# Oracle Data Modeling and Relational Database Design Ed 2.1

Oracle Database

| DURATION | MODULES | COURSE CODE |
| --- | --- | --- |
| **4 Days** | **20 Lectures** | **—** |

## Course Overview

This Oracle Data Modeling and Relational Database Design course covers the Data Modeling and Database Development process and the models that are used at each phase of the lifecycle.

## What You Will Learn

- O Course Overview
- Course Objectives O-2
- Agenda: Day 1 O-4
- Agenda: Day 2 O-5
- Agenda: Day 3 O-6
- Agenda: Day 4 O-7
- Oracle SQL Developer Data Modeler O-8
- Appendices in the Course O-10
- Additional Resources O-11

## Introduction to Modeling

- Objectives
- Why Model?
- Modeling: A Practical Example
- Database and Application Development Life Cycle
- Process Modeling
- Logical Data Modeling
- Database Design
- Database Generation
- Data Type Model
- Quiz
- Approaches to Modeling
- Top-Down Modeling
- Bottom-Up Modeling

- Targeted Modeling
- Quiz
- Summary
- Practice 1-1 Overview: Identify the Modeling Approach

## Documenting the Business Background

- Objectives
- Documenting the Business Direction
- Components of a Business Direction Statement
- Business Objective
- Assumption
- Critical Success Factor
- Key Performance Indicator
- Problem
- Devising Business Direction Objectives and Actions
- Quiz
- Summary
- Practice 2-1 Overview: Identify Types of Business Direction Information

## Building a Process Model (Data Flow Diagram)

- Objectives
- What Is a Process Model?
- Benefits of Data Flow Diagrams
- Components of a Data Flow Diagram
- Process
- External Agent
- Information Store
- Information Flow
- Quiz
- Events
- Analyzing Event Responses
- Quiz
- Class Practice: Create a Data Flow Diagram
- Summary
- Practice 3-1 Overview: Create a Data Flow Diagram

## Using Oracle SQL Developer Data Modeler to Create Your Data Flow Diagram

- Objectives
- Running Oracle SQL Developer Data Modeler on Linux
- Running Oracle SQL Developer Data Modeler on Windows
- Main Window
- Setting User Preferences
- Setting User Preferences: Data Modeler
- Building a Data Flow Diagram

- Editing the Diagram Layout
- Adding and Reusing Process Events
- Saving Your Model
- Opening a Saved Model
- Summary
- Practice 4-1 Overview: Build a Data Flow Diagram in Oracle SQL Developer
- Data Modeler

## Validating Your Data Flow Diagram

- Objectives
- DFD Rules: Process
- DFD Rules: External Agents
- DFD Rules: Information Store
- DFD Rules: Information Flow
- Design Rules in Oracle SQL Developer Data Modeler
- Quiz
- Types of Processes
- Primitive Process
- Composite Process
- Transformation Task Process
- Process Decomposition
- Decomposition Guidelines
- Quiz
- Summary
- Practice 5-1 Overview: Decompose a Process in Your Data Flow Diagram

## Identifying Entities and Attributes

- Objectives
- What Is a Logical Data Model?
- Benefits of Creating an Entity Relationship Diagram
- Components of an Entity Relationship Diagram
- Entity
- Entity Types
- Entities and Instances
- Entities Represent Sets
- Quiz
- Attributes
- Attribute Characteristics
- Class Practice: Identify Entities and Attributes
- Summary
- Practice 6-1 Overview: Identify Entities and Attributes
- Practice 6-2 Overview: Identify Entities and Attributes

## Identifying Relationships

- Objectives
- Lesson Agenda
- Relationships
- Components of a Relationship
- Relationships: Additional Examples
- Quiz
- Class Practice: Define Business Rules
- Relationship Types
- Many-to-One and One-to-Many Relationships
- Many-to-Many Relationships
- One-to-One Relationships
- Recursive Relationships
- Quiz
- Lesson Agenda
- Using a Relationship Matrix
- Determining a Relationship’s Existence
- Naming the Relationship
- Determining the Relationship’s Cardinality
- Validating the Relationship
- Quiz
- Class Practice: Build a Relationship Matrix
- Summary
- Practice 7-1 Overview: Analyze and Model Relationships
- Practice 7-2 Overview: Analyze and Model Relationships

## Assigning Unique Identifiers

- Objectives
- Lesson Agenda
- Unique Identifier
- Unique Identifier: Examples
- Identifying Relationships
- Identifying Relationships with Multiple Entities
- Non-Identifying Relationship
- Lesson Agenda
- Primary and Secondary Unique Identifiers
- Searching for Unique Identifiers
- Quiz
- Class Practice: Specify Unique Identifiers
- Summary
- Practice 8-1 Overview: Identify Unique Identifiers
- Practice 8-2 Overview: Identify Unique Identifiers

