Contents

Preface xxv

Acknowledgments xxvii

Chapter 1 Introduction 1

Outstanding Features about This Book 2
Who This Book Is For 2
What This Book Covers 2
How This Book Is Organized and How to Use This Book 5
How to Use the Source Code and Sample Databases 6
Instructors and Customers Supports 8

Chapter 2 Introduction to Databases 10

2.1 What Are Databases and Database Programs? 11
  2.1.1 File Processing System 11
  2.1.2 Integrated Databases 12
2.2 Develop a Database 13
2.3 Sample Database 14
  2.3.1 Relational Data Model 14
  2.3.2 Entity-Relationship Model 17
2.4 Identifying Keys 17
  2.4.1 Primary Key and Entity Integrity 17
  2.4.2 Candidate Key 18
  2.4.3 Foreign Keys and Referential Integrity 18
2.5 Define Relationships 19
  2.5.1 Connectivity 19
2.6 ER Notation 21
2.7 Data Normalization 22
  2.7.1 First Normal Form (1NF) 22
  2.7.2 Second Normal Form (2NF) 23
  2.7.3 Third Normal Form (3NF) 24
2.8 Database Components in Some Popular Databases 26
  2.8.1 Microsoft Access Databases 26
    2.8.1.1 Database File 27
    2.8.1.2 Tables 27
    2.8.1.3 Queries 27
  2.8.2 SQL Server Databases 28
    2.8.2.1 Data Files 28
    2.8.2.2 Tables 29
    2.8.2.3 Views 29
    2.8.2.4 Stored Procedures 29
    2.8.2.5 Keys and Relationships 30
    2.8.2.6 Indexes 30
    2.8.2.7 Transaction Log Files 30
  2.8.3 Oracle Databases 31
    2.8.3.1 Data Files 31
    2.8.3.2 Tables 31
    2.8.3.3 Views 32
    2.8.3.4 Stored Procedures 32
    2.8.3.5 Indexes 33
    2.8.3.6 Initialization Parameter Files 33
    2.8.3.7 Control Files 33
    2.8.3.8 Redo Log Files 34
    2.8.3.9 Password Files 34
  2.9 Create Microsoft Access Sample Database 34
    2.9.1 Create the LogIn Table 34
    2.9.2 Create the Faculty Table 36
    2.9.3 Create the Other Tables 38
    2.9.4 Create Relationships among Tables 41
  2.10 Create Microsoft SQL Server 2008 Sample Database 44
    2.10.1 Create the LogIn Table 46
    2.10.2 Create the Faculty Table 48
    2.10.3 Create Other Tables 49
    2.10.4 Create Relationships among Tables 54
      2.10.4.1 Create Relationship between the LogIn and the Faculty Tables 54
      2.10.4.2 Create Relationship between the LogIn and the Student Tables 57
      2.10.4.3 Create Relationship between the Faculty and the Course Tables 58
      2.10.4.4 Create Relationship between the Student and the StudentCourse Tables 59
      2.10.4.5 Create Relationship between the Course and the StudentCourse Tables 60
  2.11 Create Oracle 11g XE Sample Database 61
    2.11.1 Create a New Oracle Customer User or User Account 63
    2.11.2 Create New Customer Sample Database CSE_DEPT 65
    2.11.3 Create the LogIn Data Table 69
    2.11.4 Create the Faculty Data Table 71
    2.11.5 Create Other Tables 74
    2.11.6 Create the Constraints between Tables 78
2.11.6.1 Create the Constraints between the LogIn and Faculty Tables  78
2.11.6.2 Create the Constraints between the LogIn and Student Tables  81
2.11.6.3 Create the Constraints between the Course and Faculty Tables  83
2.11.6.4 Create the Constraints between the StudentCourse and Student Tables  83
2.11.6.5 Create the Constraints between the StudentCourse and Course Tables  85

