LIBRARY MANAGEMENT SYSTEM

Entities and Attributes:

- **Books:**
  - book_id (INT, PRIMARY KEY, AUTO_INCREMENT)
  - isbn (VARCHAR(20), UNIQUE)
  - title (VARCHAR(255), NOT NULL)
  - publication_year (INT)
  - publisher_id (INT, FOREIGN KEY referencing Publishers)
  - edition (VARCHAR(50))
- **Authors:**
  - author_id (INT, PRIMARY KEY, AUTO_INCREMENT)
  - author_name (VARCHAR(255), NOT NULL)
- **Book_Authors (Linking table for many-to-many relationship):**
  - book_id (INT, FOREIGN KEY referencing Books)
  - author_id (INT, FOREIGN KEY referencing Authors)
  - PRIMARY KEY (book_id, author_id)
- **Publishers:**
  - publisher_id (INT, PRIMARY KEY, AUTO_INCREMENT)
  - publisher_name (VARCHAR(255), NOT NULL)
- **Members:**
  - member_id (INT, PRIMARY KEY, AUTO_INCREMENT)
  - member_name (VARCHAR(255), NOT NULL)
  - address (VARCHAR(255))
  - phone_number (VARCHAR(20))

    - email (VARCHAR(255), UNIQUE)
    - join_date (DATE)
- **Loans:**
    - loan_id (INT, PRIMARY KEY, AUTO_INCREMENT)
    - book_id (INT, FOREIGN KEY referencing Books)
    - member_id (INT, FOREIGN KEY referencing Members)
    - loan_date (DATE)
    - return_date (DATE)
    - due_date (DATE)
- **Categories:**
    - category_id (INT, PRIMARY KEY, AUTO_INCREMENT)
    - category_name (VARCHAR(255), NOT NULL)
- **Book_Categories (Linking table for many-to-many relationship):**
    - book_id (INT, FOREIGN KEY referencing Books)
    - category_id (INT, FOREIGN KEY referencing Categories)
    - PRIMARY KEY (book_id, category_id)
- **Reservations:**
    - reservation_id (INT, PRIMARY KEY, AUTO_INCREMENT)
    - book_id (INT, FOREIGN KEY referencing Books)
    - member_id (INT, FOREIGN KEY referencing Members)
    - reservation_date (DATE)
    - status VARCHAR(50)) -- e.g., "Pending", "Completed", "Cancelled"

Relationships:

- **One-to-many:**
    - Publishers to Books (A publisher can publish many books)
    - Members to Loans (A member can borrow many books)

    - Books to Loans (A book can be borrowed multiple times, but one loan record per borrowing)
- **Many-to-many:**
    - Books to Authors (A book can have multiple authors, and an author can write multiple books)
    - Books to Categories (A book can belong to multiple categories, and a category can have multiple books)
- **One-to-many (Self-referencing):**
    - Members to Members (Optional: For tracking referrals or relationships between members)

SQL Query

- Table creation query
    - CREATE TABLE Publishers (

    publisher_id INT PRIMARY KEY AUTO_INCREMENT,

    publisher_name VARCHAR(255) NOT NULL

    );

    - CREATE TABLE Authors (

    author_id INT PRIMARY KEY AUTO_INCREMENT,

    author_name VARCHAR(255) NOT NULL

    );

    - CREATE TABLE Books (

    book_id INT PRIMARY KEY AUTO_INCREMENT,

    isbn VARCHAR(20) UNIQUE,

title VARCHAR(255) NOT NULL,

publication_year INT,

publisher_id INT,

edition VARCHAR(50),

FOREIGN KEY (publisher_id) REFERENCES Publishers(publisher_id)

);

