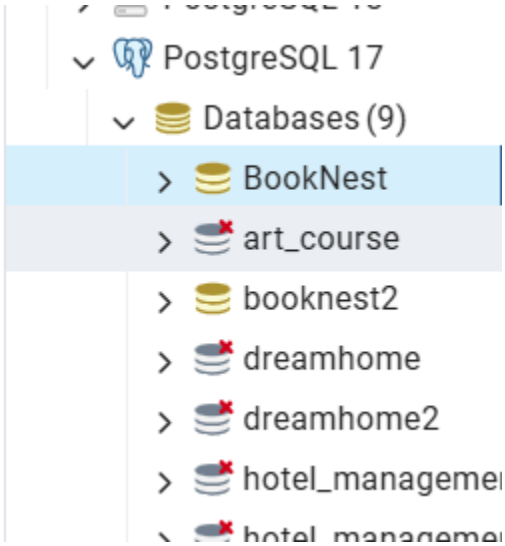
Name: Min Thant Hein
ID: PIUS20230001

Creating a database named “BookNest”:

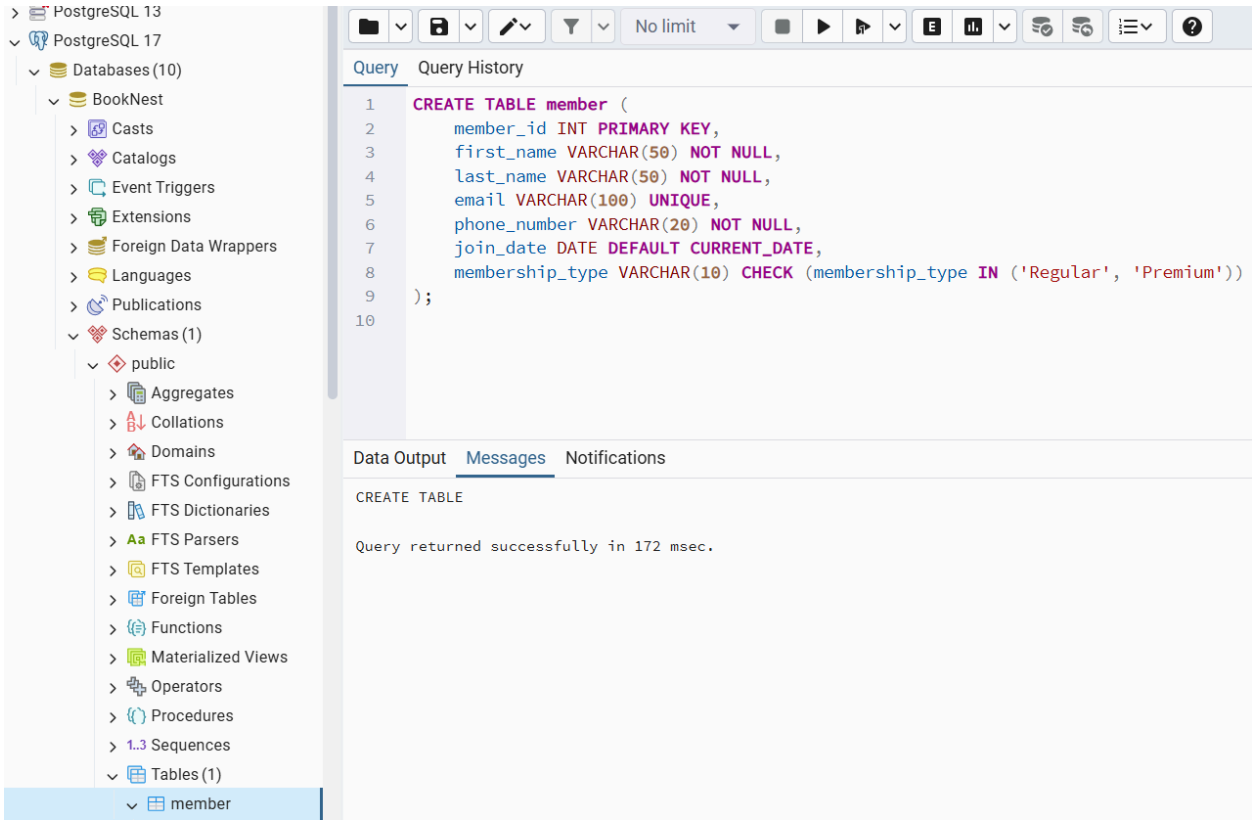


Part A and Part B

Member:

```
-- 1) Member
CREATE TABLE member (
    member_id INT PRIMARY KEY,
    first_name VARCHAR(50) NOT NULL,
    last_name VARCHAR(50) NOT NULL,
    email VARCHAR(100) UNIQUE,
    phone_number VARCHAR(20) NOT NULL,
    join_date DATE DEFAULT CURRENT_DATE,
    membership_type VARCHAR(10) CHECK (membership_type IN ('Regular', 'Premium'))
);
```

Note: to write Null!


PostgreSQL 13
PostgreSQL 17
Databases (10)
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Casts
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Foreign Tables
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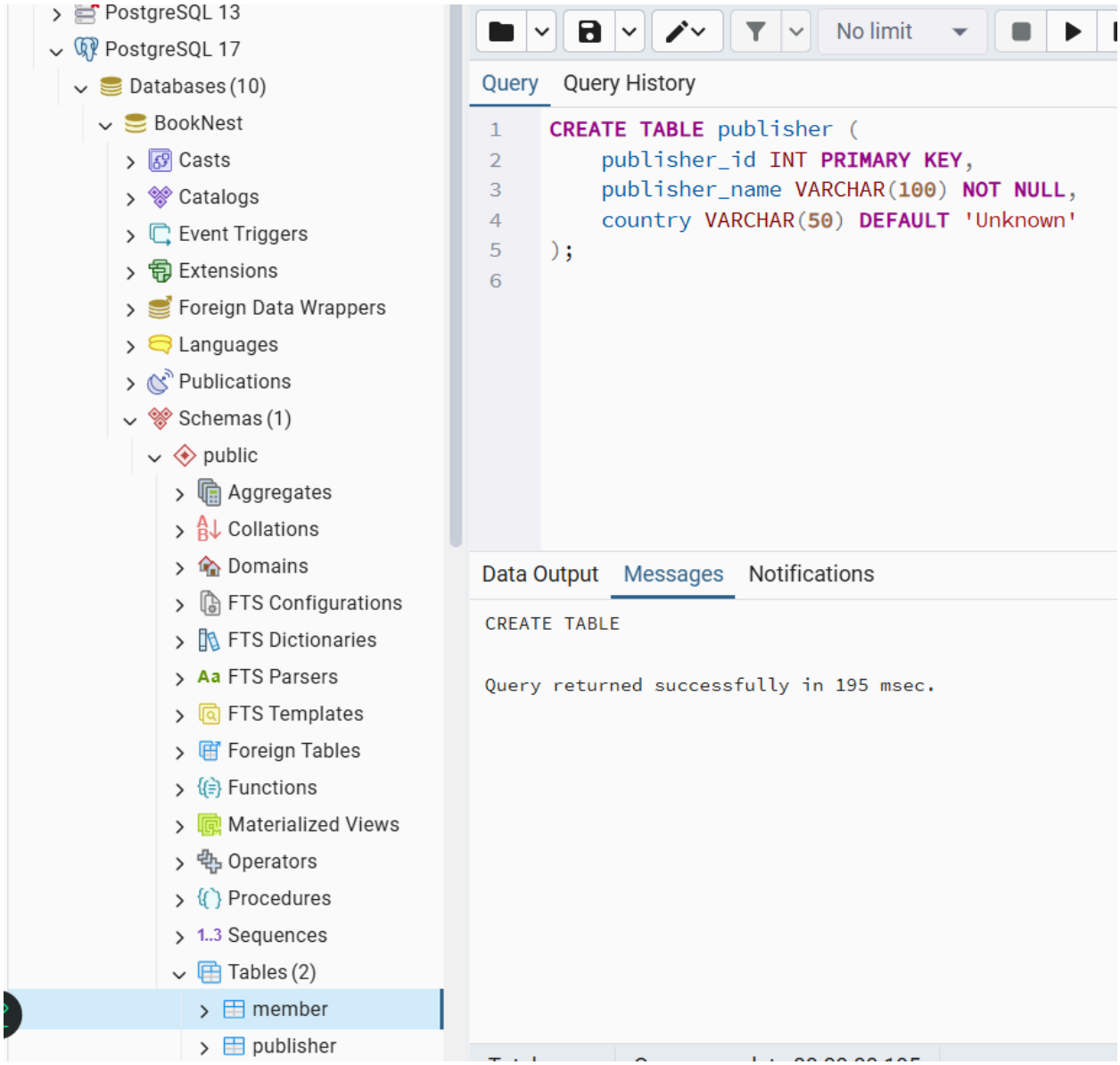
Tables (1)
member
No limit
Query
Query History
CREATE TABLE member (
member_id INT PRIMARY KEY,
first_name VARCHAR(50) NOT NULL,
last_name VARCHAR(50) NOT NULL,
email VARCHAR(100) UNIQUE,
phone_number VARCHAR(20) NOT NULL,
join_date DATE DEFAULT CURRENT_DATE,
membership_type VARCHAR(10) CHECK (membership_type IN ('Regular', 'Premium'))
);
Data Output
Messages
Notifications
CREATE TABLE
Query returned successfully in 172 msec.

