Daryl D. Silva

BSCpE-3B2

## Chapter 3: Database Design and Modeling

### Laboratory Activity 5:

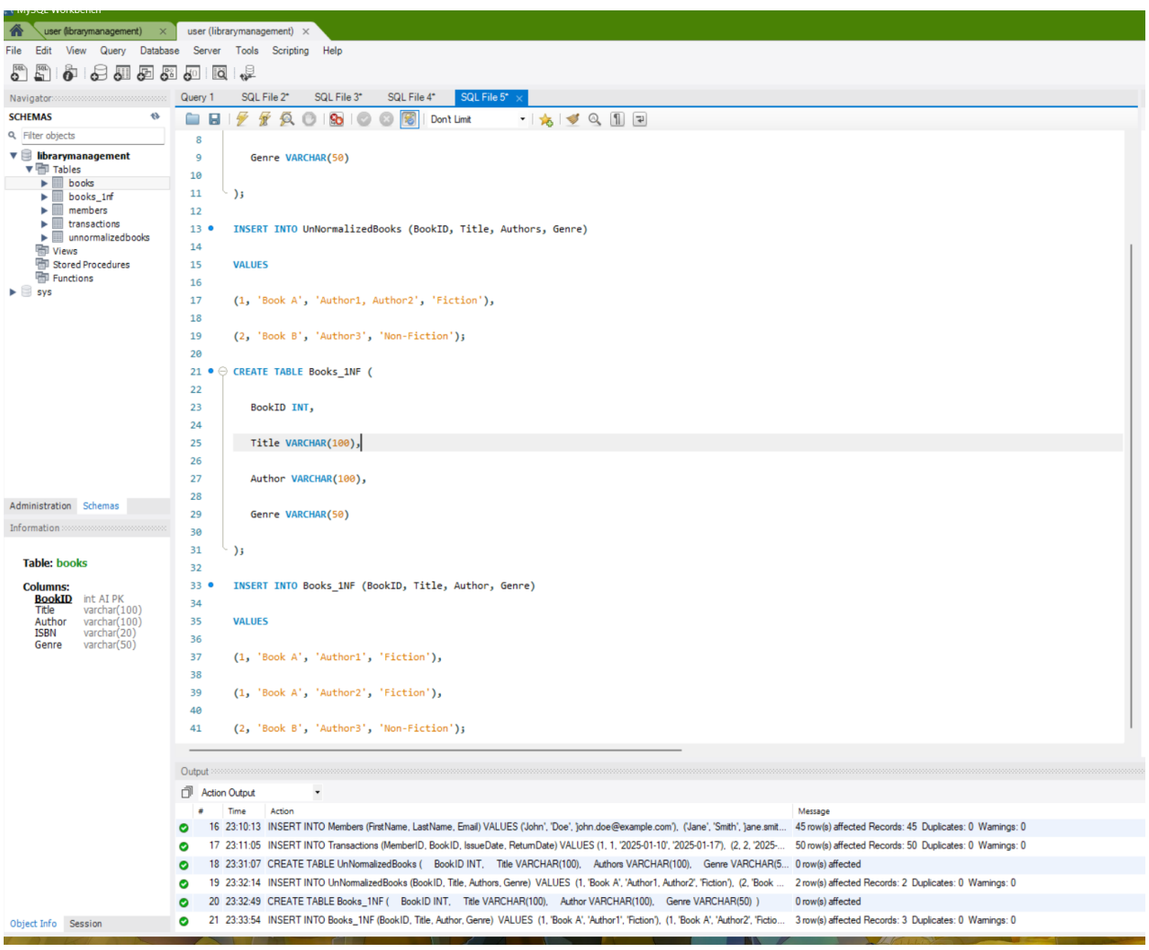
**Laboratory Title:** Normalization - First Normal Form (1NF)
**Chapter No. and Topic:** Chapter 3 - Database Design and Modeling
**Discussions:**
This activity demonstrates how to normalize a table to the First Normal Form (1NF).

