Ayanna Bianca M. Ilustre
BSCpE 3A

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DBMS

Laboratory Activity 6:

Laboratory Title: Normalization - Second Normal Form (2NF)
Chapter No. and Topic: Chapter 3 - Database Design and Modeling
Discussions:
This activity will cover the process of converting a table to the Second Normal Form (2NF).

Activity Description:
Given a 1NF table, remove partial dependencies to achieve 2NF.

Objectives:

- Remove partial dependencies and achieve 2NF.

Materials:

- SQL client

Procedure:

1. Create a 1NF table:

```
sql

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CREATE TABLE Books_1NF (

  BookID INT,

  Title VARCHAR(100),

  Author VARCHAR(100),

  Genre VARCHAR(50),

  Publisher VARCHAR(100),

  PublisherAddress VARCHAR(100)

);
```

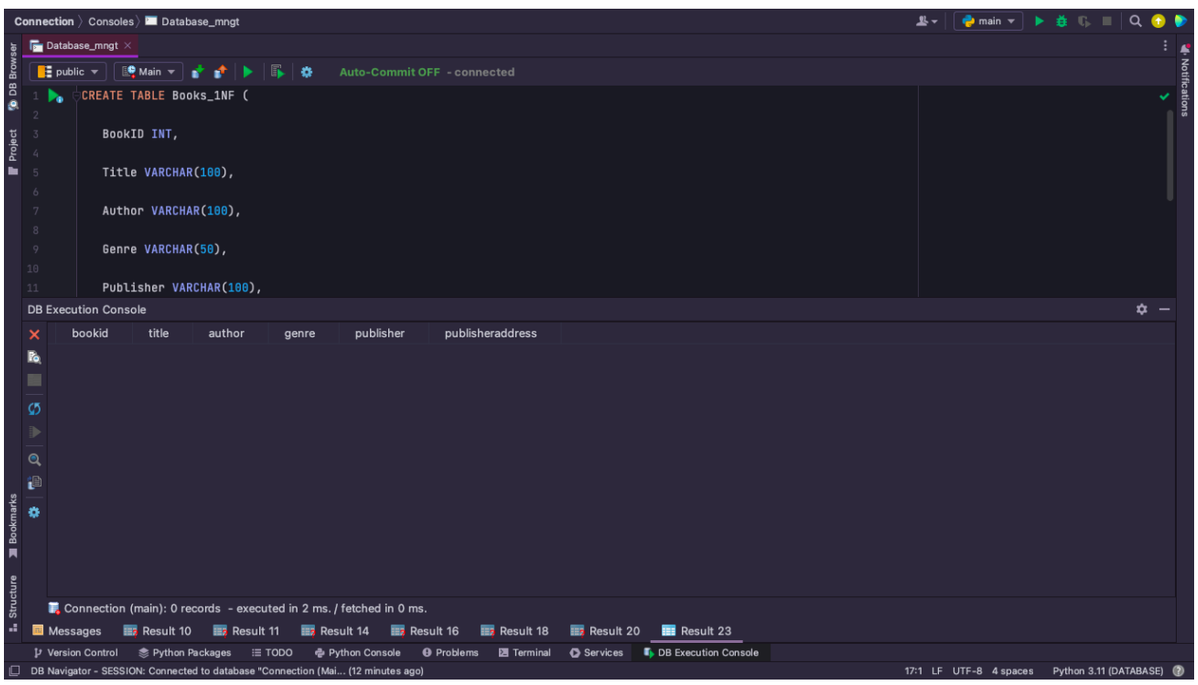

1. Insert sample data:

```
sql

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

VALUES

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

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

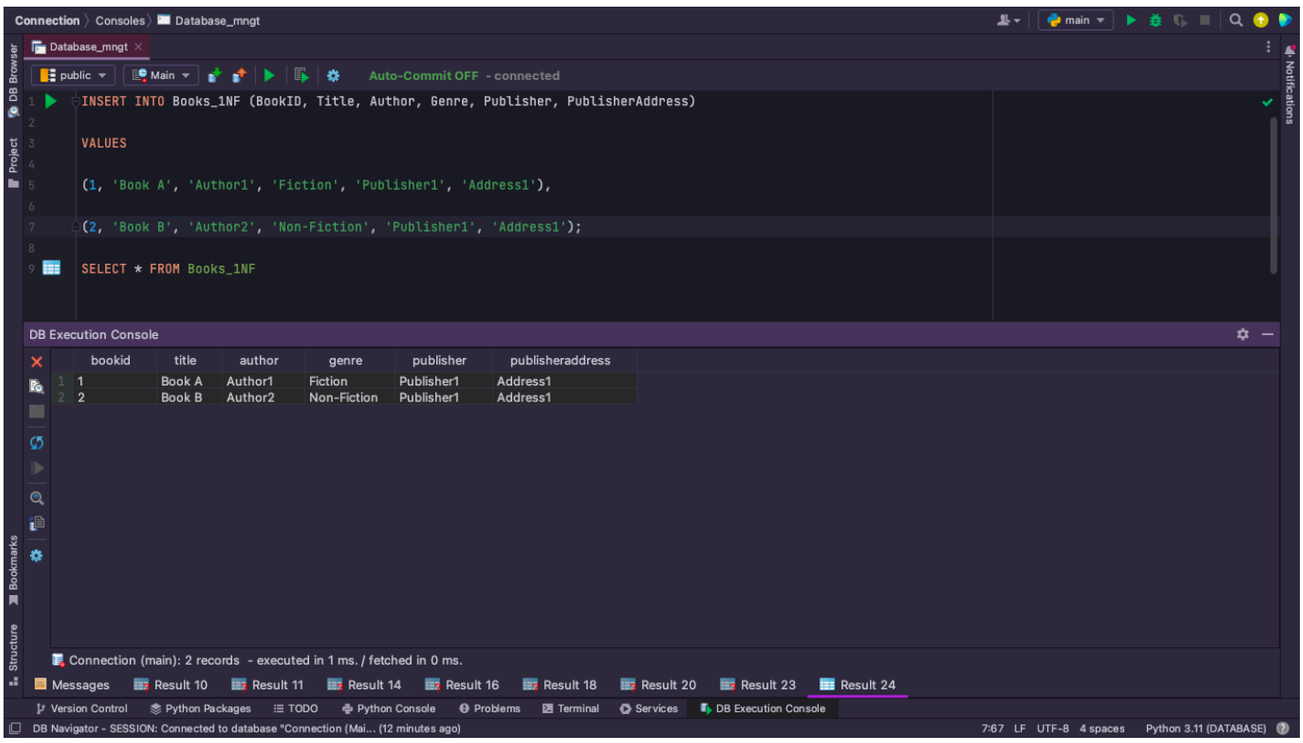

1. Create two separate tables to remove partial dependency:

```
sql

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CREATE TABLE Books_2NF (

  BookID INT PRIMARY KEY,

  Title VARCHAR(100),

  Author VARCHAR(100),

  Genre VARCHAR(50)

