WhatABook Technical Design Document

BSON Builders: Amanda Rovey, Malcolm Abdullah, Angelica Gutierrez,

Bellevue University

WEB335-J310 Introduction to NoSQL

Professor Richard Krasso

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Section 1: Introduction

1.0 Group Information

Team name: Our team name is BSON Builders.

The name “BSON Builders” was chosen for us by our professor for the WEB335-J310 Introduction to NoSQL class. While we didn’t select the name ourselves, we believe it was chosen to reflect the importance of understanding BSON (Binary JSON) in the context of NoSQL databases. BSON is a binary-encoded serialization of JSON-like documents, primarily used in MongoDB to store and transmit data efficiently.

Team Captain: Amanda Rovey

Team Mascot: The Data Mongoose

Our mascot, “The Data Mongoose,” symbolizes agility, resourcefulness, and adaptability. Just like a mongoose is known for its quick reflexes and ability to navigate complex environments, we aim to efficiently manage and utilize data within NoSQL databases. The Data Mongoose embodies our commitment to learning, exploring, and mastering the principles of NoSQL database design, while highlighting our agility and resourcefulness in handling data.

Team Member Bios

 **Amanda Rovey**	Amanda is currently a student at Bellevue University pursuing a Bachelor’s degree in Web Development. She works as a product owner and data analyst for a Behavorial Health clinic. In addition to her professional and academic pursuits, she is a mom of four and lives in rural Nebraska. Throughout her studies, she has developed a strong foundation in various aspects of web development and project management, including project management, web development fundamentals, internet systems architecture, enterprise JavaScript, business environment for web professionals, Node.js, and RESTful APIs. She is passionate about discovering innovative solutions to data challenges and looks forward to applying the knowledge gained from her courses to real-world scenarios. Outside of her studies and work, she enjoys reading, DnD, board games, and hiking. She is enthusiastic about continuous learning and is always looking for opportunities to expand her knowledge in the field of web development and database management.

 **Malcolm Abdullah**	Malcolm Abdullah is an accomplished professional with a passion for technology and creativity. Living in Missouri with his family, Malcolm balances a dynamic career as an A/V Engineer II for Spectrum while also running his own business management and marketing consulting firm. In addition, he freelances as a web designer, further showcasing his entrepreneurial spirit. Dedicated to continuous learning, Malcolm is expanding his expertise in web development with a focus on JavaScript, RESTful APIs, MongoDB, and Python. Beyond his professional pursuits, he enjoys working on cars, producing music, cooking, and diving into the worlds of manga and anime. His diverse skills and interests make him a well-rounded individual, always pushing the boundaries of both his career and hobbies.
 **Angelica Gutierrez**	Born and raised in Southern California, Angelica Gutierrez has always been around the biggest tech trends. Gutierrez is currently getting a second bachelor's in web development. Her first, Computer Systems, opened the world to programming video games, apps, to Linux programs while learning how to use Adobe products such as Photoshop. Gutierrez works with Live Nation Entertainment at local IE venues and the Walt Disney Company with their parks and resorts. Being only 24 years old, she has already programmed in various languages such as C++, HTML, C, JavaScript, Python, PHP, CSS and more! Outside of studies, Gutierrez loves going to local shows, meeting her favorite bands, collecting CDs + vinyl, going to Disney parks, and spending time with her family. She hopes to grow with Disney or Live Nation in their tech fields and be an inspiration to other girls to pick up coding as well.

1.1 Purpose

The WhatABook application aims to revolutionize the way customers interact with WhatABook, a charming used book store, by bringing its extensive collection right to their personal computers. This desktop

application is designed to provide a seamless and enjoyable experience for middle-aged users with minimal computer skills, allowing them to explore, search, and manage their favorite books with ease.

Goals

1. Seamless Book Browsing: Empower customers to effortlessly browse through the store's diverse book collection, categorized by genre, author, title, and book ID.

2. Personalized Wishlist Management: Enable customers to curate their own wishlists by adding desired books. Provide an intuitive interface for viewing and managing their wishlists, including the ability to remove books they no longer want.

3. Robust Search Capabilities: Offer powerful search options that allow customers to quickly find books by title or book ID, making their shopping experience more efficient.