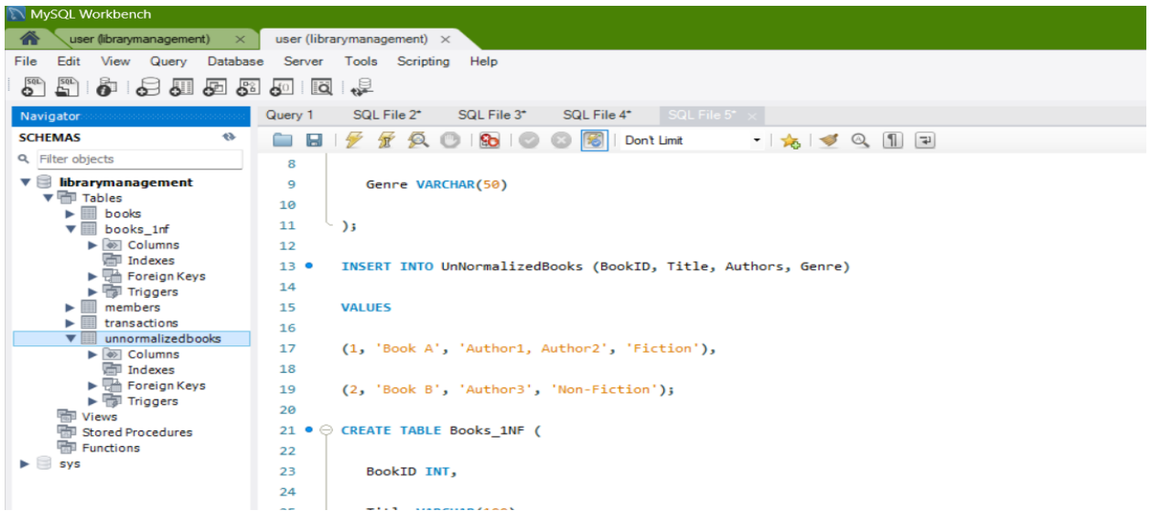
**Activity Description:**
Given a sample non-normalized table, convert it to 1NF by ensuring that all columns contain atomic values.

**Objectives:**

- Understand how to apply 1NF to a database design.
- Convert a table into 1NF.

**Result:**
The table is now in 1NF with atomic values for each column.






**Additional Questions/Discussions:**

1. How does 1NF improve data integrity?

   Answer: ***First Normal Form*** (1NF) ensures that each column in a table contains only atomic (indivisible) values and that each row is uniquely identifiable. This improves data integrity by:

- **Eliminating duplicate data**: Each piece of information is stored in only one place, reducing redundancy.
- **Ensuring consistency**: Atomic values prevent issues where a single field contains multiple pieces of data that may become inconsistent.
- **Simplifying queries**: Queries and updates become more efficient because data is organized into individual, well-defined fields.

2. What are atomic values, and why are they important?
   Answer: An **atomic value** is a single, indivisible piece of data that cannot be broken down further while retaining its meaning. For example, storing FullName as a single column ("John Doe") is **not atomic** because it contains two pieces of data (first name and last name). Instead, it should be split into FirstName and LastName.
   **Importance of atomic values:**

- **Prevents anomalies**: Atomic values help prevent update, insert, and delete anomalies by ensuring that each field stores only one piece of data.
- **Improves database flexibility**: If data is stored atomically, it can be more easily sorted, searched, and updated without affecting other records.
- **Enhances data retrieval**: Queries become more straightforward and efficient when dealing with atomic values.

**Conclusions:**

Applying 1NF to a database structure ensures that:

- ✅ Each column contains atomic values.
- ✅ Each row is uniquely identifiable (with a primary key).
- ✅ There are no repeating groups or redundant data.

By normalizing the database to 1NF, we improve data integrity, efficiency, and ease of maintenance, making the system more scalable and reliable.