

# Bookstore Sales Tracker

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## A) Executive Summary

The BooksRus' database frontend project is now complete. We've developed the architecture of BooksRus' database step-by-step and fine-tuned the design to adopt a more efficient and logical approach to storing essential data for the bookstore chain's operations.

We had a strong start with our initial database blueprint design. The team provided a clear description of the problem our database was to solve. Also, we have established our first initial Entity Relationship Diagram (ERD) based on a well-defined database outline and database schema.

Moving on to step 2, our database outline and ERD have undergone some minor modifications for clarity. During this step, we implemented a static version of how we want the website to look in the final version. We also defined the style and added test data to the website to make it look as close as possible to how we want it to look in the final version.

In step 3, we made minor adjustments, modifying customerID foreign key in the Invoices table from having NOT NULL constraint to be nullable, as it's set to NULL upon deletion. This step marked the transition to a dynamic and functional website. Specifically, we worked on getting CRUD operations working for most of the pages on the website.

We received a lot of insightful feedback on step 3 that helped us refine the functionality of the website. The team configured UPDATE for the books page to populate the input form and update a book by its ID. We also updated queries in the DML file and added client-side input validation for all pages. For the rest of step 4, we were focused on implementing all CRUD operations for the books page.

Step 4 feedback was also very helpful as we fixed some UI bugs and improved overall user experience. We separated books adding and updating sections on the books page and managed to clear input forms after they're submitted. Additionally, we added placeholders for text boxes, phone numbers formatting in the UI, dollar sign (\$) in front of the price of the book and formatted the price to show cents, and dynamic dropdown menus for the invoices page. The rest of step 5 went smoothly for our project with no major changes to the design or architecture of the database.

During step 6, we mainly focused on UI fine-tuning. We rectified issues with the input forms, specifically addressing the issue where the form was accepting phone number input in different formats than the suggested placeholder. Similarly, we addressed a flaw in form validation where blank titles and customer names were being accepted. We also improved UX by displaying "NULL" for authors in AuthorsBooks when "None" was chosen for authors when adding a book in the Books page. These changes improved the overall usability of the website.

## B) Project Outline and Database Outline:

### Overview

**BooksRus**, a bookstore chain with an annual book sales volume of 2,000 books, serves approximately 1,500 customers, and generates \$100,000 in revenue annually. An online sales tracker system, utilizing a relational database, is created to enhance the chain's sales tracking capabilities and improve inventory management. This system will efficiently record *Invoices*, capturing details of *Books* purchased by the *Customers* across its 5 *Stores* located throughout the United States. Additionally, the database schema accommodates scenarios of multiple *Authors* per book, multiple purchases for a single book, and the association of purchases with specific customers and stores.