4. User-Friendly Interface: Design a clean and straightforward interface that caters to the needs of middle-aged users, ensuring they can navigate the application with confidence and ease.

5. Efficient Data Handling: Utilize MongoDB to store and manage book and customer data effectively, ensuring smooth and reliable performance. Implement efficient database queries and operations to support the application's functionality.

6. Enhanced Customer Engagement: Foster a deeper connection with customers by providing a convenient and accessible way to explore and manage book listings, ultimately enhancing their overall experience and satisfaction.

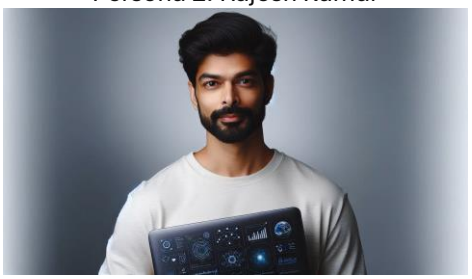
1.2 User Personas

Core users of the website:

- Middle-aged customers with minimal computer experience who want to browse and purchase used books.
- Book enthusiasts who are looking for specific genres or authors.
- Regular customers who want to manage their wishlist and keep track of books they are interested in.

3 Detailed Personas:

Persona 1: Maria Gonzalez
 
	• **Name:** Maria Gonzalez
	• **Age:** 45
	• **Occupation:** School Teacher
	• **Distinguishing Characteristics:** Limited computer skills, prefers simple and easy-to-navigate interfaces.
	• **Most Important Features:** Browsing book listings, adding books to wishlist, viewing wishlist.
	• **Least Important Features:** Advanced search options.
	• **Needs:** Easy access to book listings, ability to add and manage wishlist items.
	• **Computer Skill Level:** Basic
	• **Favorite Genre:** Mystery
	• **Preferred Device:** Desktop computer
	• **Internet Usage:** Moderate
	• **Shopping Frequency:** Monthly
	• **Additional Elements:**
	  ○ **Preferred Reading Time:** Evenings
	  ○ **Preferred Payment Method:** Credit Card
	  ○ **Reading Habit:** Reads 1-2 books per month

Persona 2: Rajesh Kumar
 
	• **Name:** Rajesh Kumar
	• **Age:** 30
	• **Occupation:** Software Developer
	• **Distinguishing Characteristics:** Tech-savvy, enjoys exploring new features and functionalities.
	• **Most Important Features:** Searching for books by title or author, viewing books by genre.
	• **Least Important Features:** Wishlist management.
	• **Needs:** Advanced search options, detailed book information.
	• **Computer Skill Level:** Advanced
	• **Favorite Genre:** Science Fiction
	• **Preferred Device:** Laptop
	• **Internet Usage:** High
	• **Shopping Frequency:** Weekly
	• **Additional Elements:**
	  ○ **Preferred Reading Time:** Weekends
	  ○ **Preferred Payment Method:** Digital Wallet
	  ○ **Reading Habit:** Reads 3-4 books per month

Persona 3: Amina Hassan
 
	• **Name:** Amina Hassan
	• **Age:** 60
	• **Occupation:** Retired Librarian
	• **Distinguishing Characteristics:** Enjoys reading and has a vast knowledge of books, prefers a straightforward interface.
	• **Most Important Features:** Browsing books by genre, adding books to wishlist.
	• **Least Important Features:** Advanced search options.
	• **Needs:** Simple navigation, easy access to book genres.
	• **Computer Skill Level:** Intermediate
	• **Favorite Genre:** Historical Fiction
	• **Preferred Device:** Tablet
	• **Internet Usage:** Moderate
	• **Shopping Frequency:** Bi-weekly
	• **Additional Elements:**
	  ○ **Preferred Reading Time:** Afternoons
	  ○ **Preferred Payment Method:** PayPal
	  ○ **Reading Habit:** Reads 2-3 books per month

