

COMP 3005 Final Project

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Conceptual Design

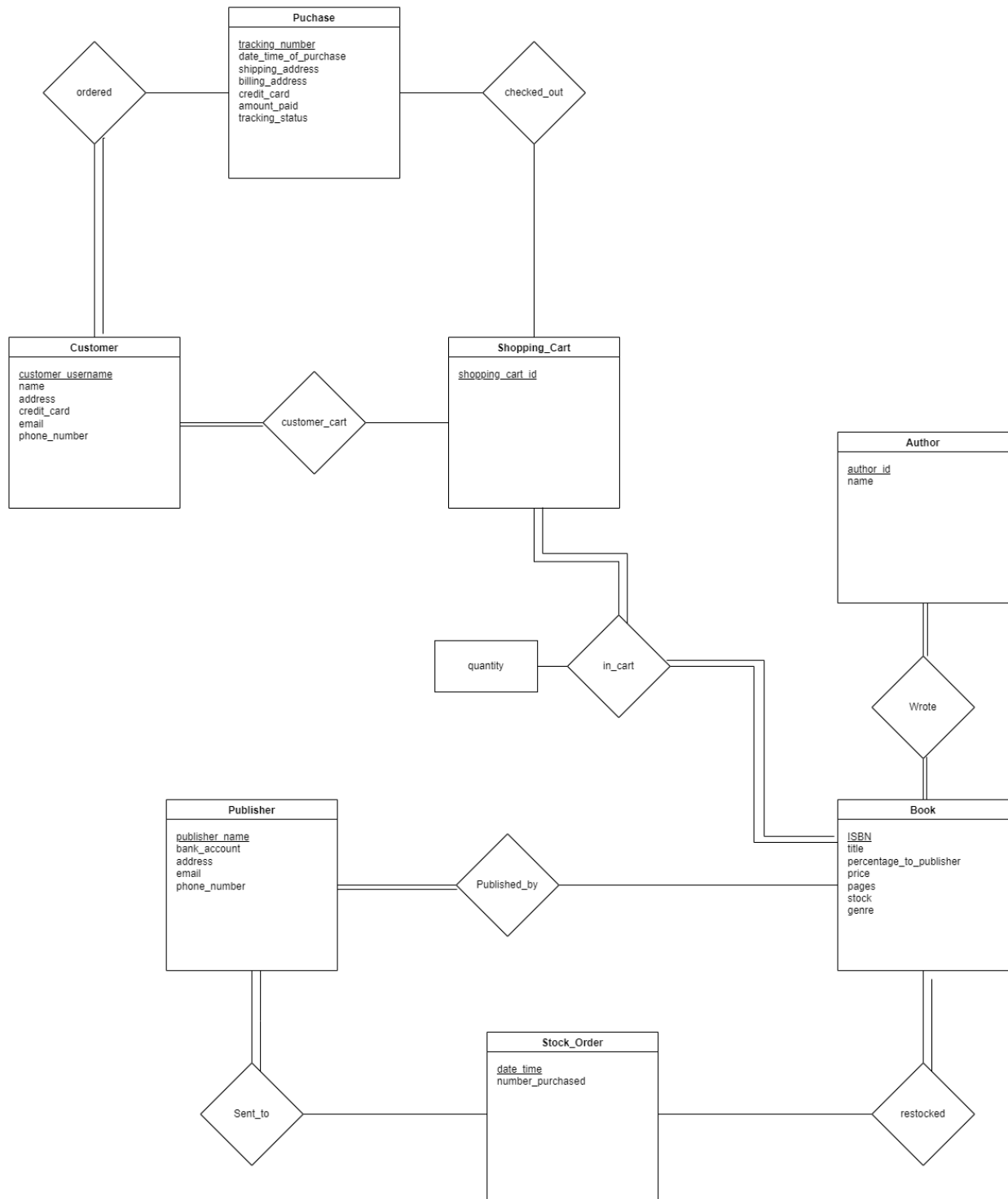


Figure 1: ER-Diagram for the database (Also available on github if resolution is too small)

Assumptions

- Two authors can have the same name so there must be an ID
- There is no limit to the number of books an author can write nor how many authors a book can have
- Stock Orders can only be ordered one at a time
- Shopping Carts are not to be deleted after checking out and instead the customer will be given a new cart.

