Table of Contents

How to Use This Guide 6
Acknowledgments 7
Disclaimer 7
Table of Contents 8
Chapter 1 Introduction 14
Objectives 14
Before You Begin 14
Lesson 1: IBM U2 as a Client/Server Platform. 15
Welcome 15
Setting the Stage 16
IBM U2 and Middleware 17
Working with the Database 21
Lesson 2: Installing UniVerse Personal Edition 23
Downloading UniVerse Personal Edition 23
Installing the UniVerse Database Server 24
Installing Client Developers Tools 26
Important Notice for Administrators 27
Starting UniVerse under Windows 27
Installing the Training Database 28
Chapter 2 IBM UniObjects 29
Objectives 29
Lesson 1 UniObjects for COM 30
The UniObjects Family 30
Starting with Native UniObjects 31
Windows Scripting Languages 32
A Word on Scripting Languages 33
Starting VBScript 34
Exercise 2.1.1 Running VBScript 35
Exercise 2.1.2 More VBScript 35
VBScript and COM Libraries 40
Exercise 2.1.3 VBScript and COM Control 41
Error Trapping 42
Exercise 2.1.4 Error Trapping 43
Starting with UniObjects 45
Exercise 2.1.5 Connecting to UniVerse 47
Identifying a UniObjects Session 49
Running a Command 50
Exercise 2.1.6 Running a Command 51
Lab 2.1.1 51
Interactive Commands 52
Lab 2.1.2 Running Interactive Commands 54
Accessing Database Files 55
Reading a Record from a File 55
Exercise 2.1.7 Reading a Record 56
Exercise 2.1.8 Using Dynamic Arrays 58
Converting Data 58

Writing Data to Files 60
Exercise 2.1.9 Updating Records 61
Lab 2.1.3 62
Calling Subroutines 62
Exercise 2.1.10 Calling a Subroutine 64
Lab 2.1.4 67
Conclusion 68
Lesson 2 Introducing UniObjects for .Net 69
What you will need 69
Windows Forms Applications 70
Choosing a Language 71
Exercise 2.2.1 Creating a Windows Forms Application 72
Connecting to the Database 76
Error Trapping 80
Creating a Connection Form 81
Getting Information from the Session 86
Lab 2.2.1 87
Exercise 2.2.2: Disconnecting from the Database 87
Lesson 3: Reading and Writing Records 90
Reading from a File 90
Exercise 2.3.1 Reading a Record 92
Step 1: Adding the Title Form 93
Step 2: Passing the Session Variable 94
Step 3: Linking the Title Form to the Main Form 95
Step 4: Reading the Title Record 97
Step 5 Showing the Title Content 99
Converting Data 101
Dynamic Arrays 103
Exercise 2.3.2 104
Lab 2.3.1: 106
Lab 2.3.2 107
Other Read Operations 109
Exercise 2.3.3: Reading Named Fields 110
Returning Interpreted Descriptors 111
Lab 2.3.3: Using I-Descriptor Lookups 112
Performing Multiple Reads 113
Lab 2.3.4 114
Handling Simple Updates 115
Replacing Dynamic Array Elements 115
Exercise 2.3.5: Replacing Dynamic Array Elements 116
Exercise 2.3.6: Controlling When Updates can Occur 118
Writing Back Changes 120
Exercise 2.3.7: Updating the BOOK_TITLES File 121
Lab 2.3.5 122
Lab 2.3.6 123
Locking and Concurrency Control 124
Using Explicit Locking Methods 125
Exercise 2.3.8: Adding Explicit Locking 126
Exercise 2.3.9: Releasing a Record Lock 128
Lab 2.3.7 129
Locking and Multiple Windows 130

