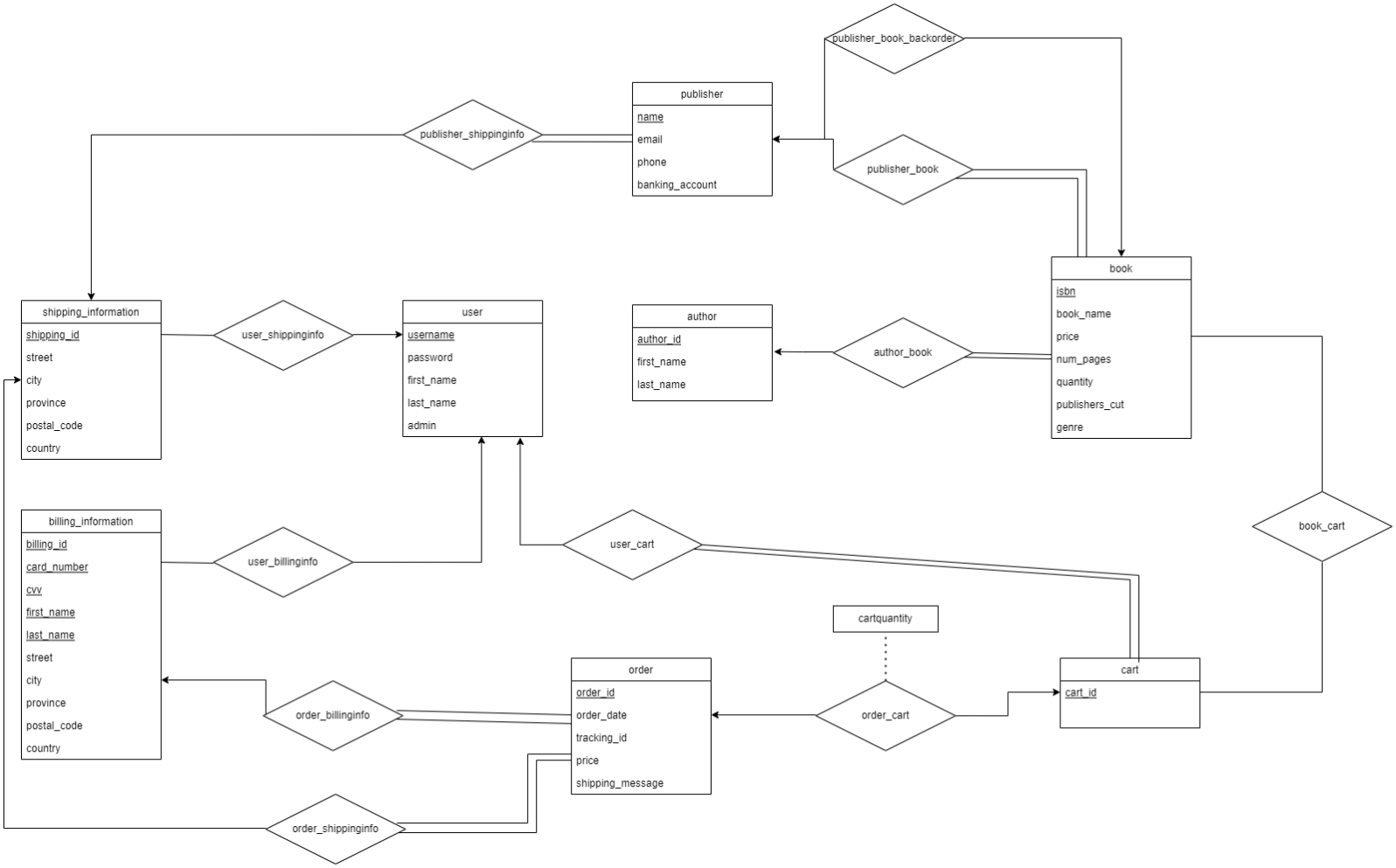
ER Diagram


publisher_book_backorder
publisher
name
email
phone
banking_account
publisher_shippinginfo
publisher_book
book
isbn
book_name
price
num_pages
quantity
publishers_cut
genre
shipping_information
shipping_id
street
city
province
postal_code
country
user_shippinginfo
user
username
password
first_name
last_name
admin
author
author_id
first_name
last_name
author_book
billing_information
billing_id
card_number
cvv
first_name
last_name
street
city
province
postal_code
country
user_billinginfo
user_cart
book_cart
cartquantity
order
order_id
order_date
tracking_id
price
shipping_message
order_billinginfo
order_cart
cart
cart_id
order_shippinginfo

