

COMP 3005 B

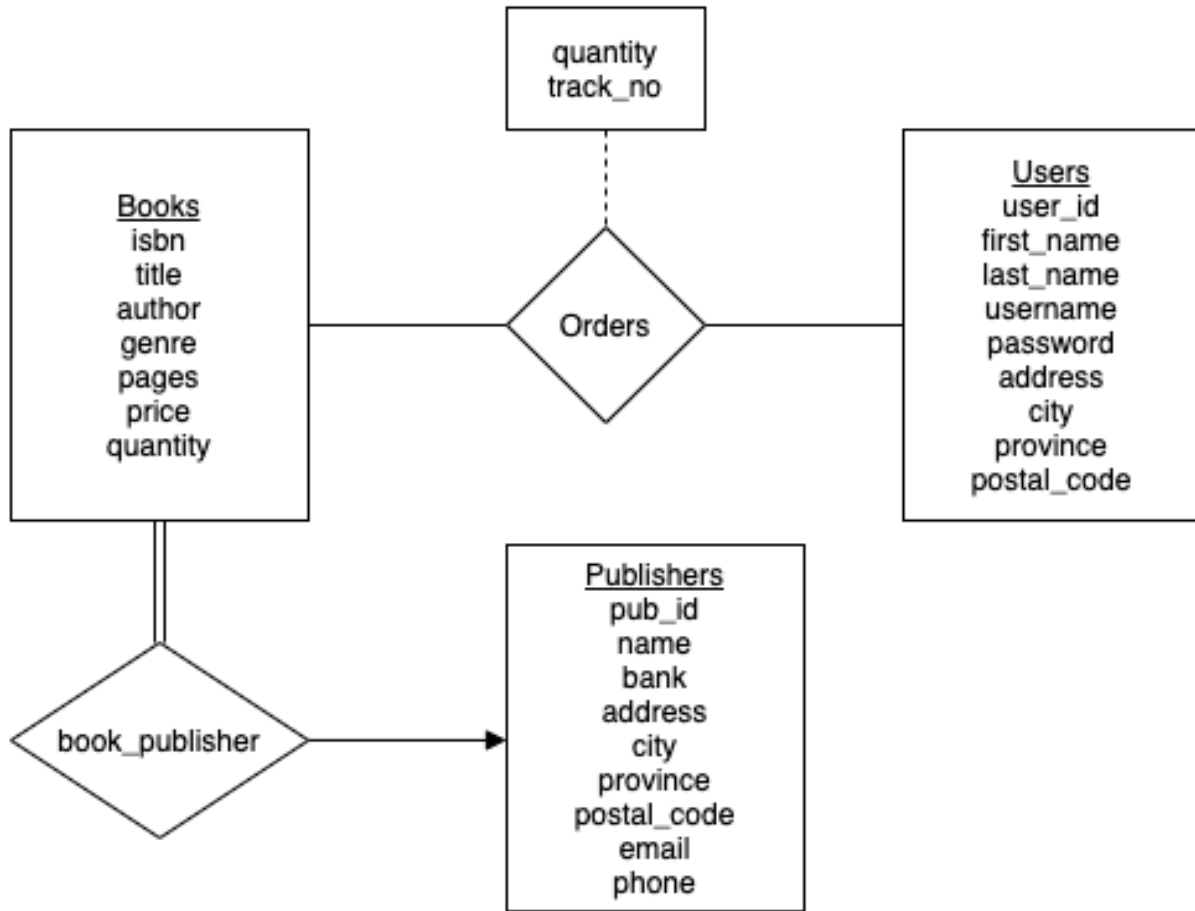
NERD BOOKS PROJECT

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Due on April 14th, 2020

Github link: <https://github.com/johnnyalier/Nerd-Books-Database.git>

2.1 Conceptual Design ER-Diagram



Based on the information given in the problem statement my design revolve around how a bookstore owner would keep information. A user relation is used to store information about bookstore customers. Attributes in this relation are user_ID (primary key), first_name, last_name, username, address, city, province, and postal_code. The owner would also want to keep information about the publishers of the books they sell. The publishers' relation has pub_ID (primary key), name, bank, address, email and phone as attributes. The most important relation in this database is the books relation which has ISBN (primary key), title, author, genre, pub_ID, pages, price and quantity as attributes. A user places an order to purchase a couple of books and this information is stored in a relation called order. user_ID, ISBN track_No, price and quantity are kept per order.

