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BSCpE 3A

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DBMS

Laboratory Activity 7:

Laboratory Title: Normalization - Third Normal Form (3NF)
Chapter No. and Topic: Chapter 3 - Database Design and Modeling
Discussions:
This activity will guide students through converting a table to the Third Normal Form (3NF) by removing transitive dependencies.

Activity Description:
Normalize a table in 2NF to 3NF by eliminating transitive dependencies.

Objectives:

- Achieve 3NF by eliminating transitive dependencies.

Materials:

- SQL client

Procedure:

1. Start with a 2NF table:

sql

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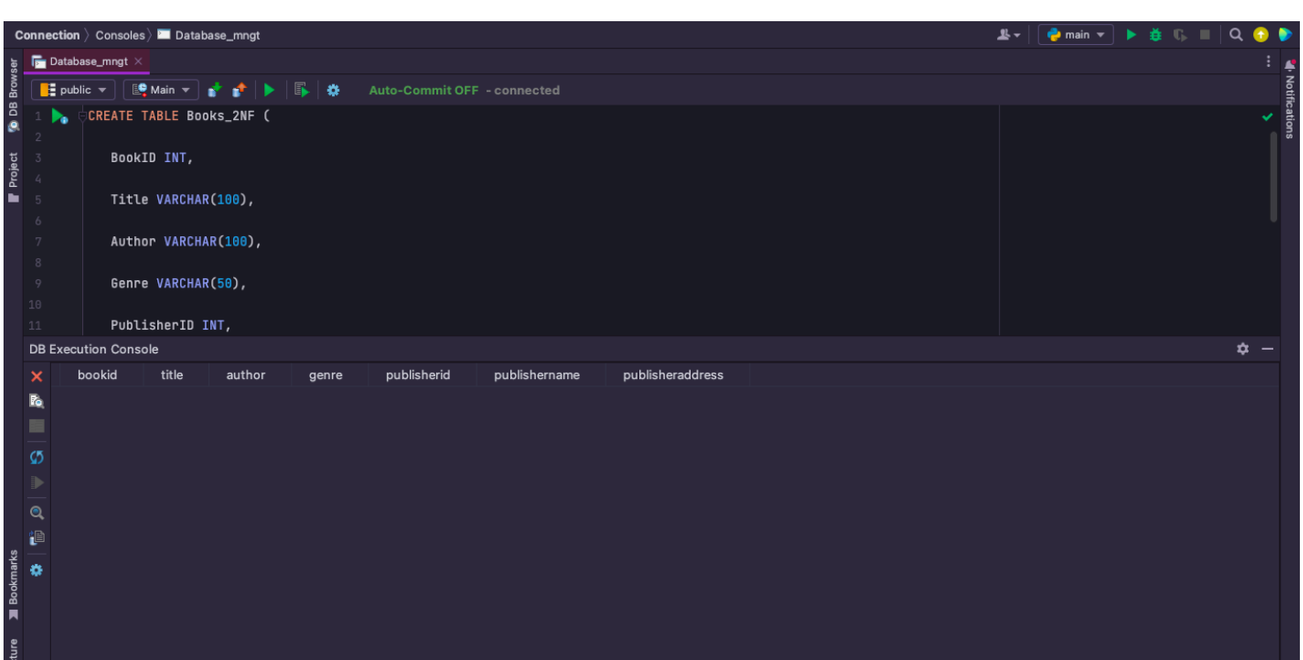
```
CREATE TABLE Books_2NF (
  BookID INT,
  Title VARCHAR(100),
  Author VARCHAR(100),
  Genre VARCHAR(50),
  PublisherID INT,
  PublisherName VARCHAR(100),
  PublisherAddress VARCHAR(100)
);
```