1.3 User Stories & 1.4 Work Estimation (story points)

Persona 1: Maria Gonzalez

User Story	Story Points
As a middle-aged customer with minimal computer experience, I need a simple and easy-to-navigate interface, so that I can browse book listings without any confusion.	3
As a middle-aged customer with minimal computer experience, I need the ability to add books to my wishlist, so that I can keep track of books I want to purchase later.	5
As a middle-aged customer with minimal computer experience, I need to view my wishlist, so that I can see all the books I have added in one place.	3
As a middle-aged customer with minimal computer experience, I need a listing of books by genre, so that I can easily find books in my favorite genre.	5
As a middle-aged customer with minimal computer experience, I need a listing of books by author, so that I can find books by my favorite authors.	5

Persona 2: Rajesh Kumar

User Story	Story Points

As a book enthusiast, I need to search for books by title, so that I can quickly find specific books I am interested in.	3
As a book enthusiast, I need to search for books by bookId, so that I can find books using their unique identifiers.	3
As a book enthusiast, I need detailed book information, so that I can make informed decisions about which books to purchase.	5
As a book enthusiast, I need to view books by genre, so that I can explore books in my favorite genres.	5
As a book enthusiast, I need to view books by author, so that I can discover books by authors I like.	5

Persona 3: Amina Hassan

User Story	Story Points
As a regular customer, I need to browse book listings, so that I can find new books to add to my collection.	3
As a regular customer, I need to add books to my wishlist, so that I can keep track of books I want to purchase in the future.	5
As a regular customer, I need to view my wishlist, so that I can see all the books I have added in one place.	3
As a regular customer, I need a listing of books by genre, so that I can easily find books in my favorite genre.	5
As a regular customer, I need a listing of books by author, so that I can find books by my favorite authors.	5

Story Decomposition and Tasking

Persona 1: Middle-Aged Customer

1. User Story 1: Simple and easy-to-navigate interface (3 Story Points)

- Task 1: Design wireframe for the UI (2 hours)

- Task 2: Implement basic navigation and layout (3 hours)

- Task 3: Develop accessibility features (e.g., large buttons, clear fonts) (2 hours)

- Task 4: Conduct usability testing with a sample of non-technical users (3 hours)

- Task 5: Iterate on feedback and update the interface for simplicity (2 hours)

Total Estimation: 12 hours

2. User Story 2: Add books to wishlist (5 Story Points)

- Task 1: Design UI for the "Add to Wishlist" button (1.5 hours)
- Task 2: Implement backend functionality to store wishlist items (3 hours)
- Task 3: Create a database schema for the wishlist (2 hours)
- Task 4: Set up API endpoint for adding books to wishlist (3 hours)
- Task 5: Test functionality and ensure smooth UX (2 hours)

Total Estimation: 11.5 hours

3. User Story 3: View wishlist (3 Story Points)

- Task 1: Design the UI for the wishlist page (2 hours)
- Task 2: Implement backend functionality to retrieve wishlist items (2 hours)
- Task 3: Set up API endpoint for displaying the wishlist (2 hours)
- Task 4: Create frontend functionality for viewing the wishlist (2.5 hours)
- Task 5: Test the wishlist display and interactivity (1.5 hours)

Total Estimation: 10 hours

4. User Story 4: Listing of books by genre (5 Story Points)

- Task 1: Design UI for genre listing (2 hours)
- Task 2: Create database schema for categorizing books by genre (3 hours)
- Task 3: Implement backend logic to fetch books by genre (3 hours)
- Task 4: Set up API endpoint for genre-based book listing (2 hours)
- Task 5: Test book filtering by genre on both backend and frontend (2 hours)

Total Estimation: 12 hours

5. User Story 5: Listing of books by author (5 Story Points)

- Task 1: Design UI for author-based listing (2 hours)
- Task 2: Implement backend logic to fetch books by author (3 hours)
- Task 3: Create a database schema for associating books with authors (3 hours)
- Task 4: Set up API endpoint for author-based book listing (2 hours)
- Task 5: Conduct testing for author-based book listing (2 hours)

Total Estimation: 12 hours

Persona 2: Rajesh Kumar (Book Enthusiast)

6. User Story 6: Search by title (3 Story Points)

- Task 1: Design UI for search functionality (1.5 hours)
- Task 2: Implement search logic in backend (2 hours)
- Task 3: Create API endpoint for searching by title (2 hours)
- Task 4: Optimize search functionality for speed and accuracy (2.5 hours)
- Task 5: Test the search feature with various book titles (2 hours)