-- 2) Publisher

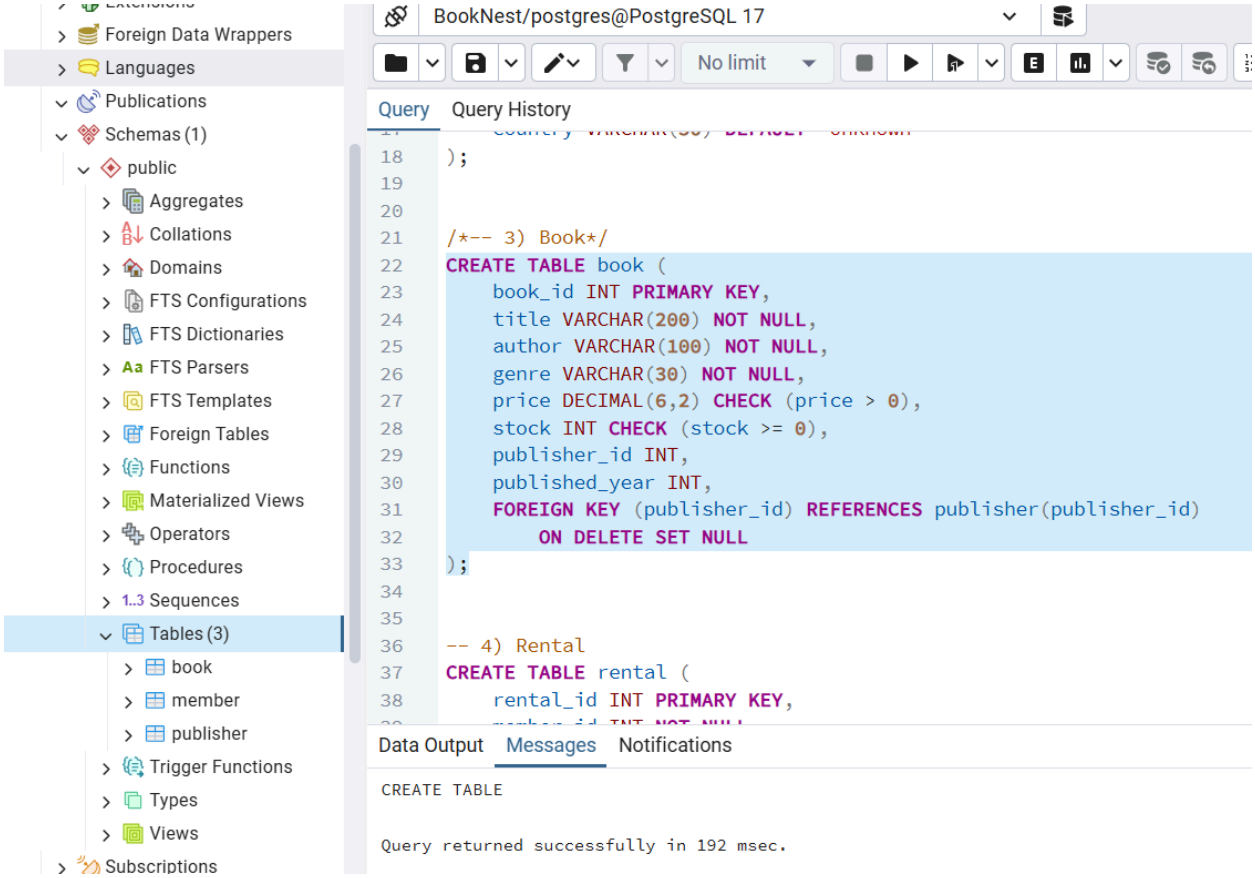
```
CREATE TABLE publisher (
    publisher_id INT PRIMARY KEY,
    publisher_name VARCHAR(100) NOT NULL,
    country VARCHAR(50) DEFAULT 'Unknown'
);
```

Note: to add Null and test



```
/*-- 3) Book*/
  CREATE TABLE book (
    book_id INT PRIMARY KEY,
    title VARCHAR(200) NOT NULL,
    author VARCHAR(100) NOT NULL,
    genre VARCHAR(30) NOT NULL,
    price DECIMAL(6,2) CHECK (price > 0),
    stock INT CHECK (stock >= 0),
    publisher_id INT,
    published_year INT,
    FOREIGN KEY (publisher_id) REFERENCES publisher(publisher_id)
        ON DELETE SET NULL
);
```

