

# **AV-004: Administering and Programming with ORACLE®**

## **Oracle 11g**

### **Duration:**

140 hours

### **Introduction:**

An Oracle database is a collection of data treated as a unit. The purpose of a database is to store and retrieve related information. A database server is the key to solving the problems of information management. In general, a server reliably manages a large amount of data in a multiuser environment so that many users can concurrently access the same data. All this is accomplished while delivering high performance. A database server also prevents unauthorized access and provides efficient solutions for failure recovery.

Oracle Database is the first database designed for enterprise grid computing, the most flexible and cost effective way to manage information and applications. Enterprise grid computing creates large pools of industry-standard, modular storage and servers. With this architecture, each new system can be rapidly provisioned from the pool of components. There is no need for peak workloads, because capacity can be easily added or reallocated from the resource pools as needed.

In this career, you will learn how to work with one of the most important Databases in the world.

## **1. Module I: OCA Oracle Database 11g: Administration I**

### **Description**

Prepare for the Oracle Certified Associate Oracle Database 11g: Administration I exam with help from this course. In each chapter, you'll find challenging exercises, practice questions, a two-minute drill, and a chapter summary to highlight what you've learned. This authoritative guide will help you pass the test and serve as your essential on-the-job reference. Get complete coverage of all OCA objectives for exam 1Z0-052, including:

- Database architecture
- Creating an Oracle Database
- Managing the Oracle instance
- Configuring and managing the Oracle network
- Managing database storage structures
- Administering user security
- Managing schema objects, data and concurrency, and undo data
- Implementing Oracle Database security
- Database maintenance and performance management

- Backup and recovery
- Moving data
- Intelligent infrastructure enhancements

## Module Content

- 1) Introduction To The Oracle Server Technologies**
  - a) Position Oracle Product Family
  - b) Explain Relational Structures
  - c) Understand The SQL Language
  - d) Appreciate The DBA's Role
- 2) Exploring The Database Architecture**
  - a) Describe The Single-Instance Architecture
  - b) Explain The Memory Structures
  - c) Describe The Process Structures
  - d) Summarize The Storage Structures
- 3) Preparing The Database Environment**
  - a) Identify The Tools For Administering An Oracle Database
  - b) Plan An Oracle Database Installation
  - c) Install The Oracle Software By Using The Oracle Universal Installer
- 4) Creating An Oracle Database**
  - a) Create A Database By Using The Database Configuration Assistant
- 5) Managing The Oracle Instance**
  - a) Describe The Stages Of Database Startup And Shutdown
  - b) Set Database Installation Parameters
  - c) Use The Alert Log And Trace Files
  - d) Use The Dictionary And Dynamic Performance Views
- 6) Configuring The Oracle Network Environment**
  - a) Configure And Manage The Oracle Network
  - b) Use The Oracle Shared Server Architecture
- 7) Managing Database Storage Structures**
  - a) Understand Tablespaces And Datafiles
  - b) Create And Manage Tablespaces
  - c) Manage Space In Tablespaces
- 8) Administering User Security**
  - a) Create And Manage Database User Accounts
  - b) Grant And Revoke Privileges
  - c) Create And Manage Roles
  - d) Create And Manage Profiles
- 9) Managing Schema Objects**
  - a) Create And Modify Tables
  - b) Manage Constraints
  - c) Create Indexes
  - d) Create And Use Temporary Tables
- 10) Managing Data And Concurrency**

- a) Manage Data Using DML
- b) Identify And Administer PL/SQL Objects
- c) Monitor And Resolve Locking Conflicts

**11) Managing Undo Data**

- a) Explain The Purpose Of Undo
- b) Understand How Transactions Generate Undo
- c) Manage Undo

**12) Implementing Oracle Database Security**

- a) Database Security And Principle Of Least Privilege
- b) Work With Standard Database Auditing

**13) Database Maintenance**

- a) Use And Manage Optimizer Statistics
- b) Use And Manage The Automatic Workload Repository
- c) Use The Advisory Framework
- d) Manage Alerts And Thresholds

**14) Performance Management**

- a) Use Automatic Memory Management
- b) Use Memory Advisors
- c) Troubleshoot Invalid And Unusable Objects

**15) Backup And Recovery Concepts**

- a) Identify The Types Of Failure That Can Occur In An Oracle Database
- b) Describe Ways To Tune Instance Recovery
- c) Identify The Importance Of Checkpoints, Redo Log Files And Archived Log Files
- d) Overview Of Flash Recovery Area
- e) Configure ARCHIVELOG Mode