Total Estimation: 10 hours

7. User Story 7: Search by bookId (3 Story Points)

- Task 1: Implement backend logic for searching by bookId (2 hours)
- Task 2: Create API endpoint for searching by bookId (1.5 hours)
- Task 3: Design UI for entering bookId (1.5 hours)
- Task 4: Implement frontend search functionality (2 hours)
- Task 5: Test bookId search functionality (2 hours)

Total Estimation: 9 hours

8. User Story 8: View detailed book information (5 Story Points)

- Task 1: Design UI for displaying detailed book information (2.5 hours)
- Task 2: Create API endpoint to fetch detailed book information (3 hours)
- Task 3: Implement backend logic for retrieving book details (2.5 hours)
- Task 4: Create database schema to store detailed book information (2.5 hours)
- Task 5: Test the display of detailed book information (2 hours)

Total Estimation: 12.5 hours

9. User Story 9: View books by genre (5 Story Points)
   - Tasks are similar to those in User Story 4.
   - Total Estimation: 12 hours

10. User Story 10: View books by author (5 Story Points)
    - Tasks are similar to those in User Story 5.
    - Total Estimation: 12 hours

Persona 3: Amina Hassan (Regular Customer)

11. User Story 11: Browse book listings (3 Story Points)
    - Task 1: Design UI for book browsing (2 hours)
    - Task 2: Implement backend logic for fetching all books (3 hours)
    - Task 3: Create API endpoint for retrieving book listings (2 hours)
    - Task 4: Optimize browsing functionality for large data sets (2.5 hours)
    - Task 5: Test browsing functionality with real data (2 hours)

