

# COMP 3005 PROJECT (FALL 2022)

## LOOK-INNA-BOOK REPORT

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COMP 3005 A

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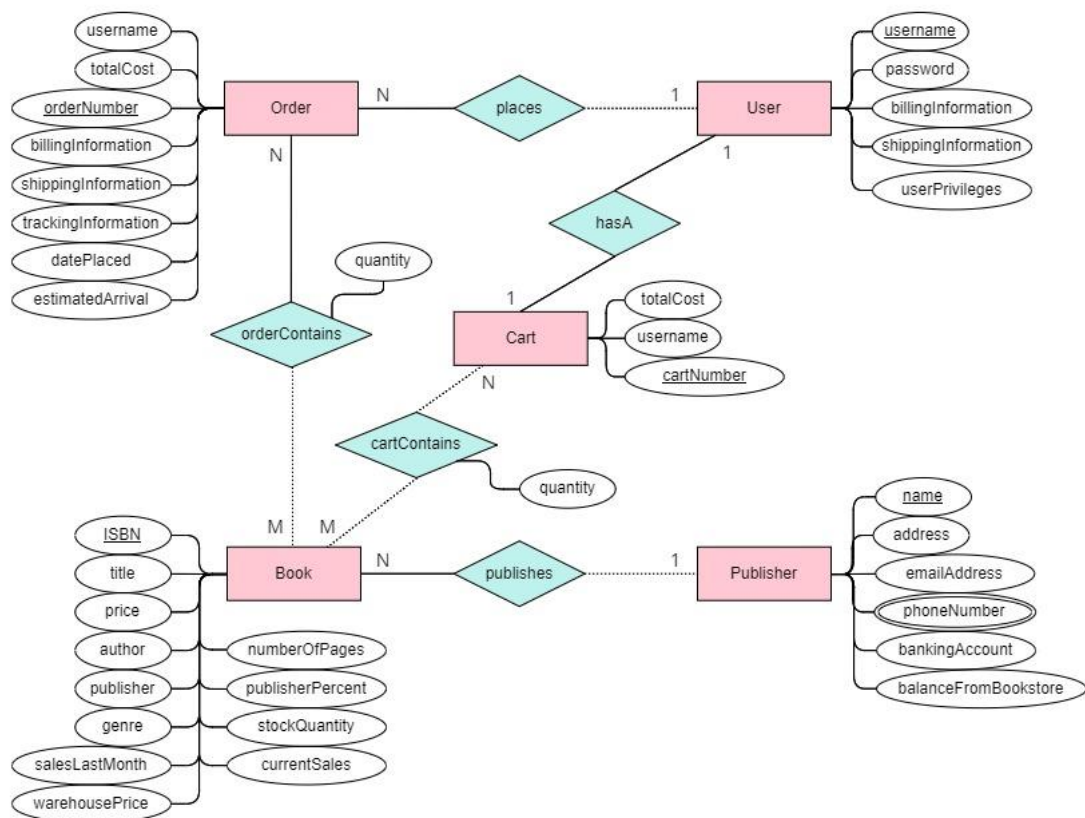
Carleton University

# 1. Project Intent

The goal of this project is to design and implement a bookstore application in which users can purchase books, store owners can add and remove books from the store's catalog and see sales statistics, and publishers can receive a percentage of the sales for their books.

## 2.1. Conceptual Design

Solid Line: Total participation  
Dotted Line: Partial participation



### 2.1.1. Entities and Attributes

#### User

A user has a unique username, a password, billing information referring to credit/debit card information, shipping information referring to the address in which to ship the order to, and either has owner privileges (access to reports, adding and removing books) or does not.

## **Cart**

A cart is a temporary entity that contains a unique cart number, a username assigned to the cart, and the total cost of the items in the cart.

## **Order**

An order has a username assigned to it, a total cost of all items in the order, a unique order number, billing information referring to credit/debit card information, shipping information referring to the address in which to ship the order to, tracking information stating where the order location currently is, the date the order was placed, and the estimated date of arrival.

## **Book**

A book has a 13 character unique ISBN, a title, a price, an author, a publisher, a genre, a number of pages, a percentage indicating how much of the sale of this book goes to the publisher, a current stock quantity, a count of how many sales were made last month, a count of how many current sales there are, and a price indicating how much the bookstore itself paid for the book (warehouse price).

## **Publisher**

A publisher has a unique name, an address, an email address, may have several phone numbers, a banking account referring to credit/debit card information, and a balance being paid out to them from their percentage of book sales.

