

Laboratory Activity 2:

Laboratory Title: Creating Tables and Establishing Primary Keys

Chapter No. and Topic: Chapter 1 - Relational Database Concepts

Discussions:

This activity focuses on creating the main tables for the Library Management System, with primary keys for each table.

Activity Description:

Create tables such as Books, Members, and Transactions for the library system.

Objectives:

- Create tables for library management.
- Define primary keys for each table.

Materials:

- MySQL Workbench or SQL client

Procedure:

1. Open MySQL Workbench and connect to the LibraryManagement database.
2. Create the following tables:

sql

Copy code

```
CREATE TABLE Books (  
  
    BookID INT PRIMARY KEY AUTO_INCREMENT,  
  
    Title VARCHAR(100),  
  
    Author VARCHAR(100),  
  
    ISBN VARCHAR(20),  
  
    Genre VARCHAR(50)  
  
);
```

```
CREATE TABLE Members (  
  
    MemberID INT PRIMARY KEY AUTO_INCREMENT,  
  
    FirstName VARCHAR(50),  
  
    LastName VARCHAR(50),  
  
    Email VARCHAR(100)  
  
);
```

```
CREATE TABLE Transactions (  
  

```

TransactionID INT PRIMARY KEY AUTO_INCREMENT,

MemberID INT,

BookID INT,

IssueDate DATE,

ReturnDate DATE,

FOREIGN KEY (MemberID) REFERENCES Members(MemberID),

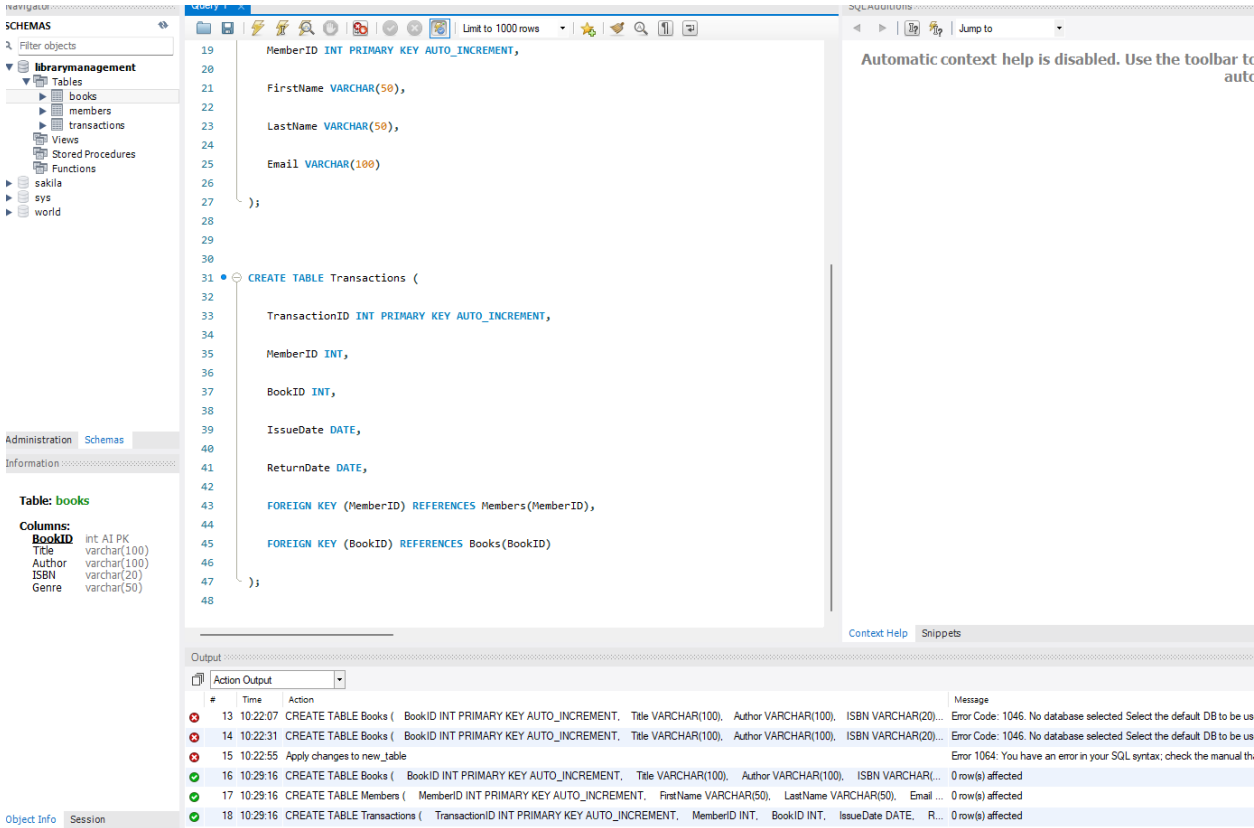
FOREIGN KEY (BookID) REFERENCES Books(BookID)