    Total Estimation: 11.5 hours

12. User Story 12: Add books to wishlist (5 Story Points)
    - Tasks are similar to those in User Story 2.

- Total Estimation: 11.5 hours

13. User Story 13: View wishlist (3 Story Points)

- Tasks are similar to those in User Story 3.
- Total Estimation: 10 hours

14. User Story 14: Listing of books by genre (5 Story Points)

- Tasks are similar to those in User Story 4.
- Total Estimation: 12 hours

15. User Story 15: Listing of books by author (5 Story Points)

- Tasks are similar to those in User Story 5.
- Total Estimation: 12 hours

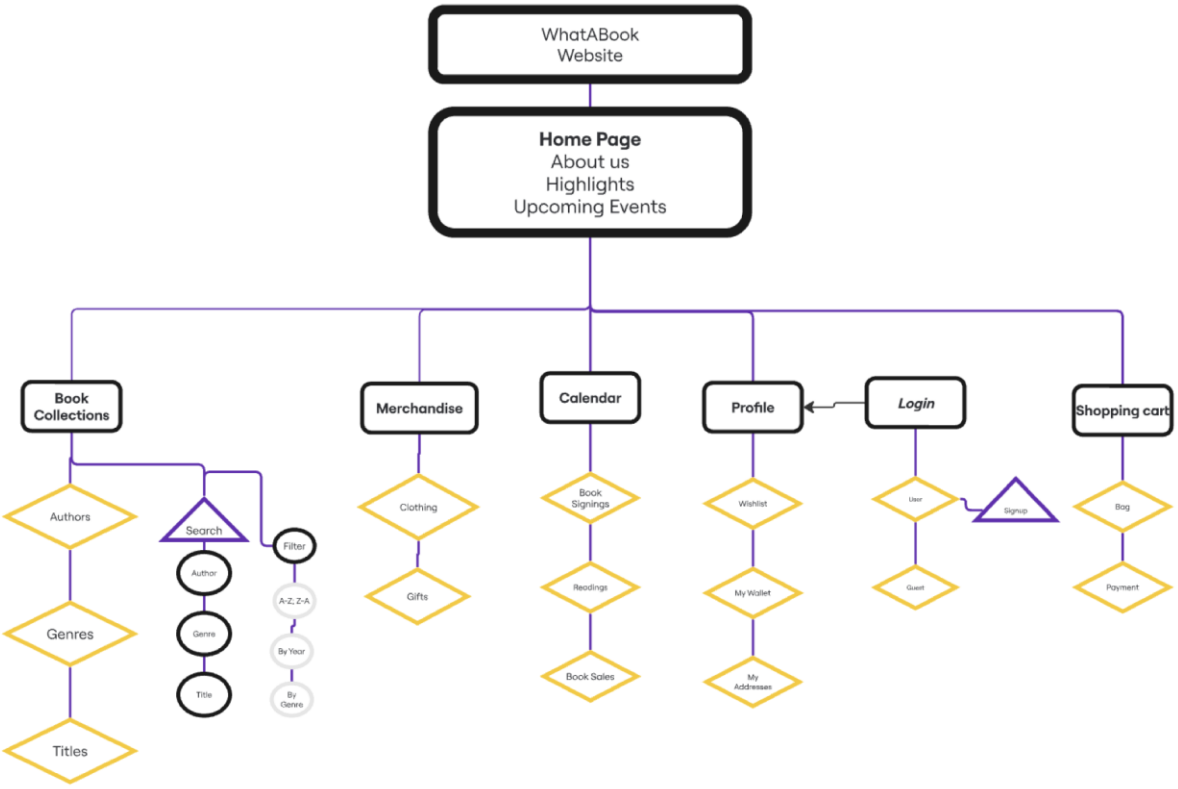
Overall Summary of Hours

- Persona 1: 57.5 hours
- Persona 2: 55.5 hours
- Persona 3: 57 hours

Section 2: Process Design

2.1 Sitemap

Assignment 7.2 - WhatABook Design



2.2 Prototypes

Hand-drawn sketch of the proposed solution

User interface principles/best practices used in the prototype:

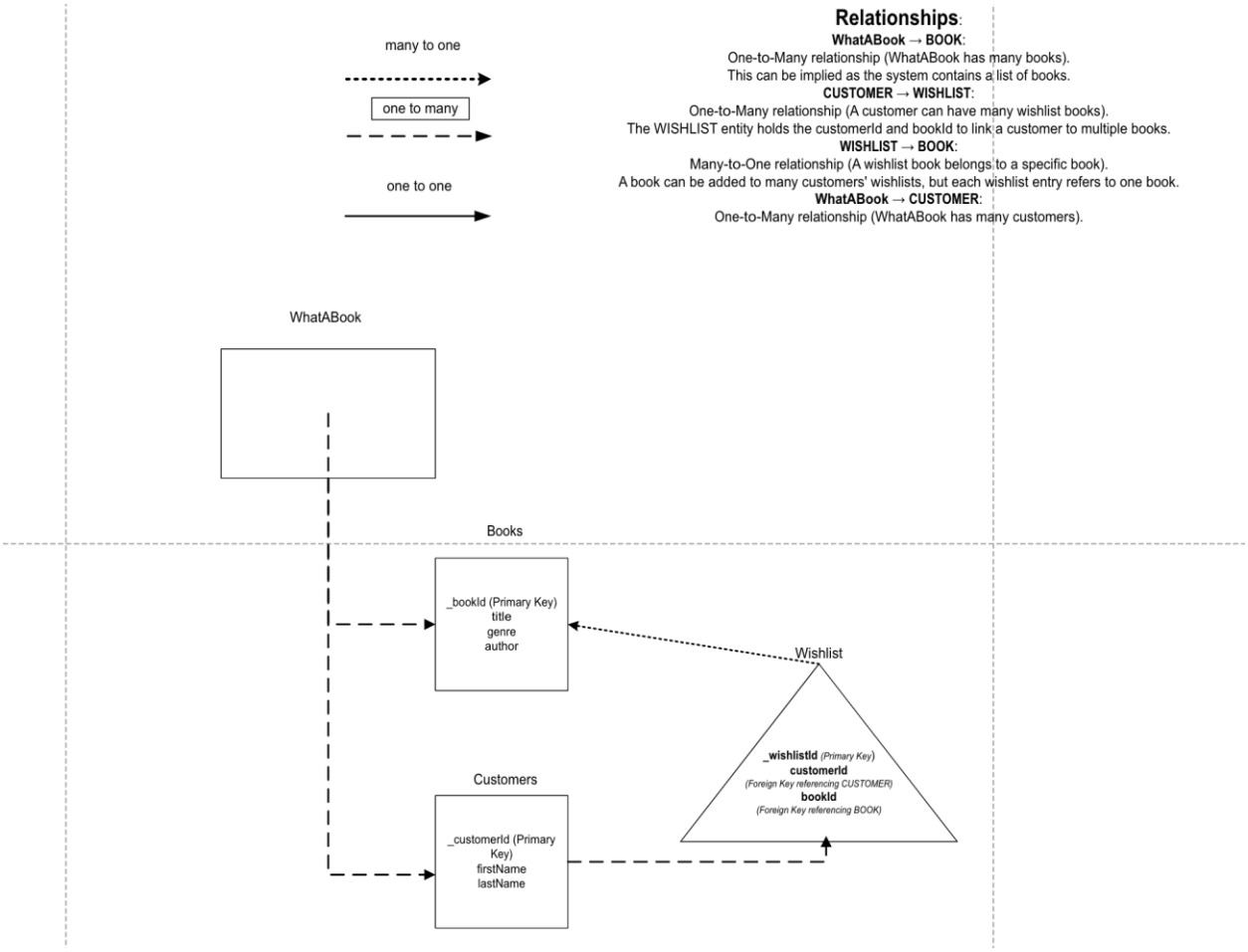
1. Be Consistent – Having the same "keywords" on every page makes it easier for the user to move around the site. They are constantly seeing that same navbar, so they get familiar with it as they continue exploring the site. We use repetitive words such as “See More” multiple times instead of having different synonyms for each section. We aim to also have the same color scheme on our actual prototype so that is also a familiarity to the user. We also use icons that users are already aware of like the cart, profile, and Facebook logo.