Note: publisher_year INT is not sure necessary or not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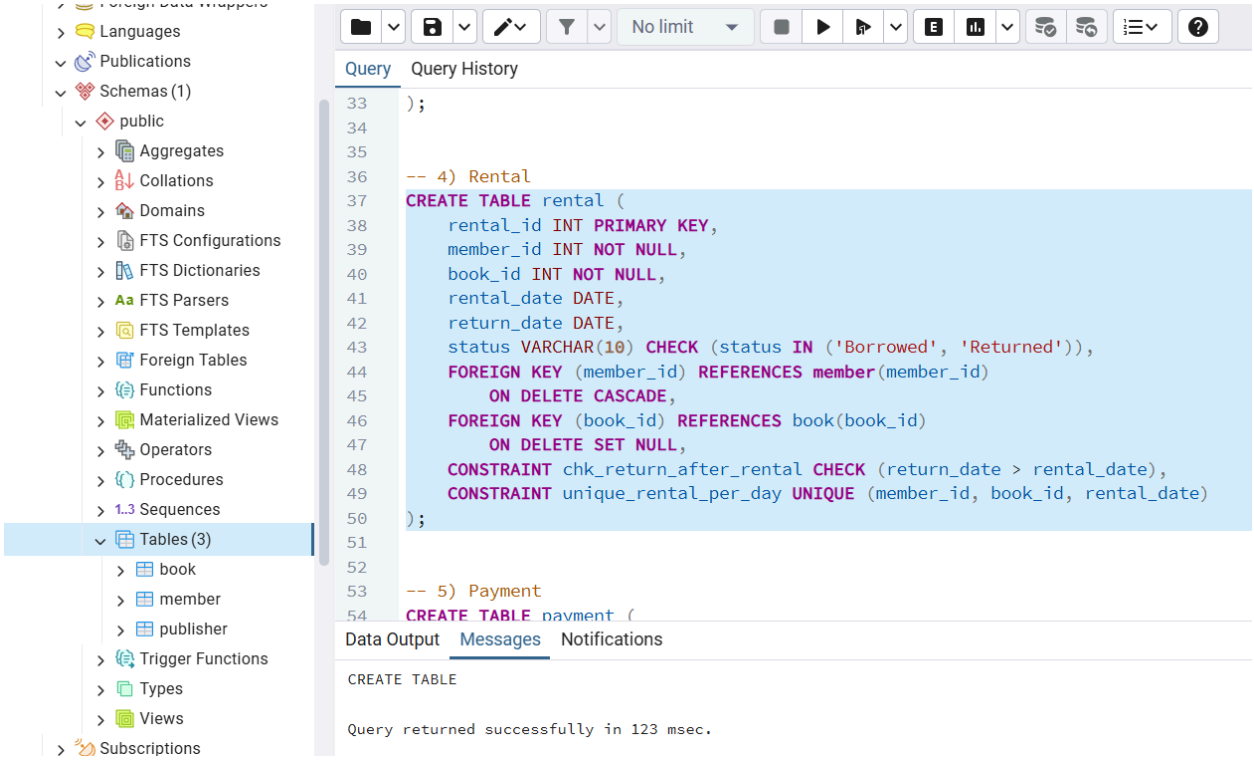
Sequences
Tables (3)
book
member
publisher
Trigger Functions
Types
Views
Subscriptions
BookNest/postgres@PostgreSQL 17
No limit
Query
Query History
);
/*-- 3) Book*/
CREATE TABLE book (
book_id INT PRIMARY KEY,
title VARCHAR(200) NOT NULL,
author VARCHAR(100) NOT NULL,
genre VARCHAR(30) NOT NULL,
price DECIMAL(6,2) CHECK (price > 0),
stock INT CHECK (stock >= 0),
publisher_id INT,
published_year INT,
FOREIGN KEY (publisher_id) REFERENCES publisher(publisher_id)
ON DELETE SET NULL
);
-- 4) Rental
CREATE TABLE rental (
rental_id INT PRIMARY KEY,
Data Output
Messages
Notifications
CREATE TABLE
Query returned successfully in 192 msec.

```
-- 4) Rental
CREATE TABLE rental (
    rental_id INT PRIMARY KEY,
    member_id INT,
    book_id INT,
    rental_date DATE,
    return_date DATE,
    status VARCHAR(10) CHECK (status IN ('Borrowed', 'Returned')),
    FOREIGN KEY (member_id) REFERENCES member(member_id)
        ON DELETE CASCADE,
    FOREIGN KEY (book_id) REFERENCES book(book_id)
        ON DELETE SET NULL,
    CONSTRAINT chk_return_after_rental CHECK (return_date > rental_date),
    CONSTRAINT unique_rental_per_day UNIQUE (member_id, book_id, rental_date)
);
```

Note: to add Null, and to check foreign key constraints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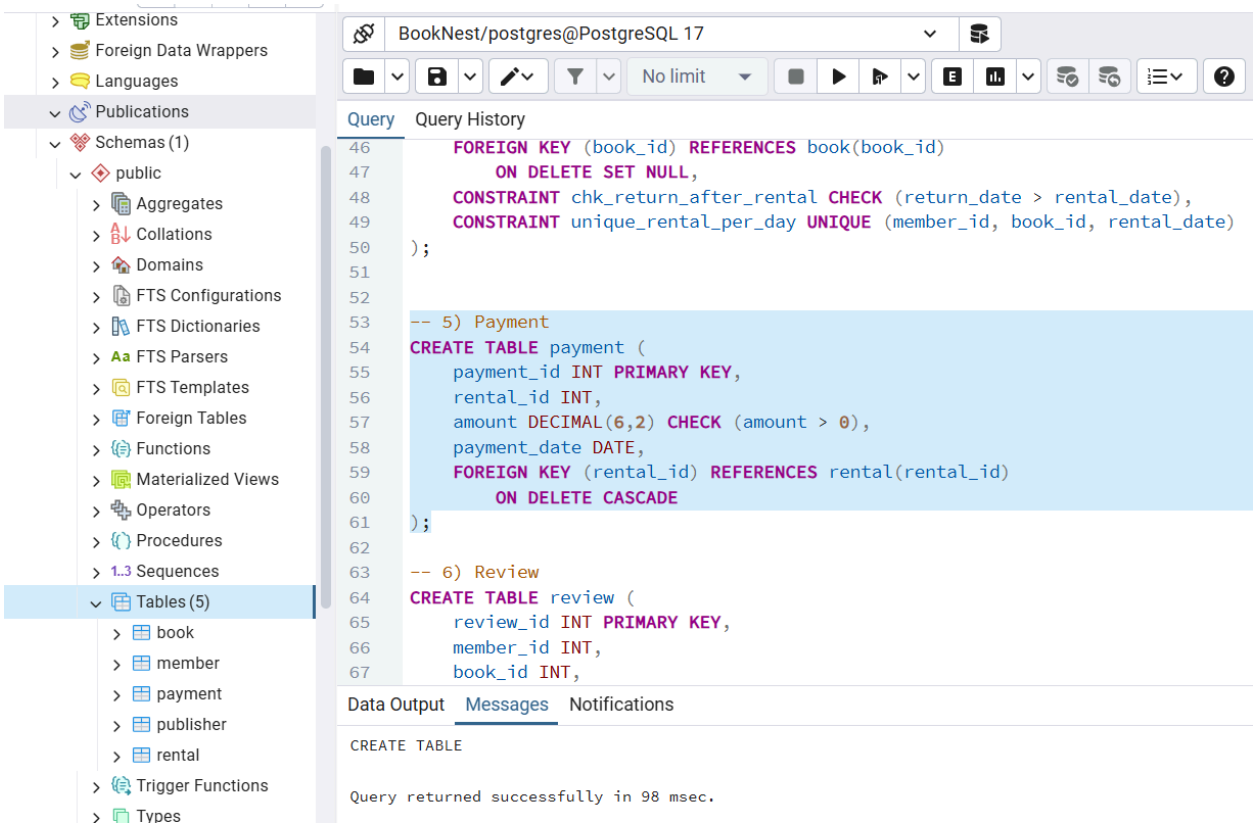
Tables (3)
book
member
publisher
Trigger Functions
Types
Views
Subscriptions
No limit
Query
Query History
);
-- 4) Rental
CREATE TABLE rental (
rental_id INT PRIMARY KEY,
member_id INT NOT NULL,
book_id INT NOT NULL,
rental_date DATE,
return_date DATE,
status VARCHAR(10) CHECK (status IN ('Borrowed', 'Returned')),
FOREIGN KEY (member_id) REFERENCES member(member_id)
ON DELETE CASCADE,
FOREIGN KEY (book_id) REFERENCES book(book_id)
ON DELETE SET NULL,
CONSTRAINT chk_return_after_rental CHECK (return_date > rental_date),
CONSTRAINT unique_rental_per_day UNIQUE (member_id, book_id, rental_date)
);
-- 5) Payment
CREATE TABLE payment (
Data Output
Messages
Notifications
CREATE TABLE
Query returned successfully in 123 msec.