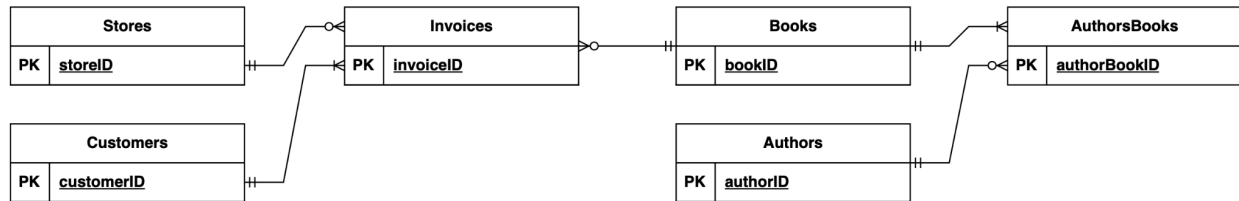
### Database Outline

- **Authors:** Records the details of authors of the books in the bookstore. An author can write more than one book.
  - **authorID:** int, auto\_increment, not NULL, PK
  - **firstName:** varchar(255), not NULL
  - **lastName:** varchar(255), not NULL
  - Relationship(s):
    - M:M relationship between **Authors** and **Books** is implemented with **authorID** as a FK inside **AuthorsBooks** (intersection table).
- **Books:** Records the details of the books in the bookstore. A book can have more than one author.
  - **bookID:** int, auto\_increment, not NULL, PK
  - **title:** varchar(255), not NULL
  - **yearOfPublication:** YEAR, not NULL
  - **price:** decimal(12, 2), not NULL
  - Relationship(s):
    - M:M relationship between **Books** and **Authors** is implemented with **bookID** as a FK inside **AuthorsBooks** (intersection table).
    - 1:M relationship between **Books** and **Invoices** is implemented with **bookID** as a FK inside **Invoices**.
- **Invoices:** Records transaction details between the bookstores and customers. Only one book can be purchased in one transaction (invoiceID).
  - **invoiceID:** int, auto\_increment, not NULL, PK
  - **date:** DATE, not NULL

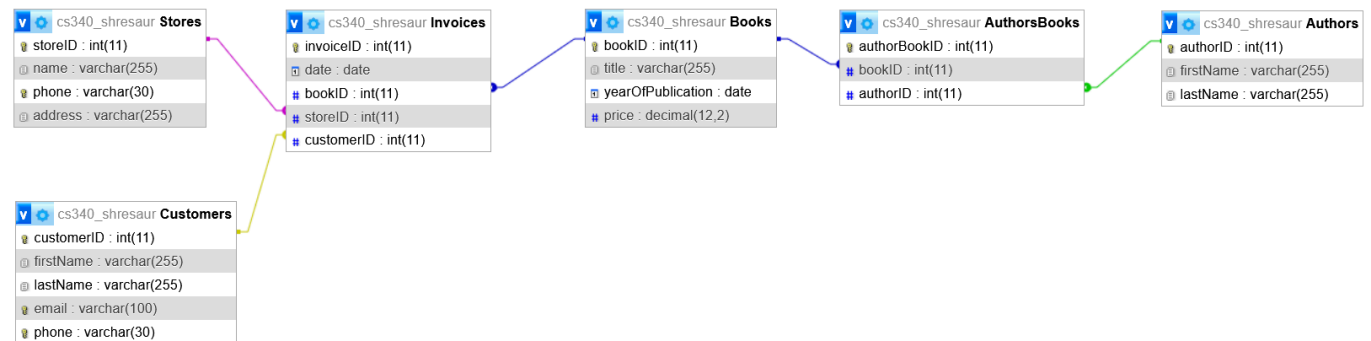
- **bookID**: int, not NULL, FK
- **storeID**: int, not NULL, FK,
- **customerID**: int, not NULL, FK
- Relationship(s):
  - 1:M relationship between **Invoices** and **Books** is implemented with **bookID** as a FK inside **Invoices**.
  - 1:M relationship between **Invoices** and **Stores** is implemented with **storeID** as a FK inside **Invoices**.
  - 1:M relationship between **Invoices** and **Customers** is implemented with **customerID** as a FK inside **Invoices**.
- **Stores**: Records the details of the bookstore locations.
  - **storeID**: int, auto\_increment, not NULL, PK
  - **name**: varchar(255), not NULL
  - **phone**: varchar(30), unique, not NULL
  - **address**: varchar(255), not NULL
  - Relationship(s):
    - 1:M relationship between **Stores** and **Invoices** is implemented with **storeID** as a FK inside **Invoices**.
- **Customers**: Records the details of the bookstores' customers information.
  - **customerID**: int, auto\_increment, not NULL, PK
  - **firstName**: varchar(255), not NULL
  - **lastName**: varchar(255), not NULL
  - **email**: varchar(100), not NULL
  - **phone**: varchar(30), unique, not NULL
  - Relationship(s):
    - 1:M relationship between **Customers** and **Invoices** is implemented with **customerID** as a FK inside **Invoices**.
- **AuthorsBooks**: Records the details of each author from **Authors** and the books they've written from **Books**.
  - **authorBookID**: int, auto\_increment, not NULL, PK
  - **authorID**: int, FK
  - **bookID**: int, not NULL, FK
  - Relationship(s):
    - 1:M relationship between **AuthorsBooks** and **Authors** is implemented with **authorID** as a FK inside **AuthorsBooks** (intersection table).

