

# Introduction to Oracle 11G PL/SQL Programming

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ORO11g5000  
3 days

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## Course Summary

A Relational Database Management System (RDBMS) is a software system that allows you to create and manage a relational database. Minimum requirements for such a system are defined by both ANSI and ISO. PL/SQL is Oracle's Procedural Language for SQL. It is Oracle's database programming language for creating stored procedures, functions, database triggers, and object methods. PL/SQL can be used for implementing business rules, computing algorithms, manipulating data, and for stand-alone programs. The Oracle 11g release has greatly enhanced the features and functionality of PL/SQL. Students will write stored procedures, functions, packages, and triggers, and implement complex business rules in Oracle. Students will learn programming, management, and security issues of working with PL/SQL program units. Programming topics will include the built-in packages that come with Oracle, the creation of triggers, and stored procedure features.

**Audience:** Application developers and database administrators

## Prerequisites

A good working knowledge of Oracle 11g SQL features is required. Programming experience in a high-level language, such as COBOL, Java, or Perl is also required.

## Lessons

### TRIGGERS

- Beyond Declarative Integrity
- Triggers
- Types of Triggers
- Trigger Sequencing
- Row-Level Triggers
- Trigger Predicates
- Trigger Conditions
- Using Sequences
- Cascading Triggers and Mutating Tables
- Generating an Error
- Maintaining Triggers

### BULK OPERATIONS

- Bulk Binding
- BULK COLLECT Clause
- FORALL Statement
- FORALL Variations
- Bulk Returns
- Bulk Fetching with Cursors

### USING PACKAGES

- Packages
- Oracle-Supplied Packages
- The DBMS\_OUTPUT Package
- The DBMS\_UTILITY Package

## PL/SQL VARIABLES AND DATATYPES

- Anonymous Blocks
- Declaring Variables
- Datatypes
- Subtypes
- Character Data
- Dates and Timestamps
- Date Intervals
- Anchored Types
- Assignment and Conversions
- Selecting into a Variable
- Returning into a Variable

## PL/SQL SYNTAX AND LOGIC

- Conditional Statements – IF/THEN
- Conditional Statements – CASE
- Comments and Labels
- Loops
- WHILE and FOR Loops
- SQL in PL/SQL
- Local Procedures and Functions

## STORED PROCEDURES AND FUNCTIONS

- Stored Subprograms
- Creating a Stored Procedure
- Procedure Calls and Parameters
- Parameter Modes
- Named Parameter Notation
- Default Arguments
- Creating a Stored Function
- Stored Functions and SQL
- Invoker's Rights

## EXCEPTION HANDLING

- SQLCODE and SQLERRM
- Exception Handlers
- Nesting Blocks
- Scope and Name Resolution
- Declaring and Raising Named Exceptions
- User-Defined Exceptions

## RECORDS, COLLECTIONS, AND USER-DEFINED TYPES

- Record Variables
- Using the %ROWTYPE Attribute
- User-Defined Object Types
- VARRAY and Nested TABLE Collections
- Using Nested TABLES
- Using VARRAYs
- Collections in Database Tables
- Associative Array Collections

- The UTL\_FILE Package
- Creating Pipes with DBMS\_PIPE
- Writing to and Reading from a Pipe
- The DBMS\_METADATA Package
- XML Packages
- Networking Packages
- Other Supplied Packages

## CREATING PACKAGES

- Structure of a Package
- The Package Interface and Implementation
- Package Variables and Package State
- Overloading Package Functions and Procedures
- Forward Declarations
- Strong REF CURSOR Variables
- Weak REF CURSOR Variables

## WORKING WITH LOBS

- Large Object Types
- Oracle Directories
- LOB Locators
- Internal LOBs
- LOB Storage and SECUREFILES
- External LOBs
- Temporary LOBs
- The DBMS\_LOB Package

## MAINTAINING PL/SQL CODE

- Privileges for Stored Programs
- Data Dictionary
- PL/SQL Stored Program Compilation
- Conditional Compilation
- Compile-Time Warnings
- The PL/SQL Execution Environment
- Dependencies and Validation
- Maintaining Stored Programs

## APPENDIX A: DYNAMIC SQL

- Generating SQL at Runtime
- Native Dynamic SQL vs. DBMS\_SQL Package
- The EXECUTE IMMEDIATE Statement
- Using Bind Variables
- Multi-row Dynamic Queries
- Bulk Operations with Dynamic SQL
- Using DBMS\_SQL
- DBMS\_SQL Subprograms

## APPENDIX B: PL/SQL VERSIONS, DATATYPES, AND LANGUAGE LIMITS

## APPENDIX C: ORACLE 11G SUPPLIED PACKAGES

- Collection Methods
- Iterating Through Collections

## **CURSORS**

- Multi-Row Queries
- Declaring and Opening Cursors
- Fetching Rows
- Closing Cursors
- The Cursor FOR Loop
- FOR UPDATE Cursors
- Cursor Parameters
- The Implicit (SQL) Cursor