setHorizontalHeaderItem(2,
                        QTableWidgetItem("BookTitle"))
870                 self.BookInvoiceItemsWindow.table.setHorizontalHeaderItem(1,
                        QTableWidgetItem("Author"))
871                 db.commit()
872
873         elif self.CurrentTable == "RoyaltyItems":
874             self.RoyaltyItemsWindow.table.sql =
                    "select * from RoyaltyItems where
                    RoyaltiesID =
                    {}".format(self.SelectedID)
875             self.RoyaltyItemsWindow.table.initTable()
876             with sqlite3.connect("PP.db") as db:
877                 cursor = db.cursor()
878                 self.ID = []
879                 sql = "select RoyaltyItemsID from
                        RoyaltyItems where RoyaltiesID =
                        {}".format(self.SelectedID)
880                 cursor.execute(sql)
881                 self.IDList = list(cursor.fetchall())
882                 for count in range(0,
                        len(self.IDList)):
883                     self.temp =
                            list(self.IDList[count])[0]
884                     self.ID.append(self.temp)
885
886                 for count in range(0, len(self.ID)):
887                     try:
888                         cursor.execute("select
                                Book.BookTitle,
                                RoyaltyItems.ISBN,
                                Firstname, Lastname,
```

```
                                RoyaltyItems.RoyaltiesID
                                from Book, RoyaltyItems,
                                Customer, Royalties where
                                RoyaltyItems.RoyaltiesID =
                                {} and
                                RoyaltyItems.RoyaltyItemsID
                                = {} and Book.ISBN =
                                RoyaltyItems.ISBN and
                                Royalties.RoyaltiesID =
                                RoyaltyItems.RoyaltiesID
                                and Customer.AuthorID =
                                Royalties.AuthorID".format(self.SelectedID,
                                self.ID[count]))
889                             self.Title =
                                    list(cursor.fetchone())
890                             self.Name = "{},
                                    {}".format(self.Title[3],
                                    self.Title[2])
891                             self.Title = self.Title[0]
892                             self.RoyaltyItemsWindow.table.setItem(count,
                                    2,
                                    QTableWidgetItem(str(self.Title)))
893                             self.RoyaltyItemsWindow.table.setItem(count,
                                    1,
                                    QTableWidgetItem(str(self.Name)))
894                         except:
895                             pass
896                 self.RoyaltyItemsWindow.table.setHorizontalHeaderItem(2,
                        QTableWidgetItem("BookTitle"))
897                 self.RoyaltyItemsWindow.table.setHorizontalHeaderItem(1,
                        QTableWidgetItem("Author"))
898                 db.commit()
899
900     def Back(self): #going back from the view window
            to the main menu
901         self.ViewWindow.table.selectedID = None
902         self.CurrentTable = "Customer"
903         self.StackedLayout.setCurrentIndex(0)
904         self.MenuBar.setVisible(True)
905
906
907
908     def QuickSearch(self): #quick search from main
            menu
909         self.QSText =
                self.MainMenuButtons.leQuickSearch.text()
```

```
910             self.QSText = self.QSText.split(' ')
911             with sqlite3.connect("PP.db") as db:
912                 cursor = db.cursor()
913 
914                 if len(self.QSText) == 1:
915                     self.TableWidget.sql = "select * from
                            Customer where Firstname like
                            '{0}%' or Lastname like
                            '{0}%'".format(self.QSText[0])
916                 elif len(self.QSText) == 0:
917                     self.TableWidget.sql = "select * from
                            Customer"
918                 else:
919                     for count in range(1,
                            len(self.QSText)):
920                         if count != 1:
921                             self.QSText[1] += "
                                    {}".format(self.QSText[count])
922                     self.TableWidget.sql = "select * from
                            Customer where Firstname like
                            '{0}%' and Lastname like
                            '{1}%'".format(self.QSText[0],
                            self.QSText[1])
923                 self.TableWidget.initTable()
924 
925 
926 
927         def Search(self): #main search interface
928             self.SearchDatabase = dbSearchDatabase()
929             self.SearchDatabase.Table = None
930             self.SearchDatabase.Valid = False
931             self.SearchDatabase.CalendarWidget =
                    dbCalendarWidget()
932             self.SearchDatabase.CalendarWidget.Calendar()
933             self.SearchDatabase.initLayout()
934 
935             if self.SearchDatabase.Valid == True:
936                 if self.SearchDatabase.Table != None:
937                     try:
938                         if self.SearchDatabase.Table ==
                                "Book":
939                             for count in range(0,
                                    len(self.SearchDatabase.Results)
                                    +1):
940                                 try:#using the results to
                                        fetch the correct data
```

```
941                         if count == 0:
942                             self.SearchTable.sql
                                    = "select *
                                    from {} where
                                    ISBN =
                                    '{}'".format(self.SearchDatabase.Tabl
                                    list(self.SearchDatabase.Results[coun
943                         else:
944                             self.SearchTable.sql
                                    += " or ISBN =
                                    '{}'".format(list(self.SearchDatabase
945                         self.SearchTable.initTable()
946                     except IndexError:
947                         self.SearchTable.setHorizontalHeaderItem(1,
                            QTableWidgetItem("Author"))
948                         with
                            sqlite3.connect("PP.db")
                            as db:
949                             cursor =
                                db.cursor()
                                #fetching
                                firstname and
                                lastname using
                                foreign key
950                             for count2 in
                                range(0,
                                self.SearchTable.rowCount()):
951                                 cursor.execute("select
                                    Firstname,
                                    Lastname,
                                    Book.AuthorID,
                                    Customer.AuthorID
                                    from
                                    Customer,
                                    Book where
                                    Book.ISBN
                                    = {} and
                                    Customer.AuthorID
                                    =
                                    Book.AuthorID".format(list(self.S
952                                 self.Name =
                                    list(cursor.fetchone())
953                                 self.Name =
                                    "{},
                                    {}".format(self.Name[1],
                                    self.Name[0])
```

```
954                                         self.SearchTable.setItem(count2,
                                                1,
                                                QTableWidgetItem(self.Name))
955                                     db.commit()
956
957
958                         if self.SearchDatabase.Table in
                            ["RoyaltyItems",
                            "BookInvoiceItems"]:
959                             index = 4
960                         else:
961                             index = 1
962
963                         if self.SearchDatabase.Table ==
                            "Customer":
964                             for count in range(0,
                                    len(self.SearchDatabase.Results)+1):
965                                 try: #using the results
                                        to fetch the correct
                                        data
966                                     if count == 0:
967                                         self.SearchTable.sql
                                            = "select *
                                            from Customer
                                            where AuthorID
                                            =
                                            '{}'".format(list(self.SearchDatabase
968                                     else:
969                                         self.SearchTable.sql
                                            += " or
                                            AuthorID =
                                            '{}'".format(list(self.SearchDatabase
970                                     self.SearchTable.initTable()
971
972
973                                 except IndexError:
974                                     self.SearchTable.initTable()
975
976                         elif self.SearchDatabase.Table !=
                            "Book" and
                            self.SearchDatabase.Table !=
                            None:
977                             for count in range(0,
                                    len(self.SearchDatabase.Results)+1):
978                                 try: #using the results
                                        to fetch the correct
```

```
                    data
979                  if count == 0:
980                      self.SearchTable.sql
                             = "select *
                             from {0} where
                             {0}ID =
                             '{1}'".format(self.SearchDatabase.Tab
                             list(self.SearchDatabase.Results[coun
981                  else:
982                      self.SearchTable.sql
                             += " or {0}ID
                             =
                             '{1}'".format(self.SearchDatabase.Tab
                             list(self.SearchDatabase.Results[coun
983                  self.SearchTable.initTable()
984
985              except IndexError:
986                  with
                         sqlite3.connect("PP.db")
                         as db:
987                      cursor =
                             db.cursor()
                             #fetching
                             firstnames and
                             lastnames and
                             book titles
                             using foreign
                             keys
988                      if
                             self.SearchDatabase.Table
                             in
                             ["Royalties",
                             "BookInvoice"]:
989                          self.SearchTable.setHorizontalHeader
                                 QTableWidgetItem("Author"))
990                          for count2 in
                                 range(0,
                                 self.SearchTable.rowCount()):
991                              cursor.execute("select
                                     Firstname,
                                     Lastname,
                                     {0}.AuthorID,
                                     Customer.AuthorID
                                     from
                                     Customer,
                                     {0}
```

```
                                    where
                                    Customer.AuthorID
                                    = {1}
                                    and
                                    {0}.AuthorID
                                    =
                                    Customer.AuthorID".format(sel
                                    list(self.SearchDatabase.Resu
992                                 self.Name
                                    =
                                    list(cursor.fetchone())
993                                 self.Name
                                    = "{},
                                    {}".format(self.Name[1],
                                    self.Name[0])
994                                 self.SearchTable.setItem(count2,
                                    1,
                                    QTableWidgetItem(self.Name))
995
996                             elif
                                self.SearchDatabase.Table
                                in
                                ["RoyaltyItems",
                                "BookInvoiceItems"]:
997                              self.SearchTable.setHorizontalHeader
                                 QTableWidgetItem("Author"))
998                              self.SearchTable.setHorizontalHeader
                                 QTableWidgetItem("Book
                                 Title"))
999                              if
                                 self.SearchDatabase.Table
                                 ==
                                 "RoyaltyItems":
1000                              self.IDType
                                  =
                                  "Royalties"
1001                             else:
1002                              self.IDType
                                  =
                                  "BookInvoice"
1003                             for count2 in
                                 range(0,
                                 self.SearchTable.rowCount()):
1004                              cursor.execute("select
                                  BookTitle,
                                  Book.ISBN,
```

```
                                    {0}.ISBN,
                                    {1}.AuthorID,
                                    Firstname,
                                    LastName
                                    from
                                    Book,
                                    {0},
                                    {1},
                                    Customer
                                    where
                                    Book.ISBN
                                    = {2}
                                    and
                                    {0}.ISBN
                                    =
                                    Book.ISBN
                                    and
                                    {1}.{1}ID
                                    =
                                    {0}.{1}ID
                                    and
                                    Customer.AuthorID
                                    =
                                    {1}.AuthorID".format(self.Sea
                                    self.IDType,
                                    list(self.SearchDatabase.Resu
1005                            self.Title
                                    =
                                    cursor.fetchone()
1006                            self.Name
                                    = "{},
                                    {}".format(self.Title[5],
                                    self.Title[4])
1007                            self.Title
                                    =
                                    "{}".format(list(self.Title)[
1008                            self.SearchTable.setItem(count2,
                                    2,
                                    QTableWidgetItem(self.Title))
1009                            self.SearchTable.setItem(count2,
                                    1,
                                    QTableWidgetItem(self.Name))
1010                    elif
                        self.SearchDatabase.Table
                        ==
                        "PubInvoice":
```