2. Reduce Cognitive Load – All the information is presented on these screens. The user does not have to click on multiple buttons or go through a maze to get information. Everything we present is listed and if it’s not, we have a see more directory which shows the user that there is more to explore.

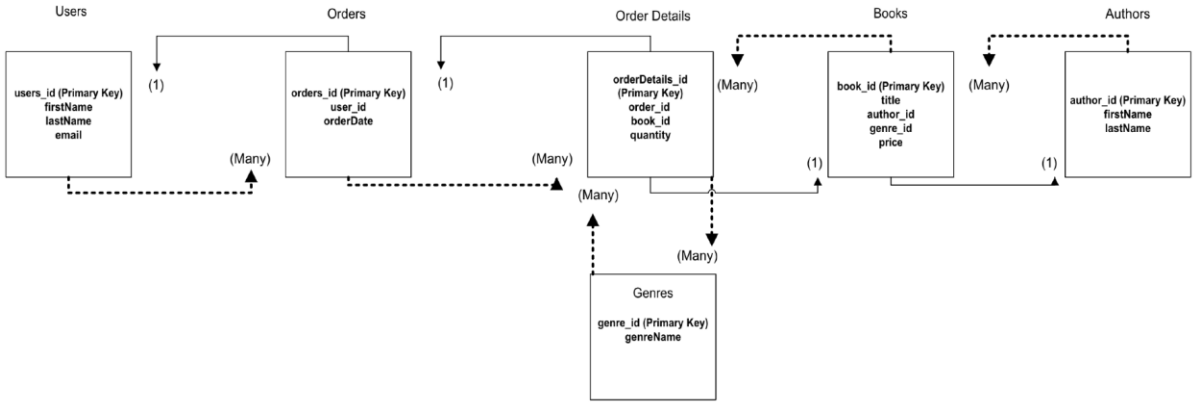
3. Navigation – Navigation is the easiest way for the user to move around your website which is why having our navbar is important. You do not want your user to feel overwhelmed like they do not know what your site has to offer.

POP by Marvel Link: https://marvelapp.com/prototype/a9abd58

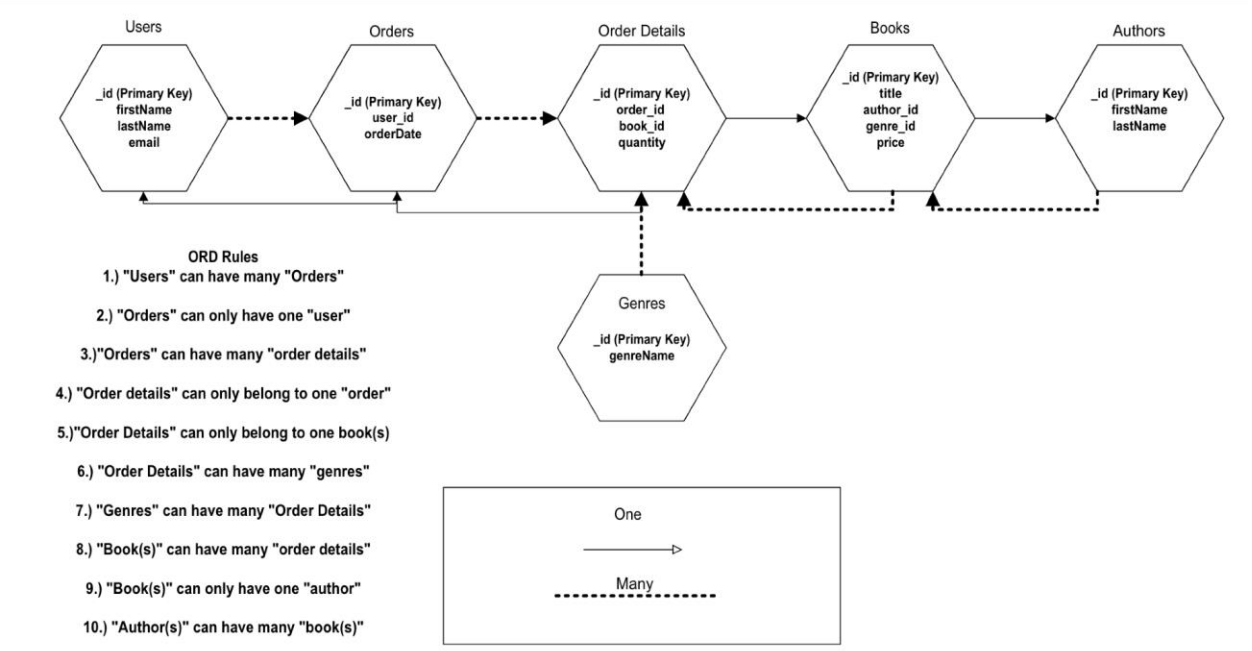
2.3 ORD



Alternative ORDs



Or



2.4 NoSQL Data Structure

Relationships

- Users embed their Orders, which in turn embed Books within each order.
- Books reference Authors and Genres via embedded documents or referencing their respective collections

Users Collection

Contains user information and embedded orders.

```
{
 "_id": "user_id_1",
 "firstName": "Luna",
 "lastName": "Starlight",
 "email": "luna.starlight@example.com",
 "orders": [
  {
   "order_id": "order_id_1",
   "orderDate": "2024-09-29T00:00:00Z",
   "orderDetails": [
    {
     "book_id": "book_id_1",
     "quantity": 1,
     "price": 15.99
```

```
     }
    ]
   }
  ]
}
```

```
{
 "_id": "user_id_2",
 "firstName": "Orion",
 "lastName": "Skywalker",
 "email": "orion.skywalker@example.com",
 "orders": [
  {
   "order_id": "order_id_2",
   "orderDate": "2024-09-29T00:00:00Z",
   "orderDetails": [
    {
     "book_id": "book_id_2",
     "quantity": 2,
     "price": 12.99
    }
   ]
  }
 ]
}
```

Books Collection

Contains book information, including genre and author references.

```
{
 "_id": "book_id_1",
 "title": "The Enchanted Forest",
 "genre": "Fantasy",
 "author_id": "author_id_1"
}
```

```
{
 "_id": "book_id_2",
 "title": "Mysteries of the Deep",
 "genre": "Adventure",
 "author_id": "author_id_2"
}
```

Authors Collection

Contains author information.

```
{
 "_id": "author_id_1",
 "firstName": "Elara",
```

"lastName": "Moonshadow"
}

{
"_id": "author_id_2",
"firstName": "Drake",
"lastName": "Stormrider"
}

Section 3: Retrospective

3.1 Team Challenges

3.2 What would you do differently?