Reduction to Relation Schemes

purchase(tracking_number, date_time_of_purchase, shipping_address, billing_address, credit_card, amount_paid, tracking_status)
customer(customer_username, name, address, credit_card, email, phone_number)
ordered(tracking_number, customer_username)
shopping_cart(shopping_cart_id)
checked_out(tracking_number, shopping_cart_id)
customer_cart(customer_username, shopping_cart_id)
book(ISBN, title, price, percentage_to_publisher, pages, stock, genre, publisher_name)
author(author_id, name)
in_cart(shopping_cart_id, ISBN, quantity)
wrote(author_id, ISBN)
publisher(publisher_name, bank_account, address, phone_number)
published_by(publisher_name, ISBN)
stock_order(date_time, number_purchased)
sent_to(publisher_name, date_time)
restocked(date_time, ISBN)

Normalization of Relation Schemas

Functional Dependencies

shopping_cart_id -> customer_username
tracking_number -> shopping_cart_id
Therefore, tracking_number -> customer_username

isbn -> publisher_name
stock_order.date_time -> isbn
Therefore, stock_order.date_time -> publisher_name

Are we in first normal form? Yes, because there are no multi-valued attributes in any relation

Are we in second normal form? Yes, because every non-primary key attribute is dependant on the primary key for every relation

Are we in third normal form? Not yet, because of shopping_cart_id -> customer_username we can remove the customer_cart relation and add customer_username as an attribute to shopping_cart. Because of shopping_cart_id -> customer_username and tracking_number -> shopping_cart_id above we know that tracking_number-> shopping_cart_id and tracking_number-> customer_username so we can eliminate the ordered and checked_out relations and add shopping_cart_id as an attribute to purchase. Because of isbn -> publisher_name we can eliminate the published_by relation and add publisher_name as an attribute to the book relation. Finally, because of isbn -> publisher_name and stock_order.date_time -> isbn we can eliminate the sent_to and restocked relations and add isbn as an attribute to stock_order. Now we are in 3rd normal form which is a good normal form.

Final Relation Scheme

purchase(tracking_number, date_time_of_purchase, shipping_address, billing_address, credit_card, amount_paid, tracking_status, shopping_cart_id)
customer(customer_username, name, address, credit_card, email, phone_number)
shopping_cart(shopping_cart_id, customer_username)
book(ISBN, title, price, percentage_to_publisher, pages, stock, genre, publisher_name)
author(author_id, name)
in_cart(shopping_cart_id, ISBN, quantity)
wrote(author_id, ISBN)
publisher(publisher_name, bank_account, address, phone_number)
stock_order(date_time, ISBN, number_purchased)