-- 5) Payment

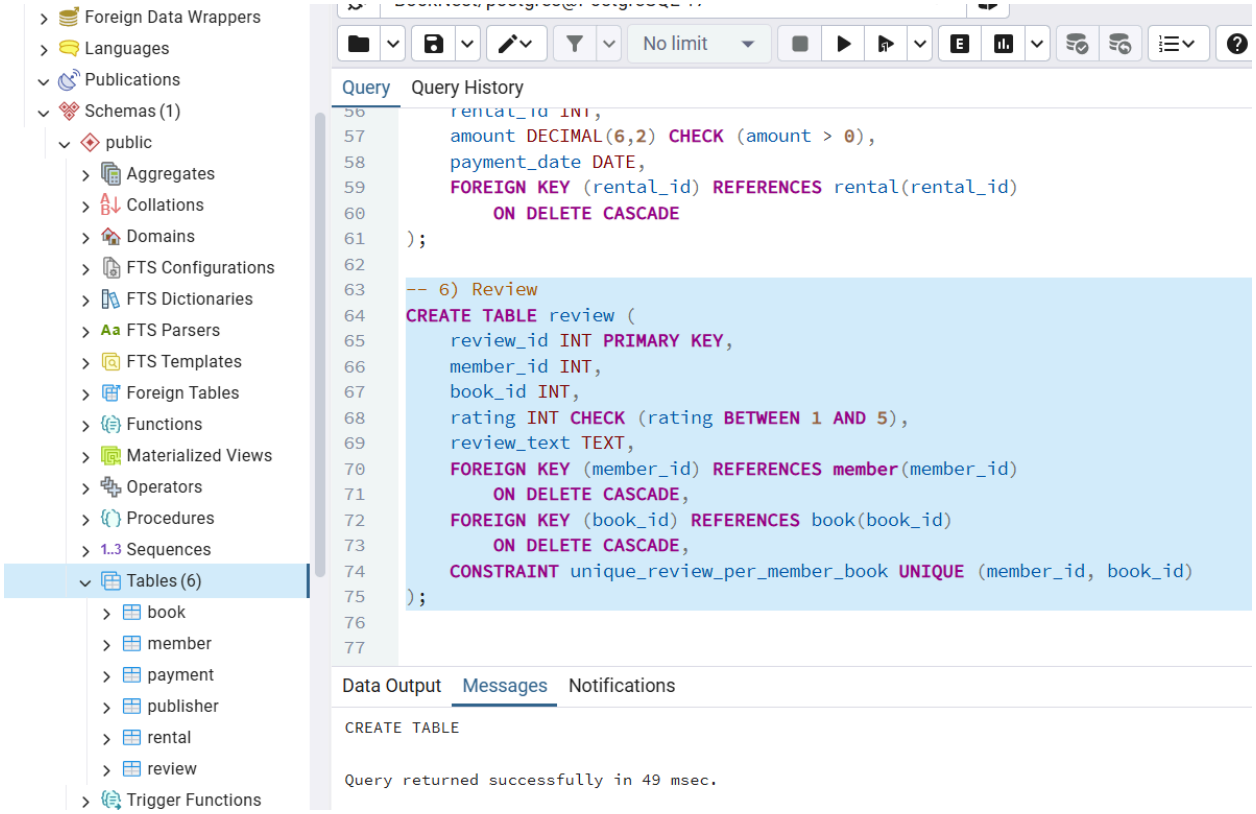
```
CREATE TABLE payment (
    payment_id INT PRIMARY KEY,
    rental_id INT,
    amount DECIMAL(6,2) CHECK (amount > 0),
    payment_date DATE,
    FOREIGN KEY (rental_id) REFERENCES rental(rental_id)
        ON DELETE CASCADE
);
```

Note: to add null and to check constraint foreign, table constraint is correct



```
-- 6) Review
CREATE TABLE review (
    review_id INT PRIMARY KEY,
    member_id INT,
    book_id INT,
    rating INT CHECK (rating BETWEEN 1 AND 5),
    review_text TEXT,
    FOREIGN KEY (member_id) REFERENCES member(member_id)
        ON DELETE CASCADE,
    FOREIGN KEY (book_id) REFERENCES book(book_id)
        ON DELETE CASCADE,
    CONSTRAINT unique_review_per_member_book UNIQUE (member_id, book_id)
);
```

Note: correct columns, to add Null, and to check foreign constraints


Foreign Data Wrappers
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Sequences
Tables (6)
book
member
payment
publisher
rental
review
Trigger Functions
No limit
Query
Query History
rental_id INT,
amount DECIMAL(6,2) CHECK (amount > 0),
payment_date DATE,
FOREIGN KEY (rental_id) REFERENCES rental(rental_id)
ON DELETE CASCADE
);
-- 6) Review
CREATE TABLE review (
review_id INT PRIMARY KEY,
member_id INT,
book_id INT,
rating INT CHECK (rating BETWEEN 1 AND 5),
review_text TEXT,
FOREIGN KEY (member_id) REFERENCES member(member_id)
ON DELETE CASCADE,
FOREIGN KEY (book_id) REFERENCES book(book_id)
ON DELETE CASCADE,
CONSTRAINT unique_review_per_member_book UNIQUE (member_id, book_id)
);
Data Output
Messages
Notifications
CREATE TABLE
Query returned successfully in 49 msec.

Part C

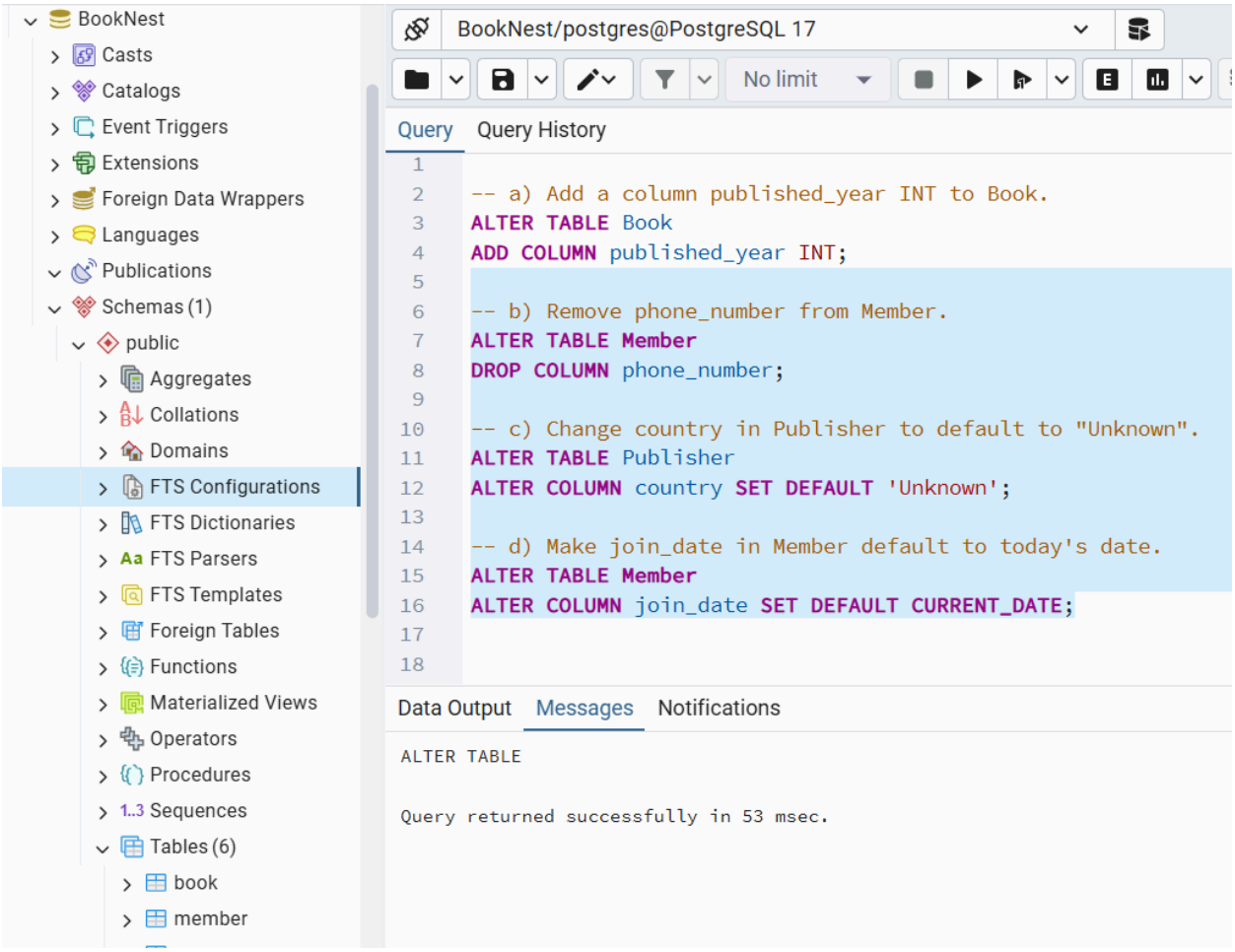
-- a) Add a column published_year INT to Book.
ALTER TABLE Book
ADD COLUMN published_year INT;