Assumptions

- For the simplicity of implementation, users' entries are assumed to be valid and therefore no error checking is done.
- Since each user has a unique id, it's used as a login credential though the username and password are more accurate.
- Each book has one publisher for simplicity of payments.
- The email and phone attributes of the publishers' relation are used to request more copied of the books if quantity is below and threshold.

2.2 Reduction to Relation Schemas

- books(ISBN, title, author, genre, pub_ID, pages, price, quantity)
- publishers(pub_ID, first_name, last_name, bank, address, city, province, postal_code, email, phone)
- users(user_ID, first_name, last_name, username, password, address, city, province, postal_code)
- order(user_ID, ISBN, track_No, price, quantity)

2.3 Normalization of Relation Schemas

To check if the relations above are in good normal form, we need to check if all of the four relation schemas are in BCNF. By the textbook definition, a database design is in BCNF if each member of the set of relation schemas that constitutes the design is in BCNF. Starting with the book relation schema, we see the functional dependency below holds.

ISBN --> title, author, genre, pub_ID, pages, price, quantity

Because there's no nontrivial functional dependency with any combination of title, author, genre, pub_ID, pages, price, and quantity without ISBN on the left side of the arrow. therefore, book schema is in BCNF.

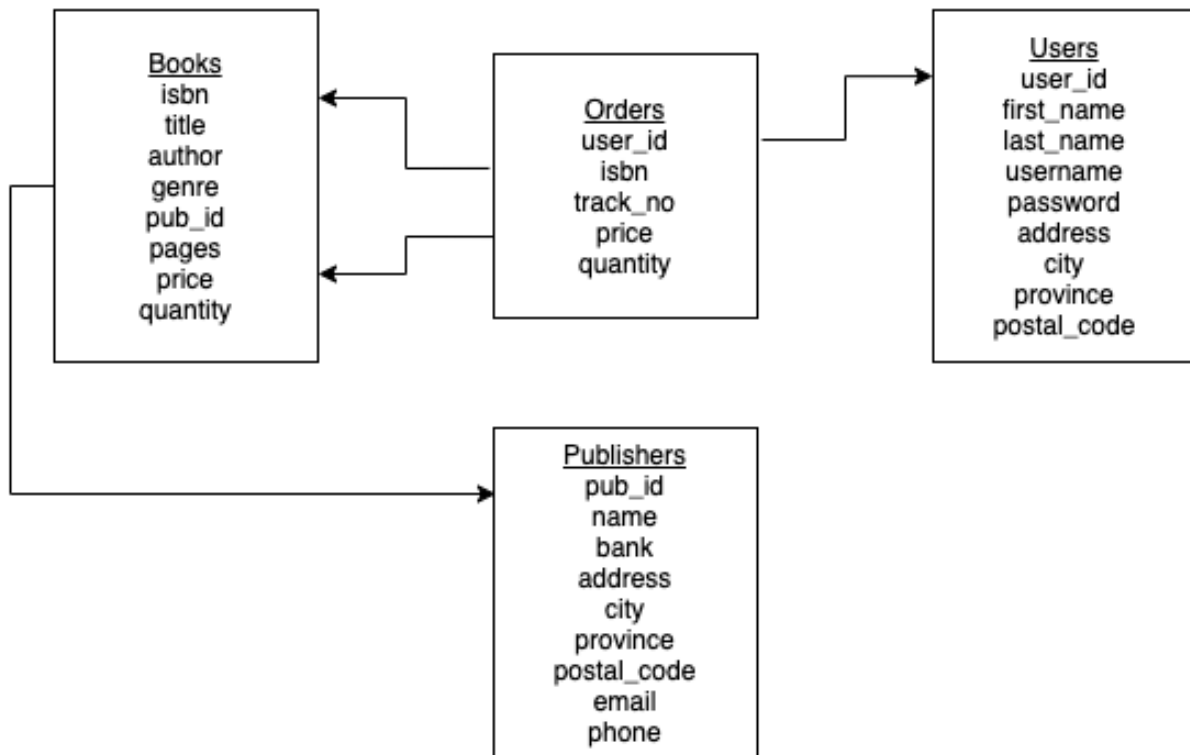
Similarly, all attributes in publisher and user relation schemas depend on pub_ID and user_ID respectively. These dependencies hold because ISBN, pub_ID and user_ID are primary keys of their respective schemas. Hence the publisher and user relation schemas are also in BCNF.

