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Module Title: Information Engineering

Course Title: Applied Computing

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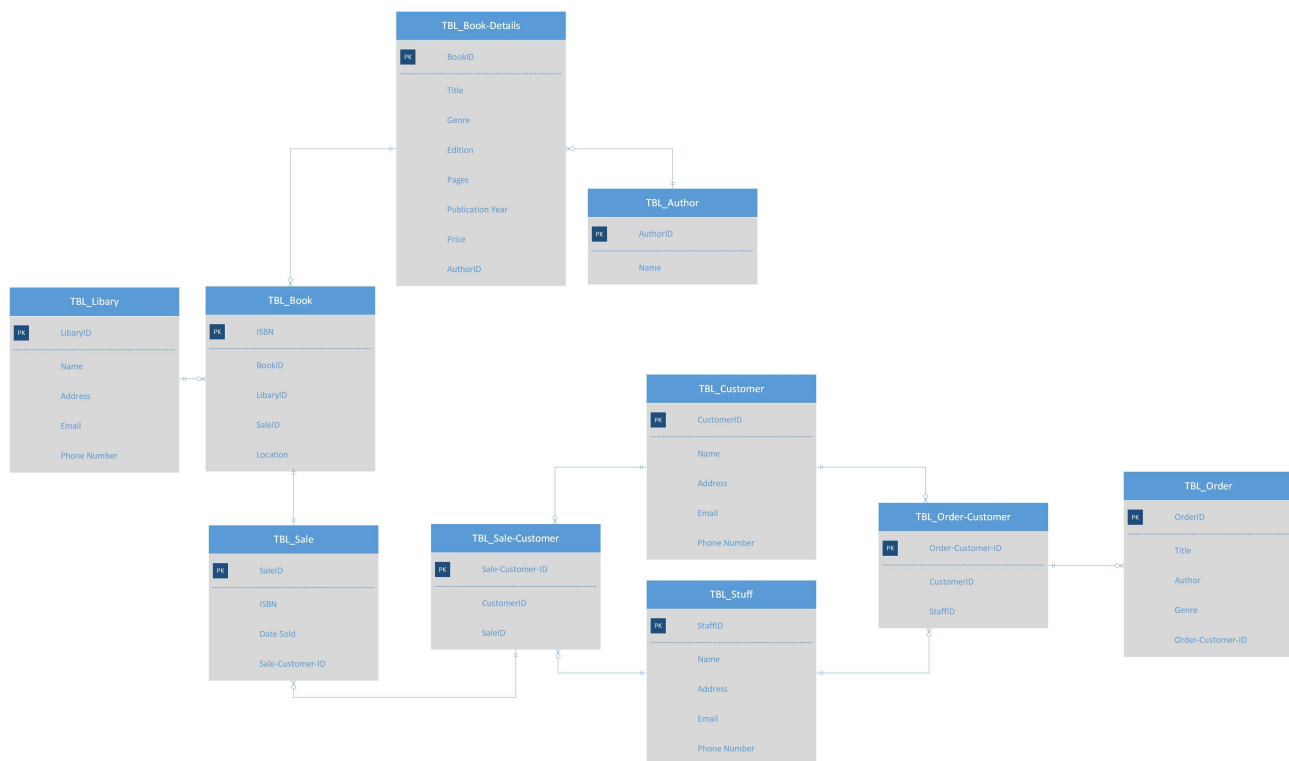
1. Introduction

This report will include:

- The initial design of the database solution.
- Screen captures of all the screens on the system, including the forms, reports, queries, macros and tables.
- A section on the user requirements and how the system was designed to meet all of these requirements.
- A simple user guide to show the basic workings of the system and all the features of it.
- The use of third normal form and how my database supports it.