Reduction to relations

author(author_id, first_name, last_name)
book(isbn, book_name, price, num_pages, quantity, publishers_cut, genre, publisher_name, author_id)
user(username, password, first_name, last_name, admin)
publisher(name, email, phone, banking_account,shipping_id)
shipping_information(shipping_id, street, city, province, postal_code, country)
billing_information(billing_id, card_number, cvv, first_name, last_name, street, city, province, postal_code, country)
cart(cart_id, username)
order(order_id, order_date, tracking_id, price, shippping_message, billing_id, shipping_id)
book_cart(cart_id, isbn, cartquantity)
order_cart(cart_id, order_id)
publisher_book_backorder(isbn, email)
user_shippinginfo(shipping_id, username)
user_billinginfo(billing_id, username)

Normalization checks
author(author_id, first_name, last_name)
F = {author_id → first_name, last_name}
$Author\_id^+$ = { author_id ,first_name, last_name} therefore author is in bcnf

book(isbn, book_name, price, num_pages, quantity, publishers_cut, publisher_name, author_id, genre)
F = {isbn → book_name, price, num_pages, quantity, publishers_cut, publisher_name, author_id, genre}
$isbn^+$ = {isbn, book_name, price, num_pages, quantity, publishers_cut, publisher_name, author_id, genre} therefore book is in bcnf

user(username, password, first_name, last_name, admin)
F = {username → password, first_name, last_name, admin}
$Username^+$ = {username , password, first_name, last_name, admin} therefore user is in bcnf

publisher(name, email, phone, banking_account, shipping_id)
F = { name → email, phone, banking_account, shippping_id
banking_account → pub_name }
$name^+$= {name, email, phone, banking_account, shipping_id} therefore publisher is in bcnf

shipping_information(shipping_id, street, city, province, postal_code, country)
F = {shipping_id → street, city, province, postal_code, country}
$shipping\_id^+$ = {shipping_id , street, city, province, postal_code, country} therefore shipping_information is in bcnf

billing_information(billing_id, street, city, province, postal_code, country)
F = {billing_id → street, city, province, postal_code, country}
billing_id$^+$ = {billing_id , street, city, province, postal_code, country} therefore billing_information is in bcnf

cart(cart_id, username)
F = {cart_id → username}
cart_id$^+$ = {cart_id, username} therefore cart is in bcnf

order(order_id, order_date, tracking_id, price, shippping_message, shipping_id, billing_id)
F = {order_id → order_date, tracking_id, price, shippping_message, shipping_id, billing_id}
order_id$^+$ = {order_date, tracking_id, price, shippping_message, shipping_id, billing_id}
therefore order is in bcnf

book_cart(cart_id, isbn, cartquantity)
F = {cart_id , isbn→ cartquantity}
(cart_id,isbn)$^+$ = {cart_id, isbn, cartquantity} therefore book_cart is in bcnf