- CREATE TABLE Book_Authors (

book_id INT,

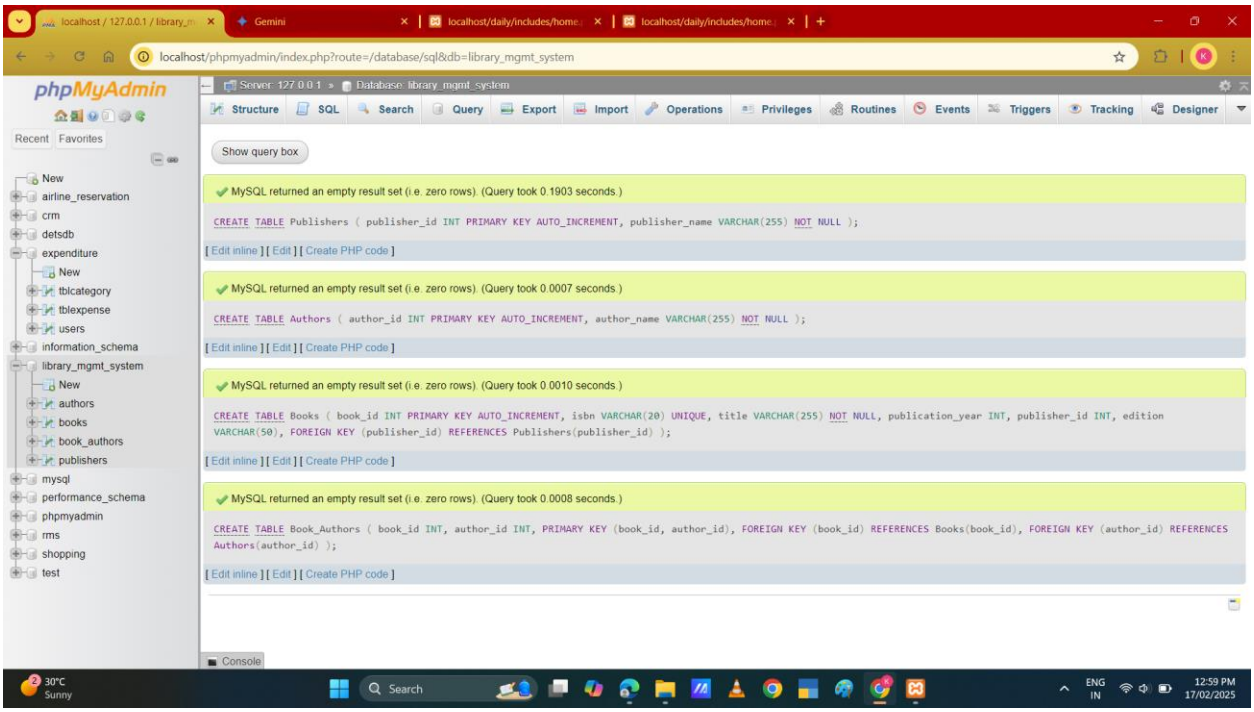
author_id INT,

PRIMARY KEY (book_id, author_id),

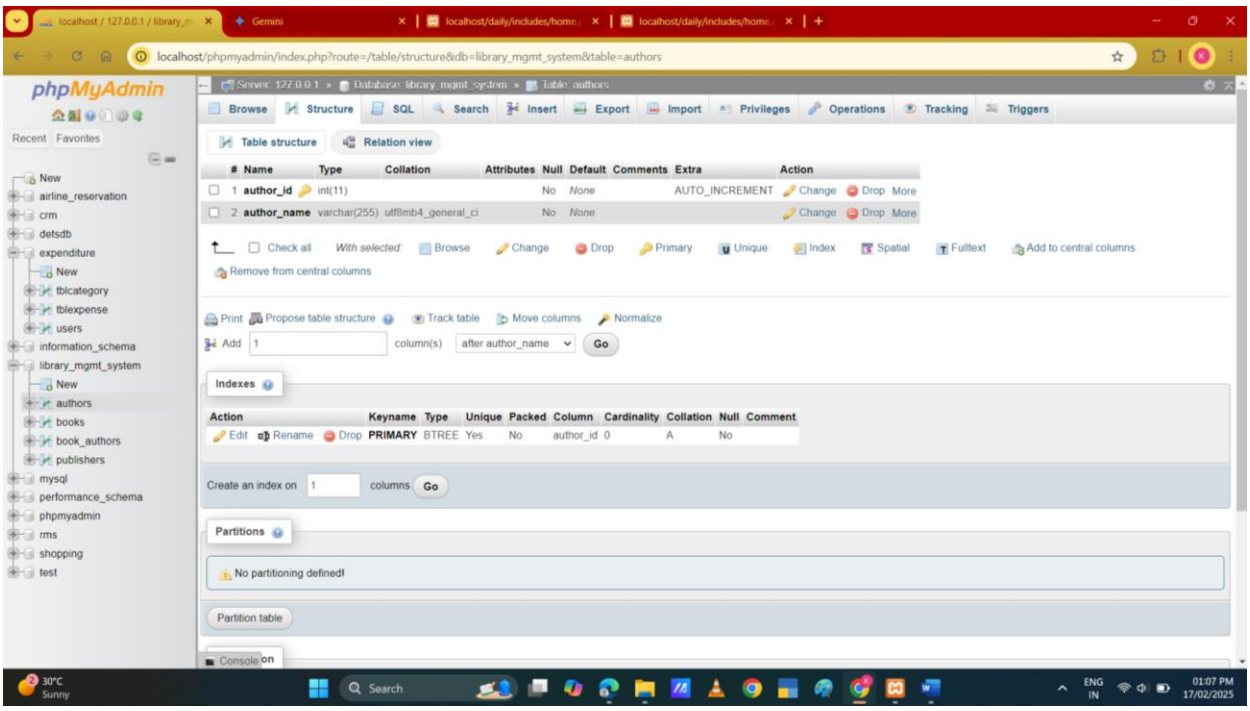