);

1. Verify the tables are created by running SHOW TABLES;.

Result:

Three tables (Books, Members, and Transactions) are created.



Additional Questions/Discussions:

- What is the importance of primary keys in a relational database?
 - Because they allow each record in a table to be uniquely identified, primary keys are crucial to relational databases. This maintains data integrity by guaranteeing that no two rows have the same primary key value. Foreign keys can be used to create associations across tables using a primary key, guaranteeing correct and consistent data throughout the database. Primary keys also make the database more dependable and effective for storing and retrieving data by preventing duplicate entries, optimizing search queries, and enhancing performance.
- How do foreign keys maintain referential integrity?

Foreign keys maintain referential integrity by ensuring that values in a child table correspond to valid, existing values in the parent table’s primary key, preventing invalid or orphaned records and enforcing consistent relationships between tables.

Conclusions:

Creating tables and establishing primary keys is fundamental for organizing and maintaining data integrity in a relational database, as primary keys ensure each record is uniquely identified and support the creation of meaningful relationships between tables, enabling efficient data management and retrieval.

Insert DATA

```
-- Inserting data into Books table

INSERT INTO Books (Title, Author, ISBN, Genre) VALUES

('The Great Gatsby', 'F. Scott Fitzgerald', '9780743273565', 'Classic'),
('To Kill a Mockingbird', 'Harper Lee', '9780061120084', 'Fiction'),
('1984', 'George Orwell', '9780451524935', 'Dystopian'),
('Pride and Prejudice', 'Jane Austen', '9781503290563', 'Romance'),
('Moby Dick', 'Herman Melville', '9781503280786', 'Adventure'),
('War and Peace', 'Leo Tolstoy', '9781400079988', 'Historical Fiction'),
('The Odyssey', 'Homer', '9780140268867', 'Classical Literature'),
('The Catcher in the Rye', 'J.D. Salinger', '9780316769488', 'Fiction'),
('The Lord of the Rings', 'J.R.R. Tolkien', '9780261103573', 'Fantasy'),
('Brave New World', 'Aldous Huxley', '9780060850524', 'Science Fiction'),
('Frankenstein', 'Mary Shelley', '9780486282114', 'Horror'),
('Dracula', 'Bram Stoker', '9780141439846', 'Horror'),
('The Picture of Dorian Gray', 'Oscar Wilde', '9780141439570', 'Philosophical'),
('Crime and Punishment', 'Fyodor Dostoevsky', '9780140449136', 'Psychological Fiction'),
('The Hobbit', 'J.R.R. Tolkien', '9780618968633', 'Fantasy'),
('The Great Alone', 'Kristin Hannah', '9780312574810', 'Historical Fiction'),
('The Shining', 'Stephen King', '9780307743657', 'Horror'),
('The Alchemist', 'Paulo Coelho', '9780062315007', 'Adventure'),
```