# **2.1.1. Relations**

## **places**

A user may have several orders (or none at all), but an order must belong to a single user.

## **hasA**

A user must have a single cart and a cart must have a single user.

## **cartContains**

A cart may contain several books (or none at all) and a book may belong to several carts (or none at all). A cart may contain a book. cartContains has an attribute quantity to keep track of the number of each book in each cart.

## **orderContains**

An order may contain several books and a book may belong to several orders (or none at all). An order must contain a book. orderContains has an attribute quantity to keep track of the number of each book in each order.

## **publishes**

A book must have a single publisher, but a publisher may have several published books (or none at all).

## 2.1.2. Assumptions

### User

1. Users have unique usernames.
2. Customers and owners are both considered users, separated by their privileges when accessing the bookstore
3. A user must have a cart but does not have to have an order.
4. Users can place many orders

### Cart

1. A cart does not have contain a book to exist.
2. Not every cart has a cartContains (it is added when populated by at least one book)

### Order

1. An order must have at least a single book.

### Book

1. Books contain their own sale quantities, warehouse prices, etc.
2. The threshold to buy new books is 10.

### Publisher

1. Publisher cannot be added to the database through the owner's menu. There is a fixed set of all available publishers.
2. Not every publisher has a book.

## 2.2. Reduction to Relation Schemas

*User*(username, password, billingInformation, shippingInformation, userPrivileges)

*Book*(ISBN, title, price, author, publisher, genre, numberOfPages, publisherPercent, stockQuantity, salesLastMonth, currentSales, warehousePrice)

*Publisher*(name, address, emailAddress, phoneNumber, bankingAccount, balanceFromBookstore)

*publisherPhoneNumbers*(phoneNumber, name)

*Order*(orderNumber, username, totalCost, billingInformation, shippingInformation, datePlaced, estimatedArrival)

*orderContains*(ISBN, orderNumber, quantity)

*Cart*(cartNumber, username, totalCost)

*cartContains*(ISBN, cartNumber, quantity)

## 2.3. Normalization of Relation Schemas

***User***(username, password, billingInformation, shippingInformation, userPrivileges)

$R = \{\text{username, password, billingInformation, shippingInformation, userPrivileges}\}$

$F = \{\text{username} \rightarrow \text{password, billingInformation, shippingInformation, userPrivileges}\}$

$\text{username}^+ = \{\text{username, password, billingInformation, shippingInformation, userPrivileges}\}$

$\text{username}^+ = R$

$\therefore$  for all non-trivial functional dependencies username is a superkey, thus this relation is in BCNF

***Book***(ISBN, title, price, author, publisher, genre, numberOfPages, publisherPercent, stockQuantity, salesLastMonth, currentSales, wareHousePrice)

$R = \{\text{ISBN, title, price, author, publisher, genre, numberOfPages, publisherPercent, stockQuantity, salesLastMonth, currentSales, warehousePrice}\}$

$F = \{\text{ISBN} \rightarrow \text{title, price, author, publisher, genre, numberOfPages, publisherPercent, stockQuantity, salesLastMonth, currentSales, warehousePrice}\}$

$\text{ISBN}^+ = \{\text{ISBN, title, price, author, publisher, genre, numberOfPages, publisherPercent, stockQuantity, salesLastMonth, currentSales, warehousePrice}\}$

$\text{ISBN}^+ = R$

$\therefore$  for all non-trivial functional dependencies ISBN is a superkey, thus this relation is in BCNF

***Publisher***(name, address, emailAddress, phoneNumber, bankingAccount, balanceFromBookstore)

$R = \{\text{name, address, emailAddress, phoneNumber, bankingAccount, balanceFromBookstore}\}$

$F = \{\text{name} \rightarrow \text{address, emailAddress, phoneNumber, bankingAccount, balanceFromBookstore}\}$

$\text{name}^+ = \{\text{name, address, emailAddress, phoneNumber, bankingAccount, balanceFromBookstore}\}$

$\text{name}^+ = R$

$\therefore$  for all non-trivial functional dependencies name is a superkey, thus this relation is in BCNF

***publisherPhoneNumbers***(phoneNumber, name)

$R = \{\text{phoneNumber, name}\}$

$F = \{\text{phoneNumber} \rightarrow \text{name}\}$

$\text{name} \rightarrow \text{phoneNumber}$   
 $\{\text{phoneNumber}, \text{name}\}^+ = \{\text{phoneNumber}, \text{name}\}$   
 $\text{phoneNumber}^+ = \{\text{phoneNumber}, \text{name}\}$   
 $\text{name}^+ = \{\text{phoneNumber}, \text{name}\}$   
 $\{\text{phoneNumber}, \text{name}\}^+ = R$