1. Insert data:

sql

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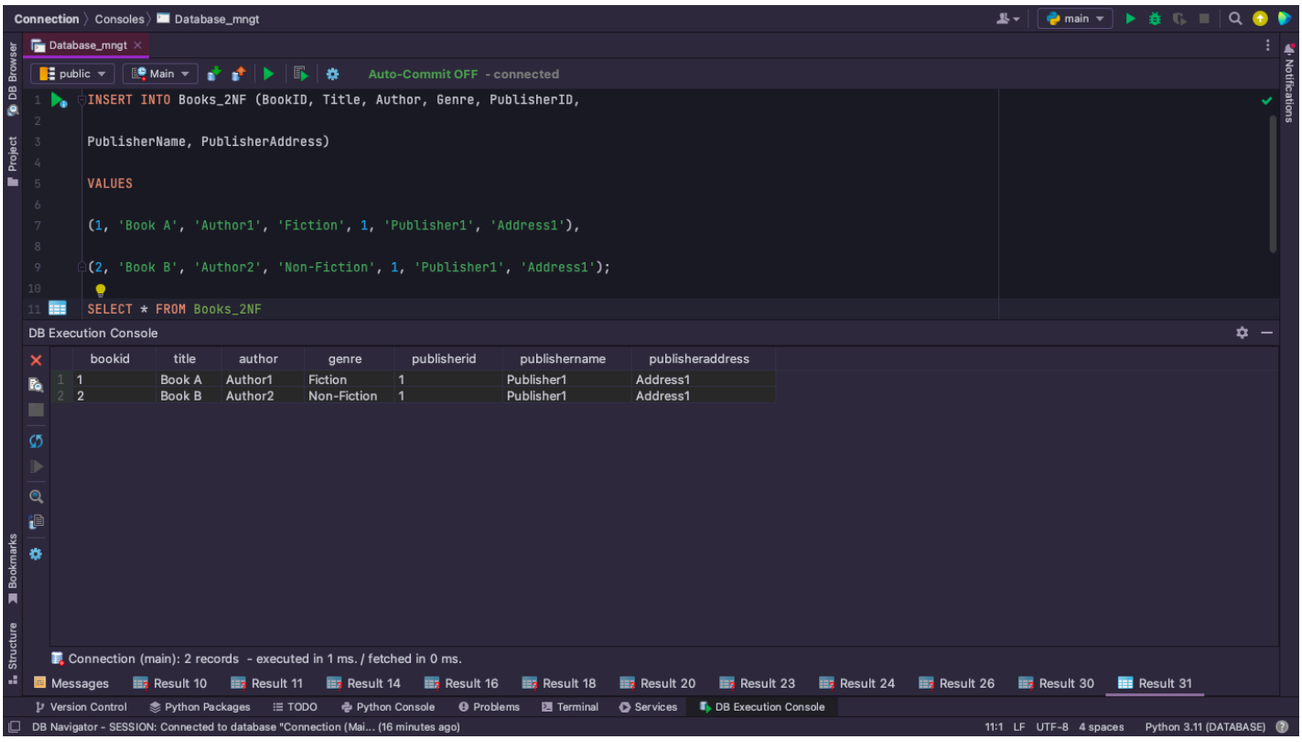
```
INSERT INTO Books_2NF (BookID, Title, Author, Genre, PublisherID,

PublisherName, PublisherAddress)

VALUES

(1, 'Book A', 'Author1', 'Fiction', 1, 'Publisher1', 'Address1'),

(2, 'Book B', 'Author2', 'Non-Fiction', 1, 'Publisher1', 'Address1');
```