Database Schema Diagram

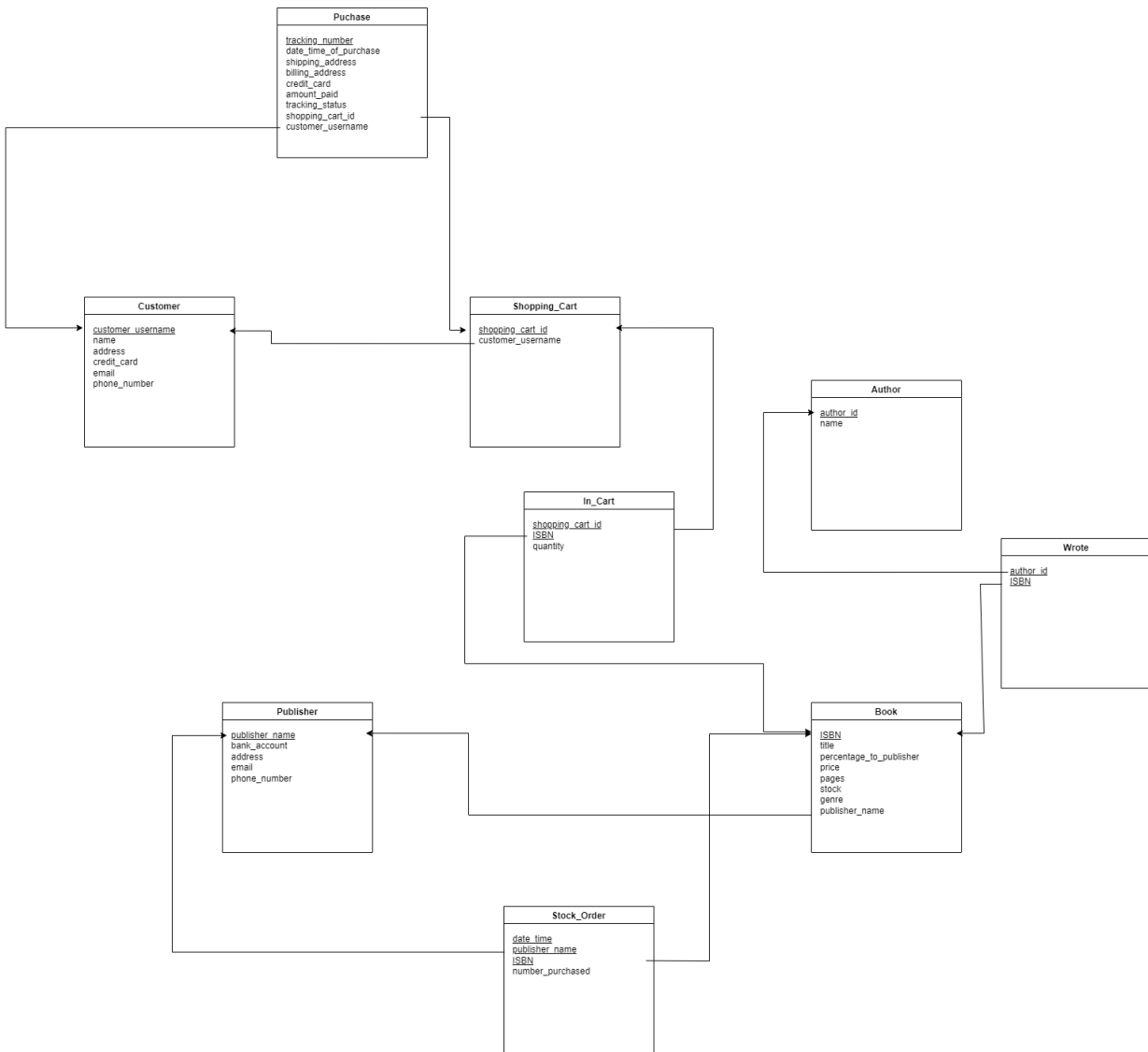


Figure 2: Database Schema Diagram (Also available on github if resolution is too small)

Implementation

My program is written in java and is run using the command line (See README for compilation and running instructions). This program is programmed functionally despite it being programmed in java. This program has two main interfaces: one for the customers and one for the owner of the bookstore.