```
1011                                self.SearchTable.setHorizontalHeaderI
                                        QTableWidgetItem("Book
                                        Title"))
1012                                self.SearchTable.setHorizontalHeaderI
                                        QTableWidgetItem("Author"))
1013                                for count2 in
                                        range(0,
                                        self.SearchTable.rowCount()):
1014                                     cursor.execute("select
                                            Firstname,
                                            Lastname,
                                            BookTitle,
                                            {0}.AuthorID,
                                            Customer.AuthorID,
                                            Book.ISBN,
                                            {0}.ISBN
                                            from
                                            Customer,
                                            {0},
                                            Book
                                            where
                                            Customer.AuthorID
                                            = {1}
                                            and
                                            {0}.AuthorID
                                            =
                                            Customer.AuthorID
                                            and
                                            Book.AuthorID
                                            =
                                            Customer.AuthorID
                                            and
                                            {0}.ISBN
                                            =
                                            Book.ISBN".format(self.Search
                                            list(self.SearchDatabase.Resu
1015                                     self.Name
                                            =
                                            list(cursor.fetchone())
1016                                     self.Title
                                            =
                                            "{}".format(self.Name[2])
1017                                     self.Name
                                            = "{},
                                            {}".format(self.Name[1],
                                            self.Name[0])
```

```
1018
1019                                                    self.SearchTable.setItem(count2,
                                                           2,
                                                           QTableWidgetItem(self.Name))
1020                                                    self.SearchTable.setItem(count2,
                                                           1,
                                                           QTableWidgetItem(self.Title))
1021
1022
1023                                            db.commit()
1024
1025
1026
1027                        self.StackedLayout.setCurrentIndex(2)
1028                        self.MenuBar.setVisible(False)
1029
1030                    except IndexError:
1031                        self.Msg = QMessageBox()
1032                        self.Msg.setWindowTitle("No
                               Results Found")
1033                        self.Msg.setText("No data matches
                               your search")
1034                        self.Msg.exec_()
1035
1036
1037        def keyReleaseEvent(self, QKeyEvent):
1038            if self.MainMenuButtons.leQuickSearch.text()
                   == "":
1039                self.TableWidget.sql = "select * from
                       Customer"
1040                self.TableWidget.initTable()
1041
1042
1043        def ChangeUsernameOrPassword(self):
1044
1045            self.ChangeWhat = dbUsernameOrPassword()
1046            self.ChangeWhat.Selection = None
1047            self.ChangeWhat.ChangeSelection()
1048            if self.ChangeWhat.Selection == "Username":
1049                self.UsernameChange = dbChangeUsername()
1050                self.UsernameChange.Username =
                       self.Username
1051                self.UsernameChange.initChangeUsernameScreen()
1052            elif self.ChangeWhat.Selection == "Password":
1053                self.PasswordChange = dbChangePassword()
```

```
1054                self.PasswordChange.Username =
                        self.Username
1055                self.PasswordChange.initChangePasswordScreen()
1056
1057        def LogOut(self):
1058            self.hide()
1059            subprocess.call("LoginDB.py", shell=True)
```

4.10.3 Module 3

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5
6
7  class initMainMenuButtons(QWidget):
8      """initialising the main menu buttons"""
9
10     def __init__(self):
11         super().__init__()
12
13         #creating the layout
14
15         self.vertical = QVBoxLayout()
16
17         self.btnLogOut = QPushButton("Log Out", self)
18         self.btnLogOut.setFixedSize(100, 30)
19
20         self.leQuickSearch = QLineEdit(self)
21         self.leQuickSearch.setPlaceholderText("Author
               Name")
22         self.leQuickSearch.setFixedSize(100, 25)
23
24         self.btnQuickSearch = QPushButton("Quick
               Search", self)
25         self.btnQuickSearch.setFixedSize(100, 30)
26
27         self.horizontalTop = QHBoxLayout()
28         self.horizontalTop.addWidget(self.btnLogOut)
29         self.horizontalTop.addStretch(1)
30         self.horizontalTop.addWidget(self.leQuickSearch)
31         self.horizontalTop.addWidget(self.btnQuickSearch)
32
```

```
33          self.btnView = QPushButton("View", self)
34          self.btnView.setFixedSize(100, 40)
35
36          self.btnSearchdb = QPushButton("Search
               Database", self)
37          self.btnSearchdb.setFixedSize(100, 40)
38
39          self.btnAddEntry = QPushButton("Add Entry",
               self)
40          self.btnAddEntry.setFixedSize(100, 40)
41
42          self.btnUpdateEntry = QPushButton("Update
               Entry", self)
43          self.btnUpdateEntry.setFixedSize(100, 40)
44
45          self.btnRemoveEntry = QPushButton("Remove
               Entry", self)
46          self.btnRemoveEntry.setFixedSize(100, 40)
47
48          self.btnChangePassword = QPushButton("Change
               Username/\nPassword", self)
49          self.btnChangePassword.setFixedSize(100, 40)
50
51          self.horizontalBottom = QHBoxLayout()
52
53          self.horizontalBottom.addWidget(self.btnView)
54          self.horizontalBottom.addWidget(self.btnSearchdb)
55          self.horizontalBottom.addWidget(self.btnAddEntry)
56          self.horizontalBottom.addWidget(self.btnUpdateEntry)
57          self.horizontalBottom.addWidget(self.btnRemoveEntry)
58          self.horizontalBottom.addWidget(self.btnChangePassword)
```

4.10.4 Module 4

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sys
4
5  class dbMenuBar(QMenuBar):
6      """the menu bar"""
7
8      def __init__(self):
9          super().__init__()
10
```

```
11          self.search_database = QAction("Search
               Database", self) #creating actions
12          self.add_entry = QAction("Add Entry", self)
13          self.update_entry = QAction("Update Entry",
               self)
14          self.remove_entry = QAction("Remove Entry",
               self)
15          self.change_password = QAction("Change
               Username/Password", self)
16          self.log_out = QAction("Log Out", self)
17
18          self.database_menu = self.addMenu("Database")
               #adding menus
19          self.database_menu.addAction(self.search_database)
               #adding actions to menus
20
21          self.actions_menu = self.addMenu("Actions")
22          self.actions_menu.addAction(self.add_entry)
23          self.actions_menu.addAction(self.update_entry)
24          self.actions_menu.addAction(self.remove_entry)
25
26          self.account_menu = self.addMenu("Account")
27          self.account_menu.addAction(self.change_password)
28          self.account_menu.addAction(self.log_out)
```

4.10.5 Module 5

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sys
4  import sqlite3
5
6  class dbTableWidget(QTableWidget):
7      """main table widget"""
8
9      def __init__(self):
10         super().__init__()
11
12
13     def initTable(self):
14         self.clear()
15         self.columns = []
16         self.setSelectionBehavior(QAbstractItemView.SelectRows)
17         self.setEditTriggers(QAbstractItemView.NoEditTriggers)
```

```
18          self.setSortingEnabled(False)
19          with sqlite3.connect("PP.db") as db:
               #fetching data from db
20              cursor = db.cursor()
21              cursor.execute(self.sql)
22              self.ColumnNames = cursor.description
23          for count in range(0, len(self.ColumnNames)):
24              self.columns.append(list(list(self.ColumnNames)[count])[0])
25          self.setRowCount(0)
26          self.setColumnCount(len(self.columns))
27          self.setHorizontalHeaderLabels(self.columns)
28          for self.row, self.form in enumerate(cursor):
29              self.insertRow(self.row)
30              for self.column, self.unit in
                   enumerate(self.form):
31                  self.setItem(self.row, self.column,
                       QTableWidgetItem(str(self.unit)))
32          self.setSortingEnabled(True)
```

4.10.6 Module 6

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5  import re
6
7  class dbAddEntryWindow(QDialog):
8      """add entry window dialog"""
9
10     def __init__(self):
11         super().__init__()
12
13     def initAddEntryWindow(self):
14         self.setWindowTitle("Add Entry")
15         self.setFixedSize(640,115)
16         self.setModal(True) #modal window
17         self.AddEntryTable = QTableWidget(self)
               #table for adding customer entry
18         self.AddEntryTable.setRowCount(1)
19         self.AddEntryTable.setColumnCount(6)
20         self.AddEntryTable.setFixedSize(617, 55)
21         self.inputList = []
22         for count in range(0, 6):
```

```
23              #0 firstname, 1 lastname, 2 email, 3
                    phoneno, 4 address, 5 postcode
24              self.input = QLineEdit(self)
25              self.input.setFrame(False)
26              self.inputList.append(self.input)
27              self.AddEntryTable.setCellWidget(0,
                    count, self.input)
28
29          self.inputList[0].setValidator(QRegExpValidator(QRegExp("[a-zA-Z\-\!
30          self.inputList[1].setValidator(QRegExpValidator(QRegExp("[a-zA-Z\-\!
31          self.inputList[2].setValidator(QRegExpValidator(QRegExp("^[\w-\.]+@(
32          self.inputList[3].setValidator(QRegExpValidator(QRegExp("^(((\+44\s?
33          self.inputList[4].setValidator(QRegExpValidator(QRegExp("[a-zA-Z
                \d\-\.]+")))
34          self.inputList[5].setValidator(QRegExpValidator(QRegExp("^[a-zA-Z]{1
                {0,1}[0-9][A-Za-z]{2}$")))
35          #2, 3 & 5 from www.regexlib.com
36          self.CustomerHeaders = ["Firstname",
                "Lastname", "Email", "Phonenumber",
                "Address", "Postcode"]
37          self.AddEntryTable.setHorizontalHeaderLabels(self.CustomerHeaders)
38          self.btnConfirm = QPushButton("Confirm",
                self) #buttons
39          self.btnCancel = QPushButton("Cancel", self)
40          self.horizontal = QHBoxLayout()
41          self.horizontal.addStretch(1)
42          self.horizontal.addWidget(self.btnCancel)
43          self.horizontal.addWidget(self.btnConfirm)
44
45          self.vertical = QVBoxLayout() #vbox layout
46          self.vertical.addWidget(self.AddEntryTable)
47          self.vertical.addStretch(1)
48          self.vertical.addLayout(self.horizontal)
49          self.setLayout(self.vertical)
50
51          self.btnCancel.clicked.connect(self.reject)
                #reject on clicking cancel
52          self.btnConfirm.clicked.connect(self.AddEntryTodb)
                #call function after clicking confirm
53          self.exec_()
54
55      def AddEntryTodb(self):
56          #fetching inputs from table
57          self.Valid = True
58          self.Message = "All Fields must be filled."
59          self.Firstname = self.inputList[0].text()
```

```
60          self.Lastname = self.inputList[1].text()
61          self.Email = self.inputList[2].text()
62          self.Phonenumber = self.inputList[3].text()
63          self.Address = self.inputList[4].text()
64          self.Postcode = self.inputList[5].text()
65
66          self.input_data = (self.Firstname,
                self.Lastname, self.Email,
                self.Phonenumber, self.Address,
                self.Postcode)
67          for count in range(0,
                len(list(self.input_data))):
68              if list(self.input_data)[count].replace("
                    ", "") == "":
69                  self.Valid = False
70          try:
71              float(self.input_data[4])
72              self.Valid = False
73              self.Message = "Invalid Address"
74          except:
75              pass
76
77          if self.Valid == True:
78              with sqlite3.connect("PP.db") as db:
79                  cursor = db.cursor()
80                  cursor.execute("PRAGMA foreign_keys =
                        ON")
81                  sql = "insert into Customer
                        (FirstName, LastName, Email,
                        PhoneNumber, Address, Postcode)
                        values (?, ?, ?, ?, ?, ?)"
82                  cursor.execute(sql, self.input_data)
83                  db.commit()
84                  self.accept()
85          else:
86              self.Msg = QMessageBox()
87              self.Msg.setWindowTitle("Invalid Entry")
88              self.Msg.setText(self.Message)
89              self.Msg.exec_()
```

4.10.7 Module 7