- 1:M relationship between **AuthorsBooks** and **Books** is implemented with **bookID** as a FK inside **AuthorsBooks** (intersection table).

### C) ER Diagram:



### D) SCHEMA:



### E) SAMPLE DATA:

Stores table:

	storeID	name	phone	address
▶	1	Metropolitan Stories	402-547-6787	1 Broad Court, Irmo, SC 29063
	2	Literary Books	542-888-2167	121 Main Lane, Pataskala, OH 43062
	3	Bookshelf Boutique	901-325-4321	9906 W. Union Street, Burke, VA 22015

Customers table:

	customerID	firstName	lastName	email	phone
▶	1	Patricia	Carlson	pcarlson@gmail.com	667-222-4521
	2	Selena	Lozada	slozada@gmail.com	701-548-1944
	3	Michael	Karlsson	mkarlsson@gmail.com	402-666-1234
	4	Sergio	Hernandez	shernandez@gmail.com	801-951-3574

Authors table:

	authorID	firstName	lastName
▶	1	Edgar	Patterson
	2	William	Fitzgerald
	3	George	Wolf
	4	Mike	Lang

Books table:

	bookID	title	yearOfPublication	price
▶	1	Linear Algebra	2005	80.00
	2	Discrete Mathematics	1992	90.99
	3	Organic Chemistry	2020	120.00
	4	Statistics	2021	115.00

AuthorsBooks table:

	authorBookID	bookID	authorID
▶	1	1	1
	2	1	2
	3	2	2
	4	3	3
	5	4	NULL

M:M relationship between Authors and Books. A book can have one or many authors (the book with bookID = 1 has two authors (authorID = 1 and authorID = 2). An author can have zero books (authorID = 4 has no books in their name at the store) or many books (authorID = 2 has two books written by them, bookID = 1 and bookID = 2).

Similarly, if an author is deleted from the Authors table, the authorID will be set to NULL in AuthorsBooks table. ON DELETE SET NULL operation was used to achieve this.

Invoices table:

	invoiceID	date	bookID	storeID	customerID
▶	1	2021-02-25	1	1	1
	2	2021-03-19	2	1	1
	3	2023-10-10	2	2	2
	4	2022-02-05	1	1	4

1:M relationship between Customers and Invoice table. One customer can buy multiple books (customerID = 1 bought bookID = 1 and bookID = 2).

1:1 relationship between Invoice and Customers. Each invoice is associated with one customer.

1:M relationship between Books and Invoices. One book can be purchased by multiple customers (bookID = 2 is purchased by customerID = 1 and customerID = 2).

1:M relationship between Stores and Invoices. One store can sell multiple books (storeID = 1 sold bookID = 1 and bookID = 2).

## F) UI Screenshots

### 1) CREATE/READ/UPDATE/DELETE Books Page

The screenshot displays the 'BooksRus' application interface. At the top, there is a navigation bar with links: Home, Books, Authors, Customers, Stores, Invoices, and AuthorsBooks. Below the navigation bar, the 'Books Table' section is visible, with a subtitle 'Browse list of books in the stores.' The table lists four books with columns for ID, Title, Publication year, Price, Update, and Delete. Below the table, the 'Add a Book' form is shown, featuring input fields for Title, Author 1 (a dropdown menu), Year of Publication, and Price (\$), each with a red asterisk indicating it is required. An 'Add Book' button is located at the bottom of the form. The footer of the application shows the copyright notice: '© 2024 Saurav Shrestha, Mo Hudeihed'.

ID	Title	Publication year	Price	Update	Delete
1	Linear Algebra	2005	\$80.00	<button>Update</button>	<button>Delete</button>
2	Discrete Mathematics	1992	\$90.99	<button>Update</button>	<button>Delete</button>
3	Organic Chemistry	2020	\$120.00	<button>Update</button>	<button>Delete</button>
4	Statistics	2021	\$115.00	<button>Update</button>	<button>Delete</button>