-- b) Remove phone_number from Member.
ALTER TABLE Member
DROP COLUMN phone_number;

-- c) Change country in Publisher to default to "Unknown".
ALTER TABLE Publisher
ALTER COLUMN country SET DEFAULT 'Unknown';

-- d) Make join_date in Member default to today's date.
ALTER TABLE Member
ALTER COLUMN join_date SET DEFAULT CURRENT_DATE;

Note: Do i need to make changes? (since I included some as NOT NULL)



Note: Since I misunderstood and I applied certain concepts. I only require to run from number b to number c.
##

Inserting Data:

```
-- Insert some publishers
INSERT INTO publisher (publisher_id, publisher_name, country)
VALUES
   (1, 'TechPress', 'USA'),
   (2, 'EduBooks', 'UK'),
   (3, 'Global Reads', 'Thailand');

-- Insert members with different membership types
INSERT INTO member (member_id, first_name, last_name, email, phone_number,
membership_type)
VALUES
   (101, 'Alice', 'Wong', 'alice@example.com', '0812345678', 'Regular'),
   (102, 'Bob', 'Smith', 'bob@example.com', '0898765432', 'Premium'),
   (103, 'Charlie', 'Ng', 'charlie@example.com', NULL, 'Regular');

-- Insert books linked to publishers
INSERT INTO book (book_id, title, author, genre, price, stock, publisher_id)
VALUES
   (201, 'Database Systems', 'C. J. Date', 'Science', 50.00, 3, 1),
   (202, 'Machine Learning Basics', 'Andrew Ng', 'Science', 60.00, 2, 1),
   (203, 'Storytelling for Data', 'Cole N. Knaflic', 'Non-Fiction', 45.00, 5, 2),
   (204, 'Children of Time', 'Adrian Tchaikovsky', 'Fiction', 30.00, 4, 3);

-- Insert rentals for members
INSERT INTO rental (rental_id, member_id, book_id, rental_date, return_date, status)
VALUES
   (301, 101, 201, DATE '2025-09-01', DATE '2025-09-07', 'Borrowed'),
   (302, 102, 202, DATE '2025-09-02', DATE '2025-09-10', 'Borrowed'),
   (303, 101, 203, DATE '2025-09-05', DATE '2025-09-12', 'Returned');

-- Insert payments related to rentals
INSERT INTO payment (payment_id, rental_id, amount, payment_date)
VALUES
   (401, 303, 10.00, DATE '2025-09-06'),
   (402, 302, 15.00, DATE '2025-09-03');


-- Insert reviews for books
INSERT INTO review (review_id, member_id, book_id, rating, review_text)
VALUES
   (501, 101, 201, 5, 'Very informative book, highly recommended!'),
   (502, 102, 203, 4, 'Great insights on data storytelling.'),
```

(503, 101, 204, 3, 'Interesting but a bit long.');

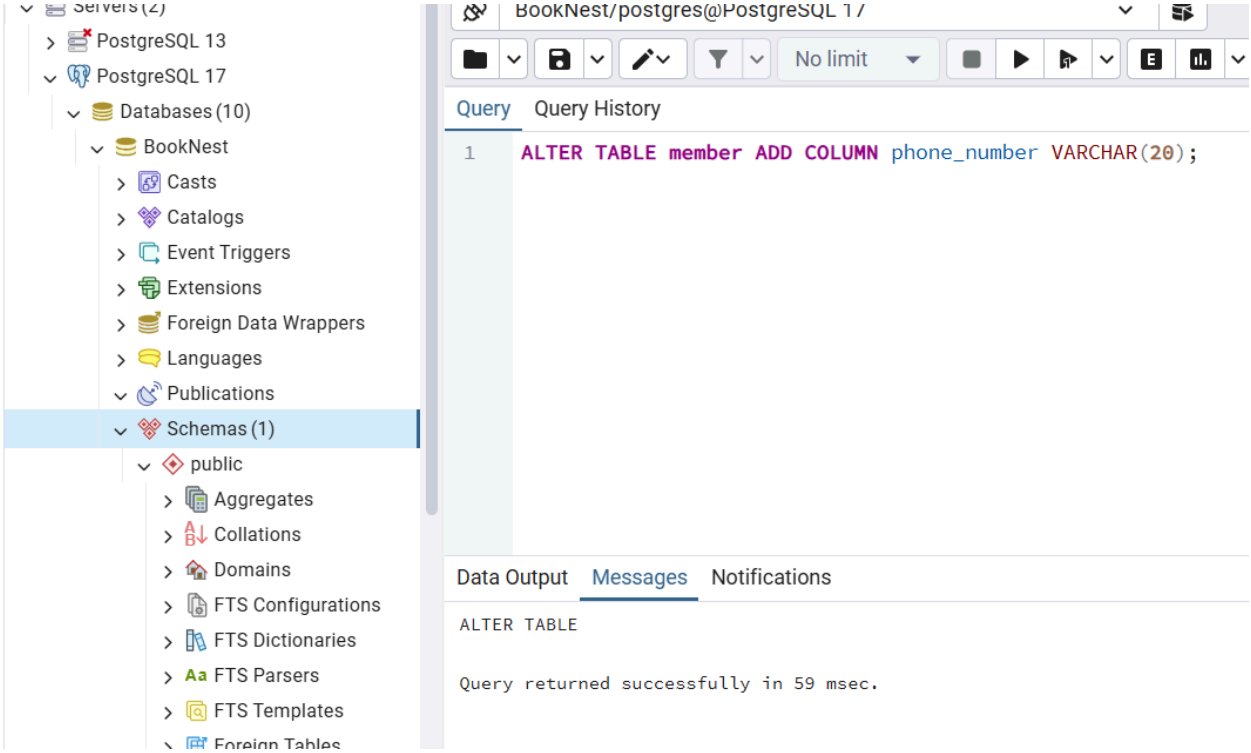
##

There is an error related to phone_number!

