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BSCpE - 2A

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

Copy code

CREATE TABLE Books_1NF (

BookID INT,

Title VARCHAR(100),

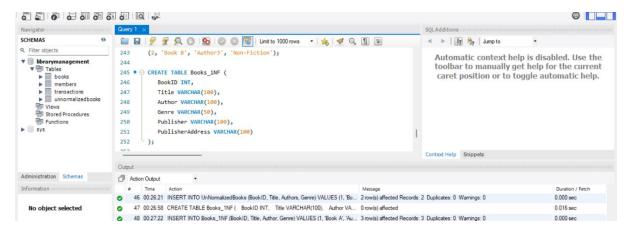
Author VARCHAR(100),

Genre VARCHAR(50),

Publisher VARCHAR(100),

PublisherAddress VARCHAR(100)

);



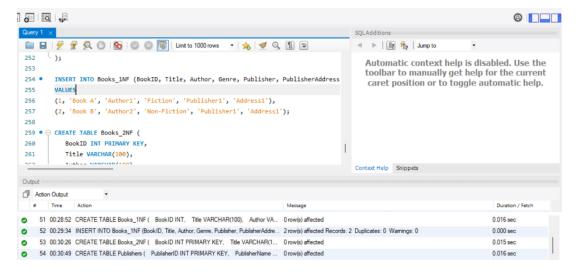
1. Insert sample data:

sql

Copy code

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

```
Copy code
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)
);
 ry Database Server Tools Scripting Help
I 🗗 🚳 🐠 🔯 🦃
                                                                                                                                                                                                                                                                                        259 • ⊖ CREATE TABLE Books 2NF (
                                                                                                                                                                                                          Automatic context help is disabled. Use the
                                           BookID INT PRIMARY KEY,
                                                                                                                                                                                                          toolbar to manually get help for the current
                     261
                                           Title VARCHAR(100),
                                                                                                                                                                                                           caret position or to toggle automatic help.
                     262
                                          Author VARCHAR(100),
                     263
                                          Genre VARCHAR(50)
dbooks
                     264
                     265
                                CREATE TABLE Publishers (
                                           PublisherID INT PRIMARY KEY,
                     267
                                          PublisherName VARCHAR(100),
                     268
                                                                                                                                                                                                     Context Help Snippets
                    Output :
                   Action Output
                   46 00:26:21 INSERT INTO UnNormalizedBooks (BookID, Title, Authors, Genre) VALUES (1, "Bo... 2 row(s) affected Records: 2 Duplicates: 0 Warning Control of 
                                                                                                                                                                                                                                                                              0.000 sec
                            47 00:26:58 CREATE TABLE Books 1NF ( BookID INT. Title VARCHAR(100). Author VA... 0 row(s) affected
                                                                                                                                                                                                                                                                              0.016 sec
                   48 00:27:22 INSERT INTO Books_1NF (BookID, Title, Author, Genre) VALUES (1, 'Book A', 'Au... 3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0
                                                                                                                                                                                                                                                                              0.000 sec
            51 00:28:52 CREATE TABLE Books_1NF ( BookID INT, Title VARCHAR(100), Author VA... 0 row(s) affected
                                                                                                                                                                                                                                                              0.016 sec
            52 00:29:34 INSERT INTO Books_1NF (BookID, Title, Author, Genre, Publisher, PublisherAddre... 2 row(s) affected Records: 2 Duplicates: 0 Warnings:
                                                                                                                                                                                                                                                              0.000 sec
             53 00:30:26 CREATE TABLE Books_2NF ( BookID INT PRIMARY KEY, Title VARCHAR(1... 0 row(s) affected
                                                                                                                                                                                                                                                              0.015 sec
           54 00:30:49 CREATE TABLE Publishers ( PublisherID INT PRIMARY KEY, PublisherName ... 0 row(s) affected
                                                                                                                                                                                                                                                              0.016 sec
```

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-key attribute depends on part of a composite primary key. 2NF eliminates it by ensuring all non-key attributes depend on the whole primary key, not just a part of it.
 - How do foreign keys help maintain data integrity?
- Foreign keys maintain data integrity by ensuring relationships between tables remain valid, preventing invalid or orphaned records.

Conclusions:

This lab showed the importance of eliminating partial dependencies for 2NF. By moving publisher information to a new table, I reduced duplication and improved organization. It also highlighted how foreign keys maintain table relationships.