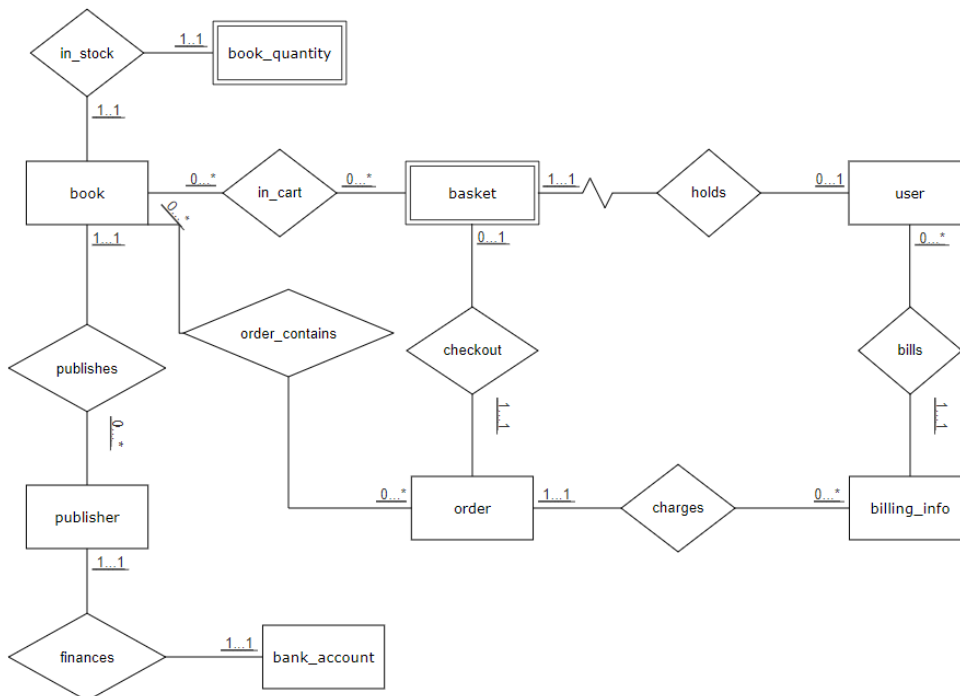
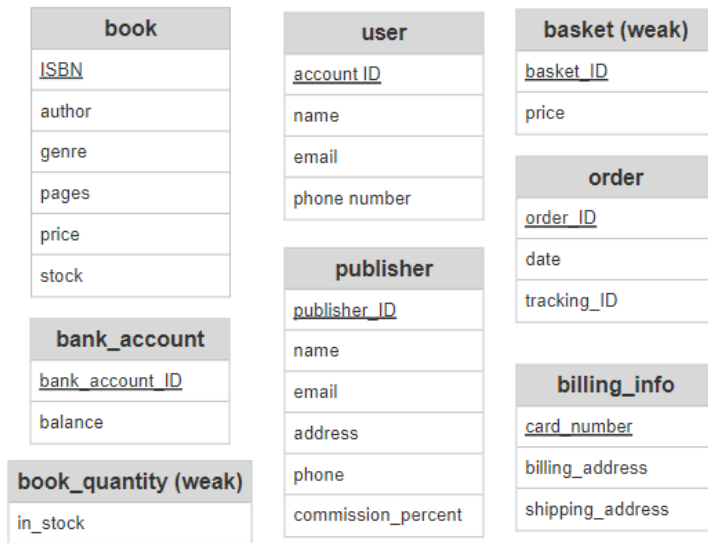


Conceptual Design



The identifying entity of basket is user (denoted by pulse shaped line). Cardinalities are explicitly stated using multiplicities.