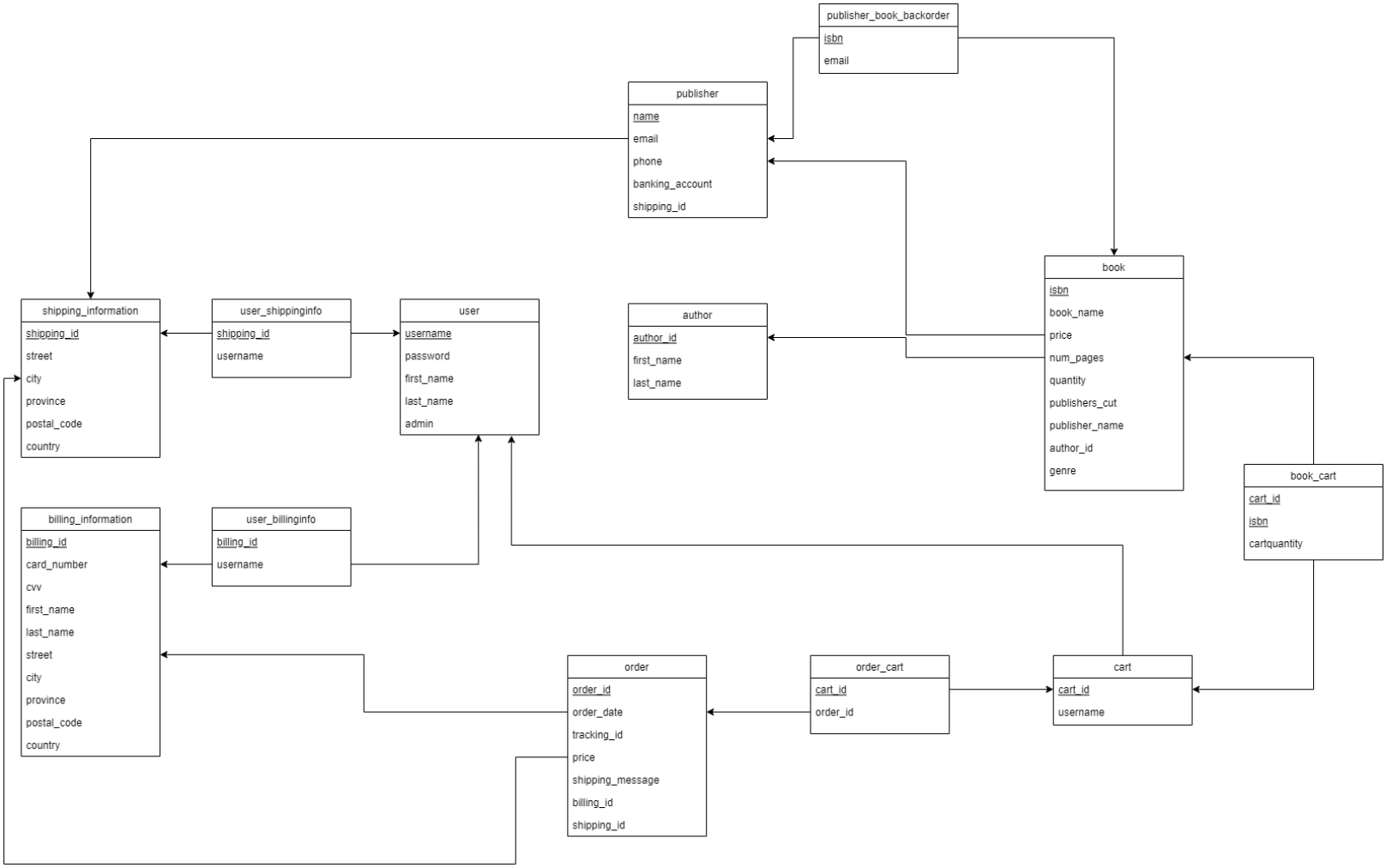
order_cart(cart_id, order_id)
F = {cart_id → order_id
Order_id → cart_id}
(cart_id)$^+$ = {cart_id, order_id}
(order_id)$^+$ = {cart_id, order_id}
therefore order_cart is in bcnf

publisher_book_backorder(isbn, email)
F = {isbn → email}
isbn$^+$ = {isbn,email} therefore publisher_book_backorder is in bcnf

user_shippinginfo(shipping_id, username)
F = {shipping_id → username}
shipping_id$^+$ = {shipping_id,username} therefore user_shippinginfo is in bcnf

user_billinginfo(billing_id, username)
F = {billing_id → username}
billing_id$^+$ = {billing_id,username} therefore user_billinginfo is in bcnf

Schema Diagram



Implementation

See code + user and admin demo videos

Github Repo

https://github.com/Joshdowning/bookstore

Appendix

December 20th Availability: 1:00-1:20, 1:20-1:40, 1:40-2:00