2.12 Chapter Summary 87
Homework 88

Chapter 3 Introduction to ADO.NET  91

3.1 The ADO and ADO.NET  91
3.2 Overview of ADO.NET  93
3.3 The Architecture of ADO.NET  94
3.4 The Components of ADO.NET  95
   3.4.1 The Data Provider  95
       3.4.1.1 The ODBC Data Provider  97
       3.4.1.2 The OLEDB Data Provider  97
       3.4.1.3 The SQL Server Data Provider  98
       3.4.1.4 The Oracle Data Provider  98
   3.4.2 The Connection Class  99
       3.4.2.1 The Open() Method of the Connection Class  101
       3.4.2.2 The Close() Method of the Connection Class  102
       3.4.2.3 The Dispose() Method of the Connection Class  102
   3.4.3 The Command and the Parameter Classes  103
       3.4.3.1 The Properties of the Command Class  103
       3.4.3.2 The Constructors and Properties of the Parameter Class  104
       3.4.3.3 Parameter Mapping  105
       3.4.3.4 The Methods of the ParameterCollection Class  107
       3.4.3.5 The Constructor of the Command Class  108
       3.4.3.6 The Methods of the Command Class  109
   3.4.4 The DataAdapter Class  112
       3.4.4.1 The Constructor of the DataAdapter Class  112
       3.4.4.2 The Properties of the DataAdapter Class  112
       3.4.4.3 The Methods of the DataAdapter Class  113
       3.4.4.4 The Events of the DataAdapter Class  113
   3.4.5 The DataReader Class  115
   3.4.6 The DataSet Component  117
       3.4.6.1 The DataSet Constructor  119
       3.4.6.2 The DataSet Properties  120
       3.4.6.3 The DataSet Methods  120
       3.4.6.4 The DataSet Events  121
   3.4.7 The DataTable Component  123
       3.4.7.1 The DataTable Constructor  124
       3.4.7.2 The DataTable Properties  125


Chapter 4 Introduction to Language Integrated Query (LINQ) 149

4.1 Overview of Language Integrated Query 149
4.1.1 Some Special Interfaces Used in LINQ 150
  4.1.1.1 The IEnumerable and IEnumerable(Of T) Interfaces 150
  4.1.1.2 The IQueryable and IQueryable(Of T) Interfaces 151
4.1.2 Standard Query Operators 152
4.1.3 Deferred Standard Query Operators 154
  4.1.3.1 AsEnumerable (Conversion Purpose) 154
  4.1.3.2 Cast (Conversion Purpose) 154
  4.1.3.3 Join (Join Purpose) 154
  4.1.3.4 OfType (Conversion Purpose) 156
  4.1.3.5 OrderBy (Ordering Purpose) 156
  4.1.3.6 Select (Projection Purpose) 157
  4.1.3.7 Where (Restriction Purpose) 158
4.1.4 Nondeferred Standard Query Operators 158
  4.1.4.1 ElementAt (Element Purpose) 158
  4.1.4.2 First (Element Purpose) 159
  4.1.4.3 Last (Element Purpose) 159
  4.1.4.4 Single (Element Purpose) 159
  4.1.4.5 ToArray (Conversion Purpose) 160
  4.1.4.6 ToList (Conversion Purpose) 160
4.2 Introduction to LINQ Query 161
4.3 The Architecture and Components of LINQ 164
  4.3.1 Overview of LINQ to Objects 165
  4.3.2 Overview of LINQ to DataSet 165
  4.3.3 Overview of LINQ to SQL 166
  4.3.4 Overview of LINQ to Entities 167
  4.3.5 Overview of LINQ to XML 168
4.4 LINQ to Objects 168
  4.4.1 LINQ and ArrayList 169
  4.4.2 LINQ and Strings 170
    4.4.2.1 Query a String to Determine the Number of Numeric Digits 171
    4.4.2.2 Sort Lines of Structured Text by any Field in the Line 172
  4.4.3 LINQ and File Directories 175
    4.4.3.1 Query the Contents of Files in a Folder 175
  4.4.4 LINQ and Reflection 177
4.5 LINQ to DataSet 179
4.5.1 Operations to DataSet Objects 179
  4.5.1.1 Query Expression Syntax 180
  4.5.1.2 Method-Based Query Syntax 182
  4.5.1.3 Query the Single Table 184
  4.5.1.4 Query the Cross Tables 186
  4.5.1.5 Query Typed DataSet 189
4.5.2 Operations to DataRow Objects Using the Extension Methods 192
4.5.3 Operations to DataTable Objects 196
4.6 LINQ to SQL 197
4.6.1 LINQ to SQL Entity Classes and DataContext Class 198
4.6.2 LINQ to SQL Database Operations 202
  4.6.2.1 Data Selection Query 203
  4.6.2.2 Data Insertion Query 205
  4.6.2.3 Data Updating Query 206
  4.6.2.4 Data Deletion Query 207
4.6.3 LINQ to SQL Implementations 210
4.7 LINQ to Entities 210
4.7.1 The Object Services Component 211
4.7.2 The ObjectContext Component 211
4.7.3 The ObjectQuery Component 211
4.7.4 LINQ to Entities Flow of Execution 211
  4.7.4.1 Construct an ObjectQuery Instance 212
  4.7.4.2 Compose a LINQ to Entities Query 212
  4.7.4.3 Convert the Query to Command Trees 212
  4.7.4.4 Execute the Query 213
  4.7.4.5 Materialize the Query 214
4.7.5 Implementation of LINQ to Entities 214
4.8 LINQ to XML 215
4.8.1 LINQ to XML Class Hierarchy 215
4.8.2 Manipulate XML Elements 216
  4.8.2.1 Creating XML from Scratch 216
  4.8.2.2 Insert XML 218
  4.8.2.3 Update XML 219
  4.8.2.4 Delete XML 220
4.8.3 Manipulate XML Attributes 220
  4.8.3.1 Add XML Attributes 220
  4.8.3.2 Get XML Attributes 221
  4.8.3.3 Delete XML Attributes 222
4.8.4 Query XML with LINQ to XML 222
  4.8.4.1 Standard Query Operators and XML 223
  4.8.4.2 XML Query Extensions 224
  4.8.4.3 Using Query Expressions with XML 224
  4.8.4.4 Using XPath and XSLT with LINQ to XML 225
  4.8.4.5 Mixing XML and Other Data Models 225
Contents