('The Hunger Games', 'Suzanne Collins', '9780439023528', 'Dystopian'),

('The Kite Runner', 'Khaled Hosseini', '9781594631931', 'Drama'),

('A Game of Thrones', 'George R.R. Martin', '9780553103540', 'Fantasy'),

('The Chronicles of Narnia', 'C.S. Lewis', '9780066238500', 'Fantasy'),

('Little Women', 'Louisa May Alcott', '9780142408760', 'Classic'),

('Anna Karenina', 'Leo Tolstoy', '9780143035008', 'Literary Fiction'),

('The Book Thief', 'Markus Zusak', '9780375842207', 'Historical Fiction'),

('Fahrenheit 451', 'Ray Bradbury', '9781451673319', 'Dystopian'),

('The Road', 'Cormac McCarthy', '9780307387899', 'Post-apocalyptic'),

('A Tale of Two Cities', 'Charles Dickens', '9780141192545', 'Historical Fiction'),

('The Fault in Our Stars', 'John Green', '9780525478812', 'Romance'),

('Gone with the Wind', 'Margaret Mitchell', '9781451635621', 'Historical Romance'),

('Wuthering Heights', 'Emily Brontë', '9780141439556', 'Gothic Fiction'),

('The Outsiders', 'S.E. Hinton', '9780142407336', 'Coming-of-age'),

('The Secret Garden', 'Frances Hodgson Burnett', '9780141321078', 'Children's Literature'),

('The Time Machine', 'H.G. Wells', '9780451530747', 'Science Fiction'),

('The Handmaid's Tale', 'Margaret Atwood', '9780385490818', 'Dystopian'),

('Jane Eyre', 'Charlotte Brontë', '9780141441146', 'Romance'),

('The Secret History', 'Donna Tartt', '9780374522116', 'Psychological Fiction'),

('Beloved', 'Toni Morrison', '9781400033416', 'Historical Fiction'),

('The Night Circus', 'Erin Morgenstern', '9780385534642', 'Fantasy'),

('The Hunger Games: Catching Fire', 'Suzanne Collins', '9780439026994', 'Dystopian'),

('The Girl on the Train', 'Paula Hawkins', '9781594633669', 'Psychological Thriller'),

('The Help', 'Kathryn Stockett', '9780399155345', 'Historical Fiction'),

('Room', 'Emma Donoghue', '9780316334754', 'Drama'),

('Sharp Objects', 'Gillian Flynn', '9780307341556', 'Thriller'),

('Big Little Lies', 'Liane Moriarty', '9780399167065', 'Drama'),

('The Martian', 'Andy Weir', '9780553418026', 'Science Fiction'),

('The Fault in Our Stars', 'John Green', '9780141345654', 'Romance'),

('All the Light We Cannot See', 'Anthony Doerr', '9781501173219', 'Historical Fiction'),