Relational Schema

book(ISBN, author, title, genre, pages, price, stock, publisher_ID)

publisher(publisher_ID, name, email, address, phone, commission_percent)

bank_account(bank_account_ID, balance, publisher_ID)

user(account_ID, name, email, phone_number)

order(order_ID, date, tracking_ID, card_number, account_ID)

billing_info(card_number, billing_address, shipping_address, account_ID)

in_cart(ISBN, account_ID, amount)

order_contains(ISBN, order_ID, amount)

Functional Dependencies

ISBN \rightarrow author, title, genre, pages, price, stock, publisher_ID

publisher_ID \rightarrow name, email, address, phone, commission_percent

bank_account_ID \rightarrow balance, publisher_ID

account_ID \rightarrow name, email, phone_number

order_ID \rightarrow date, tracking_ID, card_number, account_ID

card_number \rightarrow billing_address, shipping_address, account_ID

ISBN, account_ID \rightarrow amount

ISBN, order_ID \rightarrow amount

Normalization

book(ISBN, author, genre, pages, price, stock, publisher_ID) is in BCNF since for every non-trivial FD, LHS is a super key given ISBN \rightarrow author, genre, pages, price, stock, publisher_ID.

publisher(publisher_ID, name, email, address, phone, commission_percent) is in BCNF since for every non-trivial FD, LHS is a super key given publisher_ID → name, email, address, phone, commission_percent.

bank_account(bank_account_ID, balance, publisher_ID) is in BCNF since for every non-trivial FD, LHS is a super key given bank_account_ID → balance, publisher_ID.

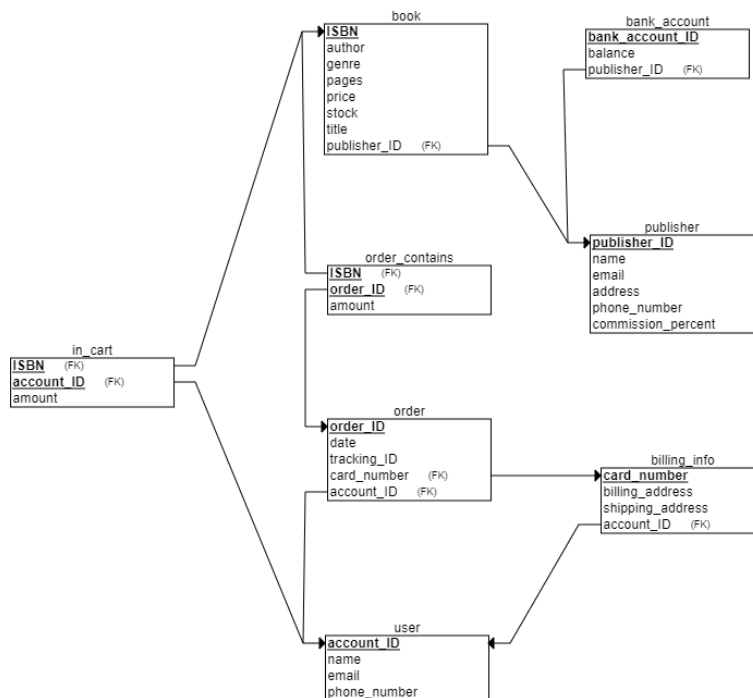
user(account_ID, name, email, phone_number) is in BCNF since for every non-trivial FD, LHS is a super key given account_ID → name, email, phone_number.

order(order_ID, date, tracking_ID, card_number, account_ID) is in BCNF since for every non-trivial FD, LHS is a super key given account_ID → name, email, phone_number.

billing_info(card_number, billing_address, shipping_address, account_ID) is in BCNF since for every non-trivial FD, LHS is a super key given card_number → billing_address, shipping_address, account_ID.

in_cart(ISBN, account_ID) and order_contains(ISBN, order_ID) are both in BCNF as ISBN, account_ID → amount and ISBN, order_ID → amount have super keys on the LHS.

