

# **Oracle Application Express: Developing Web Applications**

**Volume I • Student Guide**

D56782GC20

Edition 2.0

November 2010

D69853

**ORACLE®**

**Authors**

Marcie Young  
Salome Clement

**Technical Contributors  
and Reviewers**

Anthony Rayner  
Bryan Roberts  
Chaitanya Koratamaddi  
Christina Cho  
Christopher Wensley  
Drue Baker  
Ganesh Pitchaiah  
Hailing Huang  
Hilary Farrell  
Iloon Ellen  
Jason Straub  
Jean-Paul Fillon  
Joel Kallman  
Linda Ross  
Nancy Greenberg  
Madhavi Siddireddy  
Maria Billings  
Matthew Gregory  
Michael Hichwa  
Patrick Wolf  
Sharon Kennedy  
Terri Jennings  
Yi Lu  
Wayne Abbott

**Editor**

Daniel Milne

**Graphic Designer**

Maheshwari Krishnamurthy

**Publishers**

Joseph Fernandez  
Jayanthi Keshavamurthy

Copyright © 2010, Oracle and/or its affiliates. All rights reserved.

**Disclaimer**

This document contains proprietary information and is protected by copyright and other intellectual property laws. You may copy and print this document solely for your own use in an Oracle training course. The document may not be modified or altered in any way. Except where your use constitutes "fair use" under copyright law, you may not use, share, download, upload, copy, print, display, perform, reproduce, publish, license, post, transmit, or distribute this document in whole or in part without the express authorization of Oracle.

The information contained in this document is subject to change without notice. If you find any problems in the document, please report them in writing to: Oracle University, 500 Oracle Parkway, Redwood Shores, California 94065 USA. This document is not warranted to be error-free.

**Restricted Rights Notice**

If this documentation is delivered to the United States Government or anyone using the documentation on behalf of the United States Government, the following notice is applicable:

**U.S. GOVERNMENT RIGHTS**

The U.S. Government's rights to use, modify, reproduce, release, perform, display, or disclose these training materials are restricted by the terms of the applicable Oracle license agreement and/or the applicable U.S. Government contract.

**Trademark Notice**

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

# Contents

## Preface

### 1 Course Overview

- Course Objectives 1-2
- Agenda: Day 1 1-3
- Agenda: Day 2 1-4
- Agenda: Day 3 1-5
- Agenda: Day 4 1-6
- Agenda: Day 5 1-7
- Order Management Database Application 1-8
- Websheet Application 1-9
- Course Environment 1-10
- Additional Resources: Application Express OTN Page 1-11
- Oracle Learning Library 1-13
- Additional Resources: Documentation and Tutorials 1-14
- Additional Resources: Online Help 1-15
- Learn More 1-16
- Oracle Application Express Developer Certified Expert 1-17

### 2 Introducing Oracle Application Express

- Objectives 2-2
- Lesson Agenda 2-3
- What Is Oracle Application Express? 2-4
- Why Use Oracle Application Express? 2-5
- Types of Applications 2-6
- Applications Developed by Using Oracle Application Express 2-7
- High-Level Architecture 2-8
- Quiz 2-10
- Lesson Agenda 2-11
- What Is a Workspace? 2-12
- Defining Roles 2-13
- Oracle Application Express Components 2-15
- Implementing Additional Functionality 2-16
- Quiz 2-17
- Lesson Agenda 2-18
- Types of Installation 2-19

Logging In to a Workspace 2-20  
Creating a Developer User 2-21  
Available Sample Applications 2-22  
Running the Sample Database Application 2-23  
Sample Database Application 2-24  
What Is a Packaged Application? 2-25  
Installing a Packaged Application 2-26  
Summary 2-27  
Practice 2: Overview 2-28

### **3 Interacting with the Database by Using SQL Workshop**

Objectives 3-2  
Lesson Agenda 3-3  
What Is SQL Workshop? 3-4  
Component Usage in SQL Workshop 3-5  
Accessing SQL Workshop 3-6  
Navigating in SQL Workshop 3-7  
Lesson Agenda 3-8  
The Object Browser Interface 3-9  
Creating Database Objects 3-10  
What Is a Lookup Table? 3-11  
Creating a Lookup Table 3-12  
Viewing the Created Lookup Table 3-13  
Quiz 3-14  
Lesson Agenda 3-15  
The SQL Commands Interface 3-16  
Running SQL Commands 3-18  
Saving SQL Commands 3-19  
The SQL Scripts Interface 3-20  
Creating and Uploading SQL Scripts 3-21  
Importing and Exporting SQL Scripts 3-22  
Lesson Agenda 3-23  
The Query Builder Interface 3-24  
Building and Running a Query in Query Builder 3-25  
Saving a Query in Query Builder 3-26  
Quiz 3-27  
Lesson Agenda 3-28  
Accessing Utilities 3-29  
Loading and Unloading Data 3-30  
Loading Text and Spreadsheet Data 3-31  
Viewing the Loaded Files in the Data Workshop Repository 3-32