```
1 from PyQt4.QtCore import *
2 from PyQt4.QtGui import *
```

```
import sqlite3
import sys
from ConfirmationDialog import *

class dbUpdateEntryWindow(QDialog):
    """update entry window dialog"""

    def __init__(self):
        super().__init__()

    def initUpdateEntryWindowDlg(self):
        self.table.setSelectionBehavior(QAbstractItemView.SelectItems)
        self.setWindowTitle("Update Entry")

        self.setModal(True)
        self.btnEdit = QPushButton("Edit", self)
        #self.btnConfirm = QPushButton("Confirm",
            self)
        self.horizontal = QHBoxLayout()
        self.horizontal.addWidget(self.btnEdit)
        self.horizontal.addStretch(1)
        self.horizontal.addWidget(self.btnConfirm)
        self.vertical = QVBoxLayout()
        self.vertical.addWidget(self.table)
        self.vertical.addLayout(self.horizontal)
        self.setLayout(self.vertical)
        self.btnEdit.clicked.connect(self.Edit)
        self.btnConfirm.clicked.connect(self.Verification)
        self.TableName = "Customer"
        self.ID = "AuthorID"
        self.exec_()

    def initConfirmBtn(self): #creating confirm btn
        for instantiation of verification window
        self.btnConfirm = QPushButton("Confirm", self)

    def Verification(self):

        self.Verify.Msg = "Insert Password to confirm
            all changes"
        self.Verify.ConfirmedMsg = "Update successful"
        self.Verify.VerifyDlg()
        if self.Verify.ConfirmedDialog.Accepted ==
            True:
            self.UpdateChanges()
            self.accept()
```

```
45
46      def Edit(self):
47          self.SelectedItem = self.table.currentItem()
48          self.SelectedRow = self.table.currentRow()
49          self.SelectedColumn =
                self.table.currentColumn()
50          if self.SelectedItem != None:
51              self.EditDlg = dbUpdateEntryWindow()
52              self.EditDlg.setModal(True)
53              self.EditDlg.setWindowTitle("Input Text")
54              self.EditDlg.setFixedSize(210, 120)
55              self.EditDlg.lbl = QLabel("Insert text to
                    save over current entry", self)
56              self.EditDlg.qle = QLineEdit(self)
57              self.EditDlg.qle.setPlaceholderText("Insert
                    text here")
58              self.EditDlg.btnConfirm =
                    QPushButton("Confirm", self)
59              self.EditDlg.btnConfirm.setFixedSize(60,
                    25)
60
61              self.EditDlg.qlehorizontal = QHBoxLayout()
62              self.EditDlg.btnhorizontal = QHBoxLayout()
63              self.EditDlg.qlehorizontal.addStretch(1)
64              self.EditDlg.qlehorizontal.addWidget(self.EditDlg.qle)
65              self.EditDlg.qlehorizontal.addStretch(1)
66              self.EditDlg.btnhorizontal.addStretch(1)
67              self.EditDlg.btnhorizontal.addWidget(self.EditDlg.btnConfirm)
68              self.EditDlg.btnhorizontal.addStretch(1)
69              self.EditDlg.vertical = QVBoxLayout()
70              self.EditDlg.vertical.addWidget(self.EditDlg.lbl)
71              self.EditDlg.vertical.addLayout(self.EditDlg.qlehorizontal)
72              self.EditDlg.vertical.addLayout(self.EditDlg.btnhorizontal)
73              self.EditDlg.setLayout(self.EditDlg.vertical)
74              self.EditDlg.btnConfirm.clicked.connect(self.EditDlg.accept)
75              self.EditDlg.btnConfirm.clicked.connect(self.GetInput)
76              self.EditDlg.exec_()
77
78      def GetInput(self):
79          self.EditInput = self.EditDlg.qle.text()
80          self.table.setItem(self.SelectedRow,
                self.SelectedColumn,
                QTableWidgetItem(self.EditInput))
81
82
83      def UpdateChanges(self):
```

```
84          UL = [] #UL = Update List
85          for count in range(0, 6):
86              UL.append(self.table.item(0,
                    count).text())
87          self.Update = "Firstname = '{}', Lastname =
                '{}', Email = '{}', Phonenumber = '{}',
                Address = '{}', Postcode =
                '{}'".format(UL[0], UL[1], UL[2], UL[3],
                UL[4], UL[5])
88          with sqlite3.connect("PP.db") as db:
89              cursor = db.cursor()
90              cursor.execute("PRAGMA foreign_keys = ON")
91              sql = "update {} set {} where {} =
                    {}".format(self.TableName,
                    self.Update, self.ID, self.selectedID)
92              cursor.execute(sql)
93              db.commit()
```

4.10.8 Module 8

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5
6  class dbViewWindow(QWidget):
7      """generic view window"""
8
9      def __init__(self):
10         super().__init__()
11
12     def View(self):
13         self.setWindowTitle("View Menu")
14         self.setFixedSize(735,400)
15
16         self.btnBack = QPushButton("Back", self)
17         self.btnBack.setFixedSize(100, 30)
18         self.btnViewRoyalties = QPushButton("View
               Royalties", self)
19         self.btnViewRoyalties.setFixedSize(100, 40)
20         self.btnViewBookInvoices = QPushButton("View
               Book  \n Invoices", self)
21         self.btnViewBookInvoices.setFixedSize(100, 40)
```

```
22          self.btnViewPubInvoice = QPushButton("View
               Publishing \n Invoice", self)
23          self.btnViewPubInvoice.setFixedSize(100, 40)
24          self.btnAddBook = QPushButton("Add Book",
               self)
25          self.btnAddBook.setFixedSize(100, 40)
26          self.btnUpdateBook = QPushButton("Update
               Book", self)
27          self.btnUpdateBook.setFixedSize(100,40)
28          self.btnDeleteBook = QPushButton("Delete
               Book", self)
29          self.btnDeleteBook.setFixedSize(100, 40)
30
31
32          self.horizontalTop = QHBoxLayout()
33          self.horizontalTop.addStretch(1)
34          self.horizontalTop.addWidget(self.btnBack)
35
36          self.horizontalBottom = QHBoxLayout()
37          self.horizontalBottom.addWidget(self.btnViewPubInvoice)
38          self.horizontalBottom.addWidget(self.btnViewBookInvoices)
39          self.horizontalBottom.addWidget(self.btnViewRoyalties)
40          self.horizontalBottom.addWidget(self.btnAddBook)
41          self.horizontalBottom.addWidget(self.btnUpdateBook)
42          self.horizontalBottom.addWidget(self.btnDeleteBook)
43
44          self.vertical = QVBoxLayout()
```

4.10.9 Module 9

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5  import re
6
7
8  class dbAddItemWindow(QDialog):
9      """add entry window dialog"""
10
11     def __init__(self):
12         super().__init__()
13
14     def initAddItemWindow(self):
```

```
15          self.setWindowTitle("Add
               {}".format(self.AddType))
16          if self.Editing == True:
17              self.setWindowTitle("Edit
                   {}".format(self.AddType))
18          self.ReadyToVerify = True
19          self.setModal(True) #modal window
20          self.Calculated = False
21          with sqlite3.connect("PP.db") as db:
               #fetching data from db
22              cursor = db.cursor()
23              cursor.execute(self.sql)
24              db.commit()
25
26          self.Columns = []
27          self.ColumnNames = cursor.description
28
29          for count in range(0, len(self.ColumnNames)):
30              self.Columns.append(list(list(self.ColumnNames)[count])[0])
31          self.coordinates = []
32
33          for count in
               range(int(round(len(self.Columns)/2, 1) +
               1)):
34              for count2 in range(4):
35                      self.coordinates.append((count,
                           count2))
36
37          self.ColumnLength = len(self.Columns)
38          for count in range(0, self.ColumnLength):
39              self.Columns.insert((count * 2) + 1, "")
40
41          db.close()
42          self.inputList = []
43          self.qlabelList = []
44          self.gridLayout = QGridLayout()
45          count = 0
46
47          for self.coordinate, self.columnHeader in
               zip(self.coordinates, self.Columns):
48
49              if self.columnHeader == "": #replacing
                   spaces with line edits
50
51                  if self.AddType == "Book" and count
                       in [0, 1, 3, 4, 5, 6, 7, 9, 10,
```

```
                    11]:
52                   if count == 0:
53                       self.input = QLineEdit(self)
54                       self.input.setValidator(QRegExpValidator(QRegExp("[\
55                   elif count == 1: #exceptions for
                         book
56                       self.input = QLineEdit(self)
                             #new line edit
57                       self.input.setReadOnly(True)
58                       self.input.setText(self.selectedID)
59                   elif count in [3, 9, 11]:
60                       self.input = QLineEdit(self)
61                       if count == 3:
62                           self.input.setValidator(QIntValidator())
63                       else:
64                           self.input.setValidator(QDoubleValidator())
65                   elif count in [4, 5, 6, 7]:
                         #exceptions for book where
                         combobox is needed
66                       self.input = QComboBox(self)
                             #new combo box
67
68                   elif count == 10:
69                       self.input = QLineEdit(self)
70                       self.input.setReadOnly(True)
71
72               elif self.AddType == "PubInvoice" and
                     count in [0, 1, 2, 3, 4]:
73
74                   if count == 0: #setting  isbn
                         ineditable
75                       self.input = QLineEdit(self)
76                       self.input.setReadOnly(True)
77                       self.input.setText(self.selectedISBN)
78
79                   elif count == 1: #setting
                         authorID ineditable
80                       self.input = QLineEdit(self)
81                       self.input.setReadOnly(True)
82                       self.input.setText(self.selectedID)
83
84                   elif count == 2:
85                       self.input = QLineEdit(self)
86                       self.input.setReadOnly(True)
87
88                   elif count == 3:
```