Finally, we need to determine if the order relation schema is also in BCNF. The set of keys formed by user_ID and ISBN form the superkey for this relation since both keys are foreign keys, they form the primary key for this relation. There are two nontrivial functional dependencies in this schema, and both holds.

ISBN --> price
user_ID, ISBN --> track_No, price, quantity

Since ISBN is a foreign key and form a composite primary key, the order schema is in BCNF. We have therefore shown that all members of the relation schemas are in BCNF and thus our bookstore database design is in BCNF.

2.4 Database Schema Diagram



2.5 Implementation

PostgreSQL queries for creating the tables

create table books

```
(ISBN    varchar(10),
title    varchar(100),
author   varchar(20),
genre     varchar(100),
pub_ID    numeric(4, 0),
pages     numeric(3, 0) check(pages > 0),
price     numeric(3, 0) check(price > 0),
quantity  numeric(3, 0),
primary key (ISBN),
foreign key (pub_ID) references publisher
on delete cascade
);
```

create table publishers

```
(pub_ID    numeric(4, 0),
name       varchar(100) not null,
bank       numeric(9),
address    varchar(20),
```

```

city    varchar(20),
province varchar(2),
postal_code varchar(6),
email    varchar(40),
phone    varchar(10) check(phone = 10),
primary key (pub_ID)
);

```

```

create table users
(user_ID numeric(4, 0),
first_name varchar(20),
last_name varchar(20),
username varchar(20) not null,
password varchar(8) check(password = 8),
address varchar(20),
city varchar(20),
province varchar(2) check(province = 2),
postal_code varchar(6),
primary key (user_ID)
);

```

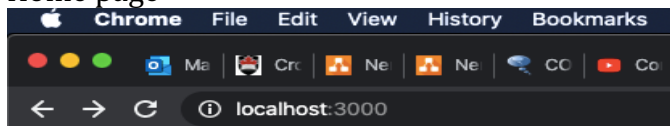
```

create table orders
(user_ID numeric(4, 0),
ISBN varchar(10),
track_No varchar(40),
price numeric(4, 0),
quantity numeric(2, 0),
primary key (user_ID, ISBN),
foreign key (user_ID) references users
on delete cascade,
foreign key (ISBN) references books
on delete cascade
);

```

Screenshots from the database

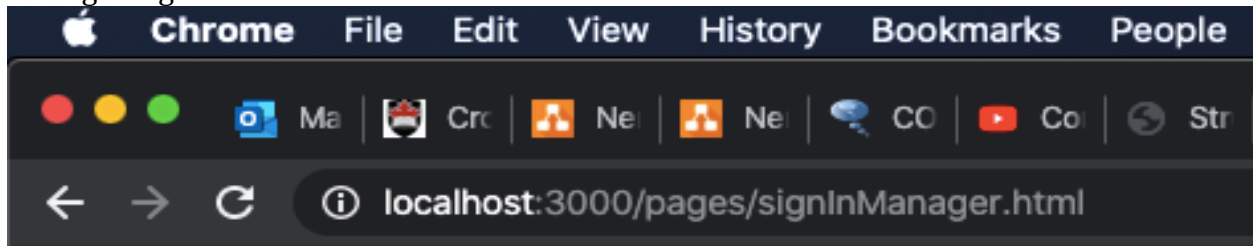
Home page



Nerd Books Collection

[Sign Up](#)
[Sign In](#)
[Manager Sign In](#)

Manager Sign In

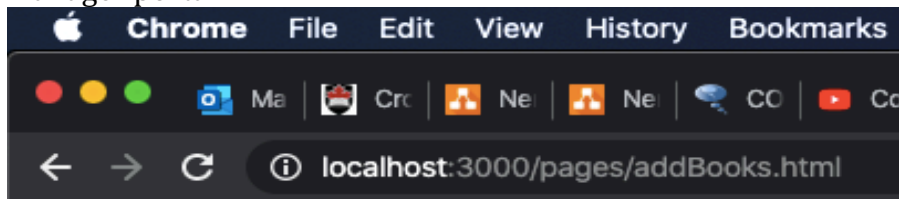


Nerd Books Manager Page

password = "Manager"