- Unloading to a Text File 3-33
- Unloading to an XML File 3-34
- Lesson Agenda 3-35
- Viewing Object Reports 3-36
- Generating DDL Statements 3-37
- Managing User Interface Defaults 3-38
- Restoring Dropped Database Objects 3-39
- Comparing Schemas 3-40
- Summary 3-41
- Practice 3: Overview 3-42

## **4 Building a Database Application**

- Objectives 4-2
- Lesson Agenda 4-3
- Types of Applications 4-4
- Accessing Application Builder 4-5
- The Application Builder Home Page 4-6
- Lesson Agenda 4-8
- The Database Application Home Page 4-9
- The Components of a Database Application 4-11
- What Is a Page? 4-12
- Different Views of a Page 4-13
- Switching Between Pages and View Types 4-15
- Quiz 4-16
- Lesson Agenda 4-18
- Creating an Application 4-19
- Creating a Database Application 4-20
- Steps to Create a Database Application from Scratch 4-21
- Creating a Database Application from Scratch: Pages Wizard 4-22
- Creating a Database Application from a Spreadsheet 4-24
- Creating a Database Application from a Spreadsheet: Data Wizard 4-25
- Running an Application 4-26
- Using the Developer Toolbar 4-27
- Summary 4-29
- Practice 4: Overview 4-30

## **5 Creating Reports**

- Objectives 5-2
- Lesson Agenda 5-3
- Creating Reports on a New Page 5-4
- Creating a Report Region on an Existing Page 5-5

Types of Reports 5-6  
Selecting the Appropriate Report Type 5-7  
Quiz 5-8  
Lesson Agenda 5-9  
Interactive Report Components 5-10  
Searching for Information in Your Report: All Columns 5-12  
Searching for Information in Your Report: Column Specific 5-13  
Selecting Columns 5-14  
Adding a Column Filter 5-15  
Adding a Row Filter 5-16  
Specifying Rows Per Page 5-17  
Sorting Columns 5-18  
Creating Control Breaks 5-20  
Highlighting a Row or Cell 5-21  
Adding Computed Columns 5-22  
Aggregating Columns 5-23  
Creating a Chart 5-24  
Creating a Group By Report 5-25  
Quiz 5-26  
Performing a Flashback Query 5-27  
Saving a Report 5-28  
Resetting Reports 5-30  
Downloading Data in Different Formats 5-31  
Subscribing to a Report 5-32  
Manipulating the Interactive Report by a Using Column Header 5-33  
Different Views of the Same Interactive Report 5-34  
Quiz 5-35  
Lesson Agenda 5-36  
Creating a New Interactive Report 5-37  
Quiz 5-38  
Lesson Agenda 5-39  
Customizing Your Interactive Report 5-40  
Editing Interactive Report Column Attributes 5-42  
Customizing the Search Bar 5-43  
Including the Download Option 5-44  
Modifying the Interactive Report Query 5-45  
Single Row View 5-46  
Excluding a Link Column 5-47  
Linking to a Custom Page 5-48  
Quiz 5-49  
Lesson Agenda 5-50

Classic (SQL) Report 5-51  
Creating a Classic (SQL) Report 5-52  
Producing Reports 5-53  
Standard Report, Print Enabled 5-55  
Lesson Agenda 5-56  
Wizard Reports 5-57  
Creating a Wizard Report 5-58  
Summary 5-59  
Practice 5: Overview 5-60