5.14 Query Data from the Course Table for the Course Form 295
5.14.1 Build the Course Queries Using the Query Builder 296
5.14.2 Bind Data Columns to the Associated Controls in the Course Form 298
5.15 Develop Codes to Query Data for the Course Form 300
5.15.1 Query Data from the Course Table Using the TableAdapter Method 300
5.15.2 Query Data from the Course Table Using the LINQ to DataSet Method 302
5.16 Query Data from Oracle Database Using Design Tools and Wizards 304
5.16.1 Introduction to dotConnect for Oracle 6.30 Express 305
5.16.2 Create a New Visual Basic.NET Project: SelectWizardOracle 305
5.16.3 Select and Add Oracle Database 11g XE as the Data Source 307
5.16.4 Modify the Codes to Access the Oracle Database 310

Part II Data Query with Runtime Objects 311

5.17 Introduction to Runtime Objects 312
5.17.1 Procedure of Building a Data-Driven Application Using Runtime Object 314
5.18 Query Data from Microsoft Access Database Using Runtime Object 315
5.18.1 Query Data Using Runtime Objects for the LogIn Form 315
5.18.1.1 Declare Global Variables and Runtime Objects 316
5.18.1.2 Connect to the Data Source with the Runtime Object 317
5.18.1.3 Coding for Method 1: Using DataSet-TableAdapter to Query Data 318
5.18.1.4 Coding for Method 2: Using the DataReader to Query Data 320
5.18.1.5 Clean up the Objects and Terminate the Project 321
5.18.2 Coding for the Selection Form 322
5.18.3 Query Data Using Runtime Objects for the Faculty Form 323
5.18.4 Query Data Using Runtime Objects for the Course Form 331
5.18.5 Query Data Using Runtime Objects for the Student Form 339
5.18.5.1 Coding for the Student Form_Load Event Procedure 341
5.18.5.2 Coding for the Select Button Click Event Procedure 342
5.19 Query Data from SQL Server Database Using Runtime Object 349
5.19.1 Migrating from Access to SQL Server and Oracle Databases 350
5.19.2 Query Data Using Runtime Objects for the LogIn Form 353
5.19.2.1 Declare the Runtime Objects 354
5.19.2.2 Connect to the Data Source with the Runtime Object 354
5.19.2.3 Coding for Method 1: Using the TableAdapter to Query Data 356
5.19.2.4 Coding for Method 2: Using the DataReader to Query Data 357
5.19.3 The Coding for the Selection Form 359
5.19.4 Query Data Using Runtime Objects For the Faculty Form 359
5.19.5 Query Data Using Runtime Objects for the Course Form 362
5.19.6 Retrieve Data from Multiple Tables Using Tables JOINS 363
5.19.7 Query Data Using Runtime Objects for the Student Form 367
Chapter 5 Data Retrieving with Visual Basic.NET

5.19 Query Student Data Using Stored Procedures
5.19.8 Create the Stored Procedure
5.19.8.1 Call the Stored Procedure
5.19.8.3 Query Data Using Stored Procedures for Student Form
5.19.8.4 Query Data Using More Complicated Stored Procedures