FOREIGN KEY (book_id) REFERENCES Books(book_id),

FOREIGN KEY (author_id) REFERENCES Authors(author_id)

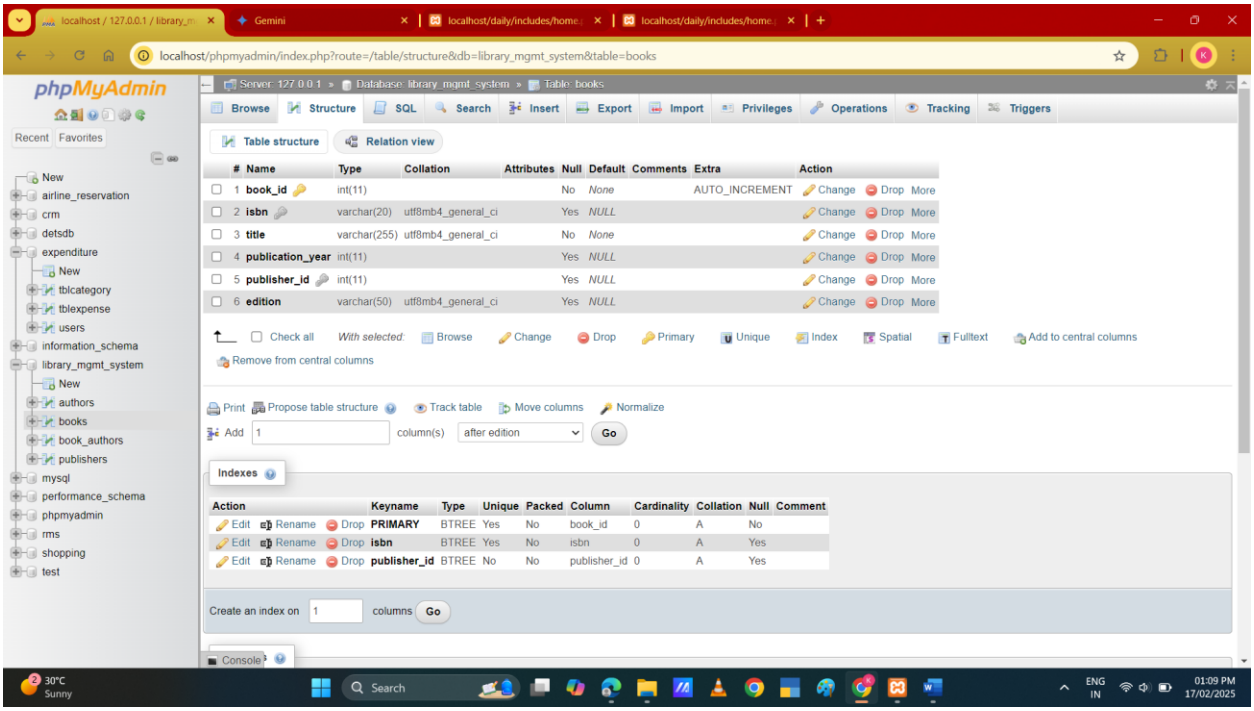
);



