

Oracle Database: SQL and PL/SQL Fundamentals

Duration: 5 Days

What you will learn

This course is designed to deliver the fundamentals of SQL and PL/SQL along with the benefits of the programming languages using Oracle Database technology. In this course participants learn the concepts of relational databases. Additionally the participants are provided with the essential SQL skills that allow them to write queries against single and multiple tables, manipulate data in tables, and create database objects. The usage of single row functions to customize output, how to invoke conversion functions and conditional expressions are covered. The use of group functions to report aggregated data is also included.

Additionally students learn to create PL/SQL blocks of application code that can be shared by multiple forms, reports, and data management applications. Participants also learn to create anonymous PL/SQL blocks, stored procedures and functions. Participants get to learn about declaring identifiers and trapping exceptions. Demonstrations and hands-on practice reinforce the fundamental concepts.

Participants use Oracle SQL Developer to develop these program units. SQL*Plus and JDeveloper are available as optional tools.

This is appropriate for a 10g and 11g audience. There are minor changes between 10g and 11g features in SQL.

Audience

Application Developers
Forms Developer
Functional Implementer
PL/SQL Developer
Portal Developer
Reports Developer
Technical Consultant

Prerequisites

Required Prerequisites

Familiarity with data processing concepts and techniques

Familiarity with programming concepts

Course Objectives

Use PL/SQL programming constructs and conditionally control code flow (loops, control structures, and explicit cursors).

Use cursors to process rows.

Identify the major structural components of the Oracle Database 11g.

Retrieve row and column data from tables with the SELECT statement.

Create reports of sorted and restricted data.

Employ SQL functions to generate and retrieve customized data.

Display data from multiple tables using the ANSI SQL 99 JOIN syntax.

Create reports of aggregated data.

Run data definition language (DDL) statements to create and manage schema objects.
Run data manipulation statements (DML) to update data in the Oracle Database.
Design PL/SQL anonymous block that execute efficiently.
Describe the features and syntax of PL/SQL.
Handle runtime errors.
Describe stored procedures and functions.

Course Topics

Introduction

Overview of Oracle Database 11g and related products
Overview of relational database management concepts and terminologies
Introduction to SQL and its development environments
The HR schema and the tables used in this course
Oracle Database documentation and additional resources

Retrieve Data using the SQL SELECT Statement

List the capabilities of SQL SELECT statements
Generate a report of data from the output of a basic SELECT statement
Use arithmetic expressions and NULL values in the SELECT statement
Invoke Column aliases
Concatenation operator, literal character strings, alternative quote operator, and the DISTINCT keyword
Display the table structure using the DESCRIBE command

Restricted and Sorted Data

Write queries with a WHERE clause to limit the output retrieved
Describe the comparison operators and logical operators
Describe the rules of precedence for comparison and logical operators
Usage of character string literals in the WHERE clause
Write queries with an ORDER BY clause
Sort the output in descending and ascending order
Substitution Variables

Usage of Single-Row Functions to Customize Output

List the differences between single row and multiple row functions
Manipulate strings using character functions
Manipulate numbers with the ROUND, TRUNC, and MOD functions
Perform arithmetic with date data
Manipulate dates with the DATE functions

Conversion Functions and Conditional Expressions

Describe implicit and explicit data type conversion
Describe the TO_CHAR, TO_NUMBER, and TO_DATE conversion functions
Nesting multiple functions
Apply the NVL, NULLIF, and COALESCE functions to data
Usage of conditional IF THEN ELSE logic in a SELECT statement

Aggregated Data Using the Group Functions

Usage of the aggregation functions in SELECT statements to produce meaningful reports
Describe the AVG, SUM, MIN, and MAX function
How to handle Null Values in a group function?

Divide the data in groups by using the GROUP BY clause

Exclude groups of data by using the HAVING clause

Display Data From Multiple Tables

Write SELECT statements to access data from more than one table

Join Tables Using SQL:1999 Syntax

View data that does not meet a join condition by using outer joins

Join a table to itself by using a self join

Create Cross Joins

Usage of Subqueries to Solve Queries

Use a Subquery to Solve a Problem

Single-Row Subqueries

Group Functions in a Subquery

Multiple-Row Subqueries

Use the ANY and ALL Operator in Multiple-Row Subqueries

Use the EXISTS Operator

SET Operators

Describe the SET operators

Use a SET operator to combine multiple queries into a single query

Describe the UNION, UNION ALL, INTERSECT, and MINUS Operators

Use the ORDER BY Clause in Set Operations

Data Manipulation

Add New Rows to a Table

Change the Data in a Table

Use the DELETE and TRUNCATE Statements

How to save and discard changes with the COMMIT and ROLLBACK statements

Implement Read Consistency

Describe the FOR UPDATE Clause

DDL Statements to Create and Manage Tables

Categorize Database Objects

Create Tables

Describe the data types

Understand Constraints

Create a table using a subquery

How to alter a table?

How to drop a table?

Other Schema Objects

Create, modify, and retrieve data from a view

Perform Data manipulation language (DML) operations on a view

How to drop a view?

Create, use, and modify a sequence

Create and drop indexes

Create and drop synonyms

Introduction to PL/SQL

PL/SQL Overview

List the benefits of PL/SQL Subprograms

Overview of the Types of PL/SQL blocks
Create a Simple Anonymous Block
Generate the Output from a PL/SQL Block

PL/SQL Identifiers

List the different Types of Identifiers in a PL/SQL subprogram
Usage of the Declarative Section to Define Identifiers
Use of variables to store data
Scalar Data Types
%TYPE Attribute
Bind Variables
Sequences in PL/SQL Expressions

Write Executable Statements

Basic PL/SQL Block Syntax Guidelines
How to comment code?
SQL Functions in PL/SQL
Data Type Conversion
Nested Blocks
Operators in PL/SQL

Interaction with the Oracle Server

SELECT Statements in PL/SQL to Retrieve data
Data Manipulation in the Server Using PL/SQL
The SQL Cursor concept
Learn to use SQL Cursor Attributes to Obtain Feedback on DML
How to save and discard transactions?

Control Structures

Conditional processing Using IF Statements
Conditional processing Using CASE Statements
Simple Loop Statement
While Loop Statement
For Loop Statement
The Continue Statement

Usage of Composite Data Types

PL/SQL Records
The %ROWTYPE Attribute
Insert and Update with PL/SQL Records
Associative Arrays (INDEX BY Tables)
INDEX BY Table Methods
INDEX BY Table of Records

Explicit Cursors

Understand Explicit Cursors
Declare the Cursor
How to open the Cursor?
Fetching data from the Cursor
How to close the Cursor?
Cursor FOR loop
Explicit Cursor Attributes

FOR UPDATE Clause and WHERE CURRENT Clause

Exception Handling

What are Exceptions?

Handle Exceptions with PL/SQL

Trap Predefined Oracle Server Errors

Trap Non-Predefined Oracle Server Errors

Trap User-Defined Exceptions

Propagate Exceptions

RAISE_APPLICATION_ERROR Procedure

Stored Procedures and Functions

What are Stored Procedures and Functions?

Differentiate between anonymous blocks and subprograms

Create a Simple Procedure

Create a Simple Procedure with IN parameter

Create a Simple Function

Execute a Simple Procedure

Execute a Simple Function