5.20 Query Data from Oracle Database Using Runtime Object
5.20.1 Install and Configure the Oracle Database 11g Express Edition
5.20.2 Configure the Oracle Database Connection String
5.20.3 Query Data Using Runtime Objects for the LogIn Form
5.20.4 The Coding for the Selection Form
5.20.5 Query Data Using Runtime Objects for the Faculty Form
5.20.6 Query Data Using Runtime Objects and LINQ to DataSet for the Course Form
5.20.7 The Stored Procedures in Oracle Database Environment
5.20.8 Create the Faculty_Course Package for the Course Form
5.20.9 Query Data Using the Oracle Package For the Course Form

5.21 Chapter Summary
Homework

Chapter 6 Data Inserting with Visual Basic.NET

Part I Data Inserting with Visual Studio.NET Design Tools and Wizards

6.1 Insert Data into a Database
6.1.1 Insert New Records into a Database Using the TableAdapter.Insert Method
6.1.2 Insert New Records into a Database Using the TableAdapter.Update Method

6.2 Insert Data into the SQL Server Database Using a Sample Project InsertWizard
6.2.1 Create New Project Based on the SelectWizard Project
6.2.2 Application User Interfaces
6.2.3 Validate Data Before the Data Insertion
6.2.3.1 Visual Basic Collection and .NET Framework Collection Classes
6.2.3.2 Validate Data Using the Generic Collection
6.2.4 Initialization Coding for the Data Insertion
6.2.5 Build the Insert Query
6.2.5.1 Configure the TableAdapter and Build the Data Inserting Query
6.2.6 Develop Codes to Insert Data Using the TableAdapter.Insert Method
6.2.7 Develop Codes to Insert Data Using the TableAdapter.Update Method 430
6.2.8 Insert Data into the Database Using the Stored Procedures 435
   6.2.8.1 Create the Stored Procedure Using the TableAdapter Query Configuration Wizard 436
   6.2.8.2 Modify the Codes to Perform the Data Insertion Using the Stored Procedure 436
6.3 Insert Data into the Oracle Database Using a Sample Project InsertWizardOracle 441

Part II Data Insertion with Runtime Objects 442
6.4 The General Runtime Objects Method 442
6.5 Insert Data into the SQL Server Database Using the Runtime Object Method 444
   6.5.1 Insert Data into the Faculty Table for the SQL Server Database 444
      6.5.1.1 Develop the Codes to Insert Data into the Faculty Table 444
6.6 Insert Data into the Microsoft Access Database Using the Runtime Objects 453
   6.6.1 Modify the Imports Commands and the ConnModule 454
   6.6.2 Modify the Database Connection String 454
   6.6.3 Modify the LogIn Query Strings 455
   6.6.4 Modify the Faculty Query String 456
   6.6.5 Modify the Faculty Insert String 458
   6.6.6 Modifications to Other Forms 459
6.7 Insert Data into the Oracle Database Using the Runtime Objects 461
   6.7.1 Add the Oracle Driver Reference and Modify the Imports Commands 462
   6.7.2 Modify the Database Connection String 463
   6.7.3 Modify the LogIn Query Strings 464
   6.7.4 Modify the Faculty Query String and Query Related Codes 466
   6.7.5 Modify the Faculty Insert String and Insertion Related Codes 466
   6.7.6 Modifications to Other Forms 468
      6.7.6.1 Modify the Codes in the Selection Form 469
      6.7.6.2 Modify the Codes in the Course Form 469
      6.7.6.3 Modify the Codes in the Student Form 470
      6.7.6.4 Modify the Codes in the SP Form 470
6.8 Insert Data into the Database Using Stored Procedures 471
   6.8.1 Insert Data into the SQL Server Database Using Stored Procedures 471
      6.8.1.1 Develop Stored Procedures of SQL Server Database 471
      6.8.1.2 Develop Codes to Call Stored Procedures to Insert Data into the Course Table 474
   6.8.2 Insert Data into the Oracle Database Using Stored Procedures 478
      6.8.2.1 Develop Stored Procedures in Oracle Database 479
      6.8.2.2 Develop Codes to Call Stored Procedures to Insert Data into the Course Table 483
Chapter 7 Data Updating and Deleting with Visual Basic.NET

Part I Data Updating and Deleting with Visual Studio.NET Design Tools and Wizards