∴ for all non-trivial functional dependencies  $\{\text{phoneNumber}, \text{name}\}$  is a superkey with  $\text{phoneNumber}$  and  $\text{name}$  as candidate keys, thus this relation is in BCNF

***Order(orderNumber, username, totalCost, billingInformation, shippingInformation, datePlaced, estimatedArrival)***

$R = \{\text{orderNumber}, \text{username}, \text{totalCost}, \text{billingInformation}, \text{shippingInformation}, \text{datePlaced}, \text{estimatedArrival}\}$   
 $F = \{\text{orderNumber} \rightarrow \text{username}, \text{totalCost}, \text{billingInformation}, \text{shippingInformation}, \text{datePlaced}, \text{estimatedArrival}\}$   
 $\text{orderNumber}^+ = \{\text{orderNumber}, \text{username}, \text{totalCost}, \text{billingInformation}, \text{shippingInformation}, \text{datePlaced}, \text{estimatedArrival}\}$   
 $\text{orderNumber}^+ = R$

∴ for all non-trivial functional dependencies  $\text{orderNumber}$  is a superkey, thus this relation is in BCNF

***orderContains(ISBN, orderNumber, quantity)***

$R = \{\text{ISBN}, \text{orderNumber}, \text{quantity}\}$   
 $F = \{\text{ISBN}, \text{orderNumber} \rightarrow \text{quantity}\}$   
 $\{\text{ISBN}, \text{orderNumber}\}^+ = \{\text{ISBN}, \text{orderNumber}, \text{quantity}\}$   
 $\{\text{ISBN}, \text{orderNumber}\}^+ = R$

∴ for all non-trivial functional dependencies  $\{\text{ISBN}, \text{orderNumber}\}$  is a superkey, thus this relation is in BCNF

***Cart(cartNumber, username, totalCost)***

$R = \{\text{cartNumber}, \text{username}, \text{totalCost}\}$   
 $F = \{\text{cartNumber} \rightarrow \text{username}, \text{totalCost}\}$   
 $\text{cartNumber}^+ = \{\text{cartNumber}, \text{username}, \text{totalCost}\}$   
 $\text{cartNumber}^+ = R$

∴ for all non-trivial functional dependencies  $\text{cartNumber}$  is a superkey, thus this relation is in BCNF

*cartContains*(ISBN, cartNumber, quantity)

$R = \{ISBN, cartNumber, quantity\}$

$F = \{ISBN, cartNumber \rightarrow quantity\}$

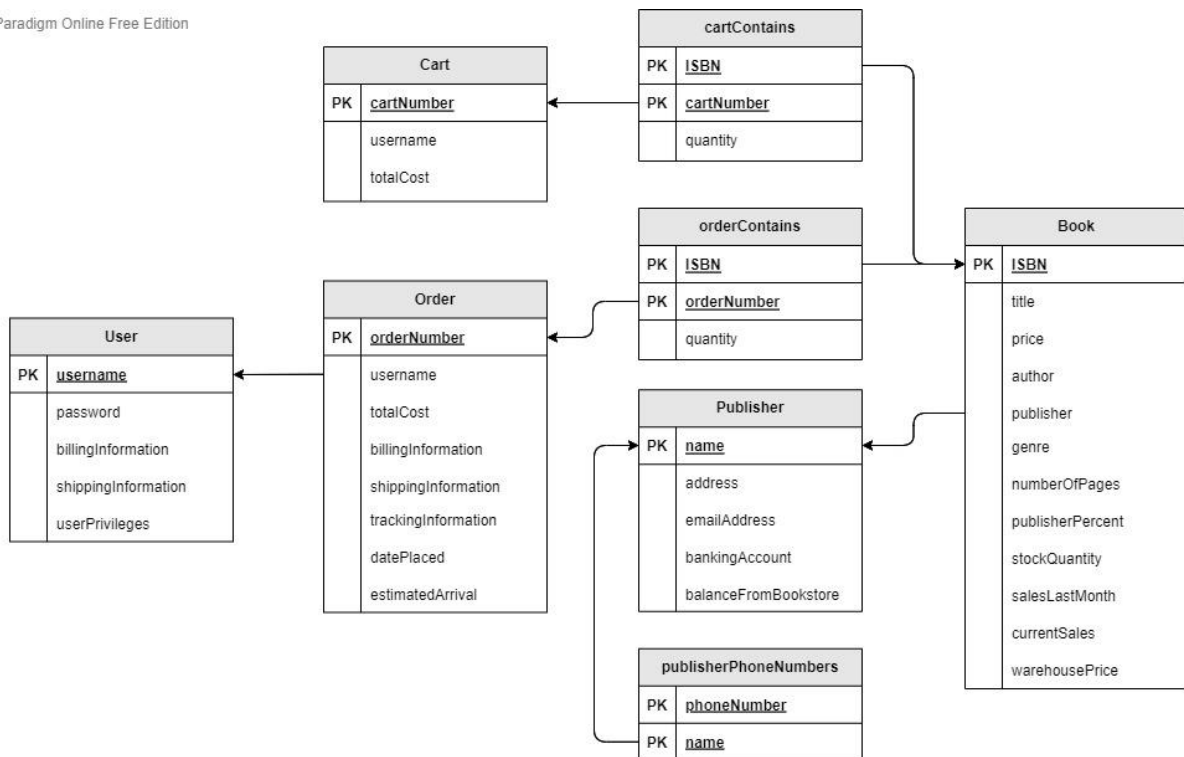
$\{ISBN, cartNumber\}^+ = \{ISBN, cartNumber, quantity\}$