## **6 Creating Forms**

Objectives 6-2  
Lesson Agenda 6-3  
Introducing Forms 6-4  
Types of Forms 6-5  
Accessing the Create Form Wizards 6-7  
Lesson Agenda 6-8  
Example: Form on a Table 6-9  
Creating a Form on a Table 6-10  
Example: Form on a Table with Report 6-11  
Creating a Form on a Table with a Report 6-12  
Example: Tabular Form 6-13  
Creating a Tabular Form 6-14  
Example: Master Detail Form 6-15  
Creating a Master Detail Form 6-16  
Quiz 6-17  
Lesson Agenda 6-19  
Using Show/Hide Edit Links 6-20  
Linking a Report to a Form 6-21  
Reordering Items 6-22  
Editing Form Items by Using Edit All 6-23  
Changing Item Display Type 6-24  
Customizing Forms 6-25  
Quiz 6-26  
Summary 6-27  
Practice 6: Overview 6-28

## **7 Working with Pages and Regions**

Objectives 7-2  
Lesson Agenda 7-3  
What Is a Page? (Recap) 7-4

Accessing a Page Definition 7-5  
Page Definition Interface 7-6  
Page Definition Interface: Component View 7-8  
Editing Page Attributes 7-9  
Lesson Agenda 7-11  
Accessing the Create Region Wizards 7-12  
Positioning the Region 7-13  
Conditional Display of Regions 7-14  
Viewing the Regions Page 7-15  
Editing a Region 7-16  
Specifying a Region Header/Footer 7-17  
Enabling Region Display Selection 7-18  
Creating a Region Display Selector 7-19  
Copying Regions 7-20  
Creating a Sub Region 7-21  
Lesson Agenda 7-22  
Page Zero 7-23  
Creating Page Zero 7-24  
Creating a Page Group 7-25  
Assigning Pages to a Page Group 7-26  
Viewing a Page Group 7-27  
Locking a Page 7-28  
Copying a Page 7-29  
Adding Comments 7-30  
Quiz 7-31  
Summary 7-33  
Practice 7: Overview 7-34

## **8 Understanding Session State and Debugging**

Objectives 8-2  
Lesson Agenda 8-3  
What Is Session State? 8-4  
What Is a Session ID? 8-5  
What Is Session Timeout? 8-6  
How Does Oracle Application Express Implement Session State? 8-7  
Identifying the Parts of an Oracle Application Express URL 8-9  
Quiz 8-11  
Lesson Agenda 8-12  
Viewing Session State 8-13  
Methods to Reference Session State 8-14  
Referencing Session State by Using Bind Variable: Examples 8-15



Referencing Session State In Static Text: Example 8-16  
Clearing the Cache 8-17  
Quiz 8-18  
Lesson Agenda 8-19  
What Is the Debug Option? 8-20  
Enabling and Disabling the Debug Mode 8-21  
Debugging an Application 8-22  
Viewing the Debug Messages: SHOW Application 8-23  
Viewing the Debug Messages: ACCEPT Request 8-24  
Summary 8-25  
Practice 8: Overview 8-26

## **9 Adding Items and Buttons**

Objectives 9-2  
Lesson Agenda 9-3  
Examples 9-4  
What Are Application Items? 9-5  
Accessing the Create Page Item Wizard 9-6  
Types of Page Items 9-7  
Lesson Agenda 9-9  
Creating a Date Picker Item 9-10  
Creating Multiple Items: Using the Tabular Form 9-11  
Creating Multiple Items: Using the Drag and Drop Layout 9-12  
Editing an Item 9-13  
Creating Quick Picks 9-14  
Finding Items by Using the Item Finder 9-15  
Quiz 9-17  
Lesson Agenda 9-18  
What Is an LOV? 9-19  
Accessing the Lists of Values Page 9-20  
Creating a Static LOV 9-21  
Creating a Dynamic LOV 9-22  
Associating an LOV with an Item 9-23  
Creating a Select List Item 9-24  
Converting an LOV 9-25  
Creating a Cascading LOV 9-26  
Lesson Agenda 9-27  
What Is a Button? 9-28  
Creating a Button 9-29  
Creating a Region Button 9-30

Accessing the Create Multiple Buttons Option 9-31  
Creating Multiple Buttons 9-32  
Editing Button Attributes 9-33  
Modifying a Region Button to Redirect to a URL 9-34  
Branching with Buttons 9-35  
Quiz 9-36  
Summary 9-37  
Practice 9: Overview 9-38