Database Schema Design



Implementation

```
Welcome to our bookstore
(1) View our selection of books
(2) Login
(3) Create account
(0) Exit
Please enter your selection:
```

When a guest opens the application they are greeted with 4 options

```
Please enter your selection: 3
Please enter your name:
Feng Du
Please enter your email address:
fengdu@email.com
Please enter your phone number:
813-564-5435
Your account ID is: 2
```

A guest can create an account by entering 3 and following the prompts

```
Please enter your selection: 2
Please enter you account ID:
2
You are now logged in as user ID: 2
```

Once a user can log in by enter their user ID

```
(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection:
```

Once logged in a user will have the option to add books to cart and checkout their cart

```
ISBN: 8479960556995, Title: A Crooked Tree, Author: Una Mannion, Genre: Horror, Pages: 516, Price: $13.99, In Stock: 15
ISBN: 7201586912903, Title: People We Meet on Vacation, Author: Emily Henry, Genre: Romance, Pages: 902, Price: $12.99, In Stock: 9
ISBN: 4530158658586, Title: Broken, Author: Jenny Lawson, Genre: Comedy, Pages: 654, Price: $19.99, In Stock: 4
ISBN: 2511947576575, Title: Project Hail Mary, Author: Andy Weir, Genre: Sci-Fi, Pages: 476, Price: $12.99, In Stock: 24
ISBN: 4631814314723, Title: Once There Were Wolves, Author: Charlotte McConachy, Genre: Fiction, Pages: 235, Price: $13.99, In Stock: 42
ISBN: 5407041282692, Title: The Wish, Author: Nicholas Sparks, Genre: Fiction, Pages: 710, Price: $12.99, In Stock: 14
ISBN: 3857762924374, Title: The Comfort Book, Author: Matt Haig, Genre: Nonfiction, Pages: 86, Price: $11.99, In Stock: 23
ISBN: 3264426460768, Title: Cultish, Author: Amanda Montell, Genre: Nonfiction, Pages: 540, Price: $12.99, In Stock: 21
ISBN: 4892428994827, Title: Fuzz, Author: Mary Roach, Genre: Nonfiction, Pages: 245, Price: $12.99, In Stock: 3
ISBN: 7699497389607, Title: Later, Author: Stephen King, Genre: Horror, Pages: 775, Price: $12.99, In Stock: 11
ISBN: 5361257320460, Title: Malibu Rising, Author: Taylor Jenkins Reid, Genre: Historical, Pages: 501, Price: $8.99, In Stock: 16
ISBN: 4531134756586, Title: The Push, Author: Ahsley Audrain, Genre: Thriller, Pages: 662, Price: $12.99, In Stock: 13
```

A user and guest can look at the selection of books

```
(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection: 2
(1) ISBN: 8479960556895, Title: A Crooked Tree, Author: Una Mannion, Genre: Horror, Pages: 516, Price: 13.99, In Stock: 15
(2) ISBN: 7201586912903, Title: People We Meet on Vacation, Author: Emily Henry, Genre: Romance, Pages: 902, Price: 12.99, In Stock: 9
(3) ISBN: 4530158656586, Title: Broken, Author: Jenny Lawson, Genre: Comedy, Pages: 654, Price: 19.99, In Stock: 4
(4) ISBN: 2511947576575, Title: Project Hail Mary, Author: Andy Weir, Genre: Sci-Fi, Pages: 476, Price: 12.99, In Stock: 24
(5) ISBN: 4631814314723, Title: Once There Were Wolves, Author: Charlotte McConachy, Genre: Fiction, Pages: 235, Price: 13.99, In Stock: 4
(6) ISBN: 5407041282692, Title: The Wish, Author: Nicholas Sparks, Genre: Fiction, Pages: 710, Price: 12.99, In Stock: 14
(7) ISBN: 3857762924374, Title: The Comfort Book, Author: Matt Haig, Genre: Nonfiction, Pages: 86, Price: 11.99, In Stock: 23
(8) ISBN: 3264426460768, Title: Cultish, Author: Amanda Montell, Genre: Nonfiction, Pages: 540, Price: 12.99, In Stock: 21
(9) ISBN: 4892428994827, Title: Fuzz, Author: Mary Roach, Genre: Nonfiction, Pages: 245, Price: 12.99, In Stock: 3
(10) ISBN: 7699497389607, Title: Later, Author: Stephen King, Genre: Horror, Pages: 775, Price: 12.99, In Stock: 11
(11) ISBN: 5361257320460, Title: Malibu Rising, Author: Taylor Jenkins Reid, Genre: Historical, Pages: 501, Price: 8.99, In Stock: 16
(12) ISBN: 4531134756586, Title: The Push, Author: Ahsley Audrain, Genre: Thriller, Pages: 662, Price: 12.99, In Stock: 13
Please choose a book:
3
You have chosen:
ISBN: 4530158656586, Title: Broken, Author: Jenny Lawson, Genre: Comedy, Pages: 654, Price: 19.99, In Stock: 4
How many would you like to order? 2
You have added new items to your cart
```