```
89                          self.input = QComboBox(self)
90
91                      elif count == 4:
92                          self.input = QLineEdit(self)
93                          self.input.setValidator(QDoubleValidator())
94
95                  elif self.AddType in ["BookInvoice",
                        "Royalties"] and count in [0, 1]:
96
97                          self.input = QLineEdit(self)
98                          self.input.setReadOnly(True)
99
100                         if count == 0:
101                             self.input.setText(self.selectedID)
102                 elif self.AddType ==
                        "BookInvoiceItems" and count in
                        [0, 1, 2, 3, 4, 5]:
103
104                     if count == 0:
105                         self.input = QLineEdit(self)
106                         self.input.setReadOnly(True)
107                         self.input.setText(self.selectedID)
108                     elif count == 1:
109                         self.input = QLineEdit(self)
110                         self.input.setReadOnly(True)
111                         self.input.setText(self.selectedISBN)
112                     elif count in [2, 3, 5]:
113                         self.input = QLineEdit(self)
114                         if count == 2:
115                             self.input.setValidator(QIntValidator())
116                         else:
117                             self.input.setValidator(QDoubleValidator())
118                     elif count == 4:
119                         self.input = QComboBox(self)
120
121                 elif self.AddType == "RoyaltyItems"
                        and count in [0, 1, 3, 4, 5, 6, 7]:
122                     with sqlite3.connect("PP.db") as
                            db:
123                         cursor = db.cursor()
124                         Selection = "NoOfPages, Size,
                                Back"
125                         sql = "select {} from Book
                                where ISBN =
                                {}".format(Selection,
                                self.selectedISBN)
```

```
126                         cursor.execute(sql)
127                         self.SelectionList =
                                list(cursor.fetchone())
128                         self.NoOfPages =
                                int(self.SelectionList[0])
129                         self.Size =
                                self.SelectionList[1]
130                         self.Back =
                                self.SelectionList[2]
131
132                         if self.Size == "Large":
133                             self.PagePrice = 0.015 *
                                    self.NoOfPages
134                             if self.Back == "Hard":
135                                 self.CoverPrice = 5
136                             elif self.Back == "Soft":
137                                 self.CoverPrice = 1
138
139                         elif self.Size == "Small":
140                             self.PagePrice = 0.01 *
                                    self.NoOfPages
141                             if self.Back == "Hard":
142                                 self.CoverPrice = 4
143                             elif self.Back == "Soft":
144                                 self.CoverPrice = 0.7
145
146                     self.input = QLineEdit(self)
147
148                     if count == 0:
149                         self.input.setText(self.selectedID)
150                         self.input.setReadOnly(True)
151                     elif count == 1:
152                         self.input.setText(self.selectedISBN)
153                         self.input.setReadOnly(True)
154                     elif count in [3, 4, 5, 6, 7]:
155                         if count == 5:
156                             self.input.setValidator(QIntValidator())
157                         elif count == 6:
158                             self.input.setReadOnly(True)
159                             self.input.setValidator(QDoubleValidator())
160                         else:
161                             self.input.setValidator(QDoubleValidator())
162                 else:
163                     self.input = QLineEdit(self) #new
                            line edit #standard input
                            method
```

```
164
165                 self.inputList.append(self.input)
                        #line edits/combo boxes appended
                        to list for further reference
166                 self.gridLayout.addWidget(self.inputList[count],
                        *self.coordinate)
167
168                 count += 1
169
170             else: #adding qlabels with the line edits
171                 self.DateEntry = False
172                 if self.AddType == "Book" and count
                        == 10: #adding date button instead
                        of qlabel
173                     self.DateEntry = True
174                 elif self.AddType == "PubInvoice" and
                        count == 2: #data button instead
                        of qlabel
175                     self.DateEntry = True
176                 elif self.AddType == "BookInvoice"
                        and count == 1:
177                     self.DateEntry = True
178                 elif self.AddType == "Royalties" and
                        count == 1:
179                     self.DateEntry = True
180
181                 else:
182                     if str(self.columnHeader) ==
                            "PubInvoiceService":
183                         self.qlabel =
                                QLabel("Service", self)
184                     elif str(self.columnHeader) in
                            ["PubInvoicePayment",
                            "BookInvoicePayment",
                            "RoyaltyPayment"]:
185                         self.qlabel =
                                QLabel("Payment", self)
186                     elif str(self.columnHeader) in
                            ["BookInvoiceDiscount",
                            "RoyaltyDiscount"]:
187                         self.qlabel =
                                QLabel("Discount", self)
188                     elif str(self.columnHeader) in
                            ["BookInvoiceQuantity",
                            "RoyaltyQuantity"]:
```

```
189                         self.qlabel =
                                QLabel("Quantity", self)
190                     elif str(self.columnHeader) ==
                        "ExcRateFromGBP":
191                         self.qlabel = QLabel("£1 = ",
                                self)
192                     elif str(self.columnHeader)[-2:]
                        in ["ID", "BN"]:
193                         self.qlabel =
                                QLabel(str(self.columnHeader))
194
195                     else:
196                         self.Label =
                                str(self.columnHeader)
197                         self.LabelLength =
                                len(self.Label)
198                         self.CamelCase = False
199                         for count2 in range(1,
                                self.LabelLength):
200                             if self.CamelCase == True:
201                                 pass
202                             else:
203                                 self.CamelCase = False
204                             if
                                    self.Label[count2].isupper()
                                    == True:
205                                 self.String1 =
                                        re.sub('(.)([A-Z][a-z]+)',
                                        r'\1 \2',
                                        self.Label[0:count2])
206                                 self.String2 =
                                        re.sub('(.)([A-Z][a-z]+)',
                                        r'\1 \2',
                                        self.Label[count2:self.LabelLength])
207                                 self.tempLabel = "{}
                                        {}".format(self.String1,
                                        self.String2)
208                                 self.CamelCase = True
209
210                         if self.CamelCase == True:
211                             self.Label =
                                    self.tempLabel
212
213                         self.qlabel =
                                QLabel(str(self.Label),
                                self)
```

```
214                     self.qlabelList.append(self.qlabel)
215                     self.gridLayout.addWidget(self.qlabelList[count],
                            *self.coordinate)
216
217                 if self.DateEntry == True:
218                     self.btnDate =
                            QPushButton("Date", self)
219                     self.qlabelList.append(self.btnDate)
220                     self.gridLayout.addWidget(self.qlabelList[count],
                            *self.coordinate)
221                     self.btnDate.clicked.connect(self.CalendarWidget.Display
222                     self.CalendarWidget.btnSelect.clicked.connect(self.getDa
223
224             if self.AddType == "Book":
225                 self.inputList[4].addItem("Large")
226                 self.inputList[4].addItem("Small")
227                 self.inputList[5].addItem("Hard")
228                 self.inputList[5].addItem("Soft")
229                 self.inputList[6].addItem("Matte")
230                 self.inputList[6].addItem("Gloss")
231                 self.inputList[7].addItem("White")
232                 self.inputList[7].addItem("Creme")
233
234             elif self.AddType == "PubInvoice":
235                 self.inputList[3].addItem("Standard")
236                 self.inputList[3].addItem("Enhanced")
237                 self.inputList[3].addItem("Colour
                        Publishing")
238                 self.inputList[3].addItem("Reprint")
239
240             elif self.AddType == "BookInvoiceItems":
241                 self.inputList[4].addItem("Rush")
242                 self.inputList[4].addItem("Premium")
243                 self.inputList[4].addItem("Standard")
244                 self.inputList[4].addItem("Economy")
245                 self.inputList[4].addItem("International")
246
247             if self.Editing == True:
248
249                 if self.AddType == "Book":
250
251                     for count in range(0, 12):
252                         try: #for line edits
253                             self.inputList[count].setText(str(self.originalItemL
254                         except: #for comboboxes
```

```
255                         self.originalIndex =
                                self.inputList[count].findText(str(self.originalI
256                         self.inputList[count].setCurrentIndex(self.originalI
257
258             elif self.AddType == "PubInvoice":
259
260                 for count in range(0, 5):
261                     try:
262                         self.inputList[count].setText(str(self.originalItemL
263                     except:
264                         self.originalIndex =
                                self.inputList[count].findText(str(self.originalI
265                         self.inputList[count].setCurrentIndex(self.originalI
266
267             elif self.AddType in ["BookInvoice",
                "Royalties"]:
268
269                 for count in range(0, 2):
270                     self.inputList[count].setText(str(self.originalItemList[
271             elif self.AddType == "BookInvoiceItems":
272                 for count in range(0, 6):
273                     try:
274                         self.inputList[count].setText(str(self.originalItemL
275                     except:
276                         self.originalIndex =
                                self.inputList[count].findText(str(self.originalI
277                         self.inputList[count].setCurrentIndex(self.originalI
278             elif self.AddType == "RoyaltyItems":
279                 for count in range(0, 8):
280                     self.inputList[count].setText(str(self.originalItemList[
281
282         self.horizontal = QHBoxLayout()
283         if self.AddType in ["BookInvoiceItems",
            "RoyaltyItems"]:
284             self.horizontal.addWidget(self.btnCalculate)
285             self.horizontal.addWidget(self.qleCalculation)
286         self.horizontal.addStretch(1)
287         self.horizontal.addWidget(self.btnCancel)
288         self.horizontal.addWidget(self.btnConfirm)
289         if self.AddType in ["BookInvoiceItems",
            "RoyaltyItems"]:
290             if self.Editing == False:
291                 self.btnConfirm.clicked.connect(self.CheckCalculated)
292         if self.Editing == False:
293             self.btnConfirm.clicked.connect(self.Validate)
294         self.vertical = QVBoxLayout()
```

```
295             self.vertical.addLayout(self.gridLayout)
296             self.vertical.addLayout(self.horizontal)
297             self.setLayout(self.vertical)
298 
299 
300             self.btnCancel.clicked.connect(self.reject)
                    #reject on clicking cancel
301             self.exec_()
302 
303         def CheckCalculated(self):
304             self.ReadyToVerify = False
305             if len(self.qleCalculation.text()) == 0:
306                 self.Msg = QMessageBox()
307                 self.Msg.setWindowTitle("Calculation")
308                 self.Msg.setText("You must fill all
                        fields and click 'Calculate' before
                        attempting to add to the database.")
309                 self.Msg.exec_()
310             else:
311                 self.ReadyToVerify = True
312 
313         def AnswerButtons(self): #so connections can be
                made outside of this class
314             self.btnConfirm = QPushButton("Confirm", self)
315             self.btnCancel = QPushButton("Cancel", self)
316             if self.AddType in ["BookInvoiceItems",
                    "RoyaltyItems"]:
317                 self.btnCalculate =
                        QPushButton("Calculate", self)
318                 self.qleCalculation = QLineEdit(self)
319                 self.qleCalculation.setReadOnly(True)
320 
321         def getDate(self):
322             self.CalendarWidget.date =
                    self.CalendarWidget.qle.text()
323             if self.AddType == "Book":
324                 self.inputList[10].setText(self.CalendarWidget.date)
325 
326             elif self.AddType == "PubInvoice":
327                 self.inputList[2].setText(self.CalendarWidget.date)
328 
329             elif self.AddType in ["BookInvoice",
                    "Royalties"]:
330                 self.inputList[1].setText(self.CalendarWidget.date)
331 
332         def keyReleaseEvent(self, QKeyEvent):
```