7.1 Update or Delete Data Against Databases
7.1.1 Update or Delete Data from Related Tables in a DataSet
7.1.2 Update or Delete Data Against Database Using TableAdapter DBDirect Methods: TableAdapter.Update and TableAdapter.Delete
7.1.3 Update or Delete Data Against Database Using TableAdapter.Update Method
7.2 Update and Delete Data for Microsoft SQL Server Database
7.2.1 Create a New Project Based on the InsertWizard Project
7.2.2 Application User Interfaces
7.2.3 Validate Data before the Data Updating and Deleting
7.2.4 Build the Update and Delete Queries
    7.2.4.1 Configure the TableAdapter and Build the Data Updating Query
    7.2.4.2 Build the Data Deleting Query
7.2.5 Develop Codes to Update Data Using the TableAdapter DBDirect Method
    7.2.5.1 Modifications of the Codes
    7.2.5.2 Creations of the Codes
7.2.6 Develop Codes to Update Data Using the TableAdapter.Update Method
7.2.7 Develop Codes to Delete Data Using the TableAdapter DBDirect Method
7.2.8 Develop Codes to Delete Data Using the TableAdapter.Update Method
7.2.9 Validate the Data after the Data Updating and Deleting
7.3 Update and Delete Data for Oracle Database
7.4 Update and Delete Data for Microsoft Access Database

Part II Data Updating and Deleting with Runtime Objects

7.5 The Runtime Objects Method
7.6 Update and Delete Data for SQL Server Database Using the Runtime Objects
    7.6.1 Update Data Against the Faculty Table for the SQL Server Database
        7.6.1.1 Develop Codes to Update the Faculty Data
        7.6.1.2 Validate the Data Updating
7.6.2 Delete Data from the Faculty Table for the SQL Server Database 517
  7.6.2.1 Develop Codes to Delete Data 517
  7.6.2.2 Validate the Data Deleting 518
7.7 Update and Delete Data for Oracle Database Using the Runtime Objects 520
  7.7.1 Add the Oracle Namespace Reference and Modify the Imports Command 521
  7.7.2 Modify the Connection String and Query String for the LogIn Form 522
    7.7.2.1 Modify the Connection String in the Form Load Event Procedure 522
    7.7.2.2 Modify the SELECT Query String in the TabLogIn Button Event Procedure 522
    7.7.2.3 Modify the SELECT Query String in the ReadLogIn Button Event Procedure 523
  7.7.3 Modify the Query Strings for the Faculty Form 523
    7.7.3.1 Modify the SELECT Query String for the Select Button Event Procedure 523
    7.7.3.2 Modify the INSERT Query String for the Insert Button Event Procedure 523
    7.7.3.3 Modify the UPDATE Query String for the Update Button Event Procedure 524
    7.7.3.4 Modify the DELETE Query String for the Delete Button Event Procedure 524
  7.7.4 Modify the Query Strings for the Course Form 524
    7.7.4.1 Modify the SELECT Query String for the Select Button Event Procedure 525
    7.7.4.2 Modify the SELECT Query String for the CourseList Event Procedure 525
  7.7.5 Modify the Query Strings for the Student Form 525
  7.7.6 Other Modifications 525
7.8 Update and Delete Data Against Database Using Stored Procedures 528
  7.8.1 Update and Delete Data Against SQL Server Database Using Stored Procedures 528
    7.8.1.1 Modify the Existing Project to Create Our New Project 529
    7.8.1.2 Modify the Codes to Update and Delete Data from the Faculty Table 529
    7.8.1.3 Develop Two Stored Procedures in the SQL Server Database 531
    7.8.1.4 Call the Stored Procedures to Perform the Data Updating and Deleting 537
  7.8.2 Update and Delete Data Against Oracle Database Using Stored Procedures 538
    7.8.2.1 Modify the Existing Project to Create Our New Project 538
    7.8.2.2 Modify the Codes to Update and Delete Data from the Faculty Table 539
    7.8.2.3 Develop Stored Procedures in the Oracle Database 542
    7.8.2.4 Call the Stored Procedure to Perform the Data Updating and Deleting 546
Contents

7.8.3 Update and Delete Data Against Databases Using the LINQ to SQL Query 548
7.8.3.1 Create a New Object of the DataContext Class 549
7.8.3.2 Develop the Codes for the Select Button Click Event Procedure 550
7.8.3.3 Develop the Codes for the Update Button Click Event Procedure 551
7.8.3.4 Develop the Codes for the Delete Button Click Event Procedure 552