Here is the error,

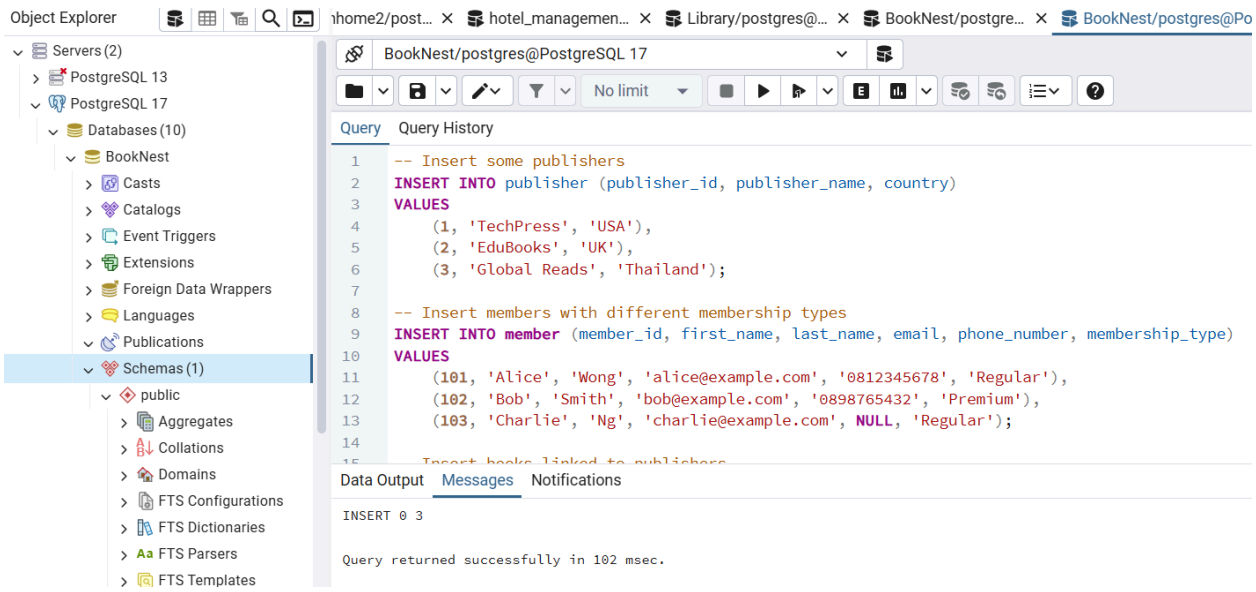
```
ERROR:  column "phone_number" of relation "member" does not exist
LINE 9: ... member (member_id, first_name, last_name, email, phone_numb...
                                                             ^

SQL state: 42703
Character: 301
```

Thus, I add the phone_number column again as a solution!



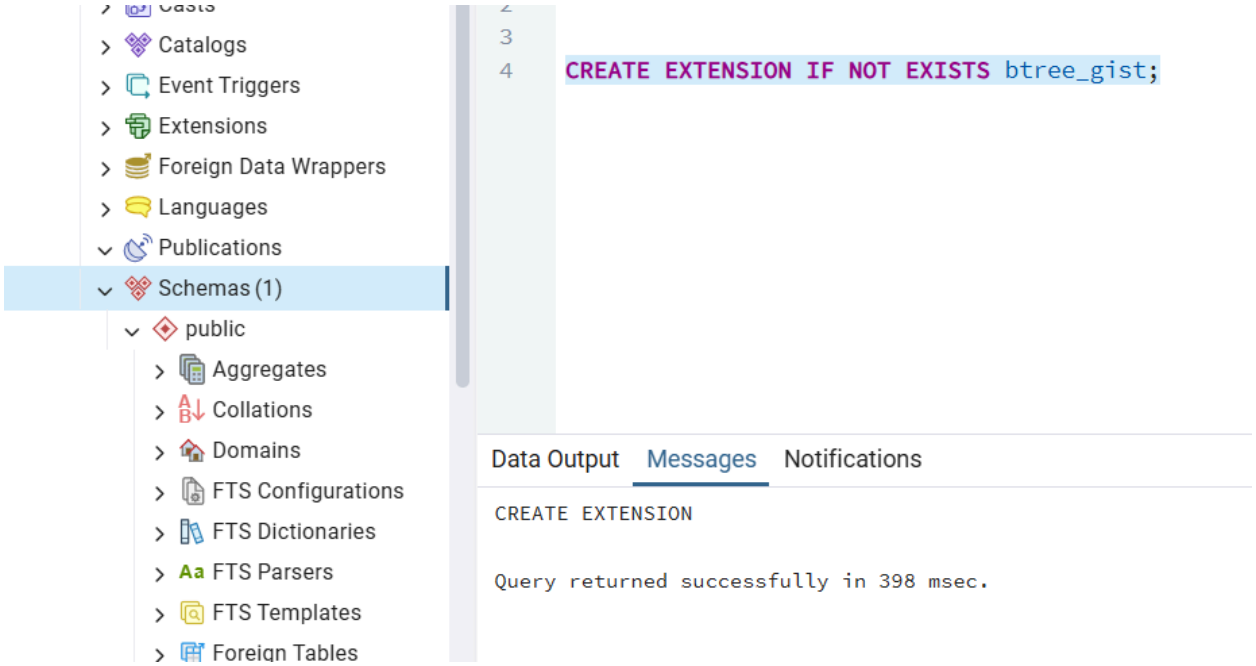
##

Thus, inserting data run successfully!



##

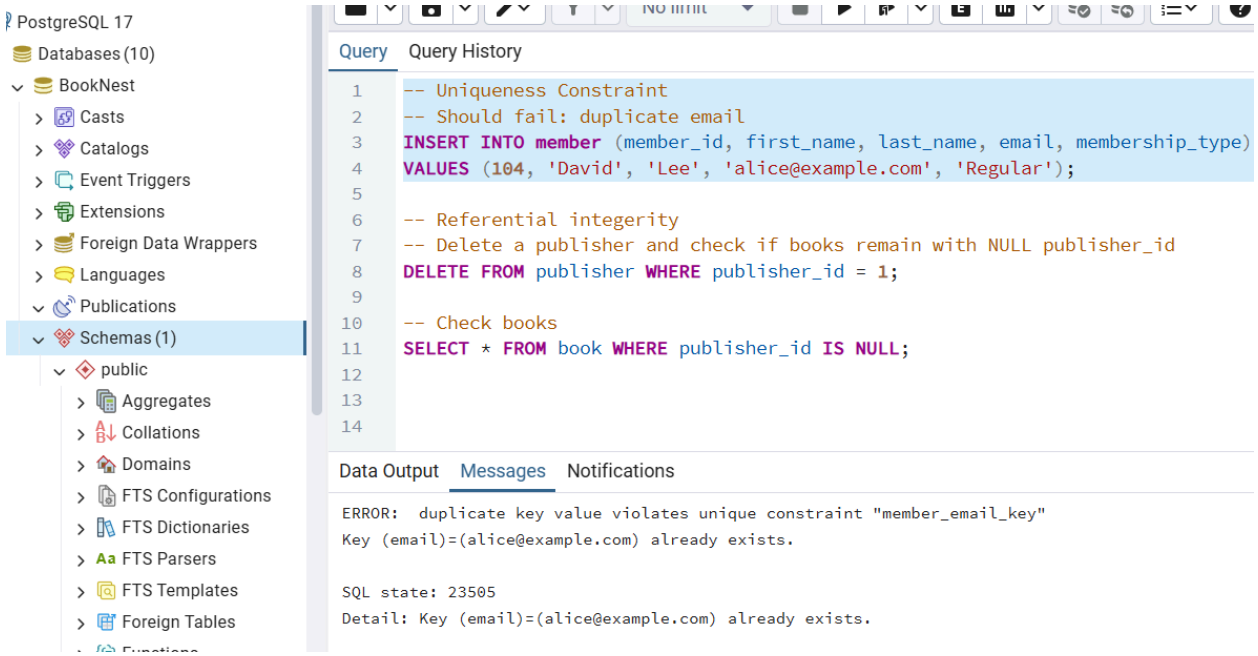
Importing an extension



To avoid double booking, I created an extension, “btree_gist”. Actually, the query lines are already completed. However, there is still a condition called double booking