**16) Performing Database Backups**

- a) Create Consistent Database Backups
- b) Back Up Your Database Without Shutting It Down
- c) Create Incremental Backups
- d) Automate Database Backups
- e) Manage Backups, View Backups Reports And Monitor The Flash Recovery Area

**17) Performing Database Recovery**

- a) Overview Of Data Recovery Advisor
- b) Use Data Recovery Advisor To Perform Recovery (Control File, Redo Log File, And Data File)

**18) Moving Data**

- a) Describe And Use Methods To Move Data (SQL Loader, Directory Objects, External Tables)
- b) Explain The General Architecture Of Oracle Data Pump
- c) Use Data Pump Export And Import To Move Data Between Oracle Databases

**19) Intelligent Infrastructure Enhancements**

- a) Use The Enterprise Manager Support Workbench
- b) Manage Patches

**2. Module II: OCA Oracle Database 11g: Administration II**

## Description

Prepare for the Oracle Certified Associate Oracle Database 11g: Administration II exam with help from this course. In each chapter, you'll find challenging exercises, practice questions, a two-minute drill, and a chapter summary to highlight what you've learned. This authoritative guide will help you pass the test and serve as your essential on-the-job reference. Get complete coverage of all OCP objectives for exam 1Z0-053, including:

- Database structure and Oracle Automatic Storage Management
- Configuring database recoverability
- Oracle Recovery Manager (RMAN)
- Oracle Flashback
- Memory management techniques
- Database tuning advisors
- Disk space and resource management
- Configuring database diagnostics
- Administering the Oracle Scheduler
- Database globalization

## Module Content

### 1) Database Architecture And ASM

- a) Understanding Database Architecture And ASM
- b) Describe ASM
- c) Set Up Initialization Parameter Files
- d) Start Up And Shut Down ASM Instances
- e) Administer ASM Disk Groups

### 2) Configuring Database Recoverability

- a) Configuring For Database Recoverability
- b) Configure Multiple Archive Log File
- c) Define Apply And Use A Retention Policy
- d) Configure The Flash Recovery Area
- e) Use The Flash Recovery Area

### 3) Creating And Maintaining An RMAN Catalog

- a) Create And Configure An Recovery Catalog
- b) Synchronize The Recovery Catalog
- c) Create And Use RMAN Stored Scripts
- d) Back Up The Recovery Catalog
- e) Create And Use A Virtual Private Catalog
- f) Configure Backup Settings
- g) Allocate Channels To Use In Backing Up
- h) Configure Backup Optimization

### 4) Creating RMAN Backups

- a) Using RMAN To Create Backups
- b) Create Image File Backups
- c) Create A Whole Database Backup
- d) Enable Fast Incremental Backup
- e) Create Duplex Backup And Back Up Backupsets

- f) Create And Archival Backup For Long- Term Retention
  - g) Create A Multisection, Compressed And Encrypted Backup
  - h) Report On And Maintain Backups
- 5) Recovering Using RMAN Backups**
- a) Perform Complete Recovery From A Critical Or Noncritical Data File Loss Using RMAN.
  - b) Perform Incomplete Recovery Using RMAN
  - c) Recover Using Incrementally Updated Backups
  - d) Switch To Images Copies For Fast Recovery
  - e) Restore A Database Onto A New Host
  - f) Recover Using A Backup Control File
  - g) Perform Disaster Recovery
- 6) User-Managed Backup And Recovery**
- a) Recover From A Lost Tempfile
  - b) Recover From A Lost Redo Log Group
  - c) Recover From The Loss Of The Password File
  - d) Perform User-Managed Complete Database Recovery
  - e) Perform User-Managed Incomplete Database Recovery
  - f) Perform User-Managed And Server-Managed Backups
  - g) Identify The Need For Backup Mode
  - h) Back Up And Recover A Control File
- 7) Miscellaneous RMAN Features**
- a) Creating A Duplicate Database Using RMAN
  - b) Using A Duplicate Database
  - c) Identify The Situations That Require TSPITR
  - d) Perform Automated TSPITR
- 8) Monitoring And Tuning RMAN**
- a) Monitoring RMAN Sessions And Jobs
  - b) Tuning RMAN
  - c) Configure RMAN For Asynchronous I/O
- 9) Configuring And Using Flashback**
- a) Restore Dropped Tables From The Recycle Bin
  - b) Perform Flashback Query
  - c) Use Flashback Transaction
  - d) Perform Flashback Table Operations
  - e) Set Up And Use A Flashback Data Archive
  - f) Configure Monitor Flashback Database And Perform Flashback Database Operations
- 10) Memory Management Techniques**
- a) Implement Automatic Memory Management
  - b) Manually Configure SGA Parameters
  - c) Configure Automatic PGA Memory Management
- 11) Using Database Tuning Advisors**
- a) Use The SQL Tuning Advisor
  - b) Use The SQL Access Advisor To Tune A Workload
  - c) Understand Database Replay
- 12) Disk Space And Resource Management**
- a) Manage Resumable Space Allocation