**Add a Book**

Title:  \* Required

Author 1:  \* Required

Year of Publication:  \* Required

Price (\$):  \* Required

Add Book

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*When Author 1 is chosen from the dropdown menu, the dropdown menu for selecting Author 2 will also appear. Once a book is added, the corresponding BookID and AuthorIDs are inserted into the intersection table AuthorsBooks. Users can choose "NONE" for both Author 1 and Author 2, resulting in NULL values being added for the authors in the AuthorsBook section for the respective Book. Similarly, the authors can also be set to NULL by choosing None when updating the Book.*

## 2) CREATE/READ/DELETE Authors Page

BooksRus

[Home](#)
[Books](#)
[Authors](#)
[Customers](#)
[Stores](#)
[Invoices](#)
[AuthorsBooks](#)

### Authors Table

Browse authors

ID	First Name	Last Name	Delete
1	Edgar	Patterson	Delete
2	William	Fitzgerald	Delete
3	George	Wolf	Delete
4	Mike	Lang	Delete

### Add an author

First Name:  \* Required

Last Name:  \* Required

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*Deleting an author will change the author value in the AuthorsBooks intersection table to NULL for the respective Book.*

## 3) CREATE/READ/DELETE Customers Page

BooksRus

[Home](#)
[Books](#)
[Authors](#)
[Customers](#)
[Stores](#)
[Invoices](#)
[AuthorsBooks](#)

### Customers Table

Browse customer information.

ID	First Name	Last Name	Email	Phone	Delete
1	Patricia	Carlson	pcarlson@gmail.com	667-222-4521	Delete
2	Selena	Lozada	slozada@gmail.com	701-548-1944	Delete
3	Michael	Karlsson	mkarlsson@gmail.com	402-666-1234	Delete
4	Sergio	Hernandez	shernandez@gmail.com	801-951-3574	Delete

### Add a customer

First Name:  \* Required

Last Name:  \* Required

Email:  \* Required

Phone:  \* Required

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*Deleting a customer from the Customers table will also delete the Invoices related to that customer from the Customers Page.*

## 4) CREATE/READ/DELETE Stores Page

BooksRus

[Home](#)
[Books](#)
[Authors](#)
[Customers](#)
[Stores](#)
[Invoices](#)
[AuthorsBooks](#)

### Stores Table

Browse stores associated with the book chain.

ID	Name	Phone	Address	Delete
1	Metropolitan Stories	402-547-6787	1 Broad Court, Irmo, SC 29063	<a href="#">Delete</a>
2	Literary Books	542-888-2167	121 Main Lane, Pataskala, OH 43062	<a href="#">Delete</a>
3	Bookshelf Boutique	901-325-4321	9906 W. Union Street, Burke, VA 22015	<a href="#">Delete</a>

### Add a store

Name:  \* Required

Phone:  \* Required

Address:  \* Required

[Add store](#)

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*Adding a store will also populate the store in the store selection dropdown menu of the Invoice page.*

## 5) CREATE/READ/DELETE Invoices Page

BooksRus

[Home](#)
[Books](#)
[Authors](#)
[Customers](#)
[Stores](#)
[Invoices](#)
[AuthorsBooks](#)

### Invoices Table

Record of transactions made by the customers.

Invoice ID	Date	Book	Store	Customer	Delete
1	02-25-2021	Linear Algebra	Metropolitan Stories	Patricia Carlson	<a href="#">Delete</a>
2	03-19-2021	Discrete Mathematics	Metropolitan Stories	Patricia Carlson	<a href="#">Delete</a>
3	10-10-2023	Discrete Mathematics	Literary Books	Selena Lozada	<a href="#">Delete</a>
4	02-05-2022	Linear Algebra	Metropolitan Stories	Sergio Hernandez	<a href="#">Delete</a>

### Add Invoice

Date:  \* Required

Title:  \* Required

Store:  \* Required

Customer:  \* Required

[Add Invoice](#)

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## 6) READ AuthorsBooks Page

BooksRus		
Home	Books	Authors
Customers	Stores	Invoices
AuthorsBooks		
AuthorsBooks Table		
Browse the authors of the respective books.		
ID	Book	Author
1	Linear Algebra	Edgar Patterson
2	Linear Algebra	William Fitzgerald
3	Discrete Mathematics	William Fitzgerald
4	Organic Chemistry	George Wolf
5	Statistics	NULL
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