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BSCpE 3A

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DBMS

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.

Materials:

- SQL client

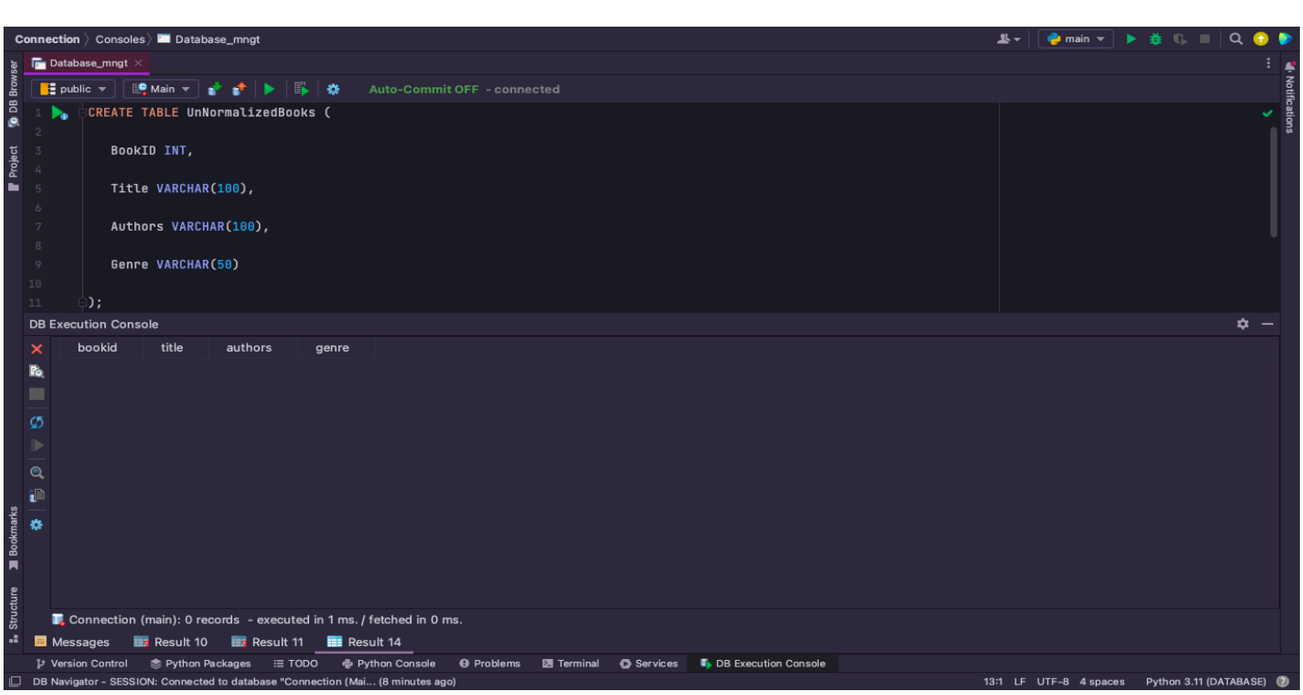
Procedure:

1. Start by creating a sample non-normalized table:

sql

Copy code

```
CREATE TABLE UnNormalizedBooks (
  BookID INT,
  Title VARCHAR(100),
  Authors VARCHAR(100),
  Genre VARCHAR(50)
);
```