('The Nightingale', 'Kristin Hannah', '9780312577224', 'Historical Fiction'),

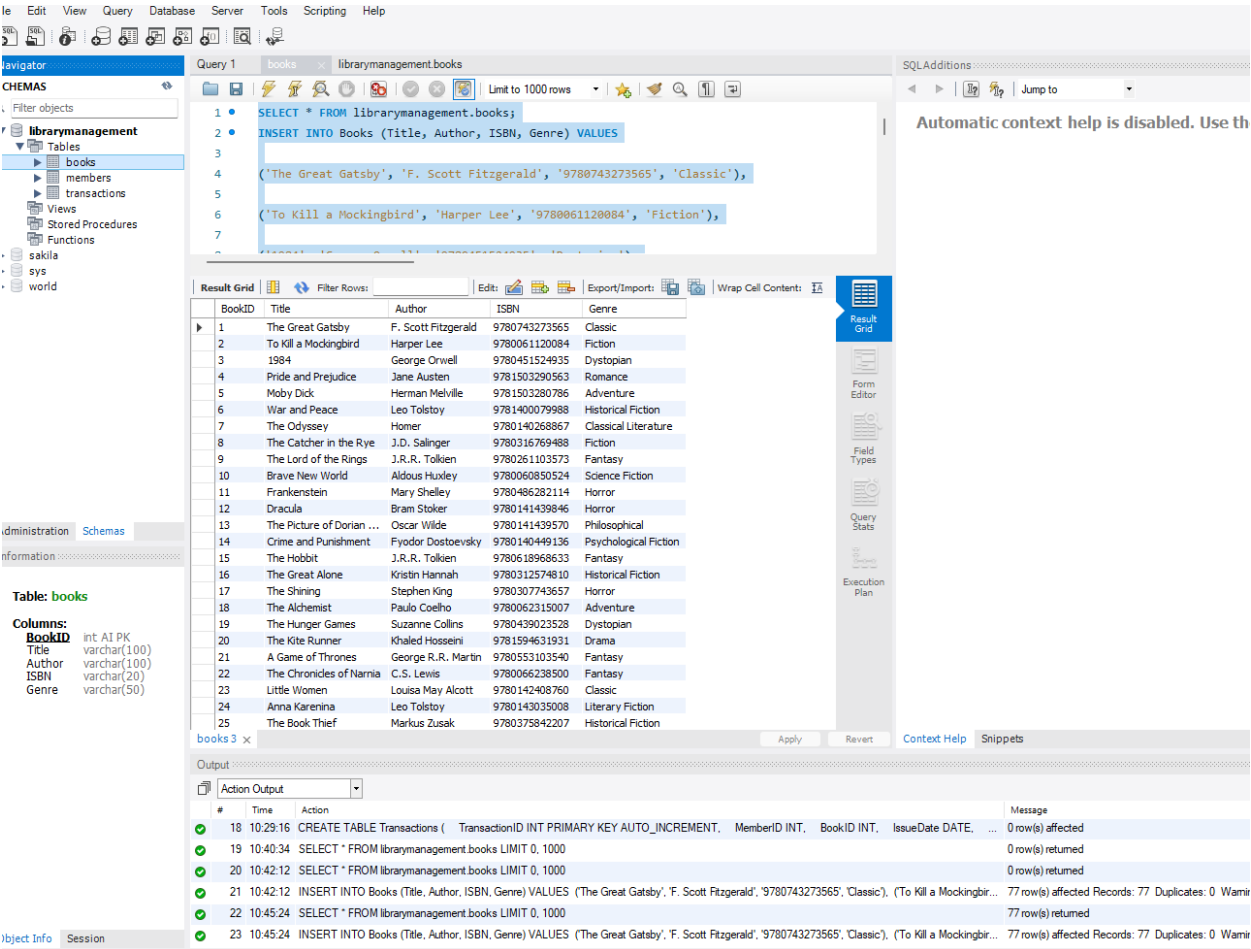
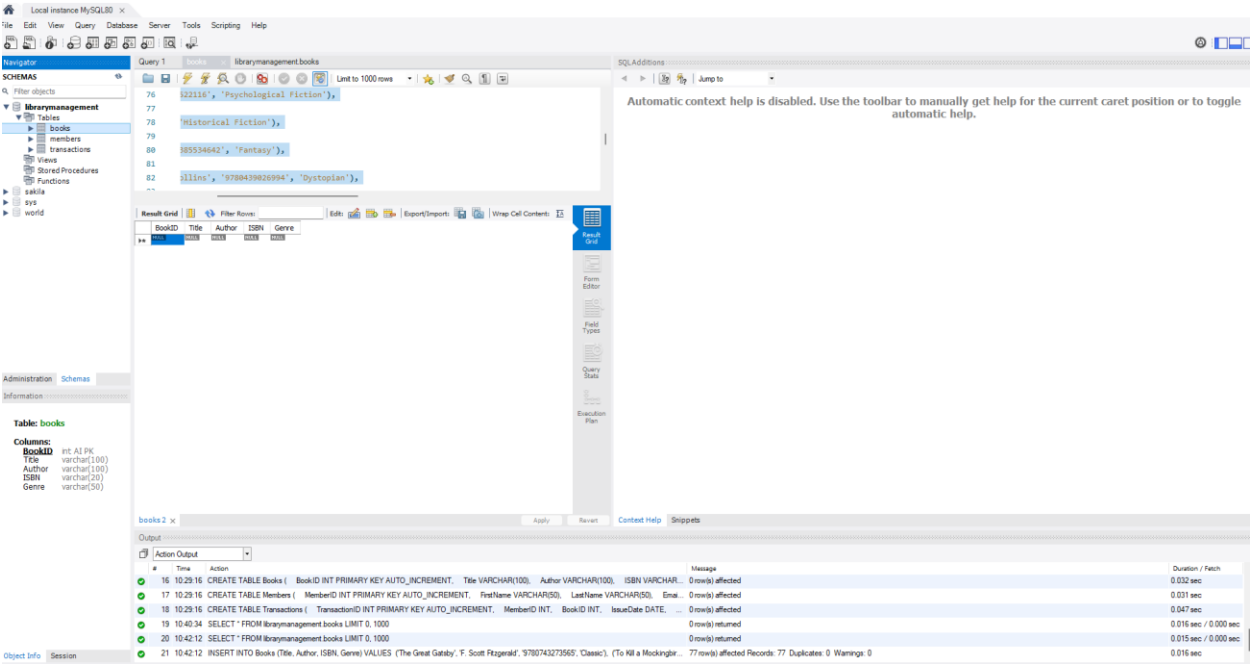
('The Giver', 'Lois Lowry', '9780544336261', 'Dystopian'),

