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# ORACLE PL-SQL PROGRAMMING

◆ 1:1 Instructor-led Online Training ◆



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## COURSE DETAILS & CURRICULUM

### Introduction

- Course Objectives
- Course Agenda
- Describe the Human Resources (HR) Schema
- PL/SQL development environments available in this course
- Introduction to SQL Developer

### Working with Oracle Cloud Exadata Express Cloud Service

- Introduction to Oracle Database Exadata Express Cloud Service
- Accessing Cloud Database using SQL Workshop
- Connecting to Exadata Express using Database Clients

### Introduction to PL/SQL

- Overview of PL/SQL
- Identify the benefits of PL/SQL Subprograms



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- Overview of the types of PL/SQL blocks
- Create a Simple Anonymous Block
- How to generate output from a PL/SQL Block?

### Declare PL/SQL Variables

- 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 Anonymous PL/SQL Blocks

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

### SQL Statements in a PL/SQL block

- Invoke SELECT Statements in PL/SQL
- Retrieve Data in PL/SQL
- SQL Cursor concept
- Avoid Errors by using Naming Conventions when using Retrieval and DML Statements
- Data Manipulation in the Server using PL/SQL
- Understand the SQL Cursor concept
- Use SQL Cursor Attributes to Obtain Feedback on DML
- Save and Discard Transactions

### Control Structures

- Conditional processing using IF Statements



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

### Composite Data Types

- Use PL/SQL Records
- The %ROWTYPE Attribute
- Insert and Update with PL/SQL Records
- 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
- The %NOTFOUND and %ROWCOUNT Attributes
- Describe the 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



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## Stored Procedures

- Create a Modularized and Layered Subprogram Design
- Modularize Development With PL/SQL Blocks
- Understand the PL/SQL Execution Environment
- List the benefits of using PL/SQL Subprograms
- List the differences between Anonymous Blocks and Subprograms
- Create, Call, and Remove Stored Procedures
- Implement Procedures Parameters and Parameters Modes
- View Procedure Information

## Stored Functions

- Create, Call, and Remove a Stored Function
- Identify the advantages of using Stored Functions
- Identify the steps to create a stored function
- Invoke User-Defined Functions in SQL Statements
- Restrictions when calling Functions
- Control side effects when calling Functions
- View Functions Information

## Debugging Subprograms

- How to debug Functions and Procedures?
- Debugging through SQL Developer

## Packages

- Listing the advantages of Packages
- Describe Packages
- What are the components of a Package?
- Develop a Package
- How to enable visibility of a Packages Components?
- Create the Package Specification and Body using the SQL CREATE Statement and SQL Developer
- Invoke the Package Constructs
- View the PL/SQL Source Code using the Data Dictionary



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## Deploying 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
- How to 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



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- 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)
- Differences between Statement Level Triggers and Row Level Triggers
- Create Instead of and Disabled Triggers
- How to Manage, Test and Remove Triggers?

### Creating Compound, DDL, and Event Database Triggers

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

### 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



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- 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 Dependencies

- Overview of Schema Object Dependencies
- Query Direct Object Dependencies using the USER\_DEPENDENCIES View
- Query an Objects Status
- Invalidation of Dependent Objects
- Display the Direct and Indirect Dependencies
- Fine-Grained Dependency Management in Oracle Database 12c
- Understand Remote Dependencies
- Recompile a PL/SQL Program Unit