## **10 Including Page Processing**

Objectives 10-2  
Lesson Agenda 10-3  
Page Rendering Versus Page Processing 10-4  
Types of Logic 10-5  
Scenario 1: Page Rendering 10-6  
Scenario 2: Page Processes 10-7  
Scenario 3: Page Processes 10-8  
Scenario 4: Page Validation 10-9  
Lesson Agenda 10-10  
What Is a Computation? 10-11  
Computation Examples 10-12  
Creating Computations 10-13  
Creating a Page Rendering Computation 10-14  
Creating a Page Processing Computation 10-15  
Quiz 10-16  
Lesson Agenda 10-17  
What Is a Page Process? 10-18  
Automatic Processing Processes 10-19  
Reviewing an Automated Row Fetch Process 10-20  
Reviewing an Automatic Row (DML) Processing Process 10-21  
Creating an On Submit Process 10-22  
Creating an On Load Process 10-23  
Options to Populate Items in a Form 10-24  
Lesson Agenda 10-25  
What Are Validations? 10-26  
Using the Create Validation Wizard 10-27  
Example of SQL Validation 10-28  
Creating a SQL Validation 10-29  
Example of PL/SQL Validation 10-30  
Creating a PL/SQL Validation 10-31

Example of Item String Comparison Validation 10-32  
Creating an Item String Comparison Validation 10-33  
Example of Regular Expression Validation 10-34  
Creating a Regular Expression Validation 10-35  
Example of Tabular Form Validation 10-36  
Creating a Tabular Form Validation 10-37  
Quiz 10-38  
Lesson Agenda 10-39  
What Is Branching? 10-40  
Creating a Branch 10-41  
Summary 10-43  
Practice 10: Overview 10-44

## **11 Using Application and Page Utilities**

Objectives 11-2  
Accessing the Utilities Page 11-3  
Application Dashboard 11-4  
Application Change History 11-5  
Recently Updated Pages 11-6  
Export Repository 11-7  
Debugging Messages 11-8  
Using the Advisor 11-9  
Resolving Advisor Errors/Warnings 11-10  
Changing List of Checks Performed 11-12  
Quiz 11-13  
Practice 11-1 Overview: Using the Advisor 11-14  
Upgrading Application Components 11-15  
Computing Database Object Dependencies 11-16  
Managing Your Attribute Dictionary 11-17  
Changing Item Properties 11-18  
Review Items/Report Columns 11-19  
Modifying Attributes in the Dictionary 11-20  
Reviewing Changes and Updating the Attribute Dictionary 11-22  
Quiz 11-23  
Application Express Views 11-24  
Searching Page Metadata 11-25  
Using Page Utilities 11-26  
Summary 11-27  
Practice 11-2 Overview: Managing the Attribute Dictionary 11-28

## **12 Adding Shared Components That Aid Navigation**

- Objectives 12-2
- Lesson Agenda 12-3
- What Are Shared Components? 12-4
- Navigational Shared Components 12-5
- Lesson Agenda 12-6
- Types of Tabs 12-7
- Accessing the Tabs Page 12-8
- Managing Tabs 12-9
- Creating Parent Tabs 12-10
- Creating Standard Tabs 12-11
- Reassigning a Standard Tab 12-12
- Lesson Agenda 12-13
- Accessing the Lists Page 12-14
- Creating Lists 12-15
- Creating List Entries 12-16
- Creating a List Region 12-17
- Creating a List Region on Page Zero 12-18
- Lesson Agenda 12-19
- Viewing a Breadcrumb 12-20
- Creating Breadcrumb Entries 12-21
- Reparenting Breadcrumbs 12-22
- Creating a Breadcrumb Region 12-23
- Lesson Agenda 12-24
- Accessing the Navigation Bar Entries Page 12-25
- Creating a Help Page 12-26
- Creating a Navigation Bar Entry 12-27
- Quiz 12-28
- Summary 12-29
- Practice 12: Overview 12-30

## **13 Displaying Dynamic Content**

- Objectives 13-2
- Lesson Agenda 13-3
- What Is a Dynamic Action? 13-4
- Creating a Standard Enable/Disable Dynamic Action 13-5
- What Is an Advanced Dynamic Action? 13-7
- Creating an Advanced Set Value with a SQL Statement Dynamic Action 13-8
- Quiz 13-10
- Lesson Agenda 13-11
- What Is a Plug-in? 13-12

Importing a Plug-in 13-13  
Adding a Plug-in Item to a Page 13-15  
Quiz 13-16  
Lesson Agenda 13-17  
Building Charts 13-18  
Creating a Flash Chart 13-20  
Creating a Map 13-22  
Creating an HTML Chart 13-24  
Viewing Chart Attributes 13-25  
Quiz 13-26  
Lesson Agenda 13-28  
Creating a Calendar 13-29  
Editing Calendar Attributes 13-30  
Creating a Link from a Calendar to a Form 13-31  
Lesson Agenda 13-32  
What Is a Tree? 13-33  
Creating Trees 13-34  
Quiz 13-36  
Summary 13-37  
Practice 13: Overview 13-38