$\{ISBN, cartNumber\}^+ = R$

$\therefore$  for all non-trivial functional dependencies  $\{ISBN, cartNumber\}$  is a superkey, thus this relation is in BCNF

## 2.4. Database Schema Diagram

Visual Paradigm Online Free Edition



\*Same assumptions as labelled above.

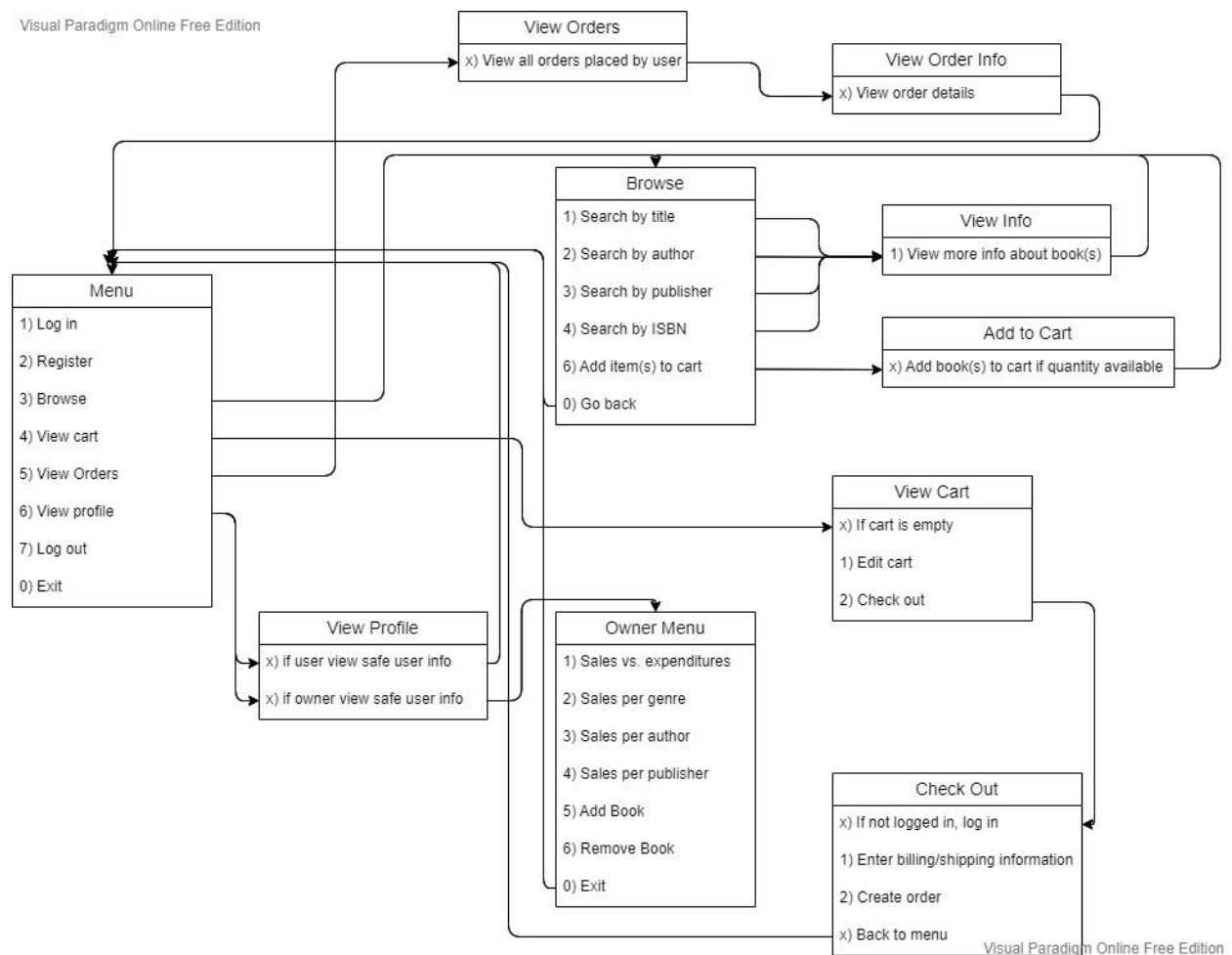
## 2.4.1. Additional Assumptions

publisherPhoneNumbers

1. A publisher must have at least one phone number.

## 2.5. Implementation

Workflow:





## Navigating as a user:

Main menu:

```
Welcome to Look Inna Book! :)
Menu:
1) Log in
2) Register
3) Browse
4) View cart
5) View orders
6) View profile
7) Log out
0) Exit
Enter your selection: █
```

Logging in:

```
Please log in:
Username: customer1
Password: c1
Welcome back customer1!
```

Searching by title (searching by anything else has the same basic view) and viewing more info about a book:

```
Enter your selection: 3

Menu:
1) Search by title
2) Search by author
3) Search by publisher
4) Search by ISBN
5) Search by genre
6) Add item(s) to cart
0) Go back
Enter your selection: 1

Enter title: book
Title: Beauty and The Book, ISBN: 1231231231231
Title: Bookerella, ISBN: 2342342342342
Title: The Princess and the Book, ISBN: 3453453453453
Title: Snow White and the Seven Books, ISBN: 4564564564564
Title: Book Hero 6, ISBN: 5675675675675

Enter an ISBN to view more info (Enter 0 to exit): 1231231231231