A user can add items to their cart

```
(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection: 3
ISBN: 4530158656586, Title: Broken, Author: Jenny Lawson, Genre: Comedy, Pages: 654, Price: $19.99 IN CART: 2
CART TOTAL: $39.98
```

A user can view their cart

```
(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection: 4
Your cart has been emptied

(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection: 3
You have no items in your cart
CART TOTAL: $0
```

A user can empty their cart

```
(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection: 7
Creating new payment option
Enter your card number: 54351435135
Enter your billing address: 73 Street
Enter your shipping address: 43 Street
Payment option added
```

A user can add payment information

```
(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection: 5
CART TOTAL: $67.95
Here are your saved payment options:
(1) Card: 54351435135, Billing Address: 73 Street, Shipping Address: 43 Street
Please choose a card for payment: 1
You have chosen card# : 54351435135
Your order has been completed Order ID: 6
```

A user can checkout their cart if they have a valid payment option

```
(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection: 8
(1) Order ID: 6 Tracking #: 1815402441
Please select an order to view contents: 1
ISBN: 7201586912903 Title: People We Meet on Vacation Author: Emily Henry Amount: 2
ISBN: 4631814314723 Title: Once There Were Wolves Author: Charlotte McConachy Amount: 3
```

A user can view all their past orders and tracking numbers. They can then select an order to view the contents of that order.

```
(1) View our selection of books
(2) Add a book to your cart
(3) View your cart
(4) Empty your cart
(5) Checkout
(6) Logout
(7) Add payment info
(8) View orders
(0) Exit
Please enter your selection: 6
You have been logged out

(1) View our selection of books
(2) Login
(3) Create account
(0) Exit
Please enter your selection: _
```

A user can logout and exit the program.

```
(1) View selection of books
(2) Add a book to inventory
(3) Remove a book from inventory
(4) View sales by publisher
(5) View sales by author
(6) View sales genre
(7) View all time sales
(8) Add book stock to inventory
(0) Exit
Please enter your selection: _
```

An owner has the following options. Viewing books is the same for guests, registered users, and owners.

```

Adding book to inventory
ISBN: 432154125
Title: Book Example
Author: Example Author
Genre: Nonfiction
# Pages: 123
Selling price: 14.99
(1) Publisher name: Firefly Books
(2) Publisher name: Carina Press
(3) Publisher name: HQN
Select the publisher of the book: 3
Book Example has been added to inventory