7.9 Chapter Summary 554

Homework 555

Chapter 8 Accessing Data in ASP.NET 559

8.1 What Is the .NET Framework? 560
8.2 What Is ASP.NET? 561
8.2.1 ASP.NET Web Application File Structure 563
8.2.2 ASP.NET Execution Model 563
8.2.3 What Really Happens When a Web Application Is Executed? 564
8.2.4 The Requirements to Test and Run the Web Project 565
8.3 Develop ASP.NET Web Application to Select Data from SQL Server Databases 566
8.3.1 Create the User Interface: LogIn Form 567
8.3.2 Develop the Codes to Access and Select Data from the Database 569
8.3.3 Validate the Data in the Client Side 573
8.3.4 Create the Second User Interface: Selection Page 574
8.3.5 Develop the Codes to Open the Other Page 576
8.3.6 Modify the Codes in the LogIn Page to Transfer to the Selection Page 577
8.3.7 Create the Third User Interface: Faculty Page 578
8.3.8 Develop the Codes to Select the Desired Faculty Information 580
8.3.8.1 Develop the Codes for the Page_Load Event Procedure 581
8.3.8.2 Develop the Codes for the Select Button Event Procedure 582
8.3.8.3 Develop the Codes for Other Procedures 583
8.3.9 Create the Fourth User Interface: Course Page 587
8.3.9.1 The AutoPostBack Property of the List Box Control 589
8.3.10 Develop the Codes to Select the Desired Course Information 590
8.3.10.1 Coding for the Course Page Loading and Ending Event Procedures 591
8.3.10.2 Coding for the Select Button’s Click Event Procedure 592
8.3.10.3 Coding for the SelectedIndexChanged Event Procedure of the CourseList Box 594
8.3.10.4 Coding for Other User-Defined Subroutine Procedures 595