Enter Password

Manager portal



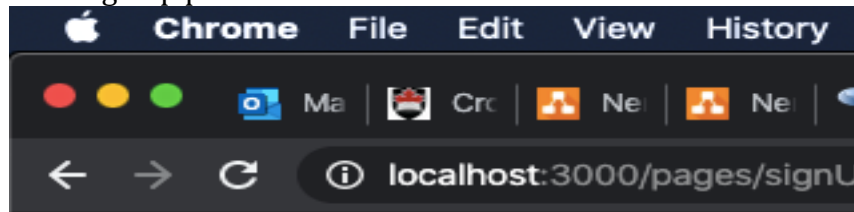
Add Book Below

ISBN
Title
Author
Genre
Publisher ID
Number of Pages
Price
Quantity

Remove Book by ISBN

ISBN

User sign up portal



Sign Up Page

User ID

First Name

Last Name

Username

Password

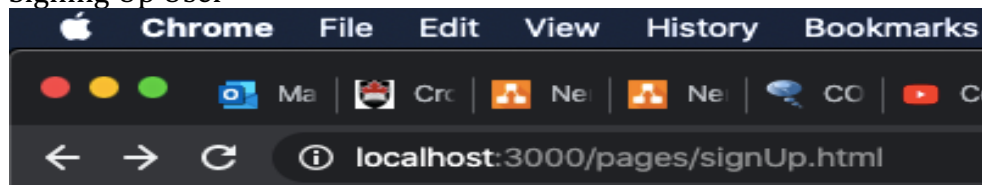
Address

City

Province

Postal Code

Signing Up User



Sign Up Page

User ID

First Name

Last Name

Username

Password

Address

City

Province

Postal Code

Postgres User table showing Rachel Green added

The screenshot shows the pgAdmin web interface in a Chrome browser. The left sidebar shows the database structure, with 'Users' selected under 'Tables (14)'. The main panel displays the 'Data Output' for the 'Users' table, showing a list of users. The user 'Rachel Green' is highlighted in the list.

user_id	first_name	last_name	username	password	address	city
3	Aller	John	allerjohn	Whisky91	180 Lees Ave	Ottawa
4	Chris	Last	name	Haoyetu1	180 Lees Ave	Ottawa
5	Chris	LastName	name	Haoyetu1	180 Lees Ave	Toronto
6	Orandi	Chris	name	Haoyetu1	180 Lees Ave	Toronto
7	Orandi	Nyamiaka	kissii	Mluyha94	10 Don Mills Ave	Toronto
8	Christopher	Nyamiaka	Orandi	Mluyha94	10 Don Mills Ave	Toronto
9	Rachel	Green	Rgreen	Rachross	100 Central Park	New York

Books display

The screenshot shows a Chrome browser window with the address bar displaying 'localhost:3000/pages/browsebooks.html'.

Books Libray

Add books to Order

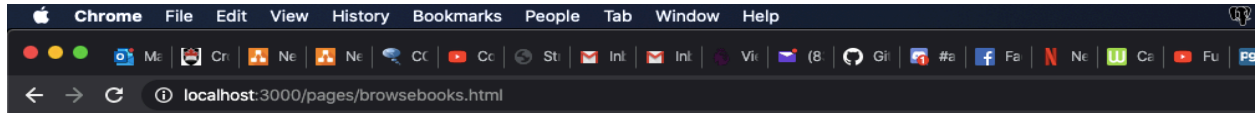
- ☐ ISBN: 9780310893 Title: Guardrails Author: Andy Stanley Genre: Religion Pub_ID: 1002 pages: 114 Price: 11 Quantity: 18
- ☐ ISBN: 1450827217 Title: Sudoku Author: Brain Games Genre: Games Pub_ID: 1003 pages: 192 Price: 5 Quantity: 14
- ☐ ISBN: 9780525573 Title: Insight Author: Tasha Eurich Genre: Person Success Pub_ID: 1008 pages: 336 Price: 24 Quantity: 30
- ☐ ISBN: 9781770413 Title: Living the Good Life Author: David Patchell Genre: Fitness Pub_ID: 1005 pages: 254 Price: 20 Quantity: 40
- ☐ ISBN: 9780051499 Title: The White Masai Author: Corinne Hofmann Genre: Autobiography Pub_ID: 1004 pages: 308 Price: 21 Quantity: 25
- ☐ ISBN: 9780051699 Title: The Alchemist Author: Paulo Coelho Genre: Treasure Hunt Pub_ID: 1004 pages: 182 Price: 21 Quantity: 13
- ☐ ISBN: 3102472760 Title: Where is God When it Hurts? Author: Philip Yancey Genre: Religion Pub_ID: 1002 pages: 286 Price: 11 Quantity: 19
- ☐ ISBN: 9780978440 Title: The Coaching Habit Author: Michael Stanier Genre: Leadership Pub_ID: 1007 pages: 230 Price: 17 Quantity: 15
- ☐ ISBN: 9780385667 Title: Things Fall Apart Author: Chinua Achebe Genre: African History Pub_ID: 1006 pages: 210 Price: 17 Quantity: 23

Click check to REMOVE book(s) from Order

[View Order](#)

Books added to the orders relation by user id 9.

