

ORACLE DATABASE 11G



CURRICULUM

Introduction to SQL

» Introduction to Oracle Database

- List the features of Oracle Database 12c
- Discuss the basic design, theoretical, and physical aspects of a relational database
- Categorize the different types of SQL statements
- Describe the data set used by the course
- Log on to the database using SQL Developer environment
- Save queries to files and use script files in SQL Developer

» 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
- Select All Columns
- Select Specific Columns
- Use Column Heading Defaults
- Use Arithmetic Operators
- Understand Operator Precedence
- Learn the DESCRIBE command to display the table structure

» Learn to Restrict and Sort Data

- Write queries that contain a WHERE clause to limit the output retrieved
- List the comparison operators and logical operators that are used in a WHERE clause
- Describe the rules of precedence for comparison and logical operators
- Use character string literals in the WHERE clause
- Write queries that contain an ORDER BY clause to sort the output of a SELECT statement
- Sort output in descending and ascending order

» Usage of Single-Row Functions to Customize Output

- Describe the differences between single row and multiple row functions
- Manipulate strings with character function in the SELECT and WHERE clauses
- Manipulate numbers with the ROUND, TRUNC, and MOD functions
- Perform arithmetic with date data
- Manipulate dates with the DATE functions

» Invoke Conversion Functions and Conditional Expressions

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

» Aggregate Data Using the Group Functions

- Use the aggregation functions to produce meaningful reports
- Divide the retrieved data in groups by using the GROUP BY clause
- Exclude groups of data by using the HAVING clause

» Display Data From Multiple Tables Using Joins

- Write SELECT statements to access data from more than one table
- View data that generally does not meet a join condition by using outer joins
- Join a table to itself by using a self-join

» Use Sub-queries to Solve Queries

- Describe the types of problem that sub-queries can solve
- Define sub-queries
- List the types of sub-queries
- Write single-row and multiple-row sub-queries

» The SET Operators

- Describe the SET operators
- Use a SET operator to combine multiple queries into a single query
- Control the order of rows returned

» Data Manipulation Statements

- Describe each DML statement
- Insert rows into a table
- Change rows in a table by the UPDATE statement
- Delete rows from a table with the DELETE statement
- Save and discard changes with the COMMIT and ROLLBACK statements
- Explain read consistency

» Use of DDL Statements to Create and Manage Tables

- Categorize the main database objects
- Review the table structure
- List the data types available for columns
- Create a simple table
- Decipher how constraints can be created at table creation
- Describe how schema objects work

» Other Schema Objects

- Create a simple and complex view
- Retrieve data from views
- Create, maintain, and use sequences
- Create and maintain indexes
- Create private and public synonyms

» Control User Access

- Differentiate system privileges from object privileges
- Create Users
- Grant System Privileges
- Create and Grant Privileges to a Role
- Change Your Password
- Grant Object Privileges
- How to pass on privileges?
- Revoke Object Privileges

» Management of Schema Objects

- Add, Modify, and Drop a Column
- Add, Drop, and Defer a Constraint
- How to enable and Disable a Constraint?
- Create and Remove Indexes
- Create a Function-Based Index
- Perform Flashback Operations
- Create an External Table by Using ORACLE_LOADER and by Using ORACLE_DATAPUMP
- Query External Tables

» Manage Objects with Data Dictionary Views

- Explain the data dictionary
- Use the Dictionary Views
- USER_OBJECTS and ALL_OBJECTS Views
- Table and Column Information
- Query the dictionary views for constraint information
- Query the dictionary views for view, sequence, index and synonym information
- Add a comment to a table
- Query the dictionary views for comment information

» Manipulate Large Data Sets

- Use Subqueries to Manipulate Data
- Retrieve Data Using a Subquery as Source
- Insert Using a Subquery as a Target
- Usage of the WITH CHECK OPTION Keyword on DML Statements
- List the types of Multitable INSERT Statements
- Use Multitable INSERT Statements
- Merge rows in a table
- Track Changes in Data over a period of time

» Data Management in different Time Zones

- Time Zones
- CURRENT_DATE, CURRENT_TIMESTAMP, and LOCALTIMESTAMP
- Compare Date and Time in a Session's Time Zone
- DBTIMEZONE and SESSIONTIMEZONE
- Difference between DATE and TIMESTAMP
- INTERVAL Data Types
- Use EXTRACT, TZ_OFFSET and FROM_TZ
- Invoke TO_TIMESTAMP, TO_YMINTERVAL and TO_DSINTERVAL