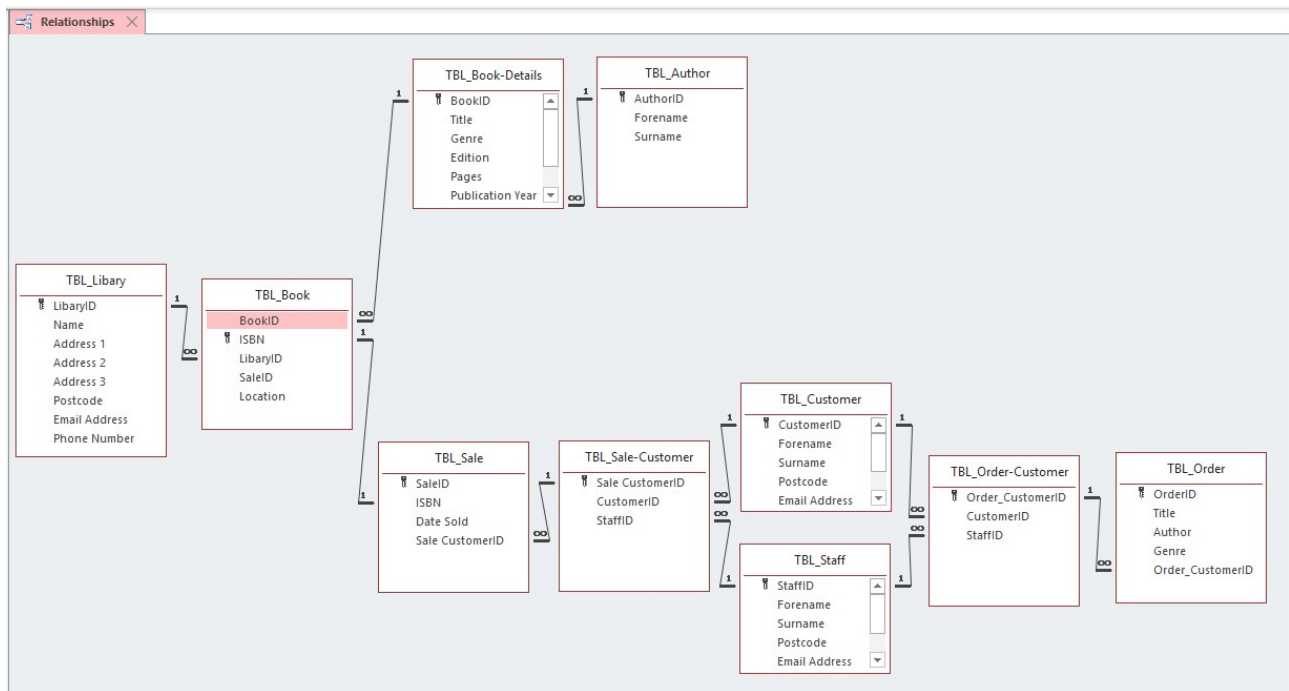
2. Initial Design

2.1 ER Diagram



3. Screen Captures

3.1 Relationship Diagram



3.2 Tables

3.2.1 Author

TBL_Author					TBL_Book	TBL_Book-Details	TB
	AuthorID	Forename	Surname	Click to Add			
+	A001	Francis	Fitzgerald				
+	A002	John	Steinbeck				
+	A003	Luke	Jones				
+	A004	Joanne	Rowling				
*							

3.2.2 Book

TBL_Book						
BookID	ISBN	LibraryID	SaleID	Location	Click to Add	
B001	ISBN 001-0-10-100001-1	LIB01	SALE001	C001R001		
B002	ISBN 001-0-10-100001-2	LIB01	SALE002	C001R002		
B001	ISBN 001-0-10-100001-3	LIB01		C001R003		
B003	ISBN 001-0-10-100001-4	LIB01		C001R004		
B004	ISBN 001-0-10-100001-5	LIB01		C001R005		
B004	ISBN 001-0-10-100001-6	LIB01	SALE003	C001R006		
B005	ISBN 001-0-10-100001-7	LIB01	SALE005	C001R007		
B005	ISBN 001-0-10-100001-8	LIB01		C001R008		
B006	ISBN 001-0-10-100001-9	LIB01		C001R009		
B006	ISBN 001-0-10-100010-1	LIB01	SALE004	C001R010		
B007	ISBN 001-0-10-100010-2	LIB01		C002R001		
B007	ISBN 001-0-10-100010-3	LIB01	SALE006	C002R002		
B008	ISBN 001-0-10-100010-4	LIB01	SALE007	C002R003		
B008	ISBN 001-0-10-100010-5	LIB01		C002R004		
B009	ISBN 001-0-10-100010-6	LIB01	SALE008	C002R005		
B009	ISBN 001-0-10-100010-7	LIB01		C002R006		
B010	ISBN 001-0-10-100010-8	LIB01	SALE009	C002R007		
B010	ISBN 001-0-10-100010-9	LIB01	SALE010	C002R008		
*						

