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BSCpE-3B2

Laboratory Activity 6:

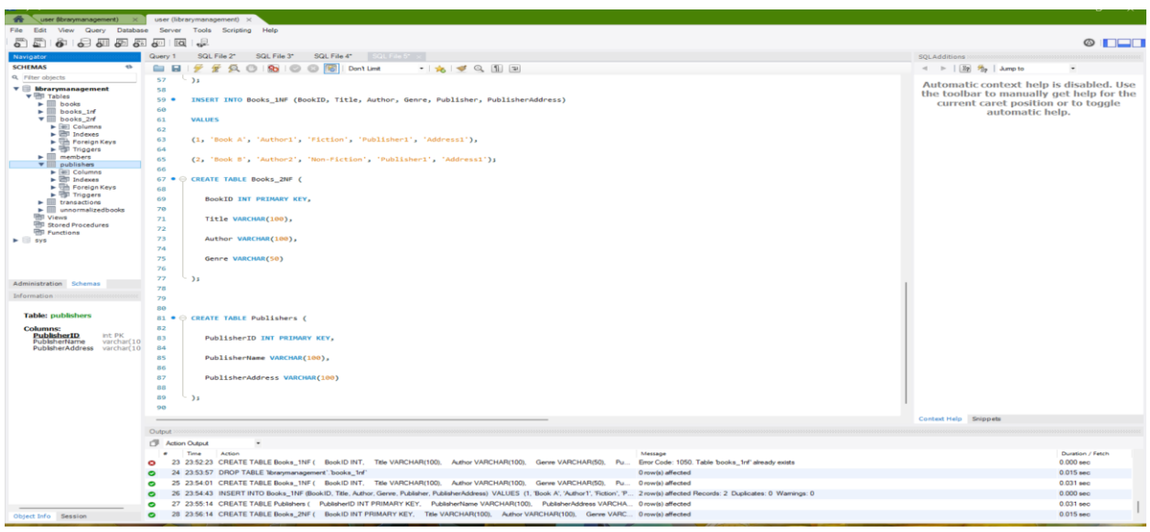
Laboratory Title: Normalization - Second Normal Form (2NF)
Chapter No. and Topic: Chapter 3 - Database Design and Modeling
Discussions:
This activity will cover the process of converting a table to the Second Normal Form (2NF).

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

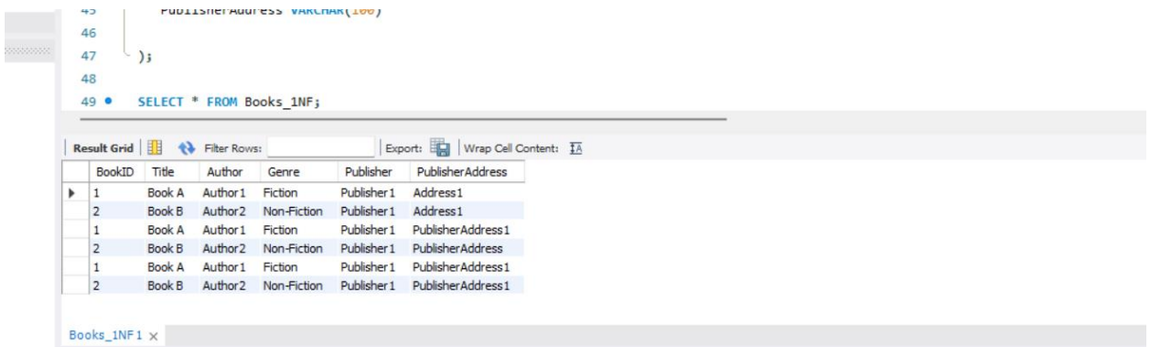
Objectives:

- Remove partial dependencies and achieve 2NF.

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



```
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');
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)
);
```



```
    PublisherAddress VARCHAR(100)
);

SELECT * FROM Books_1NF;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

BookID	Title	Author	Genre	Publisher	PublisherAddress
1	Book A	Author1	Fiction	Publisher1	Address1
2	Book B	Author2	Non-Fiction	Publisher1	Address1
1	Book A	Author1	Fiction	Publisher1	PublisherAddress1
2	Book B	Author2	Non-Fiction	Publisher1	PublisherAddress
1	Book A	Author1	Fiction	Publisher1	PublisherAddress1
2	Book B	Author2	Non-Fiction	Publisher1	PublisherAddress1

Books_1NF 1 ×

```
SELECT * FROM Books_1NF;

SELECT Publisher, PublisherAddress, COUNT(*)
FROM Books_1NF
GROUP BY Publisher, PublisherAddress;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Publisher	PublisherAddress	COUNT(*)
Publisher1	Address1	2
Publisher1	PublisherAddress1	3
Publisher1	PublisherAddress	1

Additional Questions/Discussions:

- What is a partial dependency, and how does 2NF eliminate it?

  Answer: A **partial dependency** occurs when a non-key attribute depends only on part of a composite primary key, not the whole key. **2NF** eliminates this by ensuring that all non-key attributes depend entirely on the primary key, preventing redundancy and improving data consistency.

- How do foreign keys help maintain data integrity?

  Answer: Foreign keys enforce **referential integrity** by ensuring relationships between tables remain valid. They prevent orphan records by ensuring referenced data exists in the parent table before insertion or update.

Conclusions:

2NF removes partial dependencies, reducing redundancy.

Foreign keys maintain relational consistency, preventing invalid data.

Better data integrity and efficiency lead to a more structured and reliable database.