Suggested Student Tasks with This Data

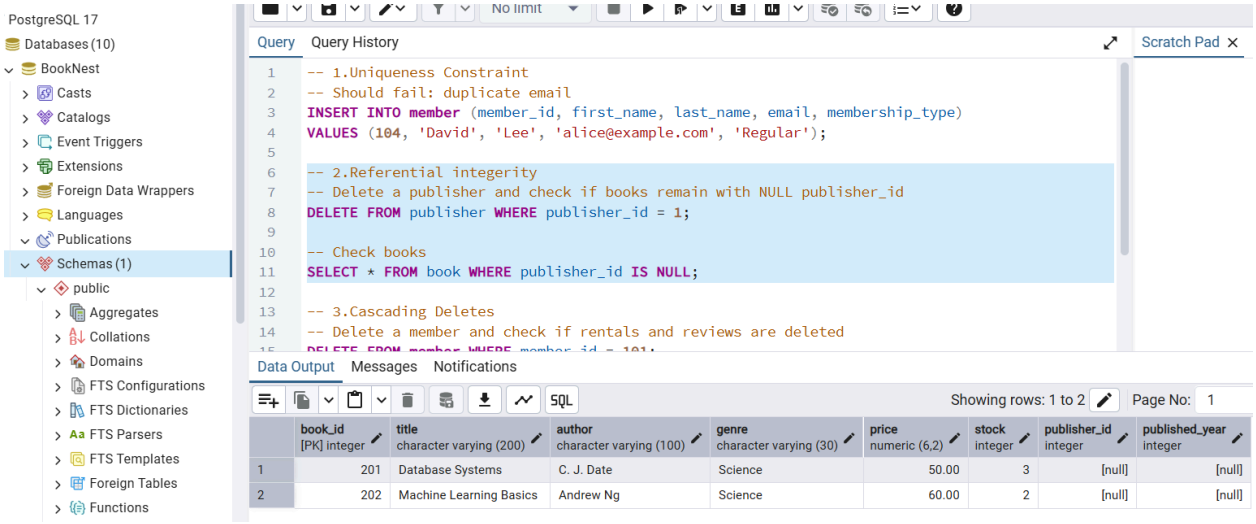
Check uniqueness: Try inserting a member with a duplicate email → should fail.



#

Test referential integrity:

- Delete a publisher → check if `publisher_id` in related books becomes NULL or default as per their design.
- Delete a member → verify that rentals and reviews are automatically deleted.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Databases (10)
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FTS Configurations
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FTS Templates
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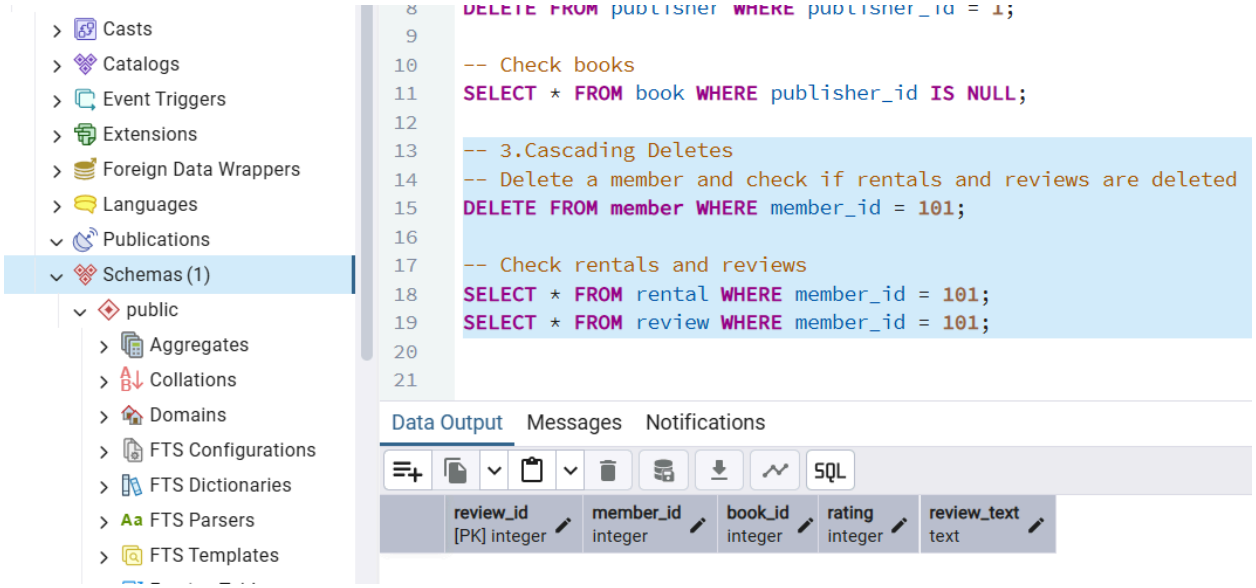
Functions
Query
Query History
Scratch Pad
-- 1.Uniqueness Constraint
-- Should fail: duplicate email
INSERT INTO member (member_id, first_name, last_name, email, membership_type)
VALUES (104, 'David', 'Lee', 'alice@example.com', 'Regular');
-- 2.Referential integerity
-- Delete a publisher and check if books remain with NULL publisher_id
DELETE FROM publisher WHERE publisher_id = 1;
-- Check books
SELECT * FROM book WHERE publisher_id IS NULL;
-- 3.Cascading Deletes
-- Delete a member and check if rentals and reviews are deleted
Data Output
Messages
Notifications
Showing rows: 1 to 2
Page No: 1
book_id [PK] integer
title character varying (200)
author character varying (100)
genre character varying (30)
price numeric (6,2)
stock integer
publisher_id integer
published_year integer
1 201 Database Systems C. J. Date Science 50.00 3 [null] [null]
2 202 Machine Learning Basics Andrew Ng Science 60.00 2 [null] [null]