3.2.3 Book Details

TBL_Book-Details		TBL_Customer		TBL_Library		TBL_Order		TBL_Order-Customer		TBL_Sale		TBL_	
	StaffID	Forename	Surname	Postcode	Email Addr	Phone Num	Date Of Birth	Click to Add					
	S001	Rusty	Wedgwood	SA15 1P	rwedgwood0@	01474503239	08/01/1978						
	S002	Wilden	Bevir	SA3 4HP	wbevir1@elpa	01961074796	06/07/1988						
	S003	Emmery	Sandon	SA14 8S	esandon2@uc	02642576233	20/12/1982						
	S004	Jayne	Stokell	SA15 3J	jstokell3@yco	04274554616	02/04/1985						
	S005	Collen	Burds	SA15 3P	cburds4@goo	02072611140	11/11/1976						
	S006	Audrey	Alkin	SA4 4WL	aalkin5@mysq	08344429612	03/01/1983						
	S007	Blakelee	Carless	SA43 2L	bcarless6@1ur	06092001257	25/04/1983						
	S008	Zollie	Bravery	SA6 5NW	zbravery7@cp	06586407136	24/05/1981						
	S009	Pepi	Peare	SA6 5RA	ppeare8@hud	08172585143	30/11/1981						
	S010	Delly	Lanchbury	SA7 9LP	dlanchbury9@	08372729612	23/09/1989						
*													

3.2.4 Customer

CustomerID	Forename	Surname	Postcode	Email Address	Phone Num	Date Of Birth	Click to Add
C001	Daisie	Luthwood	SA62 3T	dluthwooda@	02299355483	25/12/1985	
C002	Neill	Zamora	SA33 6S	nzamorab@ne	08045656788	30/11/1981	
C003	Rozina	Franchioni	SA12 7G	rfranchionic@	03101725197	25/12/1985	
C004	Deric	Scotcher	SA1 1TW	tscotcherd@n	08692555333	25/04/1990	
C005	Jackie	Cornill	SA20 0B	jcornille@ucl	03409097759	25/04/1983	
C006	My	Costan	SA32 8P	mcostanf@goc	02141471278	24/05/1981	
C007	Kerr	Cleworth	SA15 2L	kcleworthg@e	09313457268	02/01/1978	
C008	Melicent	Adao	SA62 3T	madaoh@bibl	01303410759	24/03/1980	
C009	Otis	Buttel	SA41 3U	obutteli@tiny	06264833064	25/04/1983	
C010	Esme	MacRory	SA41 3U	emacroryj@cn	05419997467	14/06/1977	
*							

3.2.5. Library

Sort & Filter			Records			Find	Text Formatting			
 TBL_Library 	 TBL_Order 	 TBL_Order-Customer 	 TBL_Sale 	 TBL_Sale-Customer 	 TBL_Staff 					
 LibraryID	 Name	 Address 1	 Address 2	 Address 3	 Postcode	 Email Address	 Phone Number	 Click to Add		
 LB01	Y Fforwm	Heol Ynys	Kings Road	Swansea	SA1 8EW	library@uwtsd.ac.uk	01792482113			
										

3.2.6 Order

Sort & Filter		Records		Title		Text Formatting	
TBL_Order	TBL_Order-Customer	TBL_Sale	TBL_Sale-Customer	TBL_Staff			
OrderID	Title	Author	Genre	Order_CustomerID	Click to Add		
O001	Lolita	Vladimir Nabokov	Romance	1			
O002	Catch-22	Joseph Heller	Humor	2			
O003	The Sound and the Fury	William Faulkner	American	3			
O004	To Kill a Mockingbird	Harper Lee	Historical	4			
O005	The Hunger Games	Suzanne Collins		5			
*				0			

3.2.7 Order Customer

TBL_Order-Customer		TBL_Sale		TBL_Sale-Customer	
Order_Cust		CustomerID	StaffID	Click to Add	
+	1	C004			
+	2		S001		
+	3	C007			
+	4		S001		
+	5	C004			
*	0				