```
333             if self.AddType == "RoyaltyItems":
334                 if self.inputList[2].text() == "£":
335                     self.inputList[7].setText("N/A")
336                     self.inputList[7].setReadOnly(True)
337                 elif self.inputList[7].text() == "N/A":
338                     self.inputList[7].setText("")
339                     self.inputList[7].setReadOnly(False)
340                 if self.inputList[5].text() != "":
341                     self.PrintCost = (self.PagePrice +
                            self.CoverPrice) *
                            int(self.inputList[5].text())
342                     self.inputList[6].setText("{0:.2f}".format(self.PrintCost))
343                 elif self.inputList[5].text() == "":
344                     self.inputList[6].clear()
345
346
347
348     def Validate(self):
349         if self.ReadyToVerify == True:
350             self.input_data = []
351             self.Valid = True
352             for count in range(0,
                    len(self.inputList)):
353                 try: #gathering the input data
354                     self.input_data.append(str(self.inputList[count].current
355                 except:
356                     if count == 8 and self.AddType ==
                            "RoyaltyItems":
357                         self.input_data.append(self.NetSales)
358                     else:
359                         self.input_data.append(self.inputList[count].text())
360
361             for count in range(0,
                    len(self.input_data)):
362
363                 if
                        str(self.input_data[count]).replace("
                        ", "") == "": #presence check
364                     self.Valid = False
365                     self.ErrorMessage = "All Fields
                            must be filled."
366                     break
367                 try:
368                     if float(self.input_data[count])
                            < 0: #range check
369                         self.Valid = False
```

```
370                         self.ErrorMessage = "Invalid
                                Entry - Please check the
                                fields."
371                         break
372                 except:
373                     pass
374
375                 if self.qlabelList[count].text() ==
                        "ISBN":
376                     if len(self.input_data[count]) !=
                            13 and
                            len(self.input_data[count]) !=
                            10: #isbn must be 10 or 13
                            digits
377                         self.Valid = False
378                         self.ErrorMessage = "Invalid
                                ISBN - Must be 10 or 13
                                digits."
379                         break
380                 elif self.qlabelList[count].text() ==
                        "No Of Pages":
381                     if int(self.input_data[count]) >
                            2000:
382                         self.Valid = False
383                         self.ErrorMessage = "Invalid
                                Entry - Please check the
                                fields."
384                         break
385                 elif self.qlabelList[count].text() ==
                        "Discount": #%'s must be between 0
                        and 100
386                     if float(self.input_data[count])
                            > 100 or
                            float(self.input_data[count])
                            < 0:
387                         self.Valid = False
388                         self.ErrorMessage = "Invalid
                                Entry - Please check the
                                fields."
389                         break
390
391             if self.Valid == False:
392                 self.Msg = QMessageBox()
393                 self.Msg.setWindowTitle("Invalid
                        Entry")
394                 self.Msg.setText(self.ErrorMessage)
```

```
395                 self.Msg.exec_()
396             else:
397                 if self.AddType not in
                        ["BookInvoiceItems",
                        "RoyaltyItems"]:
398                     if self.Editing == False:
399                         self.accept()
400                     else:
401                         self.ReadyToVerify = True
```

4.10.10 Module 10

```
1  import sys
2  from PyQt4.QtCore import *
3  from PyQt4.QtGui import *
4
5  class dbCalendarWidget(QDialog):
6
7      def __init__(self):
8          super().__init__()
9
10     def Calendar(self):
11         self.setFixedSize(265, 275)
12         self.setWindowTitle('Calendar')
13         calendar = QCalendarWidget(self)
14         calendar.setGridVisible(True)
15         calendar.clicked[QDate].connect(self.date)
16         date = calendar.selectedDate()
17         self.lblInstruction = QLabel(self)
18         self.lblInstruction.setText("Please select a
               date")
19         self.lblInstruction.setAlignment(Qt.AlignCenter)
20         self.qle = QLineEdit(self)
21         self.qle.setText(date.toString("dd-MM-yyyy"))
22         self.qle.setFixedSize(85,20)
23         self.qle.setAlignment(Qt.AlignCenter)
24         self.btnSelect = QPushButton("Select", self)
25         self.btnCancel = QPushButton("Cancel", self)
26
27         self.horizontalTop = QHBoxLayout()
28         self.horizontalTop.addStretch(1)
29         self.horizontalTop.addWidget(self.lblInstruction)
30         self.horizontalTop.addStretch(1)
31
```

```
32          self.horizontalMid1 = QHBoxLayout()
33          self.horizontalMid1.addStretch(1)
34          self.horizontalMid1.addWidget(calendar)
35          self.horizontalMid1.addStretch(1)
36
37          self.horizontalMid2 = QHBoxLayout()
38          self.horizontalMid2.addStretch(1)
39          self.horizontalMid2.addWidget(self.qle)
40          self.horizontalMid2.addStretch(1)
41
42          self.horizontalBottom = QHBoxLayout()
43          self.horizontalBottom.addWidget(self.btnCancel)
44          self.horizontalBottom.addStretch(1)
45          self.horizontalBottom.addWidget(self.btnSelect)
46
47          self.vertical = QVBoxLayout()
48          self.vertical.addLayout(self.horizontalTop)
49          self.vertical.addLayout(self.horizontalMid1)
50          self.vertical.addLayout(self.horizontalMid2)
51          self.vertical.addLayout(self.horizontalBottom)
52          self.setLayout(self.vertical)
53
54
55      def DisplayCalendar(self):
56          self.setModal(True)
57          self.btnSelect.clicked.connect(self.accept)
58          self.btnCancel.clicked.connect(self.reject)
59          self.exec_()
60
61      def date(self, date):
62          self.qle.setText(date.toString("dd-MM-yyyy"))
```

4.10.11 Module 11

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5
6  class dbConfirmationDialog(QDialog):
7      """creating confirmation modal dialogs"""
8
9      def __init__(self):
10         super().__init__()
```

```
11          self.Prevention = False
12
13      def VerifyDlg(self):
14          self.setWindowTitle("Verification")
15          self.setFixedSize(275, 150)
16          self.setModal(True)
17          self.lblWarningMsg = QLabel(self.Msg, self)
18          self.horizontal = QHBoxLayout()
19          self.horizontal.addStretch(1)
20          self.horizontal.addWidget(self.lblWarningMsg)
21          self.horizontal.addStretch(1)
22          self.lblWarningMsg.setFixedSize(250,30)
23          self.lblWarningMsg.setWordWrap(True)
24          self.lblWarningMsg.setAlignment(Qt.AlignHCenter)
25
26          self.qlePasswordBox = QLineEdit(self)
27          self.qlePasswordBox.setFixedSize(100, 25)
28          self.qlePasswordBox.setEchoMode(self.qlePasswordBox.Password)
29          self.lblPassword = QLabel("Password: ", self)
30
31          self.horizontal1 = QHBoxLayout()
32          self.horizontal1.addStretch(1)
33          self.horizontal1.addWidget(self.lblPassword)
34          self.horizontal1.addWidget(self.qlePasswordBox)
35          self.horizontal1.addStretch(1)
36
37          self.btnConfirm = QPushButton("Confirm", self)
38          self.btnCancel = QPushButton("Cancel", self)
39          self.horizontal2 = QHBoxLayout()
40          self.horizontal2.addWidget(self.btnCancel)
41          self.horizontal2.addWidget(self.btnConfirm)
42
43          self.vertical = QVBoxLayout()
44          self.vertical.addLayout(self.horizontal)
45          self.vertical.addLayout(self.horizontal1)
46          self.vertical.addLayout(self.horizontal2)
47          self.vertical.addStretch(1)
48          self.setLayout(self.vertical)
49
50
51          self.btnCancel.clicked.connect(self.reject)
52          self.ConfirmedDialog = dbConfirmationDialog()
53          self.ConfirmedDialog.ConfirmedMsg =
               self.ConfirmedMsg
54          self.lblInvalid = None
55          self.btnConfirm.clicked.connect(self.PasswordCheck)
```

```
56
57          self.ConfirmedDialog.Accepted = False
58          self.exec_()
59
60
61      def PasswordCheck(self):
62          with sqlite3.connect("dbLogin.db") as db:
63              cursor = db.cursor()
64              cursor.execute("select Password from
                    LoginDetails")
65              self.Password = list(cursor.fetchall())
66              self.Valid = False
67
68              for count in range(0, len(self.Password)):
69                  if self.qlePasswordBox.text() ==
                        list(self.Password[count])[0]:
70                      self.accept()
71                      self.ConfirmedDialog.Accepted =
                            True
72                      if self.Prevention == False:
73                          self.ConfirmedDialog.Confirmed()
74                      break
75                  else:
76                      self.Valid = False
77
78              if self.Valid == False:
79                  if self.lblInvalid == None:
80                      self.lblInvalid = QLabel("Invalid
                            Username or Password - Please
                            try again.", self)
81                      self.lblInvalid.setWordWrap(True)
82                      self.lblInvalid.setAlignment(Qt.AlignHCenter)
83                      self.horizontalInvalid =
                            QHBoxLayout()
84                      self.horizontalInvalid.addStretch(1)
85                      self.horizontalInvalid.addWidget(self.lblInvalid)
86                      self.horizontalInvalid.addStretch(1)
87                      self.vertical.addLayout(self.horizontalInvalid)
88                  else:
89                      self.lblInvalid.show()
90
91
92      def Confirmed(self):
93          self.setWindowTitle("Confirmation")
94          self.setFixedSize(275, 100)
95          self.setModal(True)
```

```
96
97          self.lblConfirmed = QLabel(self.ConfirmedMsg,
                self)
98          self.lblConfirmed.setFixedSize(250, 50)
99          self.lblConfirmed.setWordWrap(True)
100         self.lblConfirmed.setAlignment(Qt.AlignHCenter)
101
102         self.btnOk = QPushButton("OK", self)
103         self.btnOk.setFixedSize(75, 30)
104         self.btnOk.clicked.connect(self.accept)
105
106         self.horizontal = QHBoxLayout()
107         self.horizontal.addStretch(1)
108         self.horizontal.addWidget(self.btnOk)
109         self.horizontal.addStretch(1)
110
111         self.vertical = QVBoxLayout()
112         self.vertical.addWidget(self.lblConfirmed)
113         self.vertical.addStretch(1)
114         self.vertical.addLayout(self.horizontal)
115         self.setLayout(self.vertical)
116         self.exec_()
117
118     def keyReleaseEvent(self, QKeyEvent):
119         if self.lblInvalid != None:
120             self.lblInvalid.hide()
```

4.10.12 Module 12

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5
6  class dbItems(QDialog):
7      """viewing royalty and invoice items"""
8
9      def __init__(self):
10         super().__init__()
11         self.BookEdited = False
12     def BookInvoiceItems(self):
13         self.setWindowTitle("View Book Invoice Items")
14         self.setModal(True)
15         self.setFixedSize(640, 220)
```

