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BSCpE – 3A

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

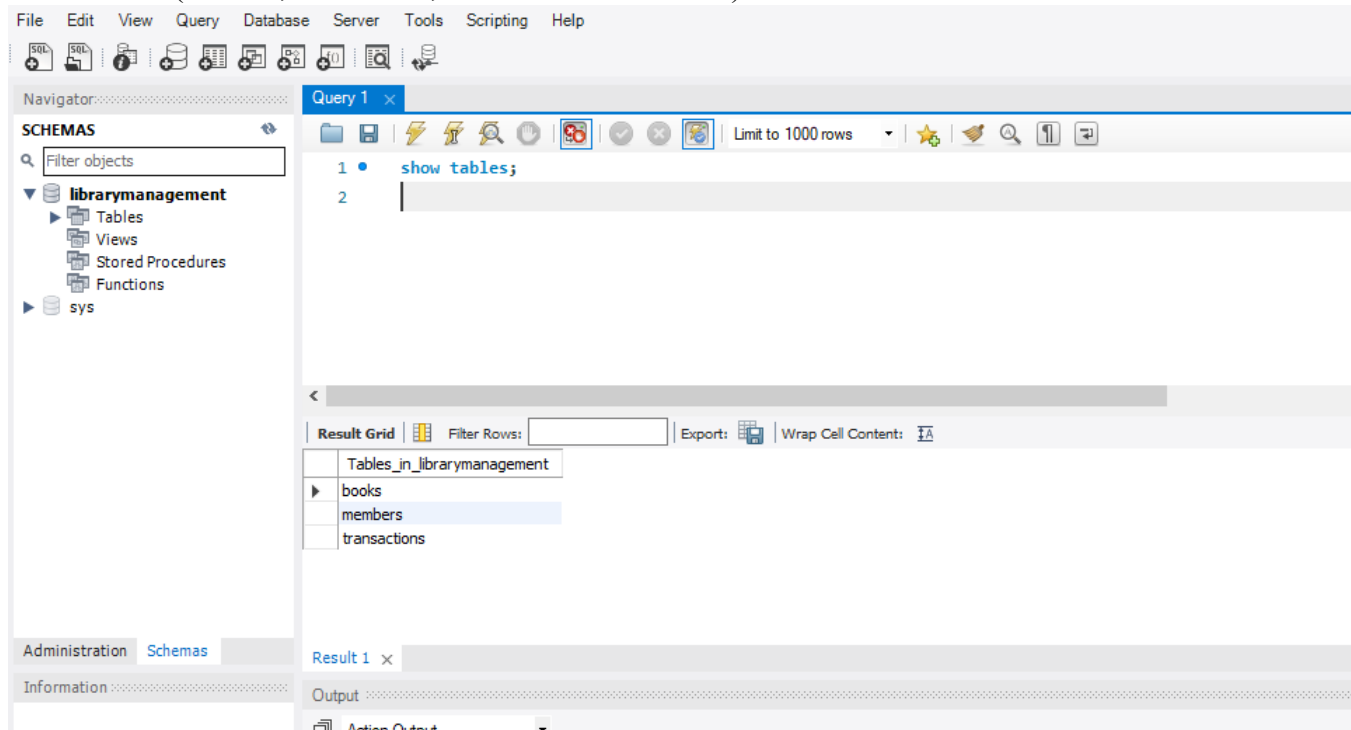
```
CREATE TABLE Books (  
    BookID INT PRIMARY KEY AUTO_INCREMENT,  
    Title VARCHAR(100),  
    Author VARCHAR(100),  
    ISBN VARCHAR(20),  
    Genre VARCHAR(50)  
);
```

```
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?

Primary keys are crucial in a relational database because they uniquely identify each record in a table, ensuring data integrity and preventing duplicates. They also establish relationships between tables by serving as foreign keys in other tables, enabling efficient querying and data organization.

- How do foreign keys maintain referential integrity?

Foreign keys maintain referential integrity by ensuring that a value in one table corresponds to an existing value in another table. This prevents orphaned records and enforces valid relationships between tables, ensuring that references are consistent and valid across the database.

Conclusions:

The **Error Code: 1452** occurs because the BookID values being inserted into the Transactions table do not exist in the Books table, violating the foreign key constraint. To resolve this issue, you need to check the Books table for existing BookIDs and ensure that all BookID values in your INSERT INTO Transactions statement match those that are already in the Books table. If any BookID values are missing, you must add the corresponding books to the Books table. Similarly, verify that all MemberID values in your Transactions statement exist in the Members table. Once you ensure that all referenced BookIDs and MemberIDs are valid, you can re-run the INSERT statement without encountering the foreign key constraint error.

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');