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BSCpE 2A1
Database Management System

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:

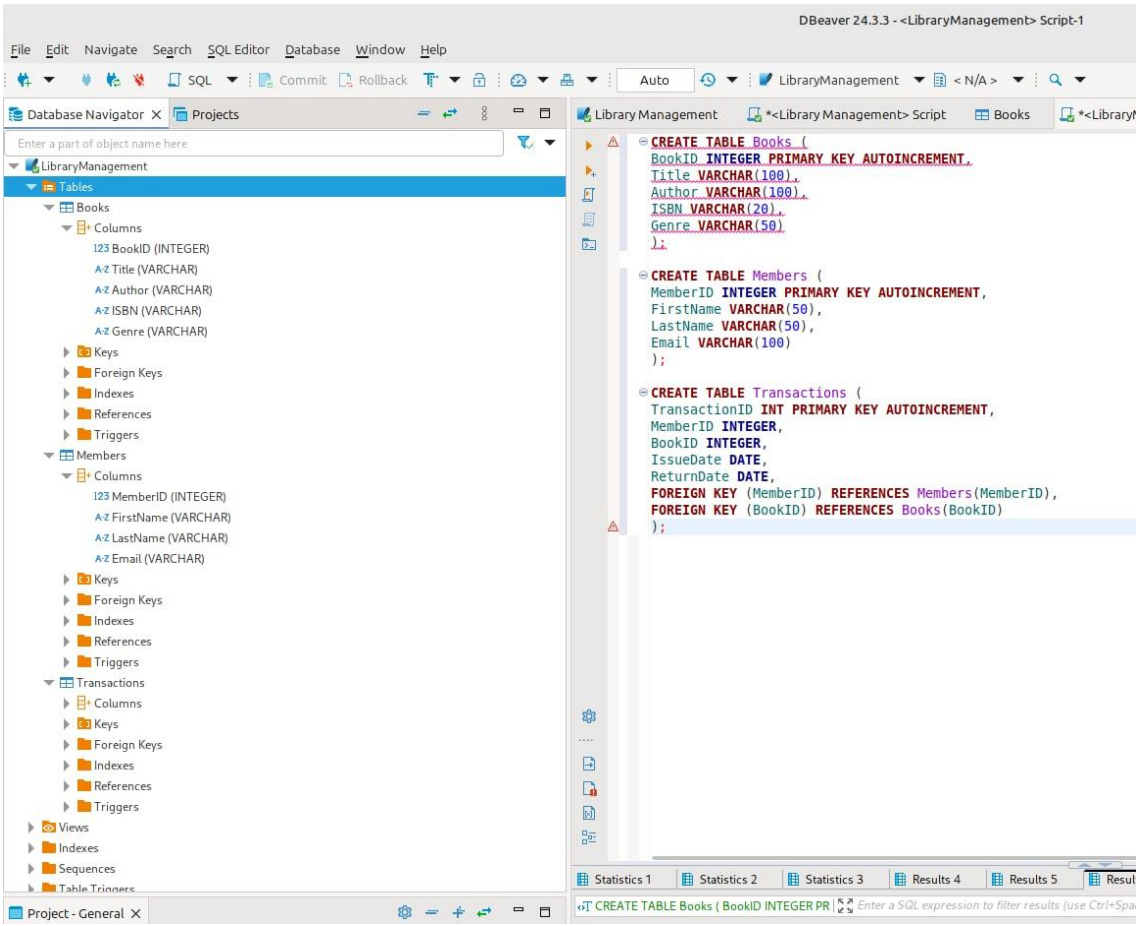
```
sql
Copy code
CREATE TABLE Books (
    BookID INT PRIMARY KEY AUTO_INCREMENT,
    Title VARCHAR(100),
    Author VARCHAR(100),
    ISBN VARCHAR(20),
    Genre VARCHAR(50)
);

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?

ANSWER:

A primary key uniquely identifies each record in a table. It ensures uniqueness by preventing duplicate records and enforces non-nullability, meaning every record must have a valid identifier. Most database systems automatically create an index on the primary key, improving search performance. Additionally, primary keys support referential integrity by allowing other tables to reference them as foreign keys, maintaining data consistency.

- How do foreign keys maintain referential integrity?
  ANSWER:
  A foreign key links a table to the primary key of another, ensuring referential integrity. It prevents orphan records, enforces valid relationships, and supports cascading actions like on delete cascade. In your SQL script, the Transactions table references Members(MemberID) and Books(BookID) to ensure valid transactions.

Conclusions:

- The setup of MySQL and DBeaver for a Library Management System (LMS) demonstrates the importance of proper database design. The process involved creating essential tables like Books, Members, and Transactions, ensuring structured and efficient data management.