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BSCpE – 3A

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)

);
```

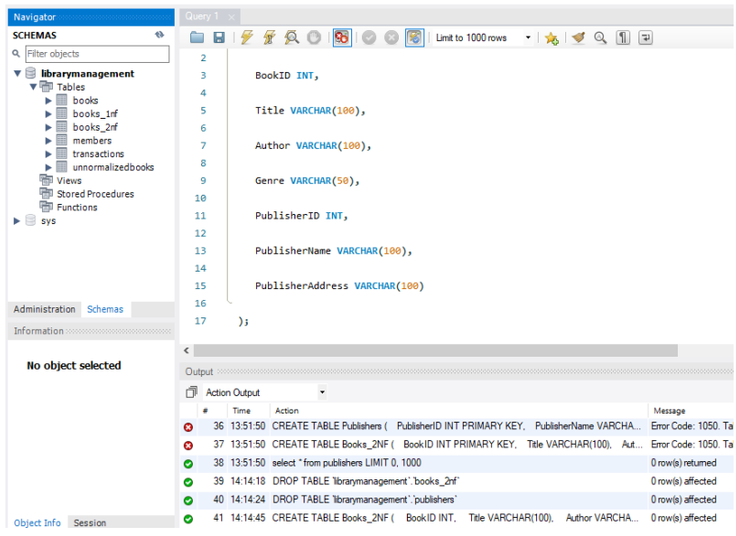

1. Insert data:

```
sql

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

    PublisherName, PublisherAddress)

    VALUES
```
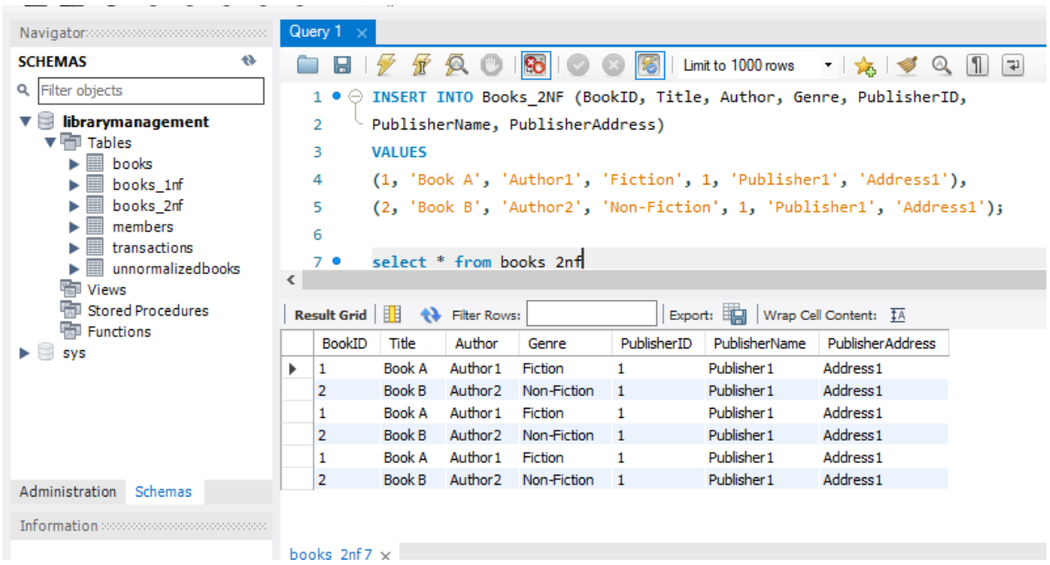
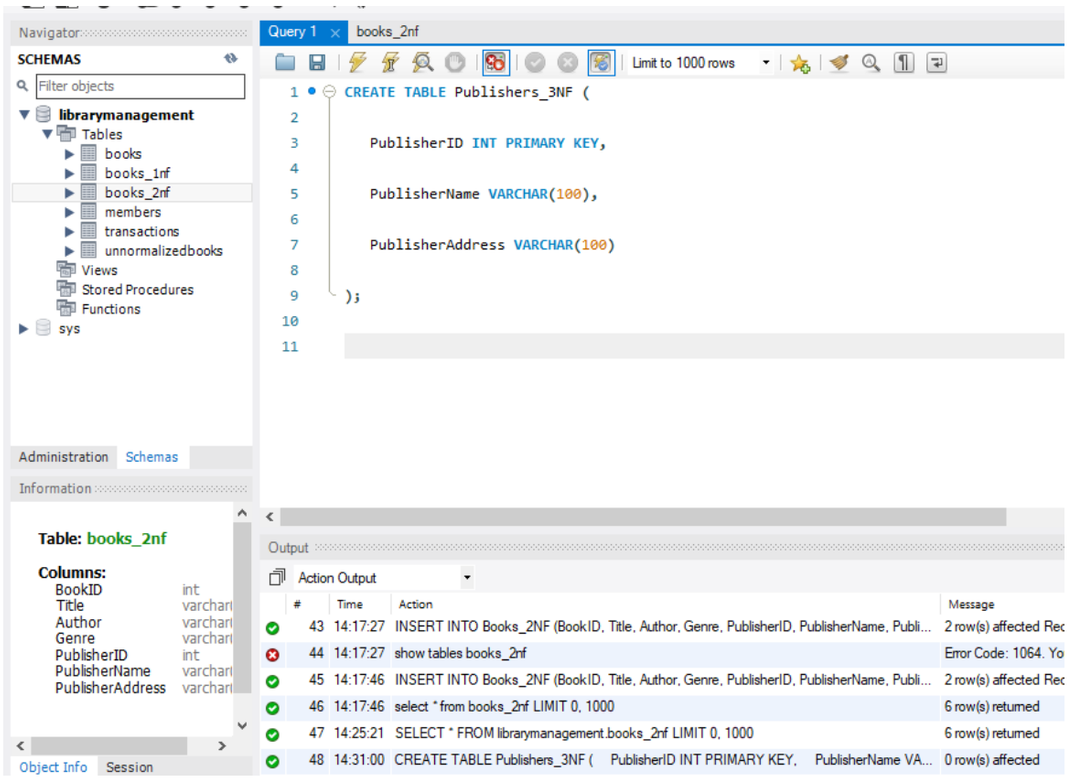