3.2.8 Sale

Sort & Filter		Records		Find	
TBL_Sale	TBL_Sale-Customer	TBL_Staff			
SaleID	ISBN	Date Sold	Sale CustomerID	Click to Add	
SALE001	ISBN 001-0-10-100001-1	11/03/2019	1		
SALE002	ISBN 001-0-10-100001-2	04/04/2019	2		
SALE003	ISBN 001-0-10-100001-6	01/02/2019	3		
SALE004	ISBN 001-0-10-100010-1	16/01/2019	4		
SALE005	ISBN 001-0-10-100001-7	15/04/2019	5		
SALE006	ISBN 001-0-10-100010-3	11/04/2019	6		
SALE007	ISBN 001-0-10-100010-4	26/02/2019	7		
SALE008	ISBN 001-0-10-100010-6	02/04/2019	8		
SALE009	ISBN 001-0-10-100010-8	26/03/2019	9		
SALE010	ISBN 001-0-10-100010-9	26/01/2019	10		
*			0		

3.2.9 Sale Customer

TBL_Sale-Customer		TBL_Staff		
	Sale CustomerID	CustomerID	StaffID	Click to Add
+	1	C001		
+	2		S004	
+	3	C001		
+	4		S007	
+	5	C008		
+	6	C006		
+	7	C002		
+	8	C001		
+	9		S003	
+	10	C010		
*	0			

3.2.10 Staff

Sort & Filter		Records		Find		Text Formatting	
TBL_Staff							
StaffID	Forename	Surname	Postcode	Email Address	Phone Num	Date Of Birt	Click to Add
S001	Rusty	Wedgwood	SA15 1P	rwedgwood0@	01474503239	08/01/1978	
S002	Wilden	Bevir	SA3 4HP	wbevir1@elpa	01961074796	06/07/1988	
S003	Emmery	Sandon	SA14 8S	esandon2@uc	02642576233	20/12/1982	
S004	Jayne	Stokell	SA15 3J	jstokell3@yco	04274554616	02/04/1985	
S005	Collen	Burds	SA15 3P	cburds4@goo	02072611140	11/11/1976	
S006	Audrey	Alkin	SA4 4WL	aalkin5@mysq	08344429612	03/01/1983	
S007	Blakelee	Carless	SA43 2L	bcarless6@1ur	06092001257	25/04/1983	
S008	Zollie	Bravery	SA6 5NW	zbravery7@cp	06586407136	24/05/1981	
S009	Pepi	Peare	SA6 5RA	ppeare8@hud	08172585143	30/11/1981	
S010	Delly	Lanchbury	SA7 9LP	dlanchbury9@	08372729612	23/09/1989	
*							

3.3 Queries

3.3.1 Book Edition

QRY_Book-Edition

TBL_Book-Details

*

BookID

Title

Genre

Edition

Pages

TBL_Author

*

AuthorID

Forename

Surname

1

∞

Field: Edition

Table: TBL_Book-Details

Sort: Ascending

Show: ☒

Criteria: [Forms]![FRM_Main-M

or:

Title

TBL_Book-Details

Genre

TBL_Book-Details

☒

Price

TBL_Book-Details

☒

Forename

TBL_Author

☒

Surname

TBL_Author

☒

☐

3.3.2 Book Stock

QRY_Book-Stock

TBL_Book

*

BookID

ISBN

LibraryID

SaleID

Location

∞ — 1

TBL_Book-Details

*

BookID

Title

Genre

Edition

Pages

Field: Title

Table: TBL_Book-Details

Sort:

Show: ☒

Criteria: ☒

or:

Genre

Table: TBL_Book-Details

Sort:

Show: ☒

Criteria: ☒

or:

Price

Table: TBL_Book-Details

Sort:

Show: ☒

Criteria: ☒

or:

SaleID

Table: TBL_Book

Sort:

Show: ☐

Criteria: Is Null

or:

3.3.3 Book Title

Query type

Query Setup

Show/Hide

QRY_Book-Title

TBL_Book-Details

*

BookID

Title

Genre

Edition

Pages

1

∞

TBL_Author

*

AuthorID

Forename

Surname

Field:

Title

Genre

Edition

Price

Forename

Surname

Table:

TBL_Book-Details

TBL_Book-Details

TBL_Book-Details

TBL_Book-Details

TBL_Author

TBL_Author

Sort:

Show:

☒

☒

☒

☒

☒

☒

Criteria:

[Forms]![FRM_Main-M

or:

3.3.4 Customer Address

Query Type

QRY_Customer-Addresses

TBL_Customer

*

CustomerID

Forename

Surname

Postcode

Email Address

Field:

Surname

Forename

Postcode

Table:

TBL_Customer

TBL_Customer

TBL_Customer

Sort:

Ascending

Show:

☒

☒

☒

Criteria:

or:

3.3.5 Customer Orders

Query type: Query Setup Show/Hide

QRY_Customer-Orders X

TBL_Order

*

OrderID

Title

Author

Genre

Order_CustomerID

TBL_Order-Customer

*

Order_CustomerID

CustomerID

StaffID

TBL_Customer

*

CustomerID

Forename

Surname

Postcode

Email Address

1 1

1 1

Field:	Forename	Surname	Title	Genre	Author	CustomerID
Table:	TBL_Customer	TBL_Customer	TBL_Order	TBL_Order	TBL_Order	TBL_Order-Customer
Sort:						
Show:	☒	☒	☒	☒	☒	☐
Criteria:						Like "C*"
or:						

3.4 Forms

3.4.1 Author

The screenshot shows a software application window titled "FRM_Author". The window has a blue header bar with the text "Author Form". On the left side, there is a grey sidebar with a button labeled "Main Menu". The main area of the form contains three input fields for "AuthorID", "Forename", and "Surname". The "AuthorID" field contains the text "A001", the "Forename" field contains "Francis", and the "Surname" field contains "Fitzgerald". Below these fields is a grid of eight buttons. The first row contains four navigation buttons: a double left arrow, a single left arrow, a single right arrow, and a double right arrow. The second row contains four action buttons: a button with a sun icon, a button with a red X icon, a button with a purple square icon, and a button with a green checkmark icon.

AuthorID	Forename	Surname
A001	Francis	Fitzgerald

Navigation and Action Buttons:

- Navigation: Previous Record, Previous Field, Next Field, Next Record
- Actions: Refresh, Cancel, Save, Print

3.4.2 Book

FRM_Book X

Book Form

Main Menu

ISBN	ISBN 001-0-10-100001-1
BookID	B001
LibaryID	LIB01
SaleID	SALE001
Location	C001R001

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3.4.3 Book Details

FRM_Book-Details X

Book Details Form

Main Menu

BookID	B001
Title	The Great Gatsby
Genre	Histroical Fiction
Edition	2
Pages	180
Publication Year	1925
Price	£60.00
AuthorID	A001

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⏪

⏩

⏭

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📁

✅

3.4.4 Customer

FRM_Customer

Customer Form

Main Menu

CustomerID	C001
Forename	Daisie
Surname	Luthwood
Postcode	SA62 3T
Email Address	dluthwooda@globo.com
Phone Number	02299355483
Date Of Birth	25/12/1985

Navigation buttons: Previous, First, Next, Last, Add, Delete, Edit, Confirm.

3.4.5 Library

FRM_Library

Library Form

Main Menu

LibraryID	LIB01
Name	Y Fforwm
Address 1	Heol Ynys
Address 2	Kings Road
Address 3	Swansea
Postcode	SA1 8EW
Email Address	library@uwtsd.ac.uk
Phone Number	01792482113

3.4.6 Order

FRM_Order

Order Form

Main Menu

OrderID	O001
Title	Lolita
Title	Lolita
Author	Vladimir Nabokov
Genre	Romance
Order_CustomerID	1