## **14 Working with Themes, Templates, and Files**

Objectives 14-2  
Lesson Agenda 14-3  
What Is a Theme? 14-4  
Accessing the Themes Page 14-5  
Creating a New Theme from the Repository 14-6  
Switching Between Themes 14-7  
Creating a Copy of an Existing Theme 14-8  
Editing a Theme 14-9  
Quiz 14-10  
Lesson Agenda 14-11  
What Are Templates? 14-12  
Types of Templates 14-13  
Accessing the Templates Page 14-14  
Copying a Template 14-15  
Editing a Template 14-16  
Applying a Template 14-17  
Applying a Template: Output 14-18  
Using Substitution Strings in Templates 14-19  
Changing Default Templates in a Theme 14-20

Overriding Application Defaults at the Page Level 14-21  
Lesson Agenda 14-22  
Uploading a Cascading Style Sheet 14-23  
Referencing a Cascading Style Sheet 14-24  
Uploading an Image 14-25  
Using an Uploaded Image 14-26  
Quiz 14-27  
Summary 14-28  
Practice 14: Overview 14-29

## **15 Administering Oracle Application Express Workspaces**

Objectives 15-2  
Lesson Agenda 15-3  
Review 15-4  
Accessing the Workspace Administration Page 15-6  
Access to Administrative Tasks 15-7  
Lesson Agenda 15-8  
Creating Oracle Application Express Users 15-9  
Setting User Privileges 15-10  
Creating a User Group 15-11  
Assigning a User to a Group 15-12  
Lesson Agenda 15-13  
Overview 15-14  
Creating a Service Request 15-15  
Setting Workspace Preferences 15-16  
Creating Announcements 15-17  
Viewing Workspace Utilization Reports 15-18  
Lesson Agenda 15-19  
Monitoring Real-Time Activity 15-20  
Viewing an Activity Report 15-21  
Monitoring Archived Activity 15-22  
Quiz 15-23  
Lesson Agenda 15-24  
Viewing the Workspace Dashboard 15-25  
Viewing the Users Dashboard 15-26  
Viewing the Database Dashboard 15-27  
About Other Dashboards 15-28  
Quiz 15-29  
Summary 15-30  
Practice 15: Overview 15-31

## **16 Implementing Security**

- Objectives 16-2
- Lesson Agenda 16-3
- Securing an Application: Overview 16-4
- Accessing Security Tasks 16-5
- Lesson Agenda 16-6
- The Authentication Schemes Page 16-7
- Implementing Authentication 16-8
- Preconfigured Authentication Schemes 16-9
- Creating Authentication Based on Preconfigured Schemes 16-11
- Copying an Authentication Scheme 16-12
- Quiz 16-13
- Lesson Agenda 16-14
- Where Can You Implement Authorization? 16-15
- Methods to Implement Authorization 16-16
- Creating an Authorization Scheme from Scratch 16-17
- Creating an Access Control Page 16-18
- Configuring the Access Control Page 16-19
- Applying an Authorization Scheme to an Application 16-20
- Applying an Authorization Scheme to a Page 16-21
- Applying an Authorization Schemeto a Column in a Report 16-22
- Quiz 16-23
- Lesson Agenda 16-24
- What Is Session State Protection? 16-25
- Enabling Session State Protection from the Edit Application Page 16-26
- Enabling Session State Protection from the Session State Protection Page 16-27
- Configuring Session State Protection 16-28
- Identifying Security Attributes 16-29
- Configuring Session State Protection by Using a Wizard 16-31
- Configuring Session State Protection for Pages and Items 16-32
- Configuring Session State Protection for Application Items 16-33
- Setting Session Timeout 16-34
- Summary 16-35
- Practice 16: Overview 16-36

## **17 Building a Websheet Application**

- Objectives 17-2
- Lesson Agenda 17-3
- What Is a Websheet? 17-4
- Websheets Versus Database Applications 17-5
- Quiz 17-6