Web browser



Books Libray

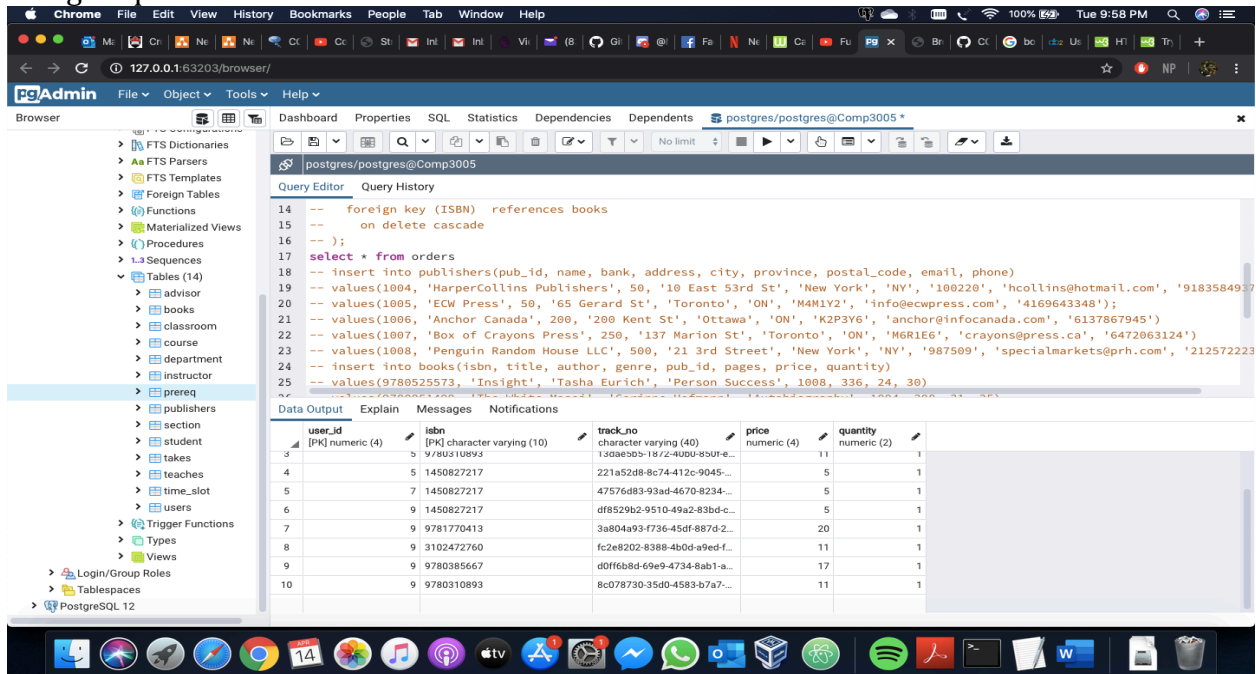
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Click check to REMOVE book(s) from Order

-
- ☐ User_ID: 9 ISBN: 1450827217 track_No: df8529b2-9510-49a2-83bd-c37c672b72ec Price: 5 Quantity: 1
 - ☐ User_ID: 9 ISBN: 9781770413 track_No: 3a804a93-f736-45df-887d-2344f0d9a840 Price: 20 Quantity: 1
 - ☐ User_ID: 9 ISBN: 3102472760 track_No: fc2e8202-8388-4b0d-a9ed-fe6173594c21 Price: 11 Quantity: 1
 - ☐ User_ID: 9 ISBN: 9780385667 track_No: d0ff6b8d-69e9-4734-8ab1-af1acc7bc8f0 Price: 17 Quantity: 1
 - ☐ User_ID: 9 ISBN: 9780310893 track_No: 8c078730-35d0-4583-b7a7-af42619c43ad Price: 11 Quantity: 1

Postgresql orders table



NOTE:

Because of unavoidable circumstances, this implementation isn't completed. I'll however continue to work on it for my personal project portfolio.