DTA-DMW-101

Advanced Microsoft SQL Server
Relational Database
Fundamentals: Level I & II

Program Information

Database Design and Implementation : LEVEL I

Nature of the Course Theory + Practical	**Total Hours per Day** 2 hours	**Course Duration** 4 Weeks

Objectives

Deerwalk Training Center – Database design and Implementation - course is targeted to learn the technical skills to write basic Transact-SQL queries for Microsoft SQL Server. This course is the foundation for all SQL Server-related disciplines; namely, Database Administration, Database Development and Business Intelligence

Target Group

This course is intended for Database Administrators, Database Developers, and Business Intelligence professionals. The course will very likely be well attended by SQL power users who aren't necessarily database-focused or plan on taking the exam; namely, report writers, business analysts and client application developers.

Training Method

- Lab exercises are mandatory, have a fixed deadline, and are graded. The course puts heavy emphasis on lab exercises because software programming can only be learnt well by explicitly putting into practice the principles that have been taught (i.e. in simpler terms – by doing lots and lots of coding). Late submission (past the deadline) of exercises incurs some penalty from total points.
- Instructors may provide relevant lecture/lab notes to students as (and when) necessary in the form of printed handouts and or via emails.

Completion Criteria

- After fulfilling all of the following criteria, the student will be deemed to have finished the Module:
- Has attended 90% of all classes held
- Has received an average grade of 80% on all assignments
- Has received an average of 60% in assessments
- The tutor believes the student has grasped all of the concepts and is ready to go on to the second module.

Required Textbooks

- Walter Shields, "SQL QuickStart Guide", ClydeBank Media.
- Allen G. Taylor, "SQL All-in-One for Dummies", Wiley.

Prerequisites

- Basic knowledge about programming, bits/bytes, procedures, classes, computer architecture, etc. If you just have theoretical knowledge that is perfectly okay but you should have strong convictions on what programming is, and what you hope to achieve from this class.
- Willing and eager to spend at least 10-20 hours (varying from student-to-student) per week outside of the training class to read/write codes in JavaScript (self-study and practice).
- There is no prior educational level requirement for this course. Anyone from 10+2 students to someone who is doing their PHD are welcome to take this course.
- If you are only interested in theory and have no interest/patience in spending at least 10 hours every week throughout the duration of the course, then this course might not be for you.
- If you have absolutely no idea about programming or do not see yourself doing programming in the next six - odd months, then this class may not be for you.

Course Details

📅 **Week 1**

Lesson 1

Relational Database Fundamentals

- Overview of Relational Database Concepts
- Relational Databases and Relational Database Management Systems
- Data Normalization

Lesson 2

Conceptual Data Modeling

- Problems with File-based System
- Concept of Data Model
- 3-Tier Architecture

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- Concept of Data Model
- 3-Tier Architecture

Lesson 3

The MAIN() METHOD – Where it All Begins

What is a Method?
- Argument List
- Return Type
- Breaking down solution (to a problem) to one or more methods

📅 Week 2 :

The Relational Data Model

- Data Modeling Using ERD
- Problems of Using ERDs and Solutions
- EERD and Chen Notation

- Relational Database Model Terminologies and their Implementation,
- Database Relations and their Characteristics,
- Relational Keys and Integrity Constraints

Relational Database Design

- Database Design Methodologies,
- Conceptual, Logical and Physical Database Designs,
- Mapping ERD into Relational Schema

📅 Week 3 :

Lesson 1
Creating a Database

- Database Development Methodology Overview
- Building a Logical Data Model
- Identifying Entities and Attributes
- Isolating Keys
- Relationships Between Entities
- Creating Entity-Relationship Diagrams
- Transforming to Physical Design
- Migrating Entities to Tables

- Selecting Primary Keys
- Defining Columns
- Enforcing Relationships with Foreign Keys
- Constructing the Database Using DDL
- Creating Tables, Indexes, Constraints and Views
- Dropping Tables, Indexes, Constraints and Views
- Modifying Tables, Indexes, Constraints and Views