1. Insert data into the table:

sql

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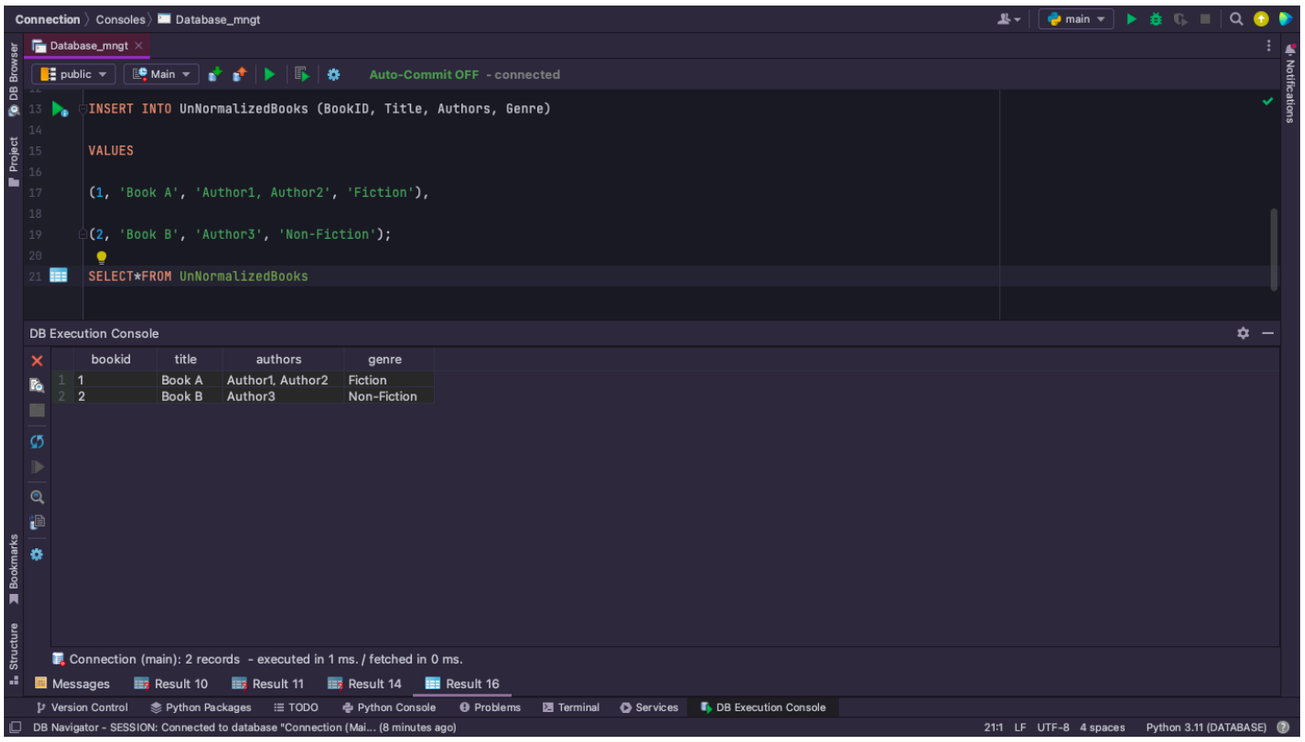
```
INSERT INTO UnNormalizedBooks (BookID, Title, Authors, Genre)
VALUES
(1, 'Book A', 'Author1, Author2', 'Fiction'),
(2, 'Book B', 'Author3', 'Non-Fiction');
```



1. Convert to 1NF by creating separate rows for multiple authors:

sql

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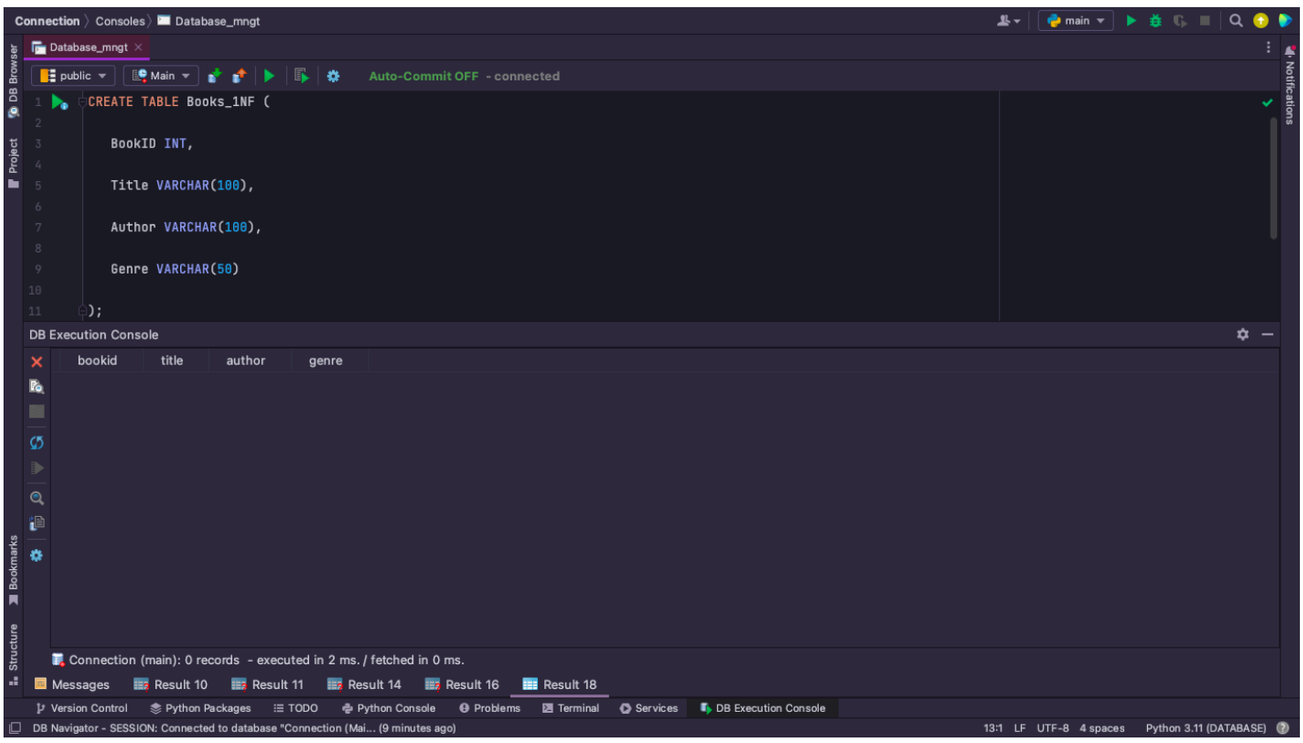
```
CREATE TABLE Books_1NF (
  BookID INT,
  Title VARCHAR(100),
  Author VARCHAR(100),
  Genre VARCHAR(50)
);
```