- b) Describe The Concepts Of Transportable Tablespaces And Databases
- c) Reclaim Wasted Space From Tables And Indexes By Using The Segment Shrink Functionality
- d) Understand The Database Resource Manager
- e) Create And Use Database Resource Manager Components

**13) Configuring Database Diagnostics**

- a) Set Up Automatic Diagnostic Repository
- b) Using Support Workbench
- c) Perform Block Media Recovery

**14) Using The Scheduler For Task Automation**

- a) Create A Job, Program And Schedule
- b) Use A Time Based Or Event Based Schedule For Executing Scheduler Jobs
- c) Create Lightweight Jobs
- d) Use Job Chains To Perform A Series Of Related Tasks
- e) Create Windows And Job Classes
- f) Use Advanced Scheduler Concepts To Prioritize Jobs

**15) Database Globalization**

- a) Customize Language Dependent Behaviour For The Database And Individual Sessions
- b) Work With Database And NLS Character Sets

### **3. Module III: OCA Oracle Database 11g SQL Fundamentals**

#### **Description**

Prepare for the Oracle Certified Associate Oracle Database 11g: SQL Fundamentals exam with help from this course. In each chapter, you'll find challenging exercises, practice questions, a two-minute drill, and a chapter summary to highlight what you've learned. This authoritative guide will help you pass the test and serve as your essential on-the-job reference. Get complete coverage of all OCA objectives for exam 1Z0-051, including:

- SQL SELECT statements
- Restricting and sorting data
- Single-row functions
- Conversion functions and conditional expressions
- Group functions
- Displaying data from multiple tables
- Subqueries
- Set operators
- DML and DDL statements
- Schema objects

#### **Module Content**

**1) Oracle Server Technologies And The Relational Paradigm**

- a) Position The Server Technologies
- b) Understand The Server Technologies
- c) Summarize The SQL Language
- d) Use The Client Tools

- e) Create The Demonstration Schemas
- 2) Data Retrieval Using The SQL Select Statement**
  - a) List The Capabilities Of The SQL Select Statement
  - b) Execute Basic Select Statement
- 3) Restricting And Sorting Data**
  - a) Limit The Rows Retrieved By A Query
  - b) Sort The Rows Retrieved By A Query
  - c) Ampersand Substitution
- 4) Single Row Functions**
  - a) Describe Various Types Of Functions Available In SQL
  - b) Use Character, Number And Date Functions In Select Statements
- 5) Using Conversion Functions And Conditional Expressions**
  - a) Describe Various Types Of Conversion
  - b) Use The To\_Char, To\_Number And To\_Date Conversion Functions
  - c) Apply Conditional Expressions In A Select Statement
- 6) Reporting Aggregated Data Using The Group Functions**
  - a) Describe The Group Functions
  - b) Identify The Available Group Functions
  - c) Group Data Using The Group By Clause
  - d) Include Or Exclude Grouped Rows Using The Having Clause
- 7) Displaying Data From Multiple Tables**
  - a) Write Select Statements To Access Data From More Than One Table Using Equijoins And Nonequijoins
  - b) Join A Table To Itself Using A Self-Join Function
  - c) View Data That Does Not Meet A Join Condition By Using Outer Joins
  - d) Generate Cartesian Product Of Two Or More Tables
- 8) Using Subqueries To Solve Problems**
  - a) Define Subqueries
  - b) Describe The Types Of Problems That Subqueries Can Solve
  - c) List The Type Of Subqueries
  - d) Write Single-Row And Multiple-Row Subqueries
- 9) Using The Set Operators**
  - a) Describe The Set Operators
  - b) Use A Set Operator To Combine Multiple Queries Into A Single Query
  - c) Control The Order Of Rows Returned
- 10) Manipulating Data**
  - a) Describe Each Data Manipulation Language (DML) Statement
  - b) Insert Rows Into A Table
  - c) Update Rows In A Table
  - d) Delete Rows From A Table
  - e) Control Transactions
- 11) Using DDL Statements To Create And Manage Tables**
  - a) Categorize The Main Database Objects
  - b) Review The Table Structure
  - c) List The Data Types That Are Available For Columns
  - d) Create A Simple Table