Title: Beauty and The Book, Price: $10.99, In Stock: 10
        ISBN: 1231231231231, Author: R.J Author, Publisher: Publisher Co., Genre: Books

Enter an ISBN to view more info (Enter 0 to exit): █
```

Adding a book to cart:

```
Menu:
1) Search by title
2) Search by author
3) Search by publisher
4) Search by ISBN
5) Search by genre
6) Add item(s) to cart
0) Go back
Enter your selection: 6

Enter the ISBN(s) of the book(s) you would like to purchase (Enter 0 to exit)
ISBN: 1231231231231
Quantity: 3
Beauty and The Book added to cart!
```

Editing cart and viewing the changes:

```
Menu:
1) Log in
2) Register
3) Browse
4) View cart
5) View orders
6) View profile
7) Log out
0) Exit
Enter your selection: 4

Title: Beauty and The Book, Price: $10.99, In Stock: 10, Quantity in cart: 3
ISBN: 1231231231231, Author: R.J Author, Publisher: Publisher Co., Genre: Books

Would you like to edit your cart? (y/n): y

Enter the ISBN of the book you would like to remove (Enter 0 to exit): 1231231231231
Quantity to remove (Enter 0 to exit): 1
Book removed!

Enter the ISBN of the book you would like to remove (Enter 0 to exit): 0

Menu:
1) Log in
2) Register
3) Browse
4) View cart
5) View orders
6) View profile
7) Log out
0) Exit
Enter your selection: 4

Title: Beauty and The Book, Price: $10.99, In Stock: 10, Quantity in cart: 2
ISBN: 1231231231231, Author: R.J Author, Publisher: Publisher Co., Genre: Books
```