Customer Interface

When first running the program the user is greeted with the following screen:

```
=====
Welcome to Look Inna Book!
=====
=== Main Menu ===
Who are you?
1 - Owner
2 - Returning Customer
3 - New Customer
q - Quit
```

Figure 3: Main Menu

From here the user is prompted to give one of four options: 1, 2, 3, or quit. Selecting 3 brings you to a screen where the user can register a customer profile. The user will be prompted to give their desired username, name, address, credit card number, email address, and phone number (Figure 4).

```
Please enter the following information
Username: jeff77
Name: Jeff James
Address: 2437 Celestic Crescent, Ottawa ON, H0H 0H0
Credit Card: 1122334455667788
Email: jeffj77@outlook.com
Phone Number: 6135552437
```

Figure 4: Profile Registration

After entering in an answer for all prompts the program queries the database to check for any accounts with the username the user just entered. If one exists then the user is prompted to try another username until they select one which has not been associated with a profile yet. The program then registers the profile by inserting the acquired information into the customer table and creating a corresponding shopping cart for the new user to use. The user is then returned to the main menu. Then the user may select 2 where they will subsequently be asked to enter their username. Once entered, they will be greeted with the following screen:

```
Welcome jeff77!
=== Customer Menu ===
1 - Search for Books
2 - View Shopping Cart
3 - Track Orders
q - Return to Main Menu
```

Figure 5: Customer Menu

From here, the user once again has 4 options. Selecting q will take the user back to the main menu. Selecting 1 allows the user to search for books and subsequently add those books to their cart if desired. Once selected the user is prompted to enter the search criteria for title,

author, etc. The user can also enter nothing for these fields if they do not wish to search those fields. If they leave all fields blank, all books in the book store are displayed.

```
Book Search:
Enter the following: (or just enter if not applicable)
Title:
Author:
Publisher:
Genre: Science Fiction
More than __ Pages: 400
Less than __ Pages:
More than $__:
Less than $__:
```

Figure 6: Searching Fields with genre searched for as “Science Fiction” and more than 400 pages

Then the database is queried using the search criteria from the previous step. The books are displayed in the following format (Figure 7).

```
=== Results ===
x: Title                               Author(s)          Price  Pages  Genre          InStock ISBN
0: The Martian                        Andy Weir          12.99  480    Science Fiction  17    9780593357132
1: The Testaments                    Margret Atwood     22.00  448    Science Fiction  14    9780771009457
Enter the numbers you'd like to add to your cart: ('end' when done)
Item: _
```

Figure 7: Books Displayed After Searching with criteria from Figure 6

As seen in Figure 7, each book is given an index on the left side of the screen. This number is used to help add items to the cart. After the search results are displayed, the user is prompted to add items to their cart by the index. This is done to help with ease of use for the user as entering a small index number is much easier than entering a large ISBN. Once the user has entered a valid index, (i.e. Not a number greater than the largest one from the previous search) they are prompted to add the quantity of that item to their cart. If the user attempts to add a number more than the number that is already in stock, it only adds the amount in stock. The stock of the book is then updated. (It should be noted that the publisher is not notified yet if the stock drops below 10). Once the quantity has been entered, the program inserts a new record into the in_cart table which holds what book is in each cart and how many of that book is in the cart. The user will continue to be asked to add items to the cart until they type 'end' at which time they will be returned to the customer menu (Figure 5). Now if the user wishes to view their cart they can select option 2 from the main menu where all of the items in their cart will be shown to them (Figure 8)

```
=== jeff77's Cart ===
x: Title                               Price  Quantity
0: The Handmaid's Tale                19.95   2
1: The Hobbit                         10.99   4
Subtotal: $83.86
Tax: $10.90
Total: $94.76
Would you like to remove anything? (y/n)
```

Figure 8: Customer Shopping Cart

Just like with the searching (Figure 7), each book in the cart is given an index. The user is then asked if they want to remove from their cart. If yes, it works the same as with the adding to the cart but in reverse, and when the books are removed the stock is updated again to reflect the books going back on the shelf, so to speak. When the user is done removing, or if they chose

not to remove, they will be asked if they are ready to checkout. If not, they will be returned to the customer menu (Figure 5). If they do choose to checkout however, they will be asked if they would like to use the credit card, billing, and shipping information from their profile. If not, they will be prompted to enter that information. Once entered, the program creates a new entry in the purchase table with the user's information and the shopping cart and then gives the user a new empty shopping cart to be associated with their profile until the next purchase and also tells the user their tracking number. Finally, the user is returned to the customer menu (Figure 5). The final option on the customer menu is option 3, tracking orders. When selected the user can enter the tracking number for any order they want to track or they can enter nothing and be shown the tracking information for all the orders that user has made from their account.

```
Enter Tracking Number (just enter for all orders on your account):  
=== jeff77's Orders ===  
=====
```