```
16          self.vertical = QVBoxLayout(self)
17          self.vertical.addWidget(self.table)
18          self.btnCalculate.setFixedSize(100, 40)
19          self.btnUpdateBookInvoiceItems.setFixedSize(100,
                40)
20          self.btnDeleteEntry.setFixedSize(100, 40)
21          self.horizontal = QHBoxLayout()
22          self.horizontal.addWidget(self.btnCalculate)
23          self.horizontal.addStretch(1)
24          self.horizontal.addWidget(self.btnUpdateBookInvoiceItems)
25          self.horizontal.addStretch(1)
26          self.horizontal.addWidget(self.btnDeleteEntry)
27          self.vertical.addLayout(self.horizontal)
28          self.setLayout(self.vertical)
29
30          self.exec_()
31
32      def BookInvoiceItemsButtons(self):
33          self.btnCalculate = QPushButton("Calculate",
                self)
34          self.btnUpdateBookInvoiceItems =
                QPushButton("Update Book \n Invoice
                Items", self)
35          self.btnDeleteEntry = QPushButton("Delete \n
                Entry", self)
36
37      def RoyaltiesItems(self):
38          self.setWindowTitle("View Royalty Items")
39          self.setModal(True)
40          self.setFixedSize(640, 220)
41          self.vertical = QVBoxLayout(self)
42          self.vertical.addWidget(self.table)
43          self.btnCalculate.setFixedSize(100, 40)
44          self.btnUpdateRoyaltyItems.setFixedSize(100,
                40)
45          self.btnDeleteEntry.setFixedSize(100, 40)
46          self.horizontal = QHBoxLayout()
47          self.horizontal.addWidget(self.btnCalculate)
48          self.horizontal.addStretch(1)
49          self.horizontal.addWidget(self.btnUpdateRoyaltyItems)
50          self.horizontal.addStretch(1)
51          self.horizontal.addWidget(self.btnDeleteEntry)
52          self.vertical.addLayout(self.horizontal)
53          self.setLayout(self.vertical)
54
55          self.exec_()
```

```
56
57      def RoyaltyItemsButtons(self):
58          self.btnCalculate = QPushButton("Calculate",
                self)
59          self.btnUpdateRoyaltyItems =
                QPushButton("Update \n Royalty Items",
                self)
60          self.btnDeleteEntry = QPushButton("Delete \n
                Entry", self)
61
62
63      def CalculateBookInvoiceItems(self):
64          with sqlite3.connect("PP.db") as db:
65              cursor = db.cursor()
66              cursor.execute("PRAGMA foreign_keys_ =
                    ON")
67              self.Empty = False
68              self.BookInvoicePayment = 0
69
70              self.IDList = []
71              sql = "select BookInvoiceItemsID from
                    BookInvoiceItems where BookInvoiceID =
                    {}".format(self.selectedID)
72              cursor.execute(sql)
73              self.IDListTuple = list(cursor.fetchall())
74              for count in range(0,
                    len(self.IDListTuple)): #conversion
                    from tuple
75                  self.IDList.append(list(self.IDListTuple[count])[0])
76
77              self.currentID = 0
78              for count in range(0, len(self.IDList)):
79                  if self.currentID <
                        self.IDList[count]: #finding
                        biggest ID no.
80                      self.currentID =
                            self.IDList[count]
81
82              sql = "select ISBN from BookInvoiceItems
                    where BookInvoiceID =
                    {}".format(self.selectedID)
83              cursor.execute(sql)
84              self.ISBNs = list(cursor.fetchall())
85
86              for count2 in range(0, len(self.ISBNs)):
87                  if self.currentID != 0:
```

```
88                      for count in range(0,
                            self.currentID +1):
89                          self.Empty = False
90                          Selection =
                                "BookInvoiceItems.BookInvoiceQuantity,
                                BookInvoiceItems.BookInvoiceDiscount,
                                BookInvoiceItems.ShippingPrice,
                                Book.Price"
91                          Tables = "BookInvoiceItems,
                                Book"
92                          sql = "select {} from {}
                                where
                                BookInvoiceItems.BookInvoiceID
                                = {} and
                                BookInvoiceItems.BookInvoiceItemsID
                                = {} and
                                BookInvoiceItems.ISBN = {}
                                and Book.ISBN =
                                BookInvoiceItems.ISBN".format(Selection,
                                Tables, self.selectedID,
                                count+1,
                                list(self.ISBNs[count2])[0])
93                          cursor.execute(sql)
94                          try:
95                              self.SelectionList =
                                    list(cursor.fetchone())
96                          except:
97                              self.Empty = True
98
99                          if self.Empty != True:
100                             self.Quantity =
                                    self.SelectionList[0]
101                             self.Discount =
                                    self.SelectionList[1]
                                    / 100
102                             self.ShippingPrice =
                                    self.SelectionList[2]
103                             self.Price =
                                    self.SelectionList[3]
104
105                             self.TempPayment =
                                    (self.Quantity *
                                    self.Price)
106                             self.Discount *=
                                    self.TempPayment
```

```
107                                 self.TempPayment -=
                                        self.Discount
108                                 self.TempPayment +=
                                        self.ShippingPrice
109
110                                 self.BookInvoicePayment
                                        += self.TempPayment
111
112
113                     elif self.currentID == 0:
114                         self.BookInvoicePayment = None
115                         sql = "update BookInvoice set
                                BookInvoicePayment = '{}'
                                where BookInvoiceID =
                                {}".format(self.BookInvoicePayment,
                                self.selectedID)
116                         cursor.execute(sql)
117                         db.commit()
118
119                 if self.currentID != 0:
120                     self.BookInvoicePayment =
                            "£{0:.2f}".format(self.BookInvoicePayment)
121                     sql = "update BookInvoice set
                            BookInvoicePayment = '{}' where
                            BookInvoiceID =
                            {}".format(self.BookInvoicePayment,
                            self.selectedID)
122                     cursor.execute(sql)
123                     db.commit()
124
125         def CalculateRoyaltyItems(self):
126             with sqlite3.connect("PP.db") as db:
127                 cursor = db.cursor()
128                 cursor.execute("PRAGMA foreign_keys = ON")
129                 self.Empty = False
130                 self.RoyaltyPayment = 0
131                 self.Currency = ""
132                 self.IDList = []
133                 sql = "select RoyaltyItemsID from
                        RoyaltyItems where RoyaltiesID =
                        {}".format(self.selectedID)
134                 cursor.execute(sql)
135                 self.IDListTuple = list(cursor.fetchall())
136                 for count in range(0,
                        len(self.IDListTuple)): #conversion
                        from tuple
```

```
137                     self.IDList.append(list(self.IDListTuple[count])[0])
138
139                 self.currentID = 0
140                 for count in range(0, len(self.IDList)):
141                     if self.currentID <
                           self.IDList[count]: #finding
                           biggest ID no. for iteration limit
142                         self.currentID =
                               self.IDList[count]
143
144                 sql = "select ISBN from RoyaltyItems
                       where RoyaltiesID =
                       {}".format(self.selectedID)
145                 cursor.execute(sql)
146                 self.ISBNs = list(cursor.fetchall())
147
148                 for count2 in range(0, len(self.ISBNs)):
149                     if self.currentID != 0:
150                         for count in range(0,
                               self.currentID+1):
151                             self.Empty = False
152                             Selection =
                                   "RoyaltyItems.Currency,
                                   RoyaltyItems.NetSales,
                                   RoyaltyItems.ExcRateFromGBP,
                                   RoyaltyItems.RoyaltyQuantity,
                                   Book.NoOfPages, Book.Size,
                                   Book.Cover, Book.Back"
153                             Tables = "RoyaltyItems, Book"
154                             sql = "select {} from {}
                                   where
                                   RoyaltyItems.RoyaltiesID =
                                   {} and
                                   RoyaltyItems.RoyaltyItemsID
                                   = {} and RoyaltyItems.ISBN
                                   = {} and Book.ISBN =
                                   RoyaltyItems.ISBN".format(Selection,
                                   Tables, self.selectedID,
                                   count+1,
                                   list(self.ISBNs[count2])[0])
155                             cursor.execute(sql)
156
157                             try:
158                                 self.SelectionList =
                                       list(cursor.fetchone())
159                             except:
```

```
160                         self.Empty = True
161
162                     if self.Empty != True:
163                         self.Currency =
                                self.SelectionList[0]
164                         self.NetSales =
                                float(self.SelectionList[1])
165                         self.Quantity =
                                self.SelectionList[3]
166                         self.NoOfPages =
                                int(self.SelectionList[4])
167                         self.Size =
                                self.SelectionList[5]
168                         self.Cover =
                                self.SelectionList[6]
169                         self.Back =
                                self.SelectionList[7]
170
171                         if self.Size == "Large":
172                             self.PagePrice =
                                    0.015 *
                                    self.NoOfPages
173                             if self.Back ==
                                    "Hard":
174                                 self.CoverPrice =
                                        5
175                             elif self.Back ==
                                    "Soft":
176                                 self.CoverPrice =
                                        1
177                         elif self.Size == "Small":
178                             self.PagePrice = 0.01
                                    * self.NoOfPages
179                             if self.Back ==
                                    "Hard":
180                                 self.CoverPrice =
                                        4
181                             elif self.Back ==
                                    "Soft":
182                                 self.CoverPrice =
                                        0.7
183
184                         self.PrintCost =
                                (self.PagePrice +
                                self.CoverPrice) *
                                self.Quantity
```