» Retrieve Data Using Sub-queries

- Multiple-Column Subqueries
- Pairwise and Non-pairwise Comparison
- Scalar Subquery Expressions
- Solve problems with Correlated Subqueries
- Update and Delete Rows Using Correlated Subqueries
- The EXISTS and NOT EXISTS operators
- Invoke the WITH clause
- The Recursive WITH clause

» Regular Expression Support

- Use the Regular Expressions Functions and Conditions in SQL
- Use Meta Characters with Regular Expressions
- Perform a Basic Search using the REGEXP_LIKE function
- Find patterns using the REGEXP_INSTR function
- Extract Substrings using the REGEXP_SUBSTR function
- Replace Patterns Using the REGEXP_REPLACE function
- Usage of Sub-Expressions with Regular Expression Support
- Implement the REGEXP_COUNT function

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» Exploring the Oracle Database Architecture

- Oracle Database Architecture Overview
- Oracle ASM Architecture Overview
- Process Architecture
- Memory structures
- Logical and physical storage structures
- ASM storage components

» Installing your Oracle Software

- Tasks of an Oracle Database Administrator
- Tools Used to Administer an Oracle Database
- Installation: System Requirements
- Oracle Universal Installer (OUI)
- Installing Oracle Grid Infrastructure
- Installing Oracle Database Software
- Silent Install

» Creating an Oracle Database

- Planning the Database
- Using the DBCA to Create a Database
- Password Management
- Creating a Database Design Template
- Using the DBCA to Delete a Database

» Managing the Oracle Database Instance

- Start and stop the Oracle database and components
- Use Oracle Enterprise Manager
- Access a database with SQL*Plus
- Modify database installation parameters
- Describe the stages of database startup
- Describe database shutdown options
- View the alert log
- Access dynamic performance views

» **Manage the ASM Instance**

- Set up initialization parameter files for ASM instance
- Start up and shut down ASM instances
- Administer ASM disk groups

» **Configuring the Oracle Network Environment**

- Use Enterprise Manager to create and configure the Listener
- Enable Oracle Restart to monitor the listener
- Use tnsping to test Oracle Net connectivity
- Identify when to use shared servers and when to use dedicated servers

» **Managing Database Storage Structures**

- Storage Structures
- How Table Data Is Stored
- Anatomy of a Database Block
- Space Management in Tablespaces
- Tablespaces in the Preconfigured Database
- Actions with Tablespaces
- Oracle Managed Files (OMF)

» **Administering User Security**

- Database User Accounts
- Predefined Administrative Accounts
- Benefits of Roles
- Predefined Roles
- Implementing Profiles

» **Managing Data Concurrency**

- Data Concurrency
- Enqueue Mechanism
- Resolving Lock Conflicts
- Deadlocks

» **Managing Undo Data**

- Data Manipulation
- Transactions and Undo Data
- Undo Data Versus Redo Data
- Configuring Undo Retention

» **Implementing Oracle Database Auditing**

- Describe DBA responsibilities for security
- Enable standard database auditing
- Specify audit options
- Review audit information
- Maintain the audit trail

» **Database Maintenance**

- Manage optimizer statistics
- Manage the Automatic Workload Repository (AWR)
- Use the Automatic Database Diagnostic Monitor (ADDM)
- Describe and use the advisory framework
- Set alert thresholds
- Use server-generated alerts
- Use automated tasks

» Performance Management

- Performance Monitoring
- Managing Memory Components
- Enabling Automatic Memory Management (AMM)
- Automatic Shared Memory Advisor
- Using Memory Advisors
- Dynamic Performance Statistics
- Troubleshooting and Tuning Views
- Invalid and Unusable Objects

» Backup and Recovery Concepts

- Part of Your Job
- Statement Failure
- User Error
- Understanding Instance Recovery
- Phases of Instance Recovery
- Using the MTTR Advisor
- Media Failure
- Archive Log Files

» Performing Database Backups

- Backup Solutions: Overview
- Oracle Secure Backup
- User-Managed Backup
- Terminology
- Recovery Manager (RMAN)
- Configuring Backup Settings
- Backing Up the Control File to a Trace File
- Monitoring the Flash Recovery Area

» Moving Data

- Describe ways to move data
- Create and use directory objects
- Use SQL*Loader to move data
- Use external tables to move data
- General architecture of Oracle Data Pump
- Use Data Pump export and import to move data

» Working with Support

- Use the Enterprise Manager Support Workbench
- Work with Oracle Support\
- Log service requests (SR)
- Manage patches

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» Core Concepts and Tools of the Oracle Database

- The Oracle Database Architecture: Overview
- ASM Storage Concepts
- Connecting to the Database and the ASM Instance
- DBA Tools Overview