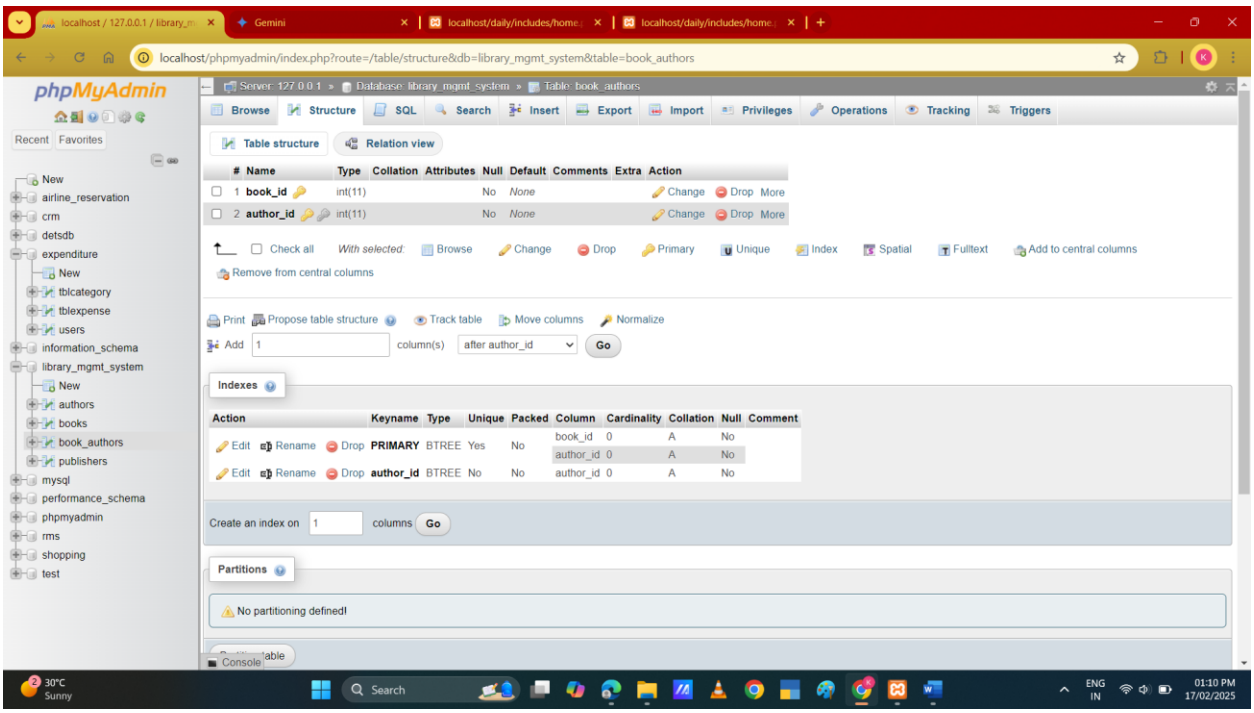
Author table Schema



Books table Schema



Book_authors Schema



Publishers Schema