('The Hunger Games', 'Suzanne Collins', '9780439023528', 'Dystopian'),

('Life After Life', 'Kate Atkinson', '9780316176491', 'Historical Fiction'),

('The Rosie Project', 'Graeme Simsion', '9781476729091', 'Romantic Comedy'),

('The Night Watchman', 'Louise Erdrich', '9780062671190', 'Historical Fiction'),
('Circe', 'Madeline Miller', '9780316556347', 'Fantasy'),
('The Silent Patient', 'Alex Michaelides', '9781250301697', 'Psychological Thriller'),
('Where the Crawdads Sing', 'Delia Owens', '9780735219090', 'Mystery'),
('Eleanor Oliphant Is Completely Fine', 'Gail Honeyman', '9780735220683', 'Contemporary Fiction'),
('Educated', 'Tara Westover', '9780399590504', 'Memoir'),
('Becoming', 'Michelle Obama', '9781524763138', 'Memoir'),
('Normal People', 'Sally Rooney', '9781984822178', 'Literary Fiction'),
('The Seven Husbands of Evelyn Hugo', 'Taylor Jenkins Reid', '9781501161933', 'Historical Fiction'),
('The Midnight Library', 'Matt Haig', '9780525559474', 'Fantasy'),
('The Tattooist of Auschwitz', 'Heather Morris', '9780062797152', 'Historical Fiction'),
('The Couple Next Door', 'Shari Lapena', '9780735234949', 'Thriller'),
('The Institute', 'Stephen King', '9781982102504', 'Horror'),
('The Silent Corner', 'Dean Koontz', '9780525482793', 'Thriller'),
('The Invisible Man', 'H.G. Wells', '9780451530969', 'Science Fiction'),
('Before We Were Strangers', 'Renée Carlino', '9781501135101', 'Romance'),
('Behind Closed Doors', 'B.A. Paris', '9781250130921', 'Thriller'),
('Big Little Lies', 'Liane Moriarty', '9780399167065', 'Drama'),
('The Tattooist of Auschwitz', 'Heather Morris', '9780062797152', 'Historical Fiction'),
('The Light We Lost', 'Jill Santopolo', '9780735212763', 'Romance'),
('The Light Between Oceans', 'M.L. Stedman', '9781451681754', 'Historical Fiction'),
('Anxious People', 'Fredrik Backman', '9781501160783', 'Contemporary Fiction'),
('Little Fires Everywhere', 'Celeste Ng', '9780735224315', 'Drama'),
('The Goldfinch', 'Donna Tartt', '9780316055437', 'Literary Fiction');



