

Oracle10g: Introduction to SQL (5 Days)

Custom Training Institute

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Oracle10g: Introduction to SQL (CTI 218)

This course introduces Oracle Database 10g Technology and the relational database concepts and the powerful SQL programming language. It provides students with the essential SQL skills of querying the database, the metadata and creating database objects. The course delves into the advanced querying and reporting techniques, data warehousing concepts and manipulating large data sets in different time zones.

Prerequisites: Experience with a structured programming language. Prior experience with Oracle or other relational database language would be helpful.

Minimum hardware requirements (per student): Windows Server 2003 or Windows XP Pro; minimum 512 MB RAM (1 GB preferred); minimum of 2 GB of free space on hard drive (before installation). Machines should be set up with STATIC Internet Protocol (IP) addresses before installation of Oracle software.

Software requirements: Oracle10g for 32-bit Windows.

Microsoft PowerPoint and Internet connection installed at instructor's workstation for presentation purposes.

Module 1: Introduction

- Oracle Database 10g Main Features
- Overview of Components, Internet Platform, Apps Server and Developer Suite
- Relational and Object Relational Database Designs
- System Development Life Cycle
- Different Means of Storing Data
- Relational Database Concept
- Term Data Models
- Relating Multiple Tables

Module 2: Using the SQL SELECT

Statement to Retrieve Data

- Projection, Selection, and Join Terminology
- Syntaxes for Basic SQL SELECT Statements
- Arithmetic and Concatenation Operators in SQL Statements
- Differences Between SQL and iSQL*Plus
- Using iSQL*Plus to Log into the Database
- iSQL*Plus Interface
- Different Types of iSQL*Plus Commands
- Saving SQL Statements to Script Files

Module 3: Restricting and Sorting Data

- Using a Selection to Limit Rows
- Using the WHERE Clause to Retrieve Specific Rows
- Using the Comparison Conditions in the WHERE Clause
- Using the LIKE Condition to Compare Literal Values
- Logical Conditions AND, OR, and NOT
- Rules of Precedence for the Conditions Shown in This Lesson
- Sorting Rows with the ORDER BY Clause
- Restricting and Sorting Output at Run Time Using Ampersand Substitution in iSQL*Plus

Module 4: Using Single Row Functions to Customize Reports

- Differences Between Single Row and Multiple Row SQL Functions
- Character Functions: Case Manipulation and Character Manipulation Types
- Character Manipulation Functions in the SELECT and WHERE Clauses
- DATE and Numeric Functions
- Using SYSDATE Function to Retrieve the Current Date in the Default Format
- DUAL Table as a Means to View Function Results
- Rules for Applying Arithmetic Operators on Dates
- Arithmetic Operators with Dates in the SELECT Clause

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Module 5: Reporting Aggregated Data Using the Group Functions

- Group Functions
- Using the Group Functions
- Utilizing the `DISTINCT` Keyword with the Group Functions
- How Nulls are Handled with the Group Functions
- Creating Groups of Data with the `GROUP BY` Clause
- Grouping Data by More Than One Column
- Avoiding Illegal Queries with the Group Functions
- Excluding Groups of Data with the `HAVING` Clause

Module 6: Displaying Data From Multiple Tables

- Join Tables Syntax Using SQL 99 Syntax
- Writing Shorter Code and Explicitly Identifying Columns from Multiple Tables Using Table Aliases
- Issuing a SQL `CROSS JOIN` Statement to Produce a Cartesian Product
- Using the `NATURAL JOIN` Clause to Retrieve Data from Tables with Same-Named Columns
- Creating a Join with the `USING` Clause to Identify Specific Columns Between Tables
- Creating a Three-Way Join with the `ON` Clause to Retrieve Information from Three Tables
- `LEFT`, `RIGHT`, and `FULL` Outer Joins
- Adding Additional Conditions when Joining Tables with the `AND` Clause

Module 7: Using Subqueries to Solve Queries

- Syntax for Subqueries in a `SELECT` Statements `WHERE` Clause
- Guidelines for Using Subqueries
- Types of Subqueries
- Executing Single Row Subqueries and Using Group Functions in a Subquery
- Identifying Illegal Statements with Subqueries
- Executing Multiple Row Subqueries
- How `ANY` and `ALL` Operators Work in Multiple Row Subqueries
- How Null Values are Handled in Subqueries