## Using Oracle SQL Developer Data Modeler to Create an Entity

- Relationship Diagram
- Objectives
- Lesson Agenda
- Building an Entity Relationship Diagram
- Specifying Logical Model General Option
- Specifying Logical Model Diagram Defaults
- Modifying Model Properties
- Notation Types
- Lesson Agenda
- Editing a Diagram Layout: Moving an Object
- Editing a Diagram Layout: Redrawing Lines
- Editing a Diagram Layout: Moving a Relationship Line
- Editing a Diagram Layout: Adding an Elbow
- Editing a Diagram Layout: Showing Levels of Detail
- Editing a Diagram Layout: Resizing Multiple Objects
- Editing a Diagram Layout: Aligning Objects
- Editing a Diagram Layout: Resize Objects to Visible
- Editing a Diagram Layout: Auto Layout Functionality
- Editing a Diagram Layout: Sorting of Attributes in Entities
- Editing a Diagram Layout: Display Comments in RDBMS
- Editing a Diagram Layout: Deprecating Entities
- Editing a Diagram Layout: Deprecating Attributes
- Simple Search Functionality
- Advanced and Global Search Functionality
- Lesson Agenda
- What Is a Subview?
- Creating a Subview
- Lesson Agenda
- What Is a Display?
- Creating a Display
- Opening and Saving a Model
- Exporting a Model
- Importing a Model
- Quiz
- Summary
- Practice 9-1 Overview: Build an ERD in Oracle SQL Developer Data Modeler

## Validating Your Entity Relationship Diagram

- Objectives
- Lesson Agenda
- ERD Checklist
- Attribute Rules
- Distinguishing Attributes and Entities

- Attribute Optionality
- Adding Additional Information to the ERD
- Lesson Agenda
- Data Modeler Reports
- Generating Data Modeler Reports as RTF, HTML, or PDF Formats
- Producing Data Modeling Metadata Reports
- Steps to Produce Data Modeler Reports
- Creating a SYSTEM Database Connection in Oracle SQL Developer
- Creating a New User for Reporting in Oracle SQL Developer
- Creating a Connection for the New Reporting User in Oracle SQL Developer
- Exporting Your Model to the Reporting Schema in Oracle SQL Developer
- Data Modeler
- Running Data Modeler Reports in Oracle SQL Developer
- Quiz
- Summary
- Practice 10-1 Overview: Develop and Validate Your ERD

## Normalizing Your Data Model

- Objectives
- Lesson Agenda
- What Is Normalization?
- First Normal Form (1NF)
- Second Normal Form (2NF)
- Third Normal Form (3NF)
- Quiz
- Lesson Agenda
- Normalization Example: Unnormalized Data
- Normalization Example: Transforming to First Normal Form
- Normalization Example: Transforming to Second Normal Form
- Normalization Example: Transforming to Third Normal Form
- Summary
- Practice 11-1 Overview: Normalize an ERD
- Practice 11-2 Overview: Validate an ERD for Normalization

## Validating Relationships

- Objectives
- Lesson Agenda
- Resolving M:M Relationships
- Quiz
- Modeling Hierarchical Data
- Examining Recursive Relationships
- Resolving an M:M Recursive Relationship
- Quiz
- Lesson Agenda
- Modeling Exclusive Relationships

- Creating an Exclusive Relationship in Oracle SQL Developer Data Modeler
- Quiz
- Entity Type Hierarchies
- Modeling Subtypes in Oracle SQL Developer Data Modeler
- Representing Entity Type Hierarchies
- Changing Preferences for Box-in-Box Presentation
- Quiz
- Model Data over Time
- Summary
- Practice 12-1 Overview: Resolve M:M Relationships
- Practice 12-2 Overview: Model Hierarchical Data
- Practice 12-3 Overview: Model Hierarchical Data and Recursive
- Relationships
- Practice 12-4 Overview: Examine Exclusive Relationships
- Practice 12-5 Overview: Examine Exclusive Relationships

## Adding and Using Data Types

- Objectives
- Lesson Agenda
- Attribute Data Types
- Logical Type
- Types Administration
- Domain
- Adding a Check Constraint to a Domain
- Adding a Range or Value List to a Domain
- Preferred Logical Types and Domains
- Creating Domains from Logical Types
- Lesson Agenda
- Data Type Model
- Distinct Type
- Structured Type
- Using Distinct Types in a Structured Type
- Collection Type
- Building a Data Type Model
- Assigning Data Types to an Attribute
- Quiz
- Summary
- Practice 13-1 Overview: Create and Assign Data Types

## Putting It All Together

- Objectives
- Practice 14-1 Overview: Develop and Validate Your ERD
- Practice 14-2 Overview: Develop and Validate Your ERD (Optional)
- Summary