8.4 Develop ASP.NET Web Application to Insert Data into SQL Server Databases 598
8.4.1 Develop the Codes to Perform the Data Insertion Function 598
8.4.2 Develop the Codes for the Insert Button Click Event Procedure 599
8.4.3 Modify the Codes in the Subroutine ShowFaculty() for the Data Validation 601
8.4.4 Validate the Data Insertion 602
8.5 Develop Web Applications to Update and Delete Data in SQL Server Databases 604
  8.5.1 Modify the Codes for the Faculty Page 605
  8.5.2 Develop the Codes for the Update Button Click Event Procedure 606
  8.5.3 Develop the Codes for the Delete Button Click Event Procedure 609
    8.5.3.1 Relationships between Five Tables in Our Sample Database 609
    8.5.3.2 Data Deleting Sequence 610
    8.5.3.3 Use the Cascade Deleting Option to Simplify the Data Deleting 611
    8.5.3.4 Create the Stored Procedure to Perform the Data Deleting 612
    8.5.3.5 Develop the Codes to Call the Stored Procedure to Perform the Data Deleting 616
  8.6 Develop ASP.NET Web Applications with LINQ to SQL Query 618
    8.6.1 Add an Existing Web Page FacultyLINQ.aspx 620
    8.6.2 Create a New Object of the DataContext Class 621
    8.6.3 Develop the Codes for the Data Selection Query 622
    8.6.4 Develop the Codes for the Data Insertion Query 623
    8.6.5 Develop the Codes for the Data Updating and Deleting Queries 625
  8.7 Develop ASP.NET Web Application to Select Data from Oracle Databases 628
    8.7.1 Add the Oracle Database Reference and Modify Imports Commands 629
    8.7.2 Modify the Connection String in the LogIn Page 629
    8.7.3 Modify the Query String in the LogIn Page 630
    8.7.4 Modify the Query String in the Faculty Page 631
    8.7.5 Modify the Query Strings in the Course Page 633
    8.7.6 Modify the Global Connection Object in the Selection Page 636
  8.8 Develop ASP.NET Web Application to Insert Data into Oracle Databases 636
    8.8.1 Create the Codes for the Insert Button Click Event Procedure 637
    8.8.2 Create the Codes for the TextChanged Event Procedure of the Faculty ID Textbox 639
    8.8.3 Modify the Codes in the Subroutine ShowFaculty() for the Data Validation 639
  8.9 Develop ASP.NET Web Application to Update and Delete Data in Oracle Databases 642
    8.9.1 Build the Codes for the Project to Perform the Data Updating 642
      8.9.1.1 Modifications to the Select Button’s Click Event Procedure 642
      8.9.1.2 Add the Codes to the Update Button Event and UpdateParameters Procedures 643
    8.9.2 Develop Stored Procedures to Perform the Data Deleting 646
      8.9.2.1 Delete an Existing Record from the Faculty Table 646
      8.9.2.2 Develop the Codes for the Delete Button’s Event Procedure 647
      8.9.2.3 Validate the Data Deleting Actions 649
      8.9.2.4 The Constraint Property: On Delete Cascade in the Data Table 650
  8.10 Chapter Summary 653
Homework 654
9.1 What Are Web Services and Their Components? 658
9.2 Procedures to Build a Web Service 659
  9.2.1 The Structure of a Typical Web Service Project 660
  9.2.2 The Real Considerations When Building a Web Service Project 660
  9.2.3 Introduction to Windows Communication Foundation (WCF) 661
    9.2.3.1 What Is WCF? 662
    9.2.3.2 WCF Data Services 662
    9.2.3.3 WCF Services 663
    9.2.3.4 WCF Clients 663
    9.2.3.5 WCF Hosting 664
    9.2.3.6 WCF Visual Studio Templates 664
  9.2.4 Procedures to Build an ASP.NET Web Service 665
9.3 Build ASP.NET Web Service Project to Access SQL Server Database 666
  9.3.1 Files and Items Created in the New Web Service Project 667
  9.3.2 A Feeling of the Hello World Web Service Project As it Runs 671
  9.3.3 Modify the Default Namespace 674
  9.3.4 Create a Base Class to Handle Error Checking for Our Web Service 675
  9.3.5 Create the Real Web Service Class 676
  9.3.6 Add Web Methods into Our Web Service Class 677
  9.3.7 Develop the Codes for Web Methods to Perform the Web Services 678
    9.3.7.1 Web Service Connection Strings 678
    9.3.7.2 Modify the Existing HelloWorld Web Method 680
    9.3.7.3 Develop the Codes to Perform the Database Queries 682
    9.3.7.4 Develop the Codes for Subroutines Used in the Web Method 684
  9.3.8 Develop the Stored Procedure to Perform the Data Query 687
    9.3.8.1 Develop the Stored Procedure WebSelectFacultySP 687
    9.3.8.2 Add Another Web Method to Call the Stored Procedure 688
  9.3.9 Use DataSet as the Returning Object for the Web Method 689
  9.3.10 Build Windows-Based Web Service Clients to Consume the Web Services 692
    9.3.10.1 Create a Web Service Proxy Class 693
    9.3.10.2 Develop the Graphic User Interface for the Windows-Based Client Project 695
    9.3.10.3 Develop the Code to Consume the Web Service 696
  9.3.11 Build Web-Based Web Service Clients to Consume the Web Service 703
    9.3.11.1 Create a New Web Site Project and Add an Existing Web Page 704
    9.3.11.2 Add a Web Service Reference and Modify the Web Form Window 704
    9.3.11.3 Modify the Codes for the Related Event Procedures 706
  9.3.12 Deploy the Completed Web Service to Production Servers 710
    9.3.12.1 Copy Web Service Files to the Virtual Directory 712
    9.3.12.2 Publish Precompiled Web Service 713
9.4 Build ASP.NET Web Service Project to Insert Data into SQL Server Database 714
9.4.1 Modify an Existing Web Service Project 714
9.4.2 Develop the Web Service Methods 715
9.4.3 Develop and Modify the Codes for the Code-Behind Page 716
  9.4.3.1 Develop and Modify the First Web Method SetSQLInsertSP 716
  9.4.3.2 Develop the Second Web Method GetSQLInsert 721
  9.4.3.3 Develop the Third Web Method SQLInsertDataSet 725
  9.4.3.4 Develop the Fourth Web Method GetSQLInsertCourse 729
9.4.4 Build Windows-Based Web Service Clients to Consume the Web Services 734
  9.4.4.1 Create a Windows-Based Consume Project and a Web Service Proxy Class 734
  9.4.4.2 Develop the Graphic User Interface for the Client Project 736
  9.4.4.3 Develop the Code to Consume the Web Service 738
9.4.5 Build Web-Based Web Service Clients to Consume the Web Services 749
  9.4.5.1 Create a New Web Site Project and Add an Existing Web Page 750
  9.4.5.2 Add a Web Service Reference and Modify the Web Form Window 750
  9.4.5.3 Modify the Codes for the Related Event Procedures 752
9.5 Build ASP.NET Web Service to Update and Delete Data for SQL Server Database 762
9.5.1 Modify an Existing Web Service Project 763
9.5.2 Guideline in Modifying Related Web Methods 764
  9.5.2.1 Modify the Web Method from SetSQLInsertSP to SQLUpdateSP 764
  9.5.2.2 Modify the Web Method GetSQLInsert to GetSQLCourse 766
  9.5.2.3 Modify the Web Method GetSQLInsertCourse to GetSQLCourseDetail 768
  9.5.2.4 Add a New Web Method SQLDeleteSP 769
9.5.3 Develop Two Stored Procedures WebUpdateCourseSP and WebDeleteCourseSP 771
  9.5.3.1 Develop the Stored Procedure WebUpdateCourseSP 771
  9.5.3.2 Develop the Stored Procedure WebDeleteCourseSP 774
9.6 Build Windows-Based Web Service Clients to Consume the Web Services 783
9.6.1 Modifications to the File Folder and Project Files 784
9.6.2 Add a New Web Reference to Our Client Project 784
9.6.3 Modify the Codes for the Different Event Procedures and Subroutines 786
  9.6.3.1 Modify the Codes of the Form_Load Event Procedure and Form-Level Variables 786
  9.6.3.2 Modify the Codes for the Select Button Click Event Procedure and Related User-defined Subroutine Procedures 787
  9.6.3.3 Remove the Insert Button Click Event Procedure 788
  9.6.3.4 Modify the Codes for the SelectedIndexChanged Event Procedure 788
  9.6.3.5 Develop the Codes for the Update Button Event Procedure 789
  9.6.3.6 Develop the Codes for the Delete Button Event Procedure 790
9.7 Build Web-Based Web Service Clients to Consume the Web Services 793
  9.7.1 Create a New Web Site Project and Add an Existing Web Page 794
  9.7.2 Add a Web Service Reference and Modify the Web Form Window 794
  9.7.3 Modify the Codes for the Related Event Procedures and Subroutines 796
    9.7.3.1 Modify the Codes in the Page_Load Event Procedure 796
    9.7.3.2 Modify Codes in the Select Button Event Procedure and Related Subroutines 796
    9.7.3.3 Modify the Codes in the SelectedIndexChanged Event Procedure of the Course List Box Control and Related Subroutines 798
    9.7.3.4 Remove the Insert Button Click Event Procedure and the TextChanged Event Procedure of the Course ID Textbox 799
    9.7.3.5 Develop Codes for the Update Button Click Event Procedure 799
    9.7.3.6 Develop Codes for the Delete Button Click Event Procedure 800