⏮

⏪

⏩

⏭

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📄

✅

3.4.7 Order Customer

FRM_Order-Customer

Order Customer Form

Main Menu

Order_CustomerID

CustomerID

StaffID

1

C004

⏮

⏪

⏩

⏭

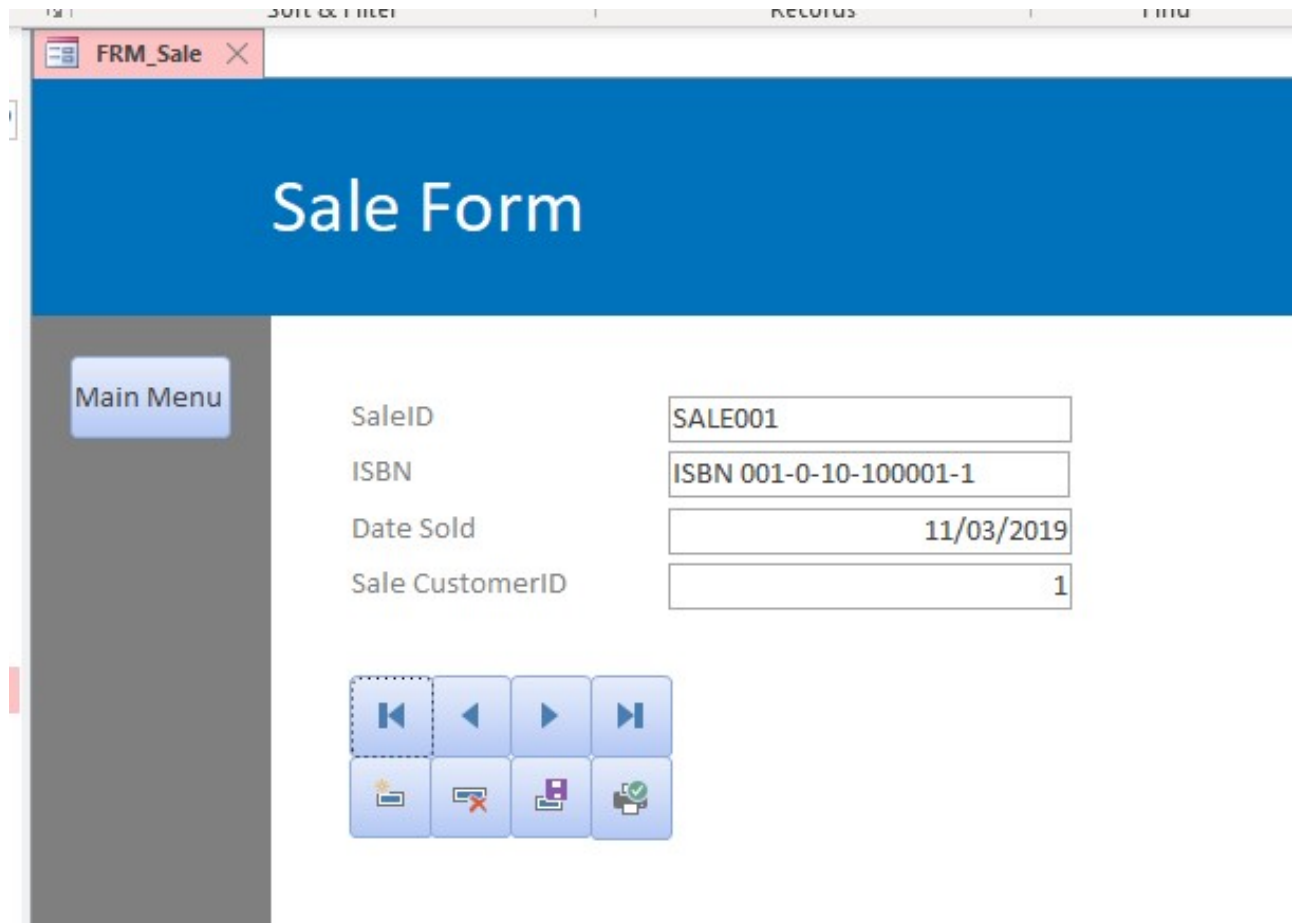








3.4.8 Sale



FRM_Sale X

Sale Form

Main Menu

SaleID	SALE001
ISBN	ISBN 001-0-10-100001-1
Date Sold	11/03/2019
Sale CustomerID	1

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3.4.9 Sale Customer

FRM_Sale-Customer

Sale Customer Form

Main Menu

Sale CustomerID

CustomerID

StaffID

1

C001

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⏩

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3.4.10 Staff

FRM_Staff

Staff Form

Main Menu

StaffID	S001
Forename	Rusty
Surname	Wedgwood
Postcode	SA15 1P
Email Address	rwedgwood0@chron.com
Phone Number	01474503239
Date Of Birth	08/01/1978

3.4.11 Main Menu

FRM_Main-Menu

Main Menu

Forms

Author

Book

Order

Sale

Library

Customer

Book Details

Order Customer

Sale Customer

Staff

Reports

Book Title:

Book Edition:

Submit

Submit

Customer Addresses:

Book Stock:

Customer Orders:

3.5 Reports

3.5.1 Book Edition

Book Edition				
Edition	Title	Genre	Price	Author Forename Author Surname
1	Harry Potter and The Deathly Hallows	Fantasy	£20.00	Joanne Rowling
1	Harry Potter and The Half-Blood Prince	Fantasy	£20.00	Joanne Rowling
1	Harry Potter and The Order of the Phoenix	Fantasy	£20.00	Joanne Rowling
1	Harry Potter and The Goblet of Fire	Fantasy	£20.00	Joanne Rowling
1	Harry Potter and The Prisoner of Azkaban	Fantasy	£20.00	Joanne Rowling
1	Harry Potter and The Chamber of Secrets	Fantasy	£20.00	Joanne Rowling
1	Harry Potter and The Philosopher's Stone	Fantasy	£20.00	Joanne Rowling

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3.5.2 Book Stock

Book Stock		
Title	Genre	Price
Harry Potter and The Chamber of Sec	Fantasy	£20.00
Harry Potter and The Goblet of Fire	Fantasy	£20.00
Harry Potter and The Half-Blood Prin	Fantasy	£20.00
Harry Potter and The Order of the Ph	Fantasy	£20.00
Harry Potter and The Philosopher's S	Fantasy	£20.00
Harry Potter and The Prisoner of Azki	Fantasy	£20.00
Of Mice and Men	Historical Fiction	£15.00
Number of books in stock:		7
03 May 2019		Page 1 of 1

3.5.3 Book Title

Books					
Title	Genre	Edition	Price	Author Forename	Author Surname
Of Mice and Men	Historical Fiction	2	£15.00	John	Steinbeck
03 May 2019			Page 1 of 1		

3.5.4 Customer Address

Sort & Filter

Records

Find

Text Formatting

RPT_Customer-Addresses X

Customer Addresses

Surname	Forename	Postcode
Adao	Melicent	SA62 3T
Buttel	Otis	SA41 3U
Cleworth	Kerr	SA15 2L
Cornill	Jackie	SA20 0B
Costan	My	SA32 8P
Franchioni	Rozina	SA12 7G
Luthwood	Daisie	SA62 3T
MacRory	Esme	SA41 3U
Scotcher	Deric	SA1 1TW
Zamora	Neill	SA33 6S