## Mapping Your Entity Relationship Diagram to a Relational Database Design

- Objectives
- Lesson Agenda
- Benefits of Creating a Relational Model
- Review: Database Design
- Relational Database: Overview
- Terminology Mapping
- Naming Conventions
- Naming Restrictions with Oracle Database
- Ensuring That Your Logical Data Model Is Complete
- Lesson Agenda
- Mapping Simple Entities
- Naming Entities
- Engineering Entities
- Mapping Attributes to Columns
- Mapping Attributes to Columns: Column Names
- Engineering Attributes
- Reviewing the Glossary
- Adding the Glossary as the Naming Standard
- Mapping Attributes to Columns with the Glossary
- Applying Name Abbreviations
- Mapping Unique Identifiers to Primary Keys
- Engineering Unique Identifiers
- Mapping Relationships to Foreign Keys
- Defining Naming Templates
- Applying Templates to One Table
- Applying Templates to the Relational Model
- Managing Prefixes
- Quiz
- Practice 15-1 Overview: Create an Initial Relational Model
- Lesson Agenda
- Mapping Exclusive Relationships to Foreign Keys
- Engineering Exclusive Relationships
- Mapping Subtypes to Tables
- Applying General Options
- Setting Compare/Copy Options
- Viewing the Mapping Comparison
- Synchronizing Deleted Objects
- Identifying Overlapping and Folding Keys
- Summary
- Practice 15-2 Overview: Forward-Engineer a Model

## Analyzing Your Relational Model

- Objectives

- Lesson Agenda
- Relational Model and Relational Model Diagram Preferences
- Reviewing Table Properties
- Previewing the DDL for a Table
- Assigning a Classification Type to One Table
- Changing the Color for Classified Tables
- Assigning Classification Types to Multiple Tables
- Reviewing Column Properties
- Column Auto Increment
- Discovering Foreign Keys
- Defining a Unique Constraint
- Defining Indexes
- Defining a Table-Level Constraint
- Table To View Wizard
- View To Table Wizard
- Specifying Valid Time Dimensions
- Specifying Volume Properties
- Lesson Agenda
- Defining Spatial Properties
- Defining Column Groups
- Creating Views
- Using table_template
- Masking Data
- Redaction Policy
- Creating Masking Template
- TSDP Policy
- Creating Sensitive Type
- Creating TSDP Policy
- Deprecating Tables and Columns
- Clear Source Stamp
- Quiz
- Summary
- Practice 16-1 Overview: Analyze Your Relational Model

## Defining Your Physical Model

- Objectives
- What Is a Physical Model?
- Creating a Physical Model
- RDBMS Administration
- RDBMS Administration: Changing the Default RDBMS Sites
- Creating Physical Model Objects
- Adding a User
- Adding Storage Templates
- Associating Physical Objects with Your Table
- Propagating Properties to Other Physical Objects

- Partitioning a Table
- Creating a Materialized View
- Cloning a Database
- Quiz
- Summary
- Practice 17-1 Overview: Create a Physical Model

## Generating Your Database

- Objectives
- Lesson Agenda
- Database Generation
- Generating DDL: Selecting a Database
- Generating DDL: ‘Create’ Selection
- Generating DDL: DDL Script
- Generating DDL: Assigned to Users
- Generating DDL: ‘Drop’ Selection
- Generating DDL: Name Substitution
- Generating DDL: Including Table Scripts
- Generating DDL: Including SQL*Plus Prompt Command in Generated DDL
- Generating DDL: Masking Oracle Errors
- Generating DDL: Using Find
- Code Folding in DDL File Editor
- DDL Preferences
- IDENTITY Column
- Lesson Agenda
- Design Rules
- Working with Rule Sets
- Working with Custom Rules
- Working with Libraries
- Working with Transformations
- Summary
- Practice 18-1 Overview: Generate DDL

## Altering an Existing Design

- Objectives
- Lesson Agenda
- Approaches to Modeling
- Using Import to Create a Model
- Importing an Existing Database
- Importing Domains
- Quiz
- Lesson Agenda
- Creating a Logical Data Model from Your Relational Model
- Reviewing and Making Changes to Your Logical Model
- Checking the Design Rules

- Forward Engineering to a New Relational Model
- Comparing Your Relational Model Changes with What Is in the Database
- Compare Mapping
- Previewing the DDL
- Comparing and Merging Two Models
- Exporting Your Model
- Exporting to a Data Modeling Design
- Exporting and Importing Preferences, Connections, and Recent Designs
- Quiz
- Lesson Agenda
- Synchronizing the Data Dictionary with Changes in a Model
- Synchronizing the Data Dictionary with Changes in a Model: Example
- Overview
- Modifying the SALARY Column and Synchronizing Data Dictionary with
- the Model
- Reviewing the Change and Setting Some Additional Options
- Reviewing the Generated DDL Script
- Backup Strategy Options
- Running the Generated DDL Script in Oracle SQL Developer and
- Confirming the Change
- Summary
- Practice 19-1 Overview: Re-Engineer the HR Schema

## Working in a Collaborative Environment

- Objectives
- Lesson Agenda
- Collaborative Environment: Example
- What Is Subversion?
- Benefits of Working in a Collaborative Environment
- Creating a Subversion (SVN) Connection
- Creating a Remote Directory
- Adding a Design Model to the Repository
- Making Changes to the Versioned Model
- Reviewing Pending Changes
- Synchronizing Changes
- Resolving Conflicts Between Users
- Reverting Changes
- Reviewing and Comparing Versions in the Repository
- Quiz
- Lesson Agenda
- Branching
- Creating and Working with a Branch
- Creating a Remote Connection and Directory in a Subversion Repository
- Saving a Model in the Subversion Repository
- Creating a Branch Based on the Model
- Committing Changes to the Repository (Trunk)