9.8 Build ASP.NET Web Service Project to Access Oracle Database 804
  9.8.1 Build a Web Service Project WebServiceOracleSelect 805
  9.8.2 Modify the Connection String 806
  9.8.3 Add Oracle Database References and Modify the Namespace Directories 806
  9.8.4 Modify the Web Method GetSQLSelect and Related Subroutines 807
  9.8.5 Modify the Web Method GetSQLSelectSP and Related Subroutines 809
    9.8.5.1 Modifications to the Stored Procedure WebSelectFacultySP 810
    9.8.5.2 Modifications to the Codes in the Web Method GetSQLSelectSP 814
    9.8.5.3 Modify the Web Method GetSQLSelectDataSet 816

9.9 Build Web Service Client Projects to Consume the Web Service 819

9.10 Build ASP.NET Web Service Project to Insert Data into Oracle Database 820
  9.10.1 Build a Web Service Project WebServiceOracleInsert 820
  9.10.2 Modify the Connection String 821
  9.10.3 Add Oracle Database Reference and Modify the Namespace Directories 822
  9.10.4 Modify the Web Method SetSQLInsertSP and Related Subroutines 822
  9.10.5 Modify the Web Method GetSQLInsert and Related Subroutines 825
  9.10.6 Modify the Web Method SQLInsertDataSet 826
  9.10.7 Modify the Web Method GetSQLInsertCourse and Related Subroutines 828
  9.10.8 Build the Oracle Package WebSelectCourseSP 830

9.11 Build Web Service Client Projects to Consume the Web Service 836

9.12 Build ASP.NET Web Service to Update and Delete Data for the Oracle Database 838
  9.12.1 Build a Web Service Project WebServiceUpdateDelete 838
  9.12.2 Modify the Connection String 839
  9.12.3 Add Oracle Database Reference and Modify the Namespace Directories 839
  9.12.4 Modify the Web Method SQLUpdateSP and Related Subroutines 840
    9.12.4.1 Develop the Stored Procedure UpdateCourse_SP 842
9.12.5 Modify the Web Method GetSQLCourse and Related Subroutines 845
9.12.6 Modify the Web Method GetSQLCourseDetail and Related Subroutines 847
9.12.7 Modify the Web Method SQLDeleteSP 849
   9.12.7.1 Develop the Stored Procedure WebDeleteCourseSP 850
9.13 Build Web Service Client Projects to Consume the Web Service 855
9.14 Chapter Summary 856
Homework 857

Index 860

About the Author 868