Exercise 2.3.10: Intra-Window Locking 131
Lab 2.3.8 135
Concurrency Strategies 136
Lab 2.3.9 138
Conclusion 139
Lesson 4 Finding Records 140
Drilling Down 140
Exercise 2.4.1: Refocussing the Title Maintenance 142
Exercise 2.4.2: Calling the Title Form from a Drill Down 147
Lab 2.4.1 149
Using Events 149
Calling a Form Using Events 151
Exercise 2.4.2: Defining an Event Using VB.Net: 152
Exercise 2.4.3: Assigning an Event Using VB.Net: 152
Exercise 2.4.4: Defining an Event Using C#: 154
Exercise 2.4.5: Subscribing to an Event using C# 155
Using Alternate Keys 157
Exercise 2.4.6: Constructing an Index 158
Reading a Select List 160
Exercise 2.4.7: Reading an Alternate Key 161
Lab 2.4.2 163
Conclusion 164
Lesson 5 Executing Commands 165
Running Commands 165
Exercise 2.5.1: Capturing a Command Output 167
Blocking Command Output 169
Exercise 2.5.2: Returning Command Data in Blocks 170
Requesting Input 173
Lab 2.5.1 174
Running Enquiry Selections 174
Running SELECT statements 175
Exercise 2.5.3: Selecting the Genres 175
Lab 2.5.2 177
Conclusion 177
Lesson 6: Using XML Queries 178
The UniXML class 179
Exercise 2.6.1: Using the UniXML class for Simple Data 181
Exercise 2.6.2: UniXML with MultiValued Data 185
Using LINQ with XML 190
Some LINQ Fundamentals 191
Exercise 2.6.3: Using LINQ with UniVerse XML 192
Conclusion 203
Lesson 7: Stored Procedures 204
Server Side Basic Restrictions 208
Calling Subroutines 210
Exercise 2.7.1: Calling a Server Subroutine 211
Lab 2.7.1 214
Exercise 2.7.2: Creating a Server class 215
Exercise 2.7.3: Creating a Call Method 220
Lab 2.7.2 Calling a Subroutine for Secondary Updates 222
Black Boxes 223

Using Despatch Routines....225
Lab 2.7.3 Creating a Dispatcher....227
Making the Calls Thread Safe....228
Using Transactions....229
The UniTransaction Class....230
Exercise 2.6.4 Simple Transaction Handling....230
Conclusion....232
Chapter 3 Relational Access....234
Objectives....234
Introduction....234
The UniVerse Calling Interface....236
Lesson 1 Preparing the Server....237
Enabling the Server for UCI....239
Exercise 3.1.1 Creating a Reporting View....241
Lab 3.1.1....243
Exercise 3.1.2 Populating the Reporting Dictionaries....243
Lab 3.1.2....246
Exercise 3.1.3 Cleaning up the Associations....246
Lab 3.1.3....247
Exercise 3.1.4 Making the Columns Visible....247
Lab 3.1.4:....248
Exercise 3.1.5 Publishing your Files....249
Exercise 3.1.6 Controlling File Access....251
Lesson 2 UCI Clients....253
A Very Short History of UDA....253
Selecting your Protocol....256
Accessing UniVerse through OleDB....258
Exercise 3.2.1 Configuring the UCI Client....259
Starting OleDB....262
The ADODB Library....262
Exercise 3.2.2 Connecting to the Data Source....263
Exercise 3.2.3 Running a SQL Selection....265
Returning Results....267
Lab 3.2.1 Fetching Multiple Columns....269
Exercise 3.2.4 Navigating a RecordSet....269
Lab 3.2.2....271
Playing with UniVerse SQL....272
Arithmetic Expressions....272
Column Functions....273
Using EVAL Expressions....274
Group By and Having....275
Sub-Queries....276
Sampling Data....277
Exercise 3.2.5 Joining Tables....277
Lab 3.2.3....280
Exercise 3.2.6 Child Tables....280
Lab 3.2.4....282
Using Parametric Queries....283
Exercise 3.2.7 Parameterized Query....285
Exercise 3.2.7 Calling Stored Procedures....287
Lab 3.2.5....290

Exercise 3.2.8 Returning Record Sets from Stored Procedures....291
Lab 3.2.6....293
Conclusion....294
Lesson 3: UniVerse ODBC....295
Exercise 3.3.1 Setting up the ODBC Connection....296
Connection Settings....299
Exercise 3.3.2 Using ODBC to load Data into Excel....300
Lab 3.3.1 Importing a Join Query....302
Using ODBC with the .NET platform....303
Exercise 3.3.2 Creating an ODBC Connection....305
Exercise 3.3.3 Data Binding to a DataSet....308
Exercise 3.3.4 Populating the DataSet....311
Exercise 3.3.5 Changing the Retrieval Order....314
Exercise 3.3.6 Performing Updates through ODBC....316
Why Calling Update Is a Bad Idea....319
Exercise 3.3.7 Running Native Queries....320
Exercise 3.3.8 Calling Stored Procedures through ODBC....323
Exercise 3.3.9 Using the ADO.NET Data Access Classes....326
Determining Stored Procedure Data Types....332
Beyond the DataSet....333
Lab 3.3.1....334
Exercise 3.3.10 Running Long Queries....334
Other OdbcCommand Methods....338
Using OleDB with ADO.NET....339
Exercise 3.3.11 Using an OledbCommand....340
Exercise 3.3.12 Calling UniVerse Commands....342
The IBM ADO.NET Provider....345
Conclusion....346
Appendix A. Setting up UniData for ODBC....348
Defining the VSG Schema....348