1. Separate publisher details into a new table and link with PublisherID:

sql

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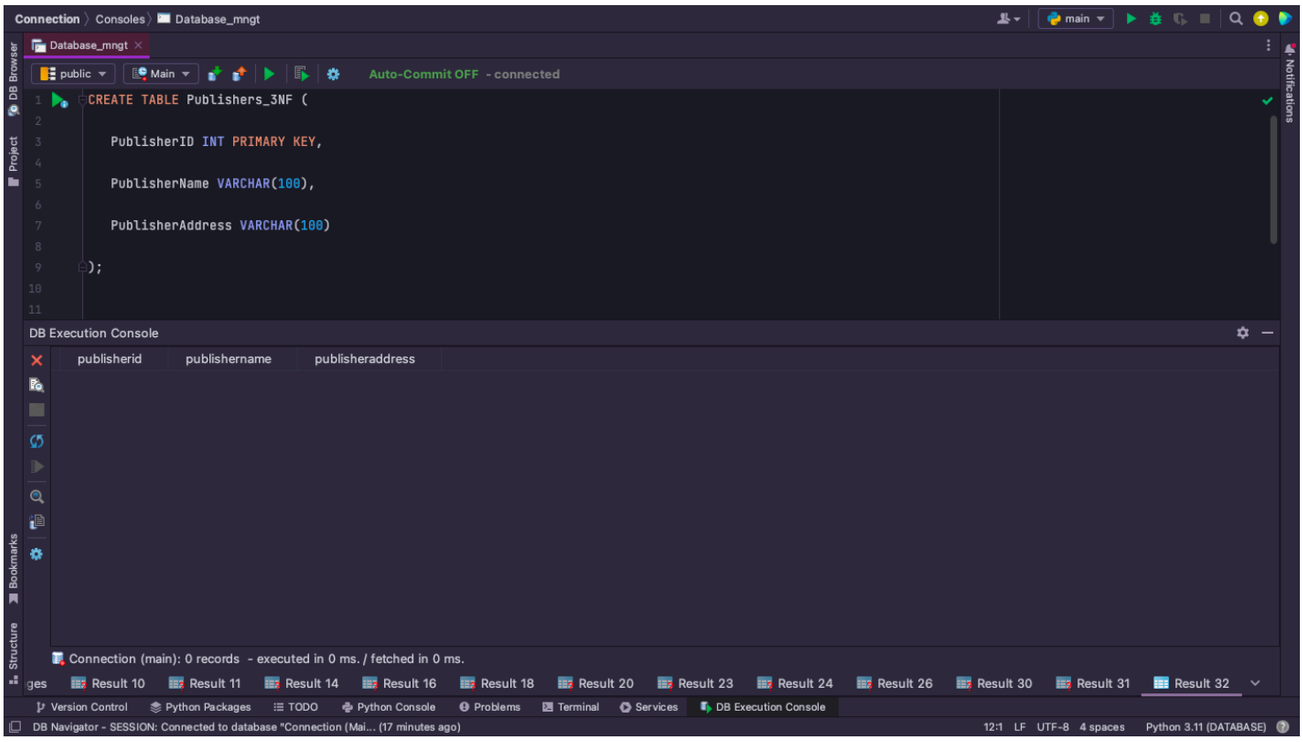
```
CREATE TABLE Publishers_3NF (

  PublisherID INT PRIMARY KEY,

  PublisherName VARCHAR(100),

  PublisherAddress VARCHAR(100)

);
```

1. Remove PublisherName and PublisherAddress from Books_2NF and adjust the table to use only PublisherID.

Result:
The table is now in 3NF, with no transitive dependencies.



Additional Questions/Discussions:

- What are transitive dependencies, and why should they be eliminated?
  - A transitive dependency occurs when a non-prime attribute depends on another non-prime attribute rather than directly on the primary key. These dependencies should be eliminated because they introduce redundancy, increase the risk of anomalies, and make updates more complex.
- How does 3NF improve data integrity?
  - 3NF improves data integrity by ensuring that all non-prime attributes depend only on the primary key and not on other non-prime attributes. By removing transitive dependencies, 3NF reduces redundancy, minimizes update anomalies, and makes the database more consistent and maintainable.

Conclusions:

Eliminating transitive dependencies through 3NF ensures a more structured and efficient database. It prevents redundant data storage, enhances consistency, and simplifies database operations, leading to better data integrity.