

Soft-Train



*At Soft-Train
Technology Works*

Fundamentals of Data Base Design (5 Days) ST45001

COURSE GOAL: To teach the user the more advanced features of a database environment.

PREREQUISITES: Beginning Windows and a general knowledge of Database Structure.

LEARNING OBJECTIVES:

Upon completion of this course, the student will be able to:

- Understand what a Database is and the various components that define the data.
- Understand the Process for designing a database.
- Learn different database Types
- Understand end user needs
- Familiarize pitfalls to avoid
- Normalization of data
- Use and be familiarized with Microsoft Access
- Database maintenance and security

KEY TOPICS:

I. Goals of Effective Database Design

- A. Understanding the Importance of Design
- B. Information Containers
- C. Strengths and Weaknesses of Information Containers
- D. Desirable Database Features

II. Database Types

- A. Flat Files
- B. Spreadsheets
- C. Hierarchical Database
- D. XML
- E. Network
- F. Object
- G. Object-Relational
- H. Exotic

III. Relational Database Fundamentals

- A. Table, Rows, and Columns
- B. Relations, Attributes, and Tuples
- C. Keys
- D. Indexes
- E. Constraints
- F. Database Operations

IV. Understanding User Needs

- A. Bring a List of Questions
- B. Meet the Customers
- C. Learn Who's Who
- D. Pick the Customers' Brains
- E. Walk a Mile in the User's Shoes
- F. Study Current Operations
- G. Brainstorm

- H. Look to the Future
 - I. Understand the Customers' Reasoning
- V. Translating User Needs into Data Models**
- A. What Are Data Models
 - B. User Interface Models
 - C. Semantic Object Models
 - D. Entity-Relationship Models
 - E. Relational Models
- VI. Extracting Business Rules**
- A. What Are Business Rules
 - B. Identifying Key Business Rules
 - C. Extracting Key Business Rules
 - D. Multi-Tier Applications
- VII. Normalizing Data**
- A. What is Normalization
 - B. First Normal Form (1NF)
 - C. Second Normal Form (2NF)
 - D. Third Normal Form (3NF)
 - E. Stopping at Third Normal Form
 - F. Fourth Normal Form (4NF)
 - G. Fifth Normal Form (5NF)
 - H. Essential Redundancy
- VIII. Designing Databases to Support Software Applications**
- A. Plan Ahead
 - B. Document Everything
 - C. Consider Multi-Tier Architecture
 - D. Convert Domains Into Tables
 - E. Keep Tables Focused
 - F. Use Three Kinds of Tables
 - G. Use Naming Conventions
- IX. Common Design Patterns**
- A. Associations
 - B. Temporal Data
 - C. Logging and Locking
 - D. Audit Trails
 - E. Turnkey Records
- X. Common Design Pitfalls**
- A. Lack of Preparation
 - B. Poor Documentation
 - C. Poor Naming Standards
 - D. Thinking too Small
 - E. Not Planning for Change
 - F. Too Much Normalization
 - G. Insufficient Normalization
 - H. Insufficient Testing
 - I. Performance Anxiety
- XI. User Needs and Requirements**
- A. Meet the Customers
 - B. Pick the Customers' Brans
 - C. Write Use Cases
 - D. Write the Requirements Documents
 - E. Demand Feedback
- XII. Building a Data Model**
- A. Semantic Object Modeling
 - B. Entity-Relationship Modeling
 - C. Relational Modeling
 - D. Putting It All Together
- XIII. Extracting Business Rules**
- A. Identifying Business Rules
 - B. Courses
 - C. Customer Courses
 - D. Employees
 - E. Drawing a New Relational Model

XIV. Normalization and Refinement

- A. Improving Flexibility
- B. Verifying First Normal Form
- C. Verifying Second Normal Form
- D. Verifying Third Form

XV. Microsoft Access

- A. Understanding Access
- B. Defining Relationships
- C. Creating Field Constraints
- D. Creating Table Constraints
- E. Creating Queries

XVI. MySQL

- A. Installing MySQL
- B. Using MySQL Command Line Client
- C. Executing SQL Scripts
- D. Using MySQL Query Browser
- E. Using MySQL Workbench

XVII. Introduction to SQL

- A. Finding More Information
- B. Standards
- C. Basic Syntax
- D. Command Overview
- E. Create Table
- F. Create Index
- G. Drop
- H. Insert
- I. Select
- J. Update
- K. Delete

XVIII. Building Databases with SQL Scripts

- A. Script Category
- B. Database Creation Scripts
- C. Basic Initialization Scripts
- D. Data Initialization Scripts
- E. Ordering SQL Commands

XIX. Database Maintenance

- A. Backups
- B. Data Warehousing
- C. Repairing the Database
- D. Compacting the Database
- E. Performance Tuning

XX. Database Security

- A. The Right Level of Security
- B. Password
- C. Privileges
- D. Initial Configuration and Privileges
- E. Too Much Security