Lesson 2
Writing Basic SQL Queries

- Displaying Table Structures
- Retrieving Column Data From a Table or View
- Selecting Unique Values
- Filtering Rows Using the WHERE Clause
- Sorting Results Using ORDER BY
- Joining Multiple Tables
- Using Column and Table Aliases

📅 Week 4 :

Manipulating Query Results

- Using Row Functions
- Character
- Numeric
- Date and Time
- Data Conversion (CAST and CONVERT)

Using the CASE Function

- Handling Null Values

Labs

Lab assignments will focus on the practice and mastery of contents covered in the lectures, and introduce critical and fundamental problem solving techniques to the students.

Program Information

Database Design and Implementation : LEVEL II

Nature of the Course
Theory + Practical

Total Hours per Day
2 hours

Course Duration
4 Weeks

Objectives

The Training – Database design and Implementation - course is targeted to learn Advanced Query Techniques, Store procedure, Tiggers , Views and database recovery.

Target Group

This course is intended for Database Administrators, Database Developers, and Business Intelligence professionals. The course will help to learn advanced query, database recovery and security, stored procedures, tiggers and more

Training Method

- Lab exercises are mandatory, have a fixed deadline, and are graded. The course puts heavy emphasis on lab exercises because software programming can only be learnt well by explicitly putting into practice the principles that have been taught (i.e. in simpler terms – by doing lots and lots of coding). Late submission (past the deadline) of exercises incurs some penalty from total points.
- Instructors may provide relevant lecture/lab notes to students as (and when) necessary in the form of printed handouts and or via emails.

Course Details

📅 **Week 1**

Lesson 1

Advanced Query Techniques

- Inner Joins
- Outer Joins (Left, Right, Full)
- Joining a Table to Itself
- Subqueries
- Tips for Developing Complex SQL Queries
- Using Aggregate Functions
  - AVG
  - COUNT
  - SUM
  - MIN
  - MAX
- Aggregating Results Using GROUP BY
- Restricting Groups with the HAVING Clause

Lesson 2

User-Defined Functions

- Definition and Benefits of Use
- CREATE FUNCTION
  - Syntax
  - RETURN Clause and the RETURNS Statement
  - Scalar vs. Table Functions
- Comparison with Stored Procedures
- Returning Scalar Values and Tables
  - ALTER and DROP FUNCTION

📅 Week 2 :

Manipulating Table Data Using SQL's Data Manipulation Language (DML)

- Inserting Data into Tables
- Updating Existing Data
- Deleting Records
- Truncating Tables

- Implementing Data Integrity with Transactions
  - Beginning Explicit Transactions
  - Committing Transactions
  - Rolling Back Transactions

Stored Procedures

- Definition and Benefits of Use
- CREATE PROCEDURE
  - Syntax
  - Variables and Parameters
- Control of Program Flow
- ALTER and DROP PROCEDURE
  - Implementation Differences

📅 Week 3 :

Working with Views

- Benefits of Using Views
- Creating Views
  - ALTER and DROP View

Triggers

- Definition and Benefits of Use
- Alternatives (e.g., Constraints)
- CREATE TRIGGER
  - Syntax
  - Trigger Types
- "Inserted" (or "NEW") and "Deleted" (or "OLD") Tables
- Event Handling and Trigger Execution
  - ALTER and DROP TRIGGER

📅 Week 4 :

Data Warehousing

- Database Warehouse Architecture,
- RAID,
- Parallelism and Partitioning,
- ETL,
- Data Mining

Database Recovery and Security

- Logical and Physical Database Security,
- SQL Injections,
- Database Recovery Mechanism,
- Deferred and Immediate Update

Labs

Lab assignments will focus on the practice and mastery of contents covered in the lectures, and introduce critical and fundamental problem solving techniques to the students.

Learning Outcomes

- Ability to understand the concept of computer-based databases.
- Increased familiarity with SQL
- How to write basic SQL Queries
- How to manipulate data and work with views

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