-- Inserting data into Members table

INSERT INTO Members (FirstName, LastName, Email) VALUES

('John', 'Doe', 'john.doe@example.com'),

('Jane', 'Smith', 'jane.smith@example.com'),

('Michael', 'Johnson', 'michael.johnson@example.com'),

('Emily', 'Davis', 'emily.davis@example.com'),

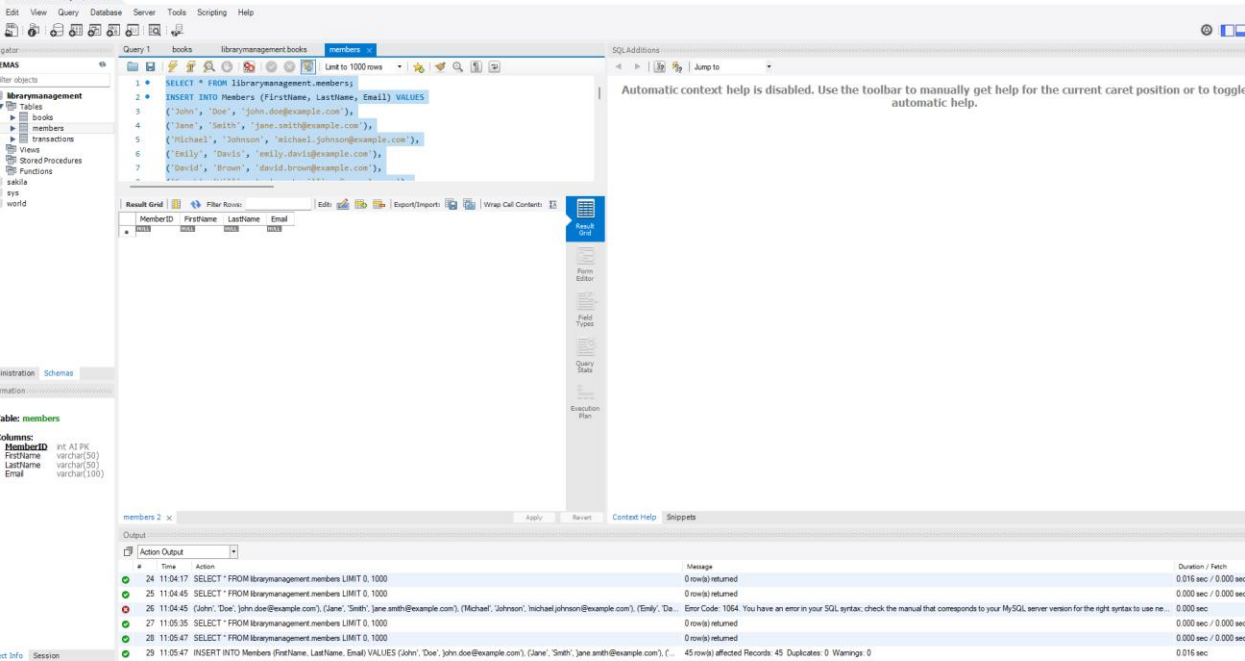
('David', 'Brown', 'david.brown@example.com'),