```
    (1, 'Book A', 'Author1', 'Fiction', 1, 'Publisher1',
    'Address1'),

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

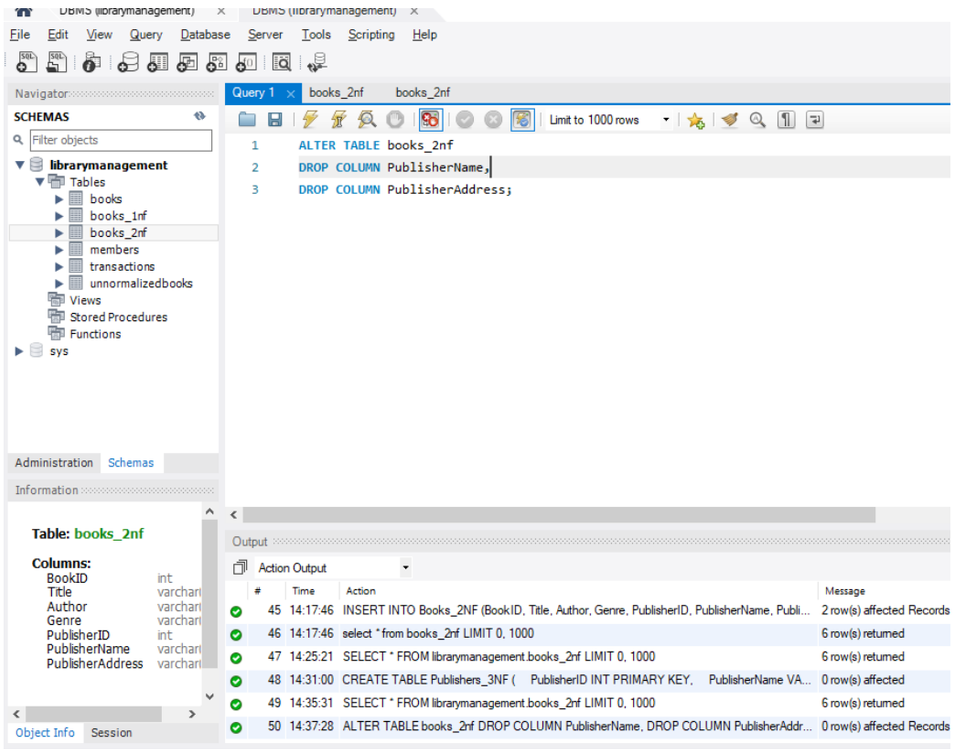


1. Separate publisher details into a new table and link with `PublisherID`:

```
sql

Copy code

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?

Transitive dependencies occur when a non-key attribute depends on another non-key attribute through a third attribute. They should be eliminated to avoid redundancy and ensure that all non-key attributes depend only on the primary key, improving data consistency and integrity.

- How does 3NF improve data integrity?

3NF improves data integrity by removing transitive dependencies, ensuring that non-key attributes depend only on the primary key. This reduces redundancy and the potential for anomalies during updates, inserts, or deletes, leading to more consistent and reliable data.

Conclusions:

In conclusion, a crucial stage in database normalization is Third Normal Form (3NF). It deals with transitive dependencies and improves data integrity through effective information organization. 3NF ensures that non-key properties only depend on the primary key , removing redundancy and helping to create a well-organized and normalized relational database model .