Module 11

What to learn

What is Store Procedure
Built in Store Procedure
Creating Store Procedure with input and output parameter
Executing Store Procedure
Returning multiple resultset

Practice Exercise

Practice 1

Count the Number of Customers Living in the City where Branch is Located

Practice 2

Understanding Normal Forms - 1NF

Consider a table named **Orders** that contains the following sample data:

OrderID	Customer	Product	Quantity
1	John	Apples, Oranges	10, 5
2	Mary	Bananas	20

Your task: Normalize this table to 1NF by removing any repeating groups and ensuring atomicity of data values. Write SQL queries to create the 1NF version of this table and populate it accordingly.

Practice 3

Converting to 2NF

Given the 1NF table below (from the prior exercise), identify and resolve any partial dependencies to transform it into 2NF. The current 1NF structure is as follows:

OrderID	Customer	Product	Quantity
1	John	Apple	10
1	John	Orange	5
2	Mary	Banana	20

Your task: Identify the primary key, decompose the table to resolve partial dependency, create tables for 2NF, and write down the SQL statements for table creation and data insertion.

Practice 4

Transforming to 3NF

The following table is in 2NF:

ProductID	Product	Manufacturer	ManufacturerContact
1	Apple	FarmCo	12345

ProductID	Product	Manufacturer	ManufacturerContact
2	Banana	FruitCo	67890

Your task: Resolve any transitive dependencies, decompose this table into multiple tables ensuring it's in 3NF. Write SQL queries to construct the normalized tables and populate them with the data provided above.

Practice 5

Creating a Fully Normalized Database

Consider a database for a library management system with the following table:

LoanID	BookTitle	MemberName	LoanDate	ReturnDate	Librarian	LibrarianContact
1	SQL Basics	Anna	2023-01-01	2023-01-15	Sam	9998887770
2	Python Guide	John	2023-02-01	2023-02-15	Lucy	8887776660

Your task: Normalize the given database to the level of 3NF. Identify functional, partial, and transitive dependencies, create new tables, and write SQL queries to create and populate these tables.

Practice 6

Understanding Denormalization Impacts

Suppose a banking application maintains a database table named **Transactions** as shown below:

TransactionID	AccountHolderName	TransactionAmount	AccountBalance	BranchAddress
1	Ali	1000	5000	Street 12, NY
2	Sara	1500	8000	Street 34, LA

Your task: Identify anomalies caused by this denormalized structure (e.g., update, insert, and delete anomalies). Describe how normalization would mitigate these anomalies and write SQL queries to normalize this structure appropriately.

Assignment Exercise

Assignment 1

Step 1: Create the following tables and insert the data as listed above :

Deposit Table

ACTNO VARCHAR(5) PK	Cname VARCHAR(18) FK	Bname VARCHAR(18) FK	Amount INT	Adate DATE
100	ANIL	VRCE	1000	1-Mar-1995
101	SUNIL	AJNI	5000	4-Jan-1996
102	MEHUL	KAROLBAGH	3500	17-Nov-1995
104	MADHURI	CHANDNI	1200	17-Dec-1995
105	PRAMOD	M.G. ROAD	3000	27-Mar-1996
106	SANDIP	ANDHERI	2000	31-Mar-1996
107	SHIVANI	VIRAR	1000	5-Sep-1995

108	KRANTI	NEHRU PLACE	5000	2-Jul-1995
109	NAREN	POWAI	7000	10-Aug-1995

BRANCH TABLE

BNAME VARCHAR2(18) PK	CITY VARCHAR2(18)
VRCE	NAGPUR
AJNI	NAGPUR
KAROLBAGH	DELHI
CHANDNI	DELHI
DHARAMPETH	NAGPUR
M.G.ROAD	BANGLORE
ANDHERI	MUMBAI
VIRAR	MUMBAI
NEHRU PLACE	DELHI
POWAI	MUMBAI

CUSTOMER TABLE

CNAME VARCHAR2(19) PK	CITY VARCHAR2(18)
ANIL	KOLKATA
SUNIL	DELHI
MEHUL	BARODA
MANDAR	PATNA
MADHURI	NAGPUR
PRAMOD	NAGPUR
SANDIP	SURAT
SHIVANI	MUMBAI
KRANTI	MUMBAI
NAREN	MUMBAI

BORROW TABLE

LOANNO VARCHAR(5) PK	CNAME VARCHAR(18) FK	BNAME VARCHAR(18) FK	AMOUNT INT
201	ANIL	VRCE	1000
206	MEHUL	AJNI	5000
311	SUNIL	DHARAMPETH	3000
321	MADHURI	ANDHERI	2000
375	PRAMOD	VIRAR	8000
481	KRANTI	NEHRU PLACE	3000

Step 2: Create the queries listed below: Q1: Create a Store Procedure which will accept name of the customer as input parameter and product the following output, List Names of Customers who are Depositors and have Same Branch City as that of input parameter customer's Name. Q2: Create a Store Procedure which will accept name of the customer as input parameter and produce the following output List in JSON format, All the Depositors Having Depositors Having Deposit in All the Branches where input parameter customer is Having an Account Q3: Create a Store Procedure that will accept city name and returns the number of customers in that city. Q4: Create a Store Procedure which will accept city of the customer as input parameter and product the following output List in JSON format List All the Customers Living in city provided in input parameter and Having the Branch City as MUMBAI or DELHI Q5: Count the Number of Customers Living in the City where Branch is Located Q6: Create a Procedure which will accept input in JSON parameter CustomerName, City, ACTNO, Branch, amount And insert these record in the Deposit table. Before inserting some validation should be done like amount should be greater than 10Rs. and date should always be current date.

Assignment 2

Real-World Application: University Registration System

A university wants to store student registration details for courses. The data model has to satisfy 3NF and manage the following information:

Student details: StudentID (PK), FirstName, LastName, DOB, Email
Course details: CourseID (PK), CourseTitle, CreditHours, Department
Registration details: RegistrationID (PK), StudentID (FK), CourseID (FK), RegistrationDate
Instructor details: InstructorID (PK), FirstName, LastName, Department, ContactNumber

Requirements:

Create tables for the given details and ensure 3NF compliance.
Populate the tables with sample data. Include at least 5 students, 5 courses, 3 instructors, and 10 registrations.
Create SQL queries to perform the following tasks:

Retrieve all students registered for a specific course along with the course details.
List the total number of students registered in each course.
Fetch details about the instructor teaching a specific course.
Find students who registered in the last month and their respective courses.

Create views to display:

A list of students grouped by their registered department.
Courses with their respective instructors and departments.
A summary of the total credit hours registered by each student.

Document your assumptions and provide a justification of how your design achieves 3NF compliance.

Online Reference

https://docs.microsoft.com/en-us/sql/relational-databases/stored-procedures/...

Introduction to Relational Databases

Introduction to Select Statement

Filtering Results with WHERE Statements

Utilizing Joins

Executing Sub queries and Unions

Aggregating Data

Advanced Data Aggregations

Built in Functions

Query Optimization

Modifying Data

Advanced Data Modification

Stored Procedure

Transaction

Error handling

Designing Tables

triggers