```

An owner can add a book to their inventory. There are 3 publishers available.

```

Please enter your selection: 3
(1) ISBN: 8479960556995, Title: A Crooked Tree, Author: Una Mannion, Genre: Horror, Pages: 516, Price: 13.99, In Stock: 15
(2) ISBN: 2511947576575, Title: Project Hail Mary, Author: Andy Weir, Genre: Sci-Fi, Pages: 476, Price: 12.99, In Stock: 24
(3) ISBN: 5407041282692, Title: The Wish, Author: Nicholas Sparks, Genre: Fiction, Pages: 710, Price: 12.99, In Stock: 14
(4) ISBN: 3857762924374, Title: The Comfort Book, Author: Matt Haig, Genre: Nonfiction, Pages: 88, Price: 11.99, In Stock: 23
(5) ISBN: 3264426460768, Title: Cultish, Author: Amanda Montell, Genre: Nonfiction, Pages: 540, Price: 12.99, In Stock: 21
(6) ISBN: 4892428994827, Title: Fuzz, Author: Mary Roach, Genre: Nonfiction, Pages: 245, Price: 12.99, In Stock: 3
(7) ISBN: 7699497389607, Title: Later, Author: Stephen King, Genre: Horror, Pages: 775, Price: 12.99, In Stock: 11
(8) ISBN: 5361257320460, Title: Malibu Rising, Author: Taylor Jenkins Reid, Genre: Historical, Pages: 501, Price: 8.99, In Stock: 16
(9) ISBN: 4531134756586, Title: The Push, Author: Ahsley Audrain, Genre: Thriller, Pages: 662, Price: 12.99, In Stock: 13
(10) ISBN: 4530158656586, Title: Broken, Author: Jenny Lawson, Genre: Comedy, Pages: 654, Price: 19.99, In Stock: 4
(11) ISBN: 7201586912903, Title: People We Meet on Vacation, Author: Emily Henry, Genre: Romance, Pages: 902, Price: 12.99, In Stock: 9
(12) ISBN: 4631814314723, Title: Once There Were Wolves, Author: Charlotte McConachy, Genre: Fiction, Pages: 235, Price: 13.99, In Stock: 42
(13) ISBN: 432154125, Title: Book Example, Author: Example Author, Genre: Nonfiction, Pages: 123, Price: 14.99, In Stock: 0

Please choose a book to remove from inventory:
13
You have removed:
ISBN: 432154125, Title: Book Example, Author: Example Author, Genre: Nonfiction, Pages: 123, Price: 14.99, In Stock: 0

```

An owner can remove a book from inventory

```

Please enter your selection: 4
(1) Publisher name: Firefly Books
(2) Publisher name: Carina Press
(3) Publisher name: HQN
Select the publisher to view sales data for: 1
Total sales for Firefly Books: $62.95
Total profit for Firefly Books: $30.396

```

```

Please enter your selection: 5
(1) Author name: Una Mannion
(2) Author name: Andy Weir
(3) Author name: Nicholas Sparks
(4) Author name: Matt Haig
(5) Author name: Amanda Montell
(6) Author name: Mary Roach
(7) Author name: Stephen King
(8) Author name: Taylor Jenkins Reid
(9) Author name: Ahsley Audrain
(10) Author name: Jenny Lawson
(11) Author name: Emily Henry
(12) Author name: Charlotte McConachy
Select the author to view sales data for: 1
Total sales for Una Mannion: $27.98
Total profit for Una Mannion: $17.98

```



```

Please enter your selection: 6
(1) Genre: Romance
(2) Genre: Horror
(3) Genre: Thriller
(4) Genre: Historical
(5) Genre: Comedy
(6) Genre: Fiction
(7) Genre: Sci-Fi
(8) Genre: Nonfiction
Select the genre to view sales data for: 1
Total sales for Romance: $25.98
Total profit for Romance: $15.98

```

```

Please enter your selection: 7
Total sales: $260.8
Total profit: $160.8