Order Purchased:	2021-12-18T16:51:49.475985300
Ordered By:	jeff77
Amount Paid:	\$94.76
Tracking Number:	1
Tracking Status:	In-Transit
Shipping to:	1234 Jubilife Street, Ottawa, ON, H0H 0H0
Contents:	
-	The Hobbit x4
-	The Handmaid's Tale x2

Figure 9: Tracking information for the order that was made from the shopping cart in Figure 8. After the order is displayed, the user is returned to the customer menu. That is all the capabilities for the regular customer.

Owner Interface

As with the customer, when first booting-up the program the user is greeted with the main menu (Figure 3). From here the user can press 1 for the owner's menu which will be displayed to the user

```
Welcome Back Owner!  
=== Owner Menu ===  
1 - Add New Books  
2 - Remove Books  
3 - View Publisher Info  
4 - View Sales Reports  
5 - View Orders to Publishers  
q - Return to Main Menu
```

Figure 10: Owner Menu

From here the user can select 1 to add new books. The user is then prompted to enter the ISBN, title, pages, and price of the book, all of which are straight forward. Then the user is prompted to enter a publisher for the book. If the publisher is already in the database then the user can move on. If not, the user is prompted to enter the bank account, address, email, and phone number for the new publisher. Then the user is prompted to enter how many copies of

the book to order from the publisher and what percentage of sales goes to the publisher. At this point, the new book (and the new publisher if applicable) is inserted into the database and a new stock order is created for the book and “sent” to the publisher. Then, the user is prompted to enter the name of the first author. Then if the author is a new name the database has never seen before, the database creates a new entry for the author. If the name is not new then the user is presented with a books written by all authors of the same name as the name entered. The user is then asked for each author with that name in the database, if the author the user entered also wrote that book. If that is the case, then the book and that author are inserted into the wrote table if not a new author is create before both are inserted into the wrote table. The user is then prompted if they’d like to add another book. If yes, they start the process over and if not they return to the owner menu.

```
ISBN: 1234567890123
Title: Example
Genre: Mystery
Pages: 321
Price: 32.10
Publisher: Example Publishing Co
Example Publishing Co is a new publisher. Please fill out their information:
Bank Account: 555000555000
Address: 321 Eterna Rd, Ottawa ON, H0H 0H0
Email: contact@example.co.uk
Phone Number: 6135551234
# of Example to Purchase from Publisher: 25
% of sales to send Publisher: 15
Author #1: John Doe
Add another author?(y/n)
y
Author #2: J.R.R. Tolkien
Is this the same author that wrote Lord of the Rings: The Fellowship of the Ring? (y/n)
n
Add another author?(y/n)
n
Book Added!
Add another book? (y/n)
```

Figure 11: Book Creation

On the owner menu, if the user selects 2, they can remove a book by entering the ISBN. If the ISBN does not exist in the database, the program will notify the user and allow them to enter the ISBN again. If they enter a book that is the only book published/written by that publisher/author then the publisher/author is also removed from the database. The user will be told that the book has been deleted and then will be prompted to delete another. The user can keep deleting books until they type ‘end’ at which point they will return to the owner menu.

```
ISBN of the book you are removing (or 'end' when done): 9780802142443
Last book from author with id=9 was removed so author is removed aswell
9780802142443 was succesfully deleted
ISBN of the book you are removing (or 'end' when done):
```

Figure 12: Book Deletion, The book is the only one in the database written by its author so the author has also been deleted.