('Sarah', 'Williams', 'sarah.williams@example.com'),

('James', 'Jones', 'james.jones@example.com'),

('Patricia', 'Garcia', 'patricia.garcia@example.com'),
('Robert', 'Miller', 'robert.miller@example.com'),
('Mary', 'Wilson', 'mary.wilson@example.com'),
('William', 'Moore', 'william.moore@example.com'),
('Linda', 'Taylor', 'linda.taylor@example.com'),
('Thomas', 'Anderson', 'thomas.anderson@example.com'),
('Jessica', 'Thomas', 'jessica.thomas@example.com'),
('Christopher', 'Jackson', 'christopher.jackson@example.com'),
('Amanda', 'White', 'amanda.white@example.com'),
('Joshua', 'Harris', 'joshua.harris@example.com'),
('Elizabeth', 'Martin', 'elizabeth.martin@example.com'),
('Andrew', 'Thompson', 'andrew.thompson@example.com'),
('Kimberly', 'Garcia', 'kimberly.garcia@example.com'),
('Steven', 'Martinez', 'steven.martinez@example.com'),
('Nicole', 'Roberts', 'nicole.roberts@example.com'),
('Brian', 'Walker', 'brian.walker@example.com'),
('Angela', 'Scott', 'angela.scott@example.com'),
('Joseph', 'Young', 'joseph.young@example.com'),
('Samantha', 'Allen', 'samantha.allen@example.com'),
('Benjamin', 'King', 'benjamin.king@example.com'),
('Rachel', 'Green', 'rachel.green@example.com'),
('Daniel', 'Adams', 'daniel.adams@example.com'),
('Lauren', 'Baker', 'lauren.baker@example.com'),
('Ethan', 'Nelson', 'ethan.nelson@example.com'),
('Hannah', 'Carter', 'hannah.carter@example.com'),
('Jack', 'Mitchell', 'jack.mitchell@example.com'),
('Megan', 'Perez', 'megan.perez@example.com'),
('Ryan', 'Roberts', 'ryan.roberts@example.com'),
('Ashley', 'Morris', 'ashley.morris@example.com'),
('William', 'Evans', 'william.evans@example.com'),
('Olivia', 'Collins', 'olivia.collins@example.com'),
('Matthew', 'Stewart', 'matthew.stewart@example.com'),
('Sophia', 'Sanchez', 'sophia.sanchez@example.com'),
('Lucas', 'Rogers', 'lucas.rogers@example.com'),
('Ava', 'Reed', 'ava.reed@example.com'),

('Gabriel', 'Cook', 'gabriel.cook@example.com'),
('Charlotte', 'Morgan', 'charlotte.morgan@example.com'),
('Jack', 'Bennett', 'jack.bennett@example.com');



-- Inserting data into Transactions table

INSERT INTO Transactions (MemberID, BookID, IssueDate, ReturnDate) VALUES

(1, 1, '2025-01-10', '2025-01-17'),
(2, 2, '2025-01-12', '2025-01-19'),
(3, 3, '2025-01-14', '2025-01-21'),
(4, 4, '2025-01-16', '2025-01-23'),
(5, 5, '2025-01-18', '2025-01-25'),
(6, 6, '2025-01-20', '2025-01-27'),
(7, 7, '2025-01-22', '2025-01-29'),
(8, 8, '2025-01-24', '2025-01-31'),
(9, 9, '2025-01-26', '2025-02-02'),
(10, 10, '2025-01-28', '2025-02-04'),
(11, 11, '2025-01-30', '2025-02-06'),
(12, 12, '2025-02-01', '2025-02-08'),
(13, 13, '2025-02-03', '2025-02-10'),
(14, 14, '2025-02-05', '2025-02-12'),
(15, 15, '2025-02-07', '2025-02-14'),
(16, 16, '2025-02-09', '2025-02-16'),
(17, 17, '2025-02-11', '2025-02-18'),
(18, 18, '2025-02-13', '2025-02-20'),
(19, 19, '2025-02-15', '2025-02-22'),

