

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.

Result:

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

user (librarymanagement) x

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

librarymanagement

Tables

books

books_1nf

books_2nf

members

publishers

publishers_1nf

transactions

unnormalizedbooks

Views

Stored Procedures

Functions

sys

Administration Schemas

Information

Schema: librarymanagement

Query 1 SQL File 2" SQL File 3" SQL File 4" SQL File 5" SQL File 6" SQL File 8" SQL File 9"

26

27 BookID INT,

28

29 Title VARCHAR(100),

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31 Author VARCHAR(100),

32

33 Genre VARCHAR(50),

34

35 PublisherID INT,

36

37 PublisherName VARCHAR(100),

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39 PublisherAddress VARCHAR(100)

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41);

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

44

45 PublisherName, PublisherAddress)

46

47 VALUES

48

49 (1, 'Book A', 'Author1', 'Fiction', 1, 'Publisher1', 'Address1'),

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51 (2, 'Book B', 'Author2', 'Non-Fiction', 1, 'Publisher1', 'Address1');

52

53

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56

57 CREATE TABLE Publishers (

58

59 PublisherID INT PRIMARY KEY,

SQLAdditions

Automatic context help is di the toolbar to manually get current caret position or t automatic help.

Context Help Snippets

Output

Action Output

Time Action Message Dura

54 00:40:01 INSERT INTO Books_1NF (BookID, Title, Author, Genre, Publisher, PublisherAddress) VALUES (1, 'Book A', 'Author1', 'Fiction', 'P... 2 row(s) affected Records: 2 Duplicates: 0 Warnings: 0 0.00

55 00:40:43 SELECT * FROM Books_1NF 6 row(s) returned 0.00

56 00:43:02 SELECT Publisher, PublisherAddress, COUNT(*) FROM Books_1NF GROUP BY Publisher, PublisherAddress 3 row(s) returned 0.01

57 00:51:18 DROP TABLE 'librarymanagement'.books_2nf 0 row(s) affected 0.04

52

53 • SELECT * FROM Books_2NF;

54

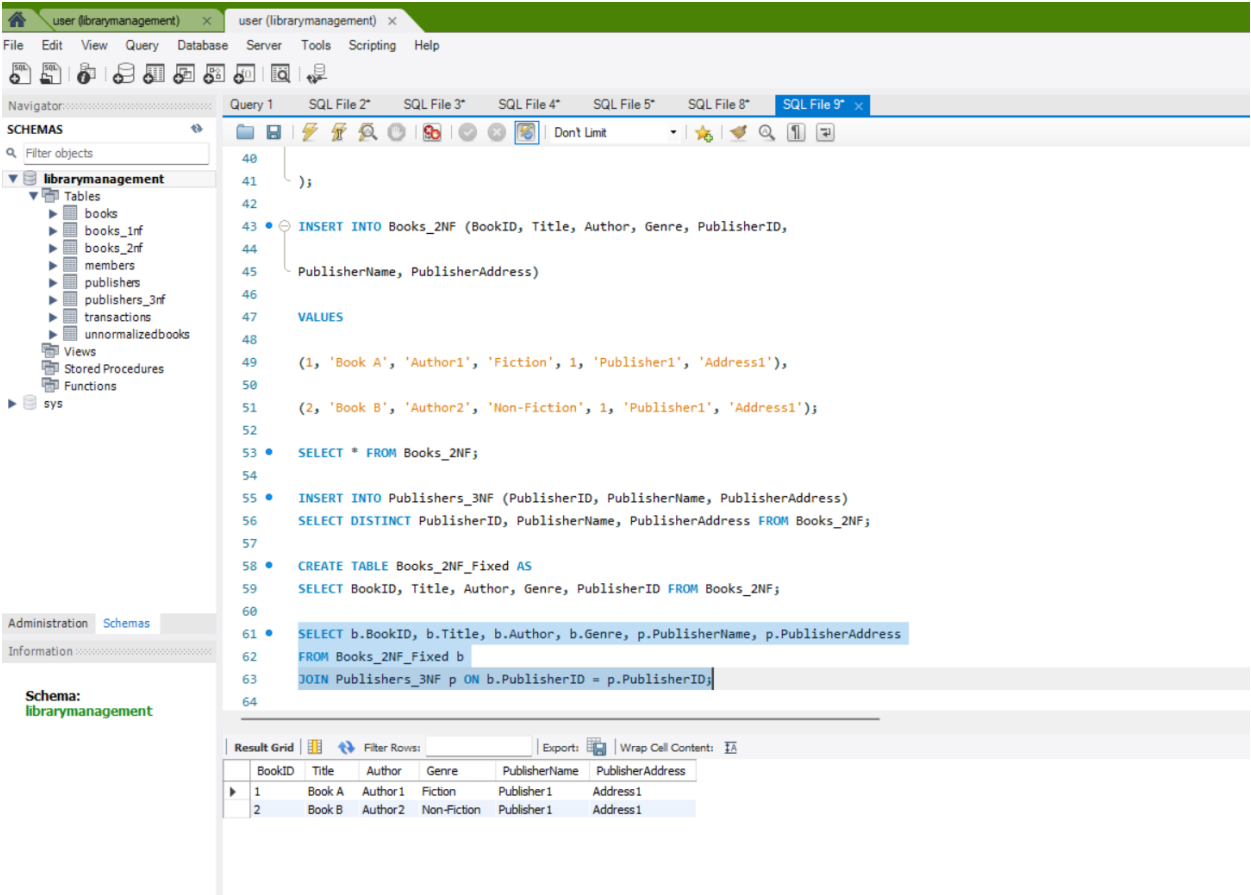
Result Grid

Filter Rows:

Export:

Wrap Cell Content:

	BookID	Title	Author	Genre	PublisherID	PublisherName	PublisherAddress
▶	1	Book A	Author1	Fiction	1	Publisher1	Address1
	2	Book B	Author2	Non-Fiction	1	Publisher1	Address1



Additional Questions/Discussions:

- What are transitive dependencies, and why should they be eliminated?

A **transitive dependency** occurs when a non-key column depends on another non-key column rather than directly on the primary key. Eliminating them ensures that all attributes depend **only** on the primary key, improving database consistency.

- How does 3NF improve data integrity?

3NF prevents **redundant data** and ensures that changes to one column do not lead to anomalies, making updates and deletions more efficient.

Conclusions:

The table is now in 3NF, ensuring minimal redundancy and improved data integrity. Each column directly depends on the primary key, preventing anomalies and maintaining consistency.