- e) Explain How Constraints Are Created At The Time Of Table Creation

#### **12) Creating Other Schema Objects**

- a) Create Simple And Complex Views
- b) Retrieve Data From Views
- c) Create Private And Public Synonyms
- d) Create, Maintain And Use Sequences
- e) Create And Maintain Indexes

### **4. Module IV: Oracle Database 11g PL/SQL Programming**

#### **Description**

Deliver dynamic, client/server PL/SQL applications with expert guidance from an Oracle programming professional. With full coverage of the latest features and tools, Oracle Database 11g PL/SQL Programming lays out each topic alongside detailed explanations, cut-and-paste syntax examples, and real-world case studies. Access and modify database information, construct powerful PL/SQL statements, execute effective queries, and deploy bulletproof security. You'll also learn how to implement C, C++, and Java procedures, Web-enable your database, cut development time, and optimize performance.

- Create, debug, and manage Oracle-driven PL/SQL programs
- Use PL/SQL structures, delimiters, operators, variables, and statements
- Identify and eliminate errors using PLSQL\_WARNINGS and exception handlers
- Work with functions, procedures, packages, collections, and triggers
- Define and deploy varray, nested table, and associative array data types
- Handle external routines, object types, large objects, and secure files
- Communicate between parallel sessions using DBMS\_ALERT and DBMS\_PIPE
- Call external procedures through Oracle Net Services and PL/SQL wrappers
- Integrate internal and server-side Java class libraries using Oracle JVM
- Develop robust Web applications using PL/SQL Gateway and Web Toolkit

#### **Course Content**

##### **1) Oracle PL/ SQL Overview**

- a) History Background
- b) Architecture
- c) Basic Block Structures
- d) Oracle 10g New Features
- e) Oracle 11g New Features

##### **2) PL/SQL Basics**

- a) Oracle PL/SQL Block Structure
- b) Variables Assignments And Operators
- c) Control Structures
- d) Store Functions, Procedures and Packages
- e) Transaction Scope
- f) Database Triggers

##### **3) Language Fundamentals**

- a) Character and Lexical Units



- b) Block Structures
- c) Variable Types
- d) Variable Scope
- 4) Control Structure**
  - a) Conditional Statements
  - b) Iterative Statements
  - c) Cursor Structures
  - d) Bulk Statements
- 5) Error Management**
  - a) Exception Types and Scope
  - b) Exception Management Built – In Functions
  - c) User-Defined Exceptions
  - d) Exception Stack Functions
  - e) Database Trigger Exception Management
- 6) Functions and Procedures**
  - a) Function and Procedure Architecture
  - b) Transaction Scope
  - c) Calling Subroutines
  - d) Functions
  - e) Procedures
- 7) Collection**
  - a) Collection types
  - b) Collection Set Operators
  - c) Collection API
- 8) Large Objects**
  - a) Character Large Objects: CLOB and NCLOB Datatypes
  - b) Binary Large Objects: BLOB Datatype
  - c) Secure Files
  - d) Binary Files: BFILE Datatype
  - e) DBMS\_LOB Package
- 9) Package**
  - a) Package Architecture
  - b) Package Specification
  - c) Package Body
  - d) Definer vs. Invoker Rights
  - e) Managing Packages in the Database Catalog
- 10) Triggers**
  - a) Introduction to triggers
  - b) Database trigger Architecture
  - c) Data Definition Language Triggers
  - d) Data Manipulation Language Triggers
  - e) Compound Triggers
  - f) Instead-of Triggers
  - g) System or Database Event Triggers
  - h) Triggers Restrictions
- 11) Dynamic SQL**

- a) Dynamic SQL Architecture
- b) Native Dynamic SQL (NDS)
- c) DBMS\_SQL Packages

**12) Intersession Communication**

- a) Introducing Intersession Communication
- b) The DBMS\_PIPE Built-in Package
- c) DBMS\_ALERT Built-in Package

**13) External Procedures**

- a) Introducing External Procedures
- b) Working with External Procedures
- c) Troubleshooting the Shared Library

**14) Object Types**

- a) Objects Basics
- b) Inheritance and Polymorphism
- c) Implementing Collection Object Bodies

**15) Java Libraries**

- a) Oracle 11g JVM New Features
- b) Java Architecture
- c) Oracle Java Connection Types
- d) Building Java Class Libraries in Oracle
- e) Mapping Oracle Types

**16) Web Application Development**

- a) PL/SQL Web Server Architecture
- b) Configuring the Standalone Oracle HTTP Server
- c) Configuring the XML DB Server
- d) Comparing Web-Enabled PL/SQL Procedures and PSPs
- e) Creating Web-Enabled PL/SQL Stored Procedures
- f) Building and Accessing PL/SQL Server Pages (PSPs)