

Contents

Foreword	xv
About the Authors	xvii
About the Technical Reviewer	xix
Acknowledgments	xxi
Introduction	xxiii
CHAPTER 1 Automated Software Testing with .NET	1
What a Tester Needs to Know About .NET Coding	2
Why .NET Languages for Testing?	2
Choosing a .NET Language for a Test Project	3
What Is Automated Software Testing?	4
Technical vs. Nontechnical Testing	4
When to Automate?	5
Project and Personnel Issues	5
Product Issues	6
Additional Test-Management Issues	7
Building a Team for Automated Testing	7
Test Scripts Are Software	8
Goals of Good Testing Software	9
Limitations of Programming Languages for Testing	10
Summary	10
CHAPTER 2 Understanding .NET Testing Choices	11
Objectives	11
.NET Namespaces for Testing	12
Creating a Simple Application for Testing	16
First Windows Forms Testware Application	16
Using Console Applications to Create Testware	23
Using Web Applications to Create Testware	31
Summary	38

CHAPTER 3	The Basics of Storing Test Data	39
	Objectives	39
	Test Results Logging and Project Planning	40
	Working with Text Files on a Test Project	40
	Working with the Windows Registry on a Test Project	59
	Accessing the Windows Registry Programmatically	60
	Working with Database Files on a Test Project	73
	Database Access Basics	73
	Summary	85
CHAPTER 4	An Overview of .NET Error Handling	87
	Objectives	87
	Syntax, Runtime, and Logic Errors	88
	Working with Syntax Errors	88
	Working with Runtime Errors	91
	Working with Logic Errors	91
	Working with Breakpoints	92
	Step Into	93
	Step Over	94
	Step Out	94
	The Debugging Windows	97
	The Locals Window	98
	The Watch Window	98
	The Autos Window	99
	The Immediate and Command Windows	100
	The Call Stack Window	100
	The Data Tips Window	101
	The Just-In-Time Debugger	104
	Using the Try-Catch Statements	109
	Try	110
	Catch	111
	Finally	111
	Scope Issues	112
	Exception Classes	113
	Making an Exception Object	114
	Using Exception Objects	115
	Creating Your Own Exception Class	116
	Throwing Exceptions	117

Using Debug and Trace	122
The Debug Class	123
The Trace Class	125
Trace and Debug Methods	126
TraceListeners	129
Turning On Trace After an Application Is Deployed	135
Summary	138
CHAPTER 5 Creating a Testing Framework	139
Objectives	140
Using Procedures to Create Test Utilities	140
Planning Your Procedures	142
Launching One Program from Another	142
Using Function Procedures	148
Procedure Accessibility	149
Building a Testing Framework Using a Static Class	150
VB .NET Shared Class	152
C# Static Class	154
Adding Existing Classes to Projects	156
Understanding Windows Forms Classes	158
Adding Additional Forms to a Project	158
Displaying Forms	160
Adding Timing to Your Tests	165
Basic Test Timing	165
Synchronous Timing Using the Shell() Method	168
Using the Timer Control	171
Simple GUI Testing Using SendKeys()	173
Summary	183
CHAPTER 6 Creating Testware Components	185
Objectives	186
Defining Properties and Methods	186
Classes and Objects	187
Planning Your Bug-Reporter Application	187
Creating and Using Procedures	193
Adding Error Handling to Methods	199
Creating Reusable Classes	204
Creating Class Members	207
Creating a Class	212

Separating Different Classes into Different Files	222
Validation Code	222
Separating the UI and Processing Components	229
Private and Shared Assemblies	232
Extending and Changing Your Components	236
Summary	249
CHAPTER 7 Automation with Console-Based Testware	251
Objectives	251
Using Console Applications	251
Using Arguments	252
Creating a Simple Example	254
Creating a Test Lab Setup	269
Running One Program from Another	269
Checking for Software Requirements	270
Installing Application Files from a Network Share	272
Creating a Network Share	273
Copying the Files from the Share	278
Saving Testware Reports to a Central Network Share	280
Completing the Application	281
Reporting Status on the Local Computer	283
Using Batch Files	300
Using Windows Scheduler	301
Summary	303
CHAPTER 8 Introduction to Database Testing	305
Objectives	306
Database Application Testing Using the Database Explorer (or Server Explorer)	306
Using the Database Explorer Window for Field-Level Integrity Testing	307
Executing Database Queries Using the Query Designer	312
SQL Statements for Testing	315
Database References vs. Database Connections	317
Automated Database Testing Using ADO.NET	318
ADO.NET Basics	319
Using the Connection and Command Objects	321
Using the DataReader Object	324

Database Testing Using the ASP.NET Data Source Controls	332
Using the Access Data Source Control	333
Working with DataGrids	335
Setting Up the DataAdapter	335
Summary	347
CHAPTER 9 Creating Web-Based Testware	349
Objectives	349
Web Technology Overview	349
Two-Tier Applications	353
Three-Tier Applications	355
N-Tier Applications	359
Creating Web-Based Testware	361
Understanding the Default Web Page Code	362
Code-Behind vs. Single-File Options	364
Inserting Data to a Database	368
Viewing Data from a Database	373
Adding Validation Code	387
Reusing Existing Components	388
Debugging a Web Application	396
The Trace Class	399
Deploying an ASP.NET Application	404
Using the Copy Web and the Publish Web Options	408
Summary	408
CHAPTER 10 Testing COM and Web Services	409
Objectives	409
Web Services vs. COM Components	409
Understanding Web Services	410
Creating a Web Service	411
Testing Web Services	417
Database Access with Web Services	422
Running Remote Testware with Web Services	423
Understanding and Testing COM	427
Referencing a COM Library	427
Accessing and Testing a COM Library	428
Finding Your Project's COM Libraries	435
Summary	436

CHAPTER 11	An Introduction to Visual Studio Team Test	439
	Objectives	439
	Team Test Edition Overview	440
	Team Test Windows	441
	Types of Tests Available	446
	Unit Testing	446
	Data-Driven Unit Testing	456
	Creating Manual Tests	462
	Organizing Tests and Managing Test Runs	464
	Creating Ordered Tests	465
	Web Testing	466
	Load Testing	471
	Summary	475
APPENDIX A	Setting Up Your Computer	477
	Hardware Requirements	477
	Software Requirements	478
	FrontPage Extensions Issues	479
	Unsupported Operating Systems	479
	Setup Instructions	480
	Uninstalling Visual Studio or Express Beta Editions	481
	Choosing Between Visual Studio 2005 or Express Editions	481
	The Exercise Files	482
	Technical Support	483
	Business Address	483
APPENDIX B	VB .NET and C# Quick Reference	485
	Setting Up to Test the Samples	485
	Programming Basics	488
	Comments	488
	Methods	489
	Organizing Code into Classes and Namespaces	489
	Shared and Static	490
	The Main() Method	492
	Namespaces	492
	Directives	495
	Holding Data	495

Declaring Constants	496
Declaring Variables	496
Choosing Types	497
Reference Types and Value Types	499
Data Conversions	501
The Convert Class.....	501
Built-In Conversion Methods.....	502
The C# Cast Operator.....	503
The VB .NET CType().....	503
Implicit Conversions	504
Working with Groups of Data	504
Enumerations	504
Structures	506
Classes	508
Arrays.....	511
Collections	523
More on Objects	524
Working with String	527
String Can Act Like an Array	527
Strings Cannot Be Changed Once Their Data Is Set.....	527
Adding Two Strings Together	528
Strings Can Use Special Characters (Escape Sequences).....	528
C# Can Use String Literals by Adding the @ Symbol.....	529
Programming Statements	530
Conditional Statements	530
Iteration and Jump Statements	536
The For-Each Loop.....	536
The For Loop (C# Only).....	537
The For-Next Loop (VB .NET Only)	538
The While Loop	539
The Do-While Loop.....	539
The Do-Until Loop (VB .NET Only).....	540
The GoTo Jump Statement	541
The Continue Jump Statement	541
The Break or Exit Jump Statements.....	542
The Return Jump Statement	543
The Scope of Variables Inside Loops	543
Operations	544

Operators	545
The Dot Operator	545
The Parentheses Operator	545
The Bracket Operator	546
The Pre and Post Increment Operators (C# Only)	546
The Negation Operator (C# Only)	546
The Multiplicative Operators	547
The Additive Operators	548
The Concatenation Operators	548
The Relational Operators	549
More on the Equality Operators	549
The Logical Operators	551
The Substitution Parameter Operator	554
The Ternary Operator	555
More on Methods	556
Methods Can Return Values	556
Some Methods Do Not Return Values	557
Methods Can Include Parameters	557
Value and Reference Types Affect Parameters	558
You Can Change the Way Value Type Parameters Behave	560
String Parameters Behave Like Value Types	561
VB .NET Has Optional Parameters	562
Using Multiple Versions of a Method	562
Using Properties	563
Summary	564
APPENDIX C Resources and References	565
Testing Books	565
.NET Books (VB .NET and C#)	565
Journals/Periodicals	566
Recommended Testing Websites	566
Other Recommended Websites	567
Recommended Database Design and SQL Resources	567
Resources on Additional Topics of Interest	568
INDEX	569