```
185
186                                 self.TempPayment=
                                        self.NetSales -
                                        self.PrintCost
187                                 if self.Currency != "£":
188                                     self.ExcRateFromGBP =
                                            float(self.SelectionList[2])
189                                     self.TempPayment /=
                                            self.ExcRateFromGBP
190                                 self.RoyaltyPayment +=
                                        self.TempPayment
191                         elif self.currentID == 0:
192                             self.BookInvoicePayment = None
193                             sql = "update Royalties set
                                    RoyaltyPayment = '{}' where
                                    RoyaltiesID =
                                    {}".format(self.RoyaltyPayment,
                                    self.selectedID)
194                             cursor.execute(sql)
195                             db.commit()
196
197                 if self.currentID != 0:
198                     self.RoyaltyPayment =
                            "£{0:.2f}".format(self.RoyaltyPayment)
199                     sql = "update Royalties set
                            RoyaltyPayment = '{}' where
                            RoyaltiesID =
                            {}".format(self.RoyaltyPayment,
                            self.selectedID)
200                     cursor.execute(sql)
201                     db.commit()
```

4.10.13 Module 13

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5
6  class dbRoyaltiesAndInvoices(QDialog):
7      """viewing royalties and invoices"""
8
9      def __init__(self):
10         super().__init__()
```

```
11
12      def PubInvoice(self):
13          self.setWindowTitle("View Publishing
                Invoices")
14          self.setModal(True)
15          self.setFixedSize(640, 220)
16          self.vertical = QVBoxLayout(self)
17          self.vertical.addWidget(self.table)
18          self.btnAddPubInvoice.setFixedSize(100, 40)
19          self.btnUpdatePubInvoice.setFixedSize(100, 40)
20          self.btnDeleteEntry.setFixedSize(100, 40)
21          self.horizontal = QHBoxLayout()
22          self.horizontal.addWidget(self.btnAddPubInvoice)
23          self.horizontal.addStretch(1)
24          self.horizontal.addWidget(self.btnUpdatePubInvoice)
25          self.horizontal.addStretch(1)
26          self.horizontal.addWidget(self.btnDeleteEntry)
27          self.vertical.addLayout(self.horizontal)
28          self.setLayout(self.vertical)
29
30          self.exec_()
31
32      def PubInvoiceButtons(self):
33          self.btnAddPubInvoice = QPushButton("Add
                Publishing \n Invoice", self)
34          self.btnUpdatePubInvoice =
                QPushButton("Update Publishing \n
                Invoice", self)
35          self.btnDeleteEntry = QPushButton("Delete \n
                Entry", self)
36
37
38      def BookInvoice(self):
39          self.setWindowTitle("View Book Invoices")
40          self.setModal(True)
41          self.setFixedSize(640, 220)
42          self.vertical = QVBoxLayout(self)
43          self.vertical.addWidget(self.table)
44          self.btnViewBookInvoiceItems.setFixedSize(100,
                40)
45          self.btnAddBookInvoice.setFixedSize(100, 40)
46          self.btnUpdateBookInvoice.setFixedSize(100,
                40)
47          self.btnDeleteEntry.setFixedSize(100, 40)
48          self.horizontal = QHBoxLayout()
49          self.horizontal.addWidget(self.btnViewBookInvoiceItems)
```

```
50          self.horizontal.addStretch(1)
51          self.horizontal.addWidget(self.btnAddBookInvoice)
52          self.horizontal.addStretch(1)
53          self.horizontal.addWidget(self.btnUpdateBookInvoice)
54          self.horizontal.addStretch(1)
55          self.horizontal.addWidget(self.btnDeleteEntry)
56          self.vertical.addLayout(self.horizontal)
57          self.setLayout(self.vertical)
58
59          self.exec_()
60
61      def BookInvoiceButtons(self):
62          self.btnViewBookInvoiceItems =
                QPushButton("View Book \n Invoice Items",
                self)
63          self.btnAddBookInvoice = QPushButton("Add
                Book \n Invoice", self)
64          self.btnUpdateBookInvoice =
                QPushButton("Update Book \n Invoice", self)
65          self.btnDeleteEntry = QPushButton("Delete \n
                Entry", self)
66
67      def Royalties(self):
68          self.setWindowTitle("View Royalties")
69          self.setModal(True)
70          self.setFixedSize(640, 220)
71          self.vertical = QVBoxLayout(self)
72          self.vertical.addWidget(self.table)
73          self.btnViewRoyaltyItems.setFixedSize(100, 40)
74          self.btnAddRoyalties.setFixedSize(100, 40)
75          self.btnUpdateRoyalties.setFixedSize(100, 40)
76          self.btnDeleteEntry.setFixedSize(100, 40)
77          self.horizontal = QHBoxLayout()
78          self.horizontal.addWidget(self.btnViewRoyaltyItems)
79          self.horizontal.addStretch(1)
80          self.horizontal.addWidget(self.btnAddRoyalties)
81          self.horizontal.addStretch(1)
82          self.horizontal.addWidget(self.btnUpdateRoyalties)
83          self.horizontal.addStretch(1)
84          self.horizontal.addWidget(self.btnDeleteEntry)
85          self.vertical.addLayout(self.horizontal)
86          self.setLayout(self.vertical)
87
88          self.exec_()
89
90      def RoyaltiesButtons(self):
```

```
91          self.btnViewRoyaltyItems = QPushButton("View
               Royalty \n Items", self)
92          self.btnAddRoyalties = QPushButton("Add \n
               Royalties", self)
93          self.btnUpdateRoyalties = QPushButton("Update
               \n Royalties", self)
94          self.btnDeleteEntry = QPushButton("Delete \n
               Entry", self)
```

4.10.14 Module 14

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5
6
7  class dbSearchDatabase(QDialog):
8      """initialising the detailed search window"""
9
10     def __init__(self):
11         super().__init__()
12
13     def initLayout(self):
14         self.setWindowTitle("Search")
15         self.gridLayout = QGridLayout()
16         self.gridLayout.setVerticalSpacing(10)
17         self.gridLayout.setHorizontalSpacing(10)
18         self.setFixedSize(400, 200)
19         self.leFirstname = QLineEdit(self)
20         self.leLastname = QLineEdit(self)
21         self.cbTable = QComboBox(self)
22         self.cbCategory = QComboBox(self)
23         self.btnDate = QPushButton("Add Date", self)
24         self.leSearch = QLineEdit(self)
25         self.btnCancel = QPushButton("Cancel", self)
26         self.btnSearch = QPushButton("Search", self)
27         self.btnDate.setFixedSize(75, 20)
28         self.lblFirstname = QLabel("Author
               Firstname:")
29         self.lblLastname = QLabel("Author Lastname:")
30         self.gridLayout.addWidget(self.leFirstname,
               0, 3)
```

```
31          self.gridLayout.addWidget(self.leLastname, 1,
                3)
32          self.gridLayout.addWidget(self.lblFirstname,
                0, 2, Qt.AlignRight)
33          self.gridLayout.addWidget(self.lblLastname,
                1, 2, Qt.AlignRight)
34          self.gridLayout.addWidget(self.cbTable, 0, 0)
35          self.gridLayout.addWidget(self.cbCategory, 2,
                0)
36          self.gridLayout.addWidget(self.btnDate, 2, 2,
                Qt.AlignHCenter)
37          self.gridLayout.addWidget(self.leSearch, 2, 3)
38          self.gridLayout.addWidget(self.btnCancel, 3,
                2)
39          self.gridLayout.addWidget(self.btnSearch, 3,
                3)
40          self.setLayout(self.gridLayout)
41          self.cbTable.addItem("Author")
42          self.cbTable.addItem("Book")
43          self.cbTable.addItem("Publishing Invoice")
44          self.cbTable.addItem("Book Invoice")
45          self.cbTable.addItem("Book Invoice Items")
46          self.cbTable.addItem("Royalties")
47          self.cbTable.addItem("Royalty Items")
48          self.cbTable.activated[str].connect(self.ChangeCategories)
49          self.cbCategory.activated[str].connect(self.DateButton)
50          self.btnDate.hide()
51          self.leSearch.hide()
52          self.CalendarWidget.btnSelect.clicked.connect(self.getDate)
53          self.btnDate.clicked.connect(self.CalendarWidget.DisplayCalendar)
54          self.leSearch.setFixedSize(self.leSearch.sizeHint())
55          self.leFirstname.setFixedSize(self.leFirstname.sizeHint())
56          self.leLastname.setFixedSize(self.leLastname.sizeHint())
57          self.btnSearch.clicked.connect(self.getSearchData)
58          self.btnCancel.clicked.connect(self.reject)
59          self.exec_()
60
61      def ChangeCategories(self):
62          self.btnDate.hide()
63          self.leSearch.show()
64          self.cbCategory.clear()
65          if self.cbTable.currentText() == "Author":
66              self.leSearch.hide()
67          elif self.cbTable.currentText() == "Book":
68              self.cbCategory.addItem("Book Title")
69              self.cbCategory.addItem("Price")
```

```
70              self.cbCategory.addItem("Date Published")
71
72          elif self.cbTable.currentText() ==
                "Publishing Invoice":
73              self.cbCategory.addItem("Service")
74              self.cbCategory.addItem("Date")
75
76          elif self.cbTable.currentText() == "Book
                Invoice":
77              self.cbCategory.addItem("Date")
78              self.btnDate.show()
79
80          elif self.cbTable.currentText() == "Book
                Invoice Items":
81              self.cbCategory.addItem("Quantity")
82              self.cbCategory.addItem("Discount")
83              self.cbCategory.addItem("Shipping Type")
84
85          elif self.cbTable.currentText() ==
                "Royalties":
86              self.cbCategory.addItem("Date")
87              self.btnDate.show()
88
89          elif self.cbTable.currentText() == "Royalty
                Items":
90              self.cbCategory.addItem("Quantity")
91              self.cbCategory.addItem("Discount")
92              self.cbCategory.addItem("Currency")
93
94      def DateButton(self):
95          if self.cbCategory.currentText()[:4] ==
                "Date":
96              self.btnDate.show()
97              self.leSearch.setReadOnly(True)
98          else:
99              self.btnDate.hide()
100             self.leSearch.setReadOnly(False)
101
102     def getDate(self):
103         self.CalendarWidget.date =
                self.CalendarWidget.qle.text()
104         self.leSearch.setText(self.CalendarWidget.date)
105
106     def getSearchData(self):
107
108         self.Valid = True
```

```
109             self.Firstname = self.leFirstname.text()
110             self.Lastname = self.leLastname.text()
111             self.Table =
                    self.cbTable.currentText().replace(" ", "")
112             if self.Table == "PublishingInvoice":
113                 self.Table = "PubInvoice"
114
115             if self.Table != "Author":
116                 self.Category =
                        self.cbCategory.currentText().replace("
                        ", "")
117                 self.Search = self.leSearch.text()
118
119                 if self.Firstname.replace(" ", "") == ""
                        or self.Lastname.replace(" ", "") ==
                        "" or self.Category == "" or
                        self.Search.replace(" ", "") == "":
120                     self.Msg = QMessageBox()
121                     self.Msg.setWindowTitle("Invalid
                            Entry")
122                     self.Msg.setText("You must fill in
                            all fields.")
123                     self.Msg.exec_()
124                     self.Valid = False
125
126
127                 if self.Category in ["Discount",
                        "Quantity"]:
128
129                     if self.Table == "RoyaltyItems":
130                         self.Category =
                                "Royalty{}".format(self.Category)
131
132                     elif self.Table == "BookInvoiceItems":
133                         self.Category =
                                "BookInvoice{}".format(self.Category)
134
135                 elif self.Category == "Date":
136                     self.Category =
                            "{}Date".format(self.Table)
137
138                 elif self.Category == "Service":
139                     self.Category = "PubInvoiceService"
140
141
142
```

```
143             if self.Table not in ["BookInvoiceItems",
                    "RoyaltyItems"]:
144                 if self.Table in ["PubInvoice",
                        "Royalties", "BookInvoice"]:
145                     self.sql = "select
                            Customer.AuthorID, {0}ID from
                            Customer, {0} where
                            (Customer.Firstname like
                            '{1}%' or Customer.Lastname
                            like '{2}%') and {0}.{3} like
                            '{4}%' and {0}.AuthorID =
                            Customer.AuthorID".format(self.Table,
                            self.Firstname, self.Lastname,
                            self.Category, self.Search)
146                 elif self.Table == "Book":
147                     self.sql = "select
                            Customer.AuthorID,
                            Book.AuthorID, Book.ISBN from
                            Customer, {0} where
                            (Customer.Firstname like
                            '{1}%' or Customer.Lastname
                            like '{2}%') and {0}.{3} like
                            '{4}%' and {0}.AuthorID =
                            Customer.AuthorID".format(self.Table,
                            self.Firstname, self.Lastname,
                            self.Category, self.Search)
148             else:
149                 self.sql = "select Customer.AuthorID,
                        Book.AuthorID, Book.ISBN,
                        {0}.ISBN, {0}ID from Customer,
                        Book, {0} where
                        (Customer.Firstname like '{1}%' or
                        Customer.Lastname like '{2}%') and
                        {0}.{3} like '{4}%' and
                        Customer.AuthorID = Book.AuthorID
                        and Book.ISBN =
                        {0}.ISBN".format(self.Table,
                        self.Firstname, self.Lastname,
                        self.Category, self.Search)
150
151         else:
152             if self.Firstname.replace(" ", "") == ""
                    or self.Lastname.replace(" ", "") ==
                    "":
153                 self.Msg = QMessageBox()
```