» Configuring for Recoverability

- Purpose of Backup and Recovery (B&R), Typical Tasks and Terminology
- Using the Recovery Manager (RMAN)
- Configuring your Database for B&R Operations

- Configuring Archivelog Mode
- Configuring Backup Retention
- Configuring and Using a Flash Recovery Area (FRA)

» Using the RMAN Recovery Catalog

- Tracking and Storing Backup Information
- Setting up a Recovery Catalog
- Recording Backups
- Using RMAN Stored Scripts
- Managing the Recovery Catalog (Backup, Export, Import, Upgrade, Drop and Virtual Private Catalog)

» Configuring Backup Settings

- Configuring and Managing Persistent Settings for RMAN
- Configuring Autobackup of Control File
- Backup optimization
- Advanced Configuration Settings: Compressing Backups
- Configuring Backup and Restore for Very Large Files (Multisection)

» Creating Backups with RMAN

- RMAN backup types
- Creating and Using the following
 - Backup Sets and Image Copies
 - Whole Database Backup
 - Fast Incremental Backup
 - Configure Backup Destinations
 - Duplexed Backup Sets
 - Archival Backups

» Restore and Recovery Task

- Restoring and Recovering
- Causes of File Loss
- Automatic Tempfile Recovery
- Recovering from the Loss of a Redo Log Group
- Recovering from a Lost Index Tablespace
- Re-creating a Password Authentication File
- Complete and Incomplete Recovery
- Other Recovery Operations

» Using RMAN to Perform Recovery

- Complete Recovery after Loss of a Critical or Noncritical Data File
- Recovering Image Copies and Switching Files
- Restore and Recovery of a Database in NOARCHIVELOG Mode
- Incomplete Recovery
- Performing Recovery with a Backup Control File
- Restoring from Autobackup: Server Parameter File and Control File
- Restoring and Recovering the Database on a New Host

» Monitoring and Tuning RMAN

- Monitoring RMAN Jobs
- Balance Between Speed of Backup Versus Speed of Recovery
- RMAN Multiplexing
- Synchronous and Asynchronous I/O
- Explaining Performance Impact of MAXPIECESIZE, FILESPERSET, MAXOPENFILES and BACKUP DURATION

» Diagnosing the Database

- Data Recovery Advisor (DRA)
- Block Corruption
- Automatic Diagnostic Repository (ADR)
- Health Monitor
- The ADR Command-Line Tool, ADRCI

» Using Flashback Technology I

- Flashback Technology: Overview and Setup
- Using Flashback Technology to Query Data
- Flashback Table
- Flashback Transaction Query
- Performing Flashback Transaction Backout

» Using Flashback Technology II

- Oracle Total Recall
- Flashback Drop and the Recycle Bin

» Performing Flashback Database

- Configuring Flashback Database
- Performing Flashback Database Operations
- Monitoring Flashback Database

» Managing Memory

- Oracle Memory Structures
- Oracle Database Memory Parameters
- Using Automatic Memory Management
- Automatic Shared Memory Management
- Using Memory Advisors
- Using Data Dictionary Views

» Managing Database Performance

- Tuning Activities
- Using Statistic Preferences
- Optimizer Statistics Collection
- Monitor the Performance of Sessions and Services
- Automatic Workload Repository (AWR)
- Describing the Benefits of Database Replay

» Managing Performance by SQL Tuning

- SQL Tuning and SQL Advisors
- Using SQL Tuning Advisor
- SQL Access Advisor
- SQL Performance Analyzer Overview

» Managing Resources

- Database Resource Manager: Overview and Concepts
- Accessing and Creating Resource Plans
- Creating Consumer Group
- Specifying Resource Plan Directives, including
 - Limiting CPU Utilization at the Database Level
 - Instance Caging
 - Activating a Resource Plan
 - Monitoring the Resource Manager

» Automating Tasks with the Scheduler

- Simplifying Management Tasks
- Creating a Job, Program, and Schedule
- Using Time-Based, Event-Based, and Complex Schedules
- Describing the Use of Windows, Window Groups, Job Classes, and Consumer Groups
- Multi-Destination Jobs

» Managing Space in Blocks

- Free Space Management
- Monitoring Space
- Compressing Data

» Managing Space in Segments

- Segment Creation on Demand
- Additional Automatic Space-Saving Functionality
- Shrinking Segments
- Segment Advisor
- Managing Resumable Space Allocation

» Managing Space for the Database

- Using 4 KB-Sector Disks
- Transporting Tablespaces
- Transporting Databases

» Duplicating a Database

- Purpose and Methods of Cloning a Database
- Using RMAN to Create a Duplicate Database
- Cloning a Database from a Backup
- Duplicate a Database Based on a Running Instance
- Targetless Duplicating a Database

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