Checking out and placing an order:

```
Enter your selection: 4

Title: Beauty and The Book, Price: $10.99, In Stock: 10, Quantity in cart: 2
ISBN: 1231231231231, Author: R.J Author, Publisher: Publisher Co., Genre: Books

Would you like to edit your cart? (y/n): n

Would you like to check out? (y/n): y

Your total is: $21.98
Would you like to proceed? (y/n): y
Please enter your billing information: 1231 1231 1231 1231 12/12 123
Please enter your shipping information: 123 House Street, City, Country, 123-ABC
Place order? (y/n): y
Order placed :)

Menu:
1) Log in
2) Register
3) Browse
4) View cart
5) View orders
6) View profile
7) Log out
0) Exit
Enter your selection: 5

Order placed: 2022-12-11, Order number: 1

Enter an order number to view details (Enter 0 to exit): 1

Order placed: 2022-12-11, Order number: 1, Total: $21.98
Billing Information: 1231 1231 1231 1231 12/12 123
Shipping Information: 123 House Street, City, Country, 123-ABC
Estimated Arrival: 2022-12-12, Tracking Information: Order is being processed at the warehouse
Books Ordered:
Title: Beauty and The Book, Price: $10.99, Quantity in order: 2
ISBN: 1231231231231, Author: R.J Author, Publisher: Publisher Co., Genre: Books
```

Customer viewing their profile:

```
Enter your selection: 6

Profile:
Username: customer1, Shipping information: 123 User Avenue, Usertown, User, USR-123
```

User logging out:

```
Enter your selection: 7

You are now logged out
```

Making a new account:

```
Enter your selection: 2

Make new account:
Username: namename
Password: passpass
Billing information: 1231 1231 1231 1231 12/12 123
Shipping information: 123 House Street, City, Country, 123-ABC
Welcome namename!
```

Owner exclusive views:

Logging in:

```
Please log in:
Username: owner1
Password: o1
Welcome back owner1!
```

Owner viewing profile, viewing reports (sales vs. expenditures and sales per genre):

```
Enter your selection: 6

Profile:
Username: owner1, Shipping information: 123 Owner Avenue, Ownerville, Owner, OWN-123

Would you like to view reports or edit books? (y/n): y

Menu:
1) Sales vs. expenditures
2) Sales per genre
3) Sales per author
4) Sales per publisher
5) Add Book
6) Remove Book
0) Exit
Enter your selection: 1

Sales: $21.98
Expenditures: $364.21

Menu:
1) Sales vs. expenditures
2) Sales per genre
3) Sales per author
4) Sales per publisher
5) Add Book
6) Remove Book
0) Exit
Enter your selection: 2

Genre: Books, Books sold: 2, Earnings: $21.98

Genre: Paper, Books sold: 0, Earnings: $0.00

Genre: Reading, Books sold: 0, Earnings: $0.00
```

Viewing reports (sales per author, sales per publisher):

```
Author: Bruce Bookwriter, Books sold: 0, Earnings: $0.00

Author: Harry Hardcover, Books sold: 0, Earnings: $0.00

Author: R.J Author, Books sold: 2, Earnings: $21.98

Author: Tina Pageturner, Books sold: 0, Earnings: $0.00

Author: Ty Storysmith, Books sold: 0, Earnings: $0.00

Menu:
1) Sales vs. expenditures
2) Sales per genre
3) Sales per author
4) Sales per publisher
5) Add Book
6) Remove Book
0) Exit
Enter your selection: 4

Publisher: Pub Lisher Group, Books sold: 0, Earnings: $0.00

Publisher: Pubbie Press, Books sold: 0, Earnings: $0.00

Publisher: Publisher Co., Books sold: 2, Earnings: $21.98
```

Adding a book:

```
Enter your selection: 5

ISBN (13 characters): 1111111111111
Title: New Book
Price (Ex. X.XX): $9.99
Author: Book Authorson
Publisher: Publisher Co.
Genre: Comedy
Number of pages: 100
Publisher percent (Ex. XXX.XX): 5.50
Stock Quantity: 15
Sales last month: 12
Current sales: 0
Warehouse price: 2.55
New Book added!
```

Removing a book:

```
ISBN of book to be deleted: 1111111111111
book removed!
```

## 2.6 Bonus Features

A user can search for a substring of a book title, author's name, publisher's name, ISBN or genre, and will get all books matching that substring. For example, when the user searches for "Harry Potter", the user could find multiple matches "Harry Potter and the Philosopher's Stone", "The Harry Potter and the Chamber of Secrets", etc..

A user can remove items from their cart before placing their order (This is not specified in the problem statement, thus is bonus).

A user can register a new account. (This is not specified in the problem statement, thus is bonus).

A user can log out and log back in and view their previous orders. (This is not specified in the problem statement, thus is bonus).

## 2.7 GitHub Repository

**Link:**

[https://github.com/samwichies/Comp3005FinalProject\\_Look-Inna-Book](https://github.com/samwichies/Comp3005FinalProject_Look-Inna-Book)