```
154                 self.Msg.setWindowTitle("Invalid
                        Entry")
155                 self.Msg.setText("You must fill enter
                        the Firstname and Lastname")
156                 self.Msg.exec_()
157                 self.Valid = False
158 
159             self.Table = "Customer" #Author table is
                    referred to as 'Customer'
160             self.sql = "select AuthorID from Customer
                    where Firstname like '{0}%' or
                    Lastname like
                    '{1}%'".format(self.Firstname,
                    self.Lastname)
161         if self.Valid == True:
162             with sqlite3.connect("PP.db") as db:
163                 cursor = db.cursor()
164                 cursor.execute(self.sql)
165                 self.Results = list(cursor.fetchall())
166             self.accept()
```

4.10.15 Module 15

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sys
4  
5  
6  class initSearchResultsMenu(QWidget):
7      """main window"""
8  
9      def __init__(self):
10         super().__init__()
11         self.btnBack = QPushButton("Back", self)
12         self.btnBack.setFixedSize(100, 30)
13         self.horizontalTop = QHBoxLayout()
14         self.horizontalTop.addStretch(1)
15         self.horizontalTop.addWidget(self.btnBack)
16 
17         self.vertical = QVBoxLayout()
18         self.vertical.addLayout(self.horizontalTop)
19         self.setLayout(self.vertical)
```

4.10.16 Module 16

```
from PyQt4.QtCore import *
from PyQt4.QtGui import *
import sqlite3
import sys

class dbUsernameOrPassword(QDialog):
    """main window"""

    def __init__(self):
        super().__init__()

    def ChangeSelection(self):
        self.setModal(True)
        self.setFixedSize(400, 50)
        self.setWindowTitle("Selection")
        self.btnUsername = QPushButton("Change
            Username", self)
        self.btnPassword = QPushButton("Change
            Password", self)
        self.btnCancel = QPushButton("Cancel", self)
        self.btnCancel.clicked.connect(self.reject)
        self.btnUsername.clicked.connect(self.UsernameSelected)
        self.btnPassword.clicked.connect(self.PasswordSelected)
        self.gridLayout = QGridLayout()
        self.gridLayout.addWidget(self.btnUsername,
            0, 0)
        self.gridLayout.addWidget(self.btnPassword,
            0, 1)
        self.gridLayout.addWidget(self.btnCancel, 0,
            2)
        self.setLayout(self.gridLayout)
        self.exec_()

    def UsernameSelected(self):
        self.Selection = "Username"
        self.accept()

    def PasswordSelected(self):
        self.Selection = "Password"
        self.accept()
```

4.10.17 Module 17

```
from PyQt4.QtCore import *
from PyQt4.QtGui import *
import sqlite3
import sys

class dbChangeUsername(QDialog):
    """Change Username confirmation"""

    def __init__(self):
        super().__init__()

    def initChangeUsernameScreen(self):
        self.setWindowTitle("Change Username")
        self.setModal(True)
        self.leOldUsername = QLineEdit(self)
        self.leNewUsername = QLineEdit(self)
        self.leNewUsername.setValidator(QRegExpValidator(QRegExp("^[\w-\.]+@
        self.leOldUsername.setValidator(QRegExpValidator(QRegExp("^[\w-\.]+@
        #reg ex from www.regexlib.com
        self.leRetype = QLineEdit(self)
        self.lblOld = QLabel("Old Username:", self)
        self.lblNew = QLabel("New Username:", self)
        self.lblRetype = QLabel("Retype New
            Username:", self)
        self.leOldUsername.setPlaceholderText("Old
            Username")
        self.leNewUsername.setPlaceholderText("New
            Username")
        self.leRetype.setPlaceholderText("Retype New
            Username")
        self.btnConfirm = QPushButton("Confirm")
        self.btnCancel = QPushButton("Cancel")
        self.horizontal = QHBoxLayout()
        self.horizontal.addWidget(self.btnCancel)
        self.horizontal.addWidget(self.btnConfirm)
        self.gridLayout = QGridLayout()
        self.gridLayout.addWidget(self.lblOld, 0, 0)
        self.gridLayout.addWidget(self.lblNew, 1, 0)
        self.gridLayout.addWidget(self.lblRetype, 2,
            0)
        self.gridLayout.addWidget(self.leOldUsername,
            0, 1)
        self.gridLayout.addWidget(self.leNewUsername,
            1, 1)
        self.gridLayout.addWidget(self.leRetype, 2, 1)
```

```
39          self.gridLayout.addLayout(self.horizontal, 3,
                2)
40          self.setLayout(self.gridLayout)
41
42          self.btnCancel.clicked.connect(self.reject)
43          self.btnConfirm.clicked.connect(self.Check)
44          self.exec_()
45
46      def Check(self):
47          if self.leNewUsername.text() ==
                self.leRetype.text():
48
49              if len(self.leNewUsername.text()) < 5:
50                  self.Msg = QMessageBox()
51                  self.Msg.setWindowTitle("Username")
52                  self.Msg.setText("New Username was
                        too short")
53                  self.Msg.exec_()
54              else:
55
56                  with sqlite3.connect("dbLogin.db") as
                        db:
57                      cursor = db.cursor()
58                      cursor.execute("select Username
                            from LoginDetails")
59                      self.OldUsername =
                            list(cursor.fetchone())[0]
60                      if self.leOldUsername.text() ==
                            self.OldUsername:
61                          self.NewUsername =
                                self.leNewUsername.text()
62                          cursor.execute("update
                                LoginDetails set Username
                                = '{}' where Username =
                                '{}'".format(self.NewUsername,
                                self.Username))
63                          self.Msg = QMessageBox()
64                          self.Msg.setWindowTitle("Username")
65                          self.Msg.setText("Username
                                was successfully changed")
66                          self.Msg.exec_()
67                          self.accept()
68
69                      else:
70                          self.Msg = QMessageBox()
71                          self.Msg.setWindowTitle("Username")
```

```
72                          self.Msg.setText("Old
                               Username was incorrect")
73                          self.Msg.exec_()
74          else:
75              self.Msg = QMessageBox()
76              self.Msg.setWindowTitle("Username")
77              self.Msg.setText("New Usernames did not
                   match")
78              self.Msg.exec_()
```

4.10.18 Module 18

```
1  from PyQt4.QtCore import *
2  from PyQt4.QtGui import *
3  import sqlite3
4  import sys
5
6  class dbChangePassword(QDialog):
7      """Change password confirmation"""
8
9      def __init__(self):
10         super().__init__()
11
12     def initChangePasswordScreen(self):
13         self.setWindowTitle("Change Password")
14         self.setModal(True)
15         self.leOldPassword = QLineEdit(self)
16         self.leNewPassword = QLineEdit(self)
17         self.leRetype = QLineEdit(self)
18         self.leOldPassword.setEchoMode(self.leOldPassword.Password)
19         self.leNewPassword.setEchoMode(self.leNewPassword.Password)
20         self.leRetype.setEchoMode(self.leRetype.Password)
21         self.lblOld = QLabel("Old Password:", self)
22         self.lblNew = QLabel("New Password:", self)
23         self.lblRetype = QLabel("Retype New
               Password:", self)
24         self.leOldPassword.setPlaceholderText("Old
               Password")
25         self.leNewPassword.setPlaceholderText("New
               Password")
26         self.leRetype.setPlaceholderText("Retype New
               Password")
27         self.btnConfirm = QPushButton("Confirm")
28         self.btnCancel = QPushButton("Cancel")
```

```
29          self.horizontal = QHBoxLayout()
30          self.horizontal.addWidget(self.btnCancel)
31          self.horizontal.addWidget(self.btnConfirm)
32          self.gridLayout = QGridLayout()
33          self.gridLayout.addWidget(self.lblOld, 0, 0)
34          self.gridLayout.addWidget(self.lblNew, 1, 0)
35          self.gridLayout.addWidget(self.lblRetype, 2,
                0)
36          self.gridLayout.addWidget(self.leOldPassword,
                0, 1)
37          self.gridLayout.addWidget(self.leNewPassword,
                1, 1)
38          self.gridLayout.addWidget(self.leRetype, 2, 1)
39          self.gridLayout.addLayout(self.horizontal, 3,
                2)
40          self.setLayout(self.gridLayout)
41
42          self.btnCancel.clicked.connect(self.reject)
43          self.btnConfirm.clicked.connect(self.Check)
44          self.exec_()
45
46      def Check(self):
47          if self.leNewPassword.text() ==
                self.leRetype.text():
48
49              if len(self.leNewPassword.text()) < 5:
50                  self.Msg = QMessageBox()
51                  self.Msg.setWindowTitle("Password")
52                  self.Msg.setText("New Password was
                        too short")
53                  self.Msg.exec_()
54              else:
55                  with sqlite3.connect("dbLogin.db") as
                        db:
56                      cursor = db.cursor()
57                      cursor.execute("select Password
                            from LoginDetails")
58                      self.OldPassword =
                            list(cursor.fetchone())[0]
59                      if self.leOldPassword.text() ==
                            self.OldPassword:
60                          self.Password =
                                self.leNewPassword.text()
61                          cursor.execute("update
                                LoginDetails set Password
                                = '{}' where Username =
```

```
                                '{}'".format(self.Password,
                                self.Username))
62                          self.Msg = QMessageBox()
63                          self.Msg.setWindowTitle("Password")
64                          self.Msg.setText("Password
                                was successfully changed")
65                          self.Msg.exec_()
66                          self.accept()
67
68                      else:
69                          self.Msg = QMessageBox()
70                          self.Msg.setWindowTitle("Password")
71                          self.Msg.setText("Old
                                Password was incorrect")
72                          self.Msg.exec_()
73          else:
74              self.Msg = QMessageBox()
75              self.Msg.setWindowTitle("Password")
76              self.Msg.setText("New Passwords did not
                    match")
77              self.Msg.exec_()
```

Chapter 5

User Manual

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5.2 Installation

5.2.1 Prerequisite Installation

Installing Python

Installing PyQt

Etc.

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5.2.3 Running the System

5.3 Tutorial

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5.3.2 Assumptions

5.3.3 Tutorial Questions

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Question 2

5.3.4 Saving

5.3.5 Limitations

5.4 Error Recovery

Chapter 6

Evaluation

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6.1.1 Objective Evaluation

6.2 Effectiveness

6.2.1 Objective Evaluation

6.3 Learnability

6.4 Usability

6.5 Maintainability

6.6 Suggestions for Improvement

6.7 End User Evidence

6.7.1 Questionnaires

6.7.2 Graphs

6.7.3 Written Statements