#


Casts
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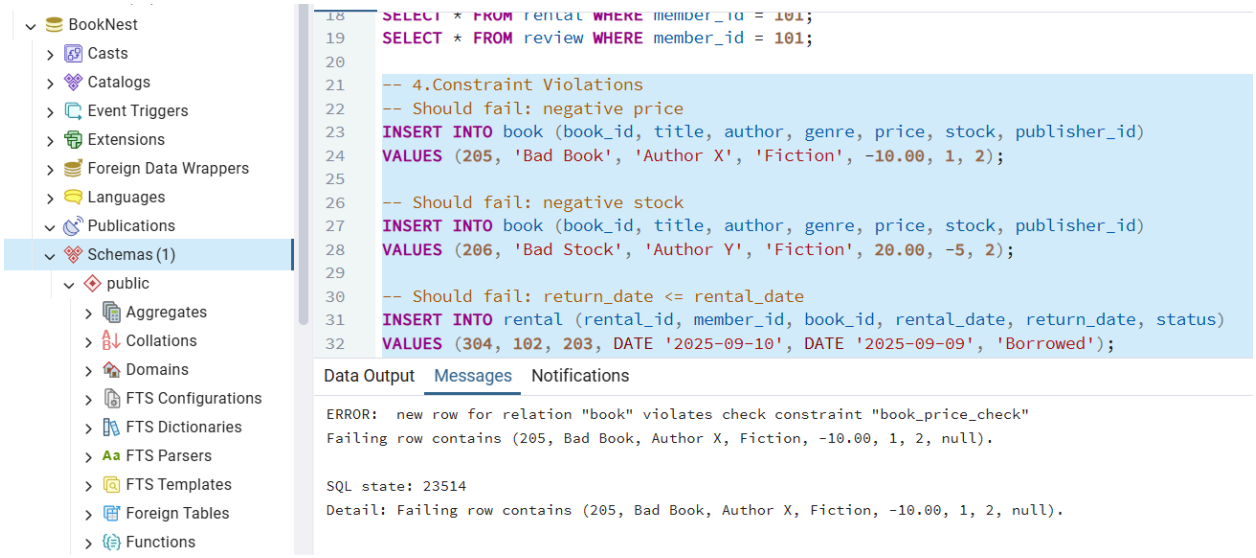
FTS Templates
DELETE FROM publisher WHERE publisher_id = 1;
-- Check books
SELECT * FROM book WHERE publisher_id IS NULL;
-- 3.Cascading Deletes
-- Delete a member and check if rentals and reviews are deleted
DELETE FROM member WHERE member_id = 101;
-- Check rentals and reviews
SELECT * FROM rental WHERE member_id = 101;
SELECT * FROM review WHERE member_id = 101;
Data Output
Messages
Notifications
review_id [PK] integer
member_id integer
book_id integer
rating integer
review_text text

#

##

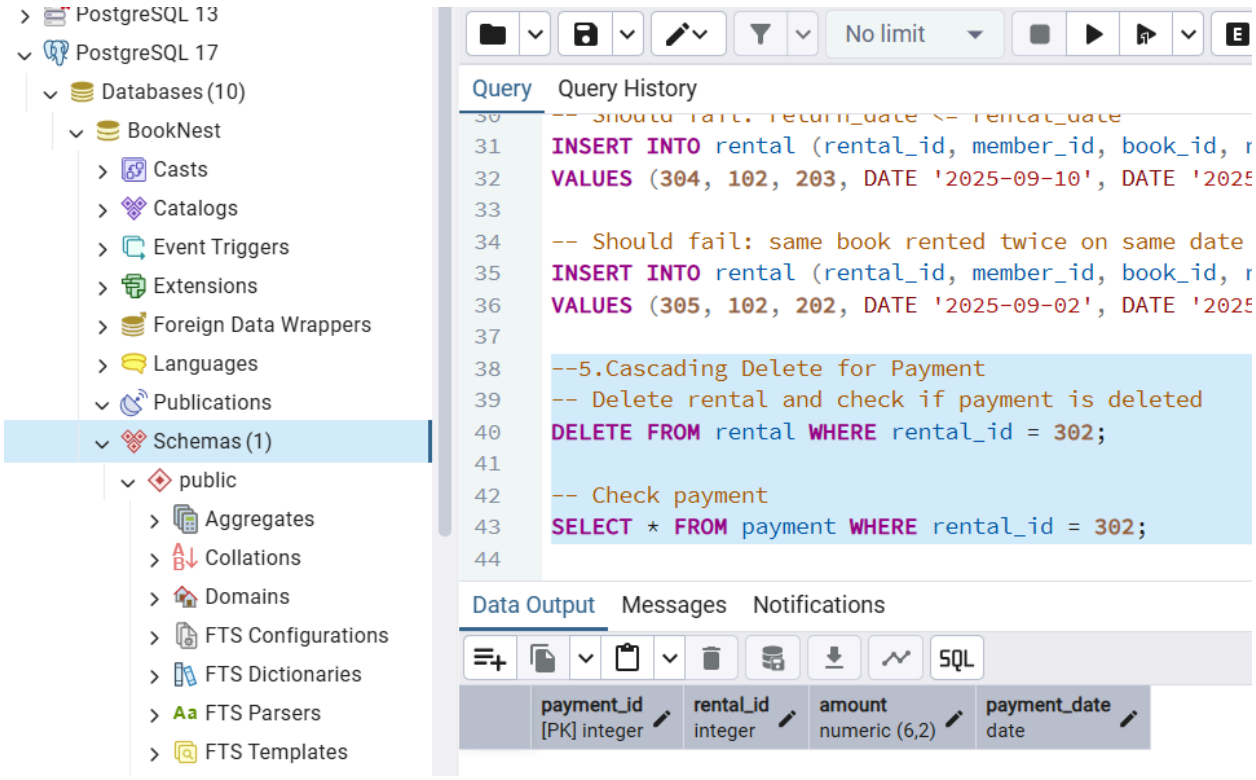
Test constraints:

- Try inserting a book with negative price or stock → should fail.
- Try inserting a rental where `return_date <= rental_date` → should fail.
- Try renting the same book twice for the same date → should fail.



#

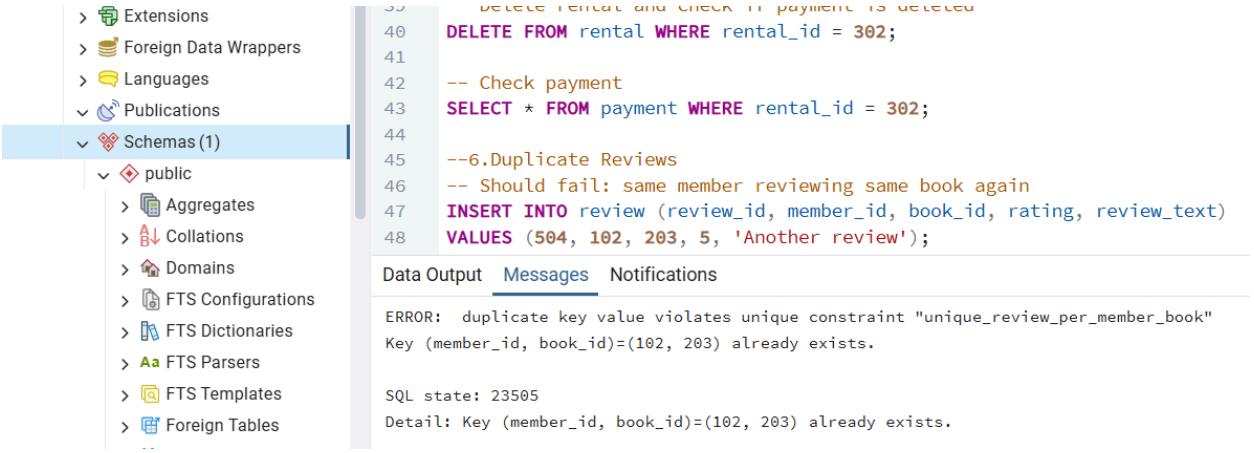
Test cascading deletes: Delete a rental and confirm its payment is deleted automatically.



#
##

Test scenarios (write sample statements to demonstrate behavior)

- Deleting a **Member** with existing rentals, payments, and reviews—show what remains.
- Deleting a **Publisher** with existing books—show how books are affected.
- Deleting a **Book** with past rentals and reviews—show what remains/changes.
- Attempting:
  • a negative book price or stock,
  • a rental where `return_date` ≤ `rental_date`,
  • two rentals of the same book that overlap,
  • a duplicate review by the same member for the same book,
  • exceeding rental limits for Regular vs Premium.



##