03 May 2019

Page 1 of 1

3.5.5 Customer Orders

RPT_Customer-Orders X

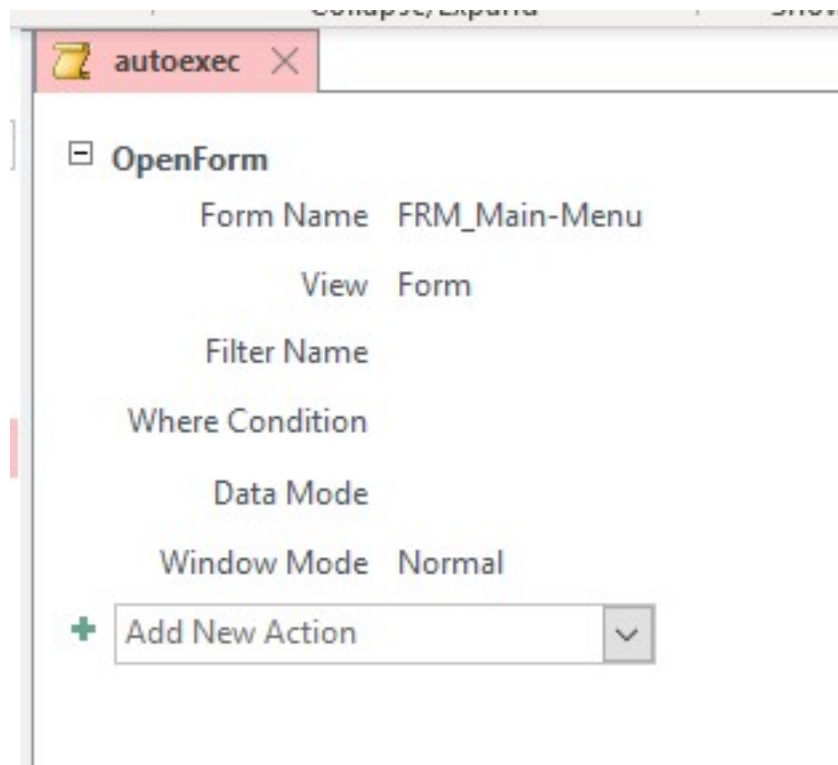
Customer Orders

Customer		Book		
Forename	Surname	Title	Genre	Author
Deric	Scotcher	Lolita	Romance	Vladimir Nabokov
		The Hunger Games		Suzanne Collins
Kerr	Cleworth	The Sound and the Fury	American	William Faulkner

03 May 2019Page 1 of 1

3.6 Macros

3.6.1 Autoexec



3.6.2 Book Edition

Collapse/Expand

Show

 **MCR_Book-Edition** ×

OpenQuery

Query Name QRY_Book-Edition

View Datasheet

Data Mode Edit

Requery

Control Name

OpenReport

Report Name RPT_Book-Edition

View Report

Filter Name

Where Condition

Window Mode Normal

+

Add New Action

▼

3.6.3 Book Title

Collapse/Expand

 **MCR_Book-Title** 

OpenQuery

Query Name QRY_Book-Title

View Datasheet

Data Mode Edit

Requery

Control Name

OpenReport

Report Name RPT_Book-Title

View Report

Filter Name

Where Condition

Window Mode Normal

4. User Requirements

The design of the system is built around the user and the requirements they have for the system. The first requirement is the navigation of the system, the user will want to navigate the system with ease and never be lost or not know how to get to a screen. Also, all these screens should only be three to five clicks away otherwise it will take them too long to get to the screen. As seen in my system all the forms have the main menu button on them, so from any form all the reports, queries and other forms are only two clicks away. Another requirement is keeping the ethos of the system the same as this will make the whole system look more professional. This means the user will not mind using it as the system is designed to be clean and simple to use.

All the other user requirements are the outputs and workings of the system, so the design of this is the structure of the system. This was done by lots of planning to make sure the final structure could handle all the outputs the user wanted. Going through all the points in the brief, then testing them on the system, all the user requirements can be met and all the outputs required can be seen and outputted in a report or query.

5. User Guide

5.1 Main Menu

When opening the database there will be a main navigation menu, this menu will automatically open. From this you will be able to navigate the database using the buttons. The buttons under the form title will take you to all the different forms in the database. To run a report that has no user entered criteria click the buttons on the form under the report title that has no required text box entry. To run a report where information is needed from the user enter the criteria in the text box and click the button to run the criteria on the data.

5.2 Forms

Once in one of the reports, on the left there will be a main menu button. This will take you back to the navigation main menu so you can access all parts of the database. On all the forms there are eight buttons. The top four will help you navigate the data in the table from taking you to the first and last or the next and previous records. Then the bottom four buttons are for manipulating the data. To add a new record use the first button, to delete a record use the second button, to save an edited record use the third one and then the print the record use the last button.

5.3 Queries and Reports

Once you run a query from the main menu the data will be gathered by the query then displayed in a report. The reports that doesn't depend on a user inputted criteria can just be run from the main menu and they will go straight in to the report. The queries that depend on a user inputted criteria will gather the data once it is entered, run the query then output the report. All of these reports can be printed by using the print button on the screen.

6. 3RD Normal Form

The normalisation of data is to reduce data redundancy, the duplication of data [1]. Third normal form is the final step of the transformation of data. The rule is:

“remove to a new table any non-key attributes that are more dependent on other non-key attributes than the table key” [2]

When looking at these rules it means that all the tables should have the relevant data in them and then link to another table that has its own linked data in it. Looking at my system and the way it is designed, it is shown that it supports the rule as all the data in the tables only rely on the primary key and that is what is linking them all together.

7. Bibliography

- [1] SQA. (06/05/2018). *The Normalisation Process* [Online]. Available: https://www.sqa.org.uk/e-learning/SoftDevRDS02CD/page_11.htm.
- [2] SQA. (06/05/2018). *3rd Normal Form (3NF)* [Online]. Available: https://www.sqa.org.uk/e-learning/SoftDevRDS02CD/page_16.htm.