Module 8: Using the SET Operators

- Using the `UNION` Operator to Return All Rows from Multiple Tables and Eliminate Any Duplicate Rows
- Using the `UNION ALL` Operator to Return All Rows from Multiple Tables
- `INTERSECT` Operator
- Using the `INTERSECT` Operator
- `MINUS` Operator
- Using the `MINUS` Operator
- `SET` Operator Guidelines
- Ordering Results When Using the `UNION` Operator

Module 9: Manipulating Data

- Writing `INSERT` Statements to Add Rows to a Table
- Copying Rows from Another Table
- Creating `UPDATE` Statements to Change Data in a Table
- Generating `DELETE` Statements to Remove Rows from a Table
- Using a Script to Manipulate Data
- Saving and Discarding Changes to a Table Through Transaction Processing
- How Read Consistency Works
- `TRUNCATE` Statement

Module 10: Using DDL Statements to Create and Manage Tables

- Main Database Objects and the Naming Rules for Database Objects
- Schema Concept
- Basic Syntax for Creating a Table and the `DEFAULT` Option
- Different Types of Constraints
- Resulting Exceptions when Constraints are Violated with DML Statements
- Creating a Table with a Subquery
- `ALTER TABLE` Functionality
- Removing a Table with the `DROP` Statement
- Renaming a Table

Module 11: Creating Other Schema Objects

- Main Database Objects and the Naming Rules for Database Objects
- Schema Concept
- Basic Syntax for Creating a Table and the `DEFAULT` Option
- Different Types of Constraints
- Resulting Exceptions When Constraints are Violated with DML Statements
- Creating a Table with a Subquery and Remove a Table with the `DROP` Statement
- `ALTER TABLE` Functionality
- Renaming a Table

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Module 12: Managing Objects with Data

Dictionary Views

- Structure of Each of the Dictionary Views
- Purpose of Each of the Dictionary Views
- Writing Queries that Retrieve Information from the Dictionary Views on the Schema Objects

Module 13: Controlling User Access

- Controlling User Access
- System vs. Objects Privileges
- Creating User Sessions and Granting System Privileges
- Using Roles to Define User Groups
- Creating and Granting Privileges to a Role
- Granting and Revoking Object Privileges
- Changing Your Password
- Using Database Links

Module 14: Manage Schema Objects

- Creating Directories
- Creating and Querying External Tables
- Creating Index Organized Tables
- Creating Function Based Indexes
- Dropping Columns
- Altering the Structure of Tables and Adding Constraints
- Performing Flashback Statements
- Materialized Views Overview

Module 15: Manipulating Large Data Sets

- Using the MERGE Statement
- Performing DML with Subqueries
- Performing DML with a RETURNING Clause
- Multitable INSERT Statements
- Tracking Changes in DML

Module 16: Generating Reports by Grouping Related Data

- GROUP BY and HAVING Clause
- Aggregating Data with ROLLUP and CUBE Operators
- Determining Subtotal Groups Using Grouping Functions
- Computing Multiple Groupings with Grouping Sets
- Defining Levels of Aggregation with Composite Columns
- Creating Combinations with Concatenated Groupings

Module 17: Managing Data in Different Time Zones

- Working with Time Zones
- Oracle10g Date Time Support
- Conversion Operations

Module 18: Searching Data Using

Advanced Subqueries

- Subquery Overview
- Using a Subquery
- Comparing Several Columns Using Multiple-Column Subqueries
- Defining a Data Source Using a Subquery in the FROM Clause
- Returning One Value Using Scalar Subquery Expressions
- Performing ROW by-Row Processing with Correlated Subqueries
- Reusing Query Blocks Using the WITH Clause

Module 19: Hierarchical Data Retrieval

- Sample Data from the EMPLOYEES Table
- The Tree Structure of Employee Data
- Hierarchical Queries
- Ranking Rows with LEVEL
- Formatting Hierarchical Reports Using LEVEL and LPAD
- Pruning Branches with the WHERE and CONNECT BY Clauses

Module 20: Performing Regular Expression

Support and Case Insensitive Searches

- Regular Expression Support Overview
- Simple and Complex Patterns for Searching and Manipulating Data

Module 21: Summary and Review