Next, as the owner the user can view information about publishers. By selecting 3 on the owner menu, the user is prompted to enter the name of the publisher for which they’d like to see information for. If the user enters nothing, they will see information for all publishers.

```

Publisher's Name (Just enter for all):
=====
Publisher: Pseudorandom House
Bank Account: 123456789012
Address: 15 Melancholy Way, Ottawa, ON, H0H 0H0
Email: contact@pseudorandomhouse.ca
Phone: 6135551111
Publishes:
- 1922
- Artemis
- Lord of the Rings: The Fellowship of the Ring
- Lord of the Rings: The Return of the King
- Lord of the Rings: The Two Towers
- The Hobbit
- The Martian
- The Shining
- The Silmarillion
=====
Publisher: Flightless Bird
Bank Account: 98765432109
Address: 88 Snowbelle Street, Ottawa, ON, H0H 0H0
Email: contact@flightlessbirdpublishing.net
Phone: 6135552222
Publishes:
- 1Q84
- Kafka on the Shore
- Norwegian Wood
- The Handmaid's Tale
- The Testaments

```

Figure 13: Publisher Information

Then, the user will be returned to the owner menu. The 4th option for the user on the owner menu is to view the sales reports. After selecting it, the user will be asked if they just want sales vs expenses. If yes, that is what is what will be displayed to the user. If no, the user will be prompted to sort by a category (author, genre, etc.).

```

Would you like to just view sales vs expenditures (y/n):n
View Sales by (genre, author, etc.): genre
=== Sales Report by genre ===
genre = Fantasy
Gross Sales: $538.51
Expenses: $-54.38
Net Total: $484.13
=====
genre = Magical Realism
Gross Sales: $463.62
Expenses: $-70.47
Net Total: $393.15
=====
genre = Science Fiction
Gross Sales: $572.55
Expenses: $-42.65
Net Total: $529.90
=====
genre = Thriller
Gross Sales: $510.52
Expenses: $-128.91
Net Total: $381.61
=====