```

An owner can view sales by publisher, author, genre, and all time sales.

```

(1) ISBN: 8479960556995, Title: A Crooked Tree, Author: Una Mannion, Genre: Horror, Pages: 516, Price: 13.99, In Stock: 15
(2) ISBN: 2511947576575, Title: Project Hail Mary, Author: Andy Weir, Genre: Sci-Fi, Pages: 476, Price: 12.99, In Stock: 24
(3) ISBN: 5407041282692, Title: The Wish, Author: Nicholas Sparks, Genre: Fiction, Pages: 710, Price: 12.99, In Stock: 14
(4) ISBN: 3857762924374, Title: The Comfort Book, Author: Matt Haig, Genre: Nonfiction, Pages: 88, Price: 11.99, In Stock: 23
(5) ISBN: 3264426460768, Title: Cultish, Author: Amanda Montell, Genre: Nonfiction, Pages: 540, Price: 12.99, In Stock: 21
(6) ISBN: 4892428994827, Title: Fuzz, Author: Mary Roach, Genre: Nonfiction, Pages: 245, Price: 12.99, In Stock: 3
(7) ISBN: 7699497389607, Title: Later, Author: Stephen King, Genre: Horror, Pages: 775, Price: 12.99, In Stock: 11
(8) ISBN: 5361257320460, Title: Malibu Rising, Author: Taylor Jenkins Reid, Genre: Historical, Pages: 501, Price: 8.99, In Stock: 16
(9) ISBN: 4531134756586, Title: The Push, Author: Ahsley Audrain, Genre: Thriller, Pages: 662, Price: 12.99, In Stock: 13
(10) ISBN: 4530158656586, Title: Broken, Author: Jenny Lawson, Genre: Comedy, Pages: 654, Price: 19.99, In Stock: 4
(11) ISBN: 7201586912903, Title: People We Meet on Vacation, Author: Emily Henry, Genre: Romance, Pages: 902, Price: 12.99, In Stock: 9
(12) ISBN: 4631814314723, Title: Once There Were Wolves, Author: Charlotte McConachy, Genre: Fiction, Pages: 235, Price: 13.99, In Stock: 42

Please choose a book:
1
You have chosen:
ISBN: 8479960556995, Title: A Crooked Tree, Author: Una Mannion, Genre: Horror, Pages: 516, Price: 13.99, In Stock: 15
How many would you like to add to stock? 13
Stock updated, email sent to publisher

(1) View selection of books
(2) Add a book to inventory
(3) Remove a book from inventory
(4) View sales by publisher
(5) View sales by author
(6) View sales genre
(7) View all time sales
(8) Add book stock to inventory
(9) Exit
Please enter your selection: 1
ISBN: 2511947576575, Title: Project Hail Mary, Author: Andy Weir, Genre: Sci-Fi, Pages: 476, Price: $12.99, In Stock: 24
ISBN: 5407041282692, Title: The Wish, Author: Nicholas Sparks, Genre: Fiction, Pages: 710, Price: $12.99, In Stock: 14
ISBN: 3857762924374, Title: The Comfort Book, Author: Matt Haig, Genre: Nonfiction, Pages: 88, Price: $11.99, In Stock: 23
ISBN: 3264426460768, Title: Cultish, Author: Amanda Montell, Genre: Nonfiction, Pages: 540, Price: $12.99, In Stock: 21
ISBN: 4892428994827, Title: Fuzz, Author: Mary Roach, Genre: Nonfiction, Pages: 245, Price: $12.99, In Stock: 3
ISBN: 7699497389607, Title: Later, Author: Stephen King, Genre: Horror, Pages: 775, Price: $12.99, In Stock: 11
ISBN: 5361257320460, Title: Malibu Rising, Author: Taylor Jenkins Reid, Genre: Historical, Pages: 501, Price: $8.99, In Stock: 16
ISBN: 4531134756586, Title: The Push, Author: Ahsley Audrain, Genre: Thriller, Pages: 662, Price: $12.99, In Stock: 13
ISBN: 4530158656586, Title: Broken, Author: Jenny Lawson, Genre: Comedy, Pages: 654, Price: $19.99, In Stock: 4
ISBN: 7201586912903, Title: People We Meet on Vacation, Author: Emily Henry, Genre: Romance, Pages: 902, Price: $12.99, In Stock: 9
ISBN: 4631814314723, Title: Once There Were Wolves, Author: Charlotte McConachy, Genre: Fiction, Pages: 235, Price: $13.99, In Stock: 42
ISBN: 8479960556995, Title: A Crooked Tree, Author: Una Mannion, Genre: Horror, Pages: 516, Price: $13.99, In Stock: 28

```

An owner can add books to stock

GitHub Repository

<https://github.com/GnefDu/COMP3005-Project>

DDL and relations are provided in SQL folder. Full size images of ER diagram and relation schema are provided in the repository.

Availability

Any time after 2 pm on Dec 20.