1. Insert normalized data:

sql

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INSERT INTO Books_1NF (BookID, Title, Author, Genre)

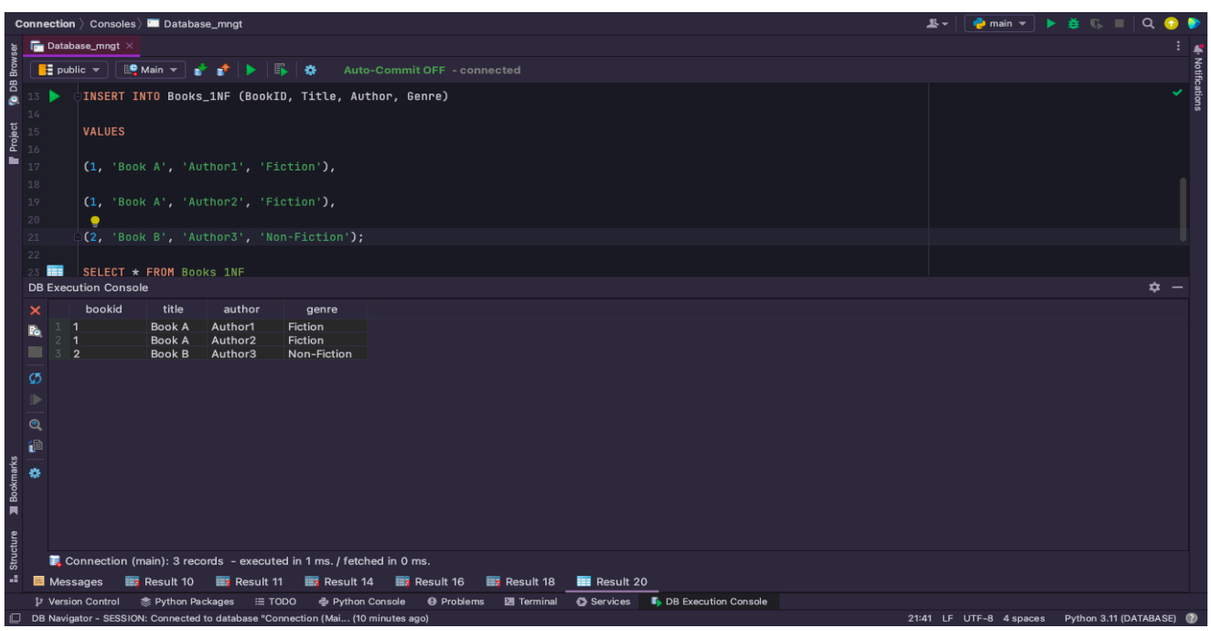
VALUES

(1, 'Book A', 'Author1', 'Fiction'),

(1, 'Book A', 'Author2', 'Fiction'),

(2, 'Book B', 'Author3', 'Non-Fiction');

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



Additional Questions/Discussions:

- How does 1NF improve data integrity?
    - First Normal Form (1NF) improves data integrity by ensuring that each column in a database table contains only atomic values and that each row is uniquely identifiable. By eliminating duplicate columns and ensuring that data is stored in a structured manner, 1NF reduces redundancy and prevents data anomalies such as insertion, deletion, and update anomalies. This leads to a more consistent and reliable database.
- What are atomic values, and why are they important?
    - Atomic values are indivisible pieces of data, meaning they cannot be further broken down into smaller meaningful parts. For example, storing "John, Lisa" in a single column violates atomicity, as it contains two names instead of one. Atomic values are important because they simplify querying, improve indexing, and reduce redundancy, making the database easier to manage and ensuring that operations like searching and updating work efficiently.

Conclusions:

1NF enhances data integrity by enforcing atomicity and eliminating data duplication. Ensuring that all values are atomic helps maintain consistency, simplifies database operations, and prevents anomalies. Following 1NF is a fundamental step toward designing a robust and efficient relational database.