);
```
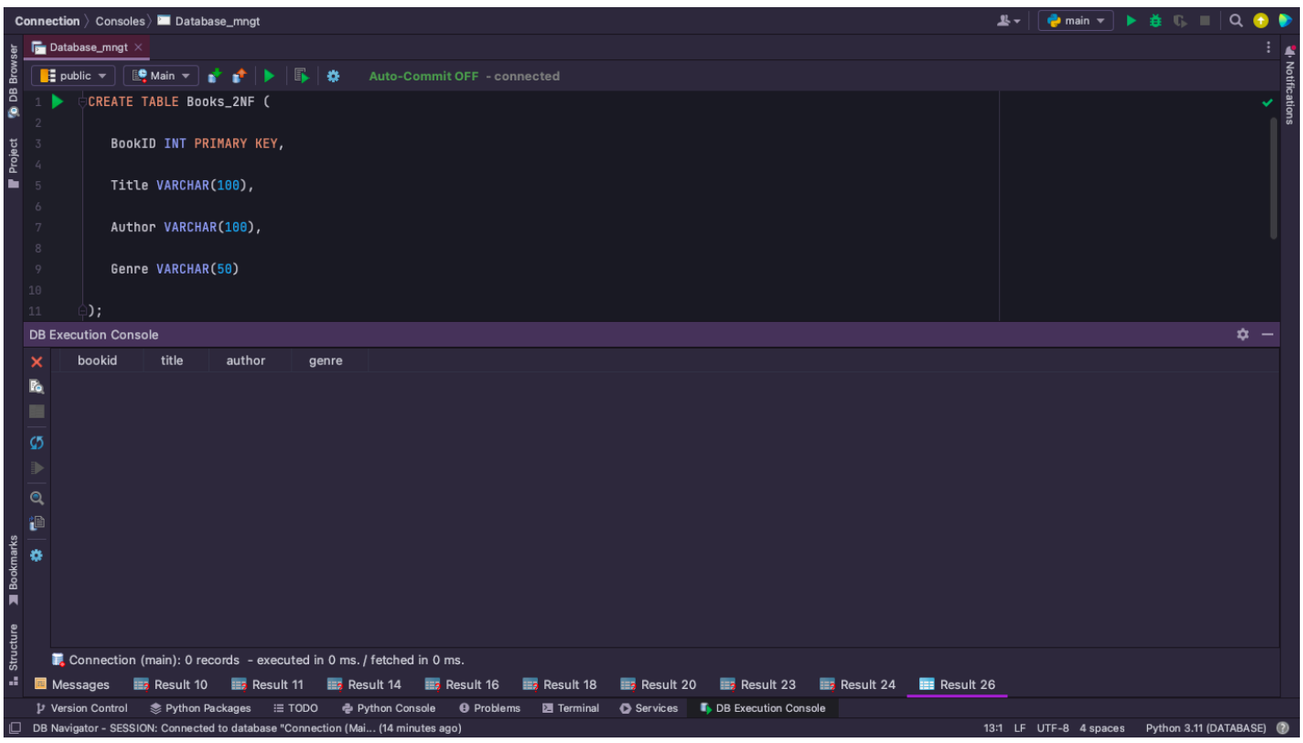
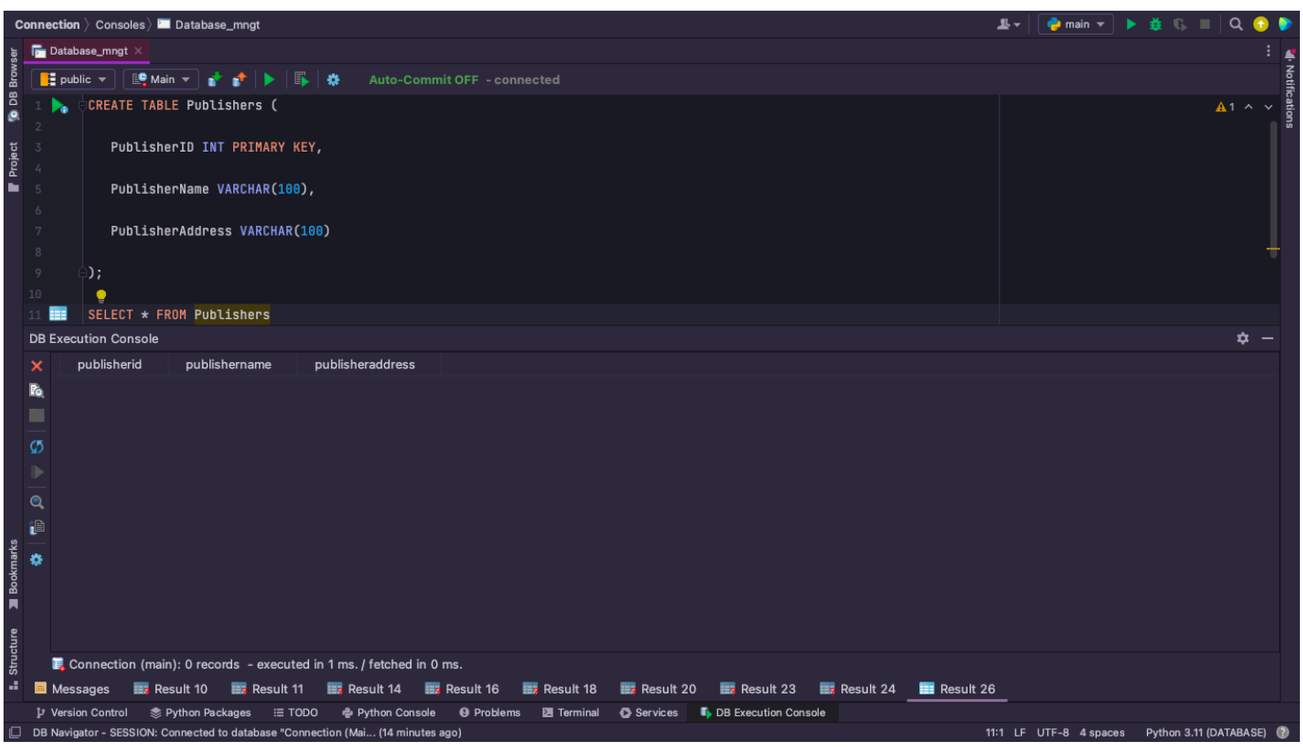




```
CREATE TABLE Publishers (
  PublisherID INT PRIMARY KEY,
  PublisherName VARCHAR(100),
  PublisherAddress VARCHAR(100)
);
```

1. Move Publisher data into the `Publishers` table and adjust `Books_2NF` to include `PublisherID` as a foreign key.

Result:
The table is now in 2NF with no partial dependencies.



Additional Questions/Discussions:

- What is a partial dependency, and how does 2NF eliminate it?
    - A partial dependency occurs when a non-prime attribute depends only on a part of a composite primary key rather than the entire key. 2NF eliminates partial dependencies by ensuring that all non-prime attributes are fully functionally dependent on the whole primary key, usually by decomposing the table into smaller, more focused tables.
- How do foreign keys help maintain data integrity?
    - Foreign keys enforce referential integrity by ensuring that a value in one table corresponds to a valid entry in another table. They prevent orphan records, enforce consistency between related tables, and reduce redundancy by linking data instead of duplicating it.

Conclusions:

2NF improves database structure by removing partial dependencies, making data storage more efficient and reducing redundancy. Foreign keys ensure consistency across tables, preserving data integrity and enforcing logical relationships.