```

Figure 14: Sales by genre

The final option is to view the orders to the publishers to fill stock. When selected the user is prompted to enter the name of the publisher they want to see the orders to. However, once again they can enter nothing in order to view information for all publishers.

```

Publisher's Name (Just enter for all):
===Flightless Bird===
Order to: Flightless Bird placed at: 2021-12-18T10:22:44.300283500 for Kafka on the Shore / 9781400079278 x10
Order to: Flightless Bird placed at: 2021-12-18T10:23:44.300283500 for Norwegian Wood / 9780375704024 x10
Order to: Flightless Bird placed at: 2021-12-18T10:24:44.300283500 for 1Q84 / 9780385678025 x10
Order to: Flightless Bird placed at: 2021-12-18T10:30:44.300283500 for The Handmaid's Tale / 9780771008795 x15
Order to: Flightless Bird placed at: 2021-12-18T10:31:44.300283500 for The Testaments / 9780771009457 x14
Order to: Flightless Bird placed at: 2021-12-18T20:41:06.288223500 for 1Q84 / 9780385678025 x10
Order to: Flightless Bird placed at: 2021-12-18T20:41:06.487223100 for Kafka on the Shore / 9781400079278 x10
Order to: Flightless Bird placed at: 2021-12-18T20:41:06.771736900 for Norwegian Wood / 9780375704024 x10
Order to: Flightless Bird placed at: 2021-12-18T20:41:06.842738400 for The Handmaid's Tale / 9780771008795 x10
Order to: Flightless Bird placed at: 2021-12-18T20:41:07.216738700 for The Testaments / 9780771009457 x10
===Post-Secondary University Press===
Order to: Post-Secondary University Press placed at: 2021-12-18T10:25:44.300283500 for The President is Missing / 9781538713839 x10
Order to: Post-Secondary University Press placed at: 2021-12-18T10:26:44.300283500 for The President's Daughter / 9780316540711 x10
Order to: Post-Secondary University Press placed at: 2021-12-18T10:27:44.300283500 for Fear No Evil / 9780316499149 x50
Order to: Post-Secondary University Press placed at: 2021-12-18T10:32:44.300283500 for Do Androids Dream of Electric Sheep? / 9780345404473 x11
Order to: Post-Secondary University Press placed at: 2021-12-18T10:32:44.300283500 for Hamlet / 9780143128540 x12
Order to: Post-Secondary University Press placed at: 2021-12-18T10:32:44.300283500 for Macbeth / 9780143128564 x10
Order to: Post-Secondary University Press placed at: 2021-12-18T10:32:44.300283500 for Romeo and Juliet / 9780143128571 x11
Order to: Post-Secondary University Press placed at: 2021-12-18T10:33:44.300283500 for The Man in the High Castle / 9780547572482 x11
Order to: Post-Secondary University Press placed at: 2021-12-18T10:34:44.300283500 for A Scanner Darkly / 9780547572178 x10
Order to: Post-Secondary University Press placed at: 2021-12-18T20:41:07.032738800 for The President's Daughter / 9780316540711 x10
Order to: Post-Secondary University Press placed at: 2021-12-18T20:41:07.091740300 for The President is Missing / 9781538713839 x10
===Pseudorandom House===
Order to: Pseudorandom House placed at: 2021-12-18T10:17:44.300283500 for Lord of the Rings: The Fellowship of the Ring / 9780261102354 x13
Order to: Pseudorandom House placed at: 2021-12-18T10:18:44.300283500 for Lord of the Rings: The Two Towers / 9780261102361 x14
Order to: Pseudorandom House placed at: 2021-12-18T10:19:44.300283500 for Lord of the Rings: The Return of the King / 9780261102378 x15
Order to: Pseudorandom House placed at: 2021-12-18T10:20:44.300283500 for The Silmarillion / 9780261102736 x20
Order to: Pseudorandom House placed at: 2021-12-18T10:21:44.300283500 for The Hobbit / 9780007458424 x10
Order to: Pseudorandom House placed at: 2021-12-18T10:28:44.300283500 for 1922 / 9781982136079 x25
Order to: Pseudorandom House placed at: 2021-12-18T10:29:44.300283500 for The Shining / 9780307743657 x25
Order to: Pseudorandom House placed at: 2021-12-18T10:35:44.300283500 for The Martian / 9780593357132 x17
Order to: Pseudorandom House placed at: 2021-12-18T10:36:44.300283500 for Artemis / 9780553448122 x16
Order to: Pseudorandom House placed at: 2021-12-18T20:41:06.571224700 for Lord of the Rings: The Fellowship of the Ring / 9780261102354 x10
Order to: Pseudorandom House placed at: 2021-12-18T20:41:06.643738300 for Lord of the Rings: The Return of the King / 9780261102378 x10
Order to: Pseudorandom House placed at: 2021-12-18T20:41:06.709738500 for Lord of the Rings: The Two Towers / 9780261102361 x10
Order to: Pseudorandom House placed at: 2021-12-18T20:41:06.908739600 for The Hobbit / 9780007458424 x10
Order to: Pseudorandom House placed at: 2021-12-18T20:41:07.158740500 for The Silmarillion / 9780261102736 x10

```

Figure 15: Viewing orders to all publishers

GitHub Repository

<https://github.com/braedenbrooking/COMP3005FinalProject>

On here you will find:

- The code (LookInnaBook.java)
- README with instructions for running and a brief overview for using
- All SQL files for building the database (including some example values to fill the database for testing)
- Both the ER-Diagram and the Database Schema
- A Copy of this Report
- .gitignore

Appendix I

Available Time Slots

- Dec 20 @ 12:00-12:20pm
- Dec 20 @ 12:20-12:40pm
- Dec 20 @ 12:40-1:00pm