

PL/SQL

Duration: 40 Hours

Introduction

- Course Objectives
- Course Agenda
- Human Resources (HR) Schema
- Introduction to SQL Developer

Introduction to PL/SQL

- PL/SQL Overview
- Benefits of PL/SQL Subprograms
- Overview of the Types of PL/SQL blocks
- Create a Simple Anonymous Block
- Generate 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 variables to store data
- Identify Scalar Data Types
- The %TYPE Attribute
- What are Bind Variables?
- Sequences in PL/SQL Expressions

Write Executable Statements

- Describe Basic PL/SQL Block Syntax Guidelines
- Comment Code
- Deployment of SQL Functions in PL/SQL
- How to convert Data Types?
- Nested Blocks
- Identify the Operators in PL/SQL

Interaction with the Oracle Server

- Invoke SELECT Statements in PL/SQL to Retrieve data
- Data Manipulation in the Server Using PL/SQL
- SQL Cursor concept
- Usage of SQL Cursor Attributes to Obtain Feedback on DML
- Save and Discard Transactions

Control Structures

- Conditional processing Using IF Statements
- Conditional processing Using CASE Statements
- Use simple Loop Statement
- Use While Loop Statement
- Use For Loop Statement
- Describe the Continue Statement

Composite Data Types

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

Explicit Cursors

- What are Explicit Cursors?
- Declare the Cursor
- Open the Cursor
- Fetch data from the Cursor
- Close the Cursor
- Cursor FOR loop
- Explicit Cursor Attributes
- FOR UPDATE Clause and WHERE CURRENT Clause

Exception Handling

- Understand 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

- Understand 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

Create Stored Procedures

- Create a Modularized and Layered Subprogram Design
- Modularize Development With PL/SQL Blocks
- Describe the PL/SQL Execution Environment
- Identity the benefits of Using PL/SQL Subprograms
- List the differences Between Anonymous Blocks and Subprograms
- Create, Call, and Remove Stored Procedures Using the CREATE Command and SQL Developer
- Implement Procedures Parameters and Parameters Modes
- View Procedures Information Using the Data Dictionary Views and SQL Developer

Create Stored Functions

- Create, Call, and Remove a Stored Function Using the CREATE Command and SQL Developer
- Identity the advantages of Using Stored Functions in SQL Statements
- List the steps to create a stored function
- Implement User-Defined Functions in SQL Statements
- Identity the restrictions when calling Functions from SQL statements
- Control Side Effects when calling Functions from SQL Expressions
- View Functions Information

Create Packages

- Identify the advantages of Packages
- Describe Packages
- List the components of a Package
- Develop a Package
- How to enable visibility of a Package's components?
- Create the Package Specification and Body Using the SQL CREATE Statement and SQL Developer
- Invoke Package Constructs
- View PL/SQL Source Code Using the Data Dictionary

Packages

- Overloading Subprograms in PL/SQL
- Use the STANDARD Package
- Use Forward Declarations to Solve Illegal Procedure Reference
- Implement Package Functions in SQL and Restrictions
- Persistent State of Packages
- Persistent State of a Package Cursor
- Control Side Effects of PL/SQL Subprograms
- Invoke PL/SQL Tables of Records in Packages

Implement Oracle-Supplied Packages in Application Development

- What are Oracle-Supplied Packages?
- Examples of Some of the Oracle-Supplied Packages
- How Does the DBMS_OUTPUT Package Work?
- Use the UTL_FILE Package to Interact With Operating System Files
- Invoke the UTL_MAIL Package
- Write UTL_MAIL Subprograms

Dynamic SQL

- The Execution Flow of SQL
- What is Dynamic SQL?
- Declare Cursor Variables
- Dynamically executing a PL/SQL Block
- Configure Native Dynamic SQL to Compile PL/SQL Code
- Invoke DBMS_SQL Package
- Implement DBMS_SQL with a Parameterized DML Statement
- Dynamic SQL Functional Completeness

Design Considerations for PL/SQL Code

- Standardize Constants and Exceptions
- Understand Local Subprograms
- Write Autonomous Transactions
- Implement the NOCOPY Compiler Hint
- Invoke the PARALLEL_ENABLE Hint
- The Cross-Session PL/SQL Function Result Cache
- The DETERMINISTIC Clause with Functions
- Usage of Bulk Binding to Improve Performance

Triggers

- Describe Triggers
- Identify the Trigger Event Types and Body
- Business Application Scenarios for Implementing Triggers
- Create DML Triggers Using the CREATE TRIGGER Statement and SQL Developer
- Identify the Trigger Event Types, Body, and Firing (Timing)
- Statement Level Triggers Versus Row Level Triggers
- Create Instead of and Disabled Triggers
- How to Manage, Test, and Remove Triggers?

Create Compound, DDL, and Event Database Triggers

- What are Compound Triggers?
- Identify the Timing-Point Sections of a Table Compound Trigger
- Compound Trigger Structure for Tables and Views
- Implement a Compound Trigger to Resolve the Mutating Table Error
- Compare Database Triggers to Stored Procedures
- Create Triggers on DDL Statements
- Create Database-Event and System-Event Triggers
- System Privileges Required to Manage Triggers

The PL/SQL Compiler

- What is the PL/SQL Compiler?
- Describe the Initialization Parameters for PL/SQL Compilation
- List the New PL/SQL Compile Time Warnings
- Overview of PL/SQL Compile Time Warnings for Subprograms
- List the benefits of Compiler Warnings
- List the PL/SQL Compile Time Warning Messages Categories

- Setting the Warning Messages Levels: Using SQL Developer, PLSQL_WARNINGS Initialization Parameter, and the DBMS_WARNING Package Subprograms
- View Compiler Warnings: Using SQL Developer, SQL*Plus, or the Data Dictionary Views

Manage PL/SQL Code

- What Is Conditional Compilation?
- Implement Selection Directives
- Invoke Predefined and User-Defined Inquiry Directives
- The PLSQL_CCFLAGS Parameter and the Inquiry Directive
- Conditional Compilation Error Directives to Raise User-Defined Errors
- The DBMS_DB_VERSION Package
- Write DBMS_PREPROCESSOR Procedures to Print or Retrieve Source Text
- Obfuscation and Wrapping PL/SQL Code

Dependencies

- Overview of Schema Object Dependencies
- Query Direct Object Dependencies using the USER_DEPENDENCIES View
- Query an Object's Status
- Invalidation of Dependent Objects
- Display the Direct and Indirect Dependencies
- Fine-Grained Dependency Management in Oracle Database 11g
- Understand Remote Dependencies
- Recompile a PL/SQL Program Unit