(20, 20, '2025-02-17', '2025-02-24'),
(21, 21, '2025-02-19', '2025-02-26'),
(22, 22, '2025-02-21', '2025-02-28'),
(23, 23, '2025-02-23', '2025-03-02'),
(24, 24, '2025-02-25', '2025-03-04'),
(25, 25, '2025-02-27', '2025-03-06'),
(26, 26, '2025-03-01', '2025-03-08'),
(27, 27, '2025-03-03', '2025-03-10'),
(28, 28, '2025-03-05', '2025-03-12'),
(29, 29, '2025-03-07', '2025-03-14'),
(30, 30, '2025-03-09', '2025-03-16'),
(31, 31, '2025-03-11', '2025-03-18'),
(32, 32, '2025-03-13', '2025-03-20'),
(33, 33, '2025-03-15', '2025-03-22'),
(34, 34, '2025-03-17', '2025-03-24'),
(35, 35, '2025-03-19', '2025-03-26'),
(36, 36, '2025-03-21', '2025-03-28'),
(37, 37, '2025-03-23', '2025-03-30'),
(38, 38, '2025-03-25', '2025-04-01'),
(39, 39, '2025-03-27', '2025-04-03'),
(40, 40, '2025-03-29', '2025-04-05'),
(41, 41, '2025-03-31', '2025-04-07'),
(42, 42, '2025-04-02', '2025-04-09'),
(43, 43, '2025-04-04', '2025-04-11'),
(44, 44, '2025-04-06', '2025-04-13'),
(45, 45, '2025-04-08', '2025-04-15'),
(46, 46, '2025-04-10', '2025-04-17'),
(47, 47, '2025-04-12', '2025-04-19'),
(48, 48, '2025-04-14', '2025-04-21'),
(49, 49, '2025-04-16', '2025-04-23'),
(50, 50, '2025-04-18', '2025-04-25');

MySQL Workbench
Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Query 1 books librarymanagement.books members transactions transactions

1 SELECT * FROM librarymanagement.transactions;
2 INSERT INTO Transactions (MemberID, BookID, IssueDate, ReturnDate) VALUES
3 (1, 1, '2025-01-10', '2025-01-17'),
4 (2, 2, '2025-01-12', '2025-01-19'),
5 (3, 3, '2025-01-14', '2025-01-21'),
6 (4, 4, '2025-01-16', '2025-01-23'),
7 (5, 5, '2025-01-18', '2025-01-25');

CHEMAS

Filter objects

librarymanagement
Tables
books
members
transactions
Views
Stored Procedures
Functions
schemas
sys
world

Administration Schemas

Information

Table: transactions
Columns:
TransactionID int AI PK
MemberID int
BookID int
IssueDate date
ReturnDate date

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position. Automatic help is disabled.

Result Grid

TransactionID MemberID BookID IssueDate ReturnDate

transactions 4 x

Apply Revert Context Help Snippets

Output

Action Output

Time Action Message

32 11:06:30 INSERT INTO Transactions (MemberID, BookID, IssueDate, ReturnDate) VALUES (1, 1, '2025-01-10', '2025-01-17'), (2, 2, '2025-01-12', '2025-01-19'); ... Error Code: 1452. Cannot add or update a child row: a foreign key constraint fails (librarymanagement.`transactions`, CONSTRAINT `transactions` ... 0 row(s) returned

33 11:07:09 SELECT * FROM librarymanagement.transactions LIMIT 0, 1000 ... Error Code: 1064. You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use ... 0 row(s) returned

34 11:07:09 INSERT INTO Transactions (MemberID, BookID, IssueDate, ReturnDate) VALUES (1, 1, '2025-01-10', '2025-01-17'), (2, 2, '2025-01-12', '2025-01-19'); ... Error Code: 1064. You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use ... 0 row(s) returned

35 11:07:23 SELECT * FROM librarymanagement.transactions LIMIT 0, 1000 ... Error Code: 1064. You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use ... 0 row(s) returned

36 11:07:31 SELECT * FROM librarymanagement.transactions LIMIT 0, 1000 ... Error Code: 1064. You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use ... 0 row(s) returned

37 11:07:31 INSERT INTO Transactions (MemberID, BookID, IssueDate, ReturnDate) VALUES (1, 1, '2025-01-10', '2025-01-17'), (2, 2, '2025-01-12', '2025-01-19'); ... 45 row(s) affected Records: 45 Duplicates: 0 Warnings: 0