Lesson Agenda 17-7  
Creating a Websheet Application 17-8  
Enabling Websheet Properties 17-10  
Running a Websheet 17-11  
Lesson Agenda 17-12  
Creating a Page 17-13  
Incorporating Markup Syntax 17-14  
Quiz 17-15  
Lesson Agenda 17-16  
What Are Data Grids? 17-17  
Creating a Data Grid 17-18  
Data Grid Menus 17-20  
Using Column Header Actions 17-21  
Performing an Inline Edit 17-22  
Editing a Row 17-23  
Changing Multiple Row Values at One Time 17-24  
Changing How a Column Is Displayed 17-25  
Adding a Column 17-26  
Viewing Data Grid Properties 17-27  
Toggling Check Boxes 17-28  
Setting Multiple Column Values 17-29  
Viewing Change History 17-30  
Quiz 17-31  
Lesson Agenda 17-32  
Adding Annotations to a Data Grid 17-33  
Viewing Annotations 17-34  
Lesson Agenda 17-35  
Reports 17-36  
Creating a Report 17-37  
Report Menus 17-39  
Manipulating Report Attributes 17-40  
Editing Your Report Query 17-41  
Including New Columns in Your Report 17-42  
Lesson Agenda 17-43  
Creating a Saved Report 17-44  
Lesson Agenda 17-45  
Adding a Data Grid or Report Section to a Page 17-46  
Using a Data Grid or Report in a Chart Section 17-48  
Adding a Navigation Section 17-50  
Adding a Text Section 17-51  
Moving a Section to a Different Page 17-52



Viewing Change History for a Page 17-53  
Quiz 17-54  
Lesson Agenda 17-55  
Viewing the Websheet Dashboard 17-56  
Monitoring Activity in Your Websheet 17-57  
Lesson Agenda 17-58  
Sharing Websheets with Users 17-59  
1. View the Current Websheet Authentication Method 17-60  
2. Create Users in Application Express Administration 17-61  
3. Create an Access Control List (ACL) in Your Websheet 17-62  
4. Change Websheet Authorization to Use a Custom ACL 17-64  
5. Test User Access to the Websheet 17-65  
Quiz 17-66  
Summary 17-67  
Practice 17: Overview 17-68

## **18 Deploying an Application**

Objectives 18-2  
Lesson Agenda 18-3  
Steps to Deploy an Application 18-4  
What Is a Packaged Application? 18-5  
What Are Supporting Objects? 18-6  
Lesson Agenda 18-7  
Identifying the Supporting Objects for an Application 18-8  
Creating Installation Scripts 18-9  
Specifying Prerequisites and Other Options 18-10  
Specifying Build Options 18-11  
Creating an Installation Script 18-12  
Creating Upgrade Scripts 18-13  
Creating Deinstallation Scripts 18-14  
Accessing the Export Page 18-15  
Exporting an Application 18-16  
Quiz 18-17  
Lesson Agenda 18-18  
Importing an Application 18-19  
Installing the Application 18-20  
Publishing the Application URL 18-21  
Quiz 18-22  
Summary 18-23  
Practice 18: Overview 18-24

## **19 Managing and Maintaining the Application Development Process**

- Objectives 19-2
- What Is Team Development? 19-3
- Tracking the Progress of Your Application Development Project 19-4
- Creating and Updating Features 19-5
- Creating and Updating Milestones 19-6
- Creating Bugs 19-7
- Creating and Updating To Dos 19-8
- Quiz 19-9
- Managing Preferences 19-12
- Managing Links and News 19-13
- Viewing the Release Summary 19-14
- Utilizing Team Development Utilities 19-15
- Review Team Development Dashboard 19-16
- Using the Tag Cloud 19-17
- Review the Progress of Your Milestones and Features 19-18
- Enabling Feedback for an Application 19-19
- Enabling Feedback in Application Properties 19-20
- Creating a Feedback Page 19-21
- Submitting Feedback 19-22
- Accessing Submitted Feedback in Team Development 19-23
- Quiz 19-24
- Summary 19-25
- Practice 19: Overview 19-26

## **Appendix A: Converting Oracle Forms Applications**

- Objectives A-2
- Oracle Application Express for Oracle Forms Developers A-3
- Forms Conversion: Overview A-5
- Converting Your Oracle Forms Application A-6
- Converting Oracle Forms to XML A-8
- Creating a Workspace and Adding Oracle Application Express Users A-9
- Uploading Database Objects A-11
- Creating a Conversion Project A-12
- Editing Your Conversion Project A-14
- Reviewing and Editing Forms Metadata A-15
- Setting Up Application Defaults A-16
- Generating Your Application Express Application A-17
- Reviewing Your Application A-18
- Summary A-19