



CONTENTS

Preface	xvii
1 Graphing Application	1
<i>Introducing Computers, the Internet and Visual Basic .NET</i>	
1.1 What Is a Computer?	1
1.2 Computer Organization	2
1.3 Machine Languages, Assembly Languages and High-Level Languages	3
1.4 Visual Basic .NET	4
1.5 Other High-Level Languages	5
1.6 Structured Programming	6
1.7 Key Software Trend: Object Technology	7
1.8 The Internet and the World Wide Web	8
1.9 Introduction to Microsoft .NET	9
1.10 Test-Driving the Visual Basic .NET Graphing Application	10
1.11 Internet and Web Resources	13
1.12 Wrap-Up	14
2 Welcome Application	18
<i>Introducing the Visual Studio® .NET IDE</i>	
2.1 Test-Driving the Welcome Application	18
2.2 Overview of the Visual Studio .NET IDE	19
2.3 Creating a Project for the Welcome Application	23
2.4 Menu Bar and Toolbar	27
2.5 Visual Studio .NET IDE Windows	28
2.6 Auto Hide	32
2.7 Using Help	33
2.8 Saving and Closing Solutions in Visual Studio .NET	34
2.9 Internet and Web Resources	34
2.10 Wrap-Up	35
3 Welcome Application	41
<i>Introduction to Visual Programming</i>	
3.1 Test-Driving the Welcome Application	41
3.2 Constructing the Welcome Application	44
3.3 Objects used in the Welcome Application	53
3.4 Wrap-Up	54
4 Designing the Inventory Application	63
<i>Introducing TextBoxes and Buttons</i>	
4.1 Test-Driving the Inventory Application	63
4.2 Constructing the Inventory Application	65
4.3 Adding Labels to the Inventory Application	71

4.4	Adding TextBoxes and a Button to the Form	74
4.5	Wrap-Up	76
5	Completing the Inventory Application	83
	<i>Introducing Programming</i>	
5.1	Test-Driving the Inventory Application	83
5.2	Introduction to Visual Basic .NET Code	84
5.3	Inserting an Event Handler	91
5.4	Performing a Calculation and Displaying the Result	94
5.5	Using the Debugger: Syntax Errors	97
5.6	Wrap-Up	101
6	Enhancing the Inventory Application	108
	<i>Introducing Variables, Memory Concepts and Arithmetic</i>	
6.1	Test-Driving the Enhanced Inventory Application	108
6.2	Variables	110
6.3	Handling the TextChanged Event	113
6.4	Memory Concepts	115
6.5	Arithmetic	116
6.6	Using the Debugger: Breakpoints	119
6.7	Internet and Web Resources	122
6.8	Wrap-Up	123
7	Wage Calculator Application	129
	<i>Introducing Algorithms, Pseudocode and Program Control</i>	
7.1	Test-Driving the Wage Calculator Application	129
7.2	Algorithms	130
7.3	Pseudocode	131
7.4	Control Structures	132
7.5	If...Then Selection Statement	134
7.6	If...Then...Else Selection Statement	137
7.7	Constructing the Wage Calculator Application	139
7.8	Assignment Operators	144
7.9	Formatting Text	145
7.10	Using the Debugger: The Watch Window	147
7.11	Wrap-Up	151
8	Dental Payment Application	158
	<i>Introducing CheckBoxes and Message Dialogs</i>	
8.1	Test-Driving the Dental Payment Application	158
8.2	Designing the Dental Payment Application	160
8.3	Using CheckBoxes	161
8.4	Using a Dialog to Display a Message	163
8.5	Logical Operators	168
8.6	Wrap-Up	173
9	Car Payment Calculator Application	180
	<i>Introducing the Do While...Loop and Do Until...Loop Repetition Statements</i>	
9.1	Test-Driving the Car Payment Calculator Application	180
9.2	Do While...Loop Repetition Statement	182
9.3	Do Until...Loop Repetition Statement	184
9.4	Constructing the Car Payment Calculator Application	186
9.5	Wrap-Up	194

10	Class Average Application	202
	<i>Introducing the Do...Loop While and Do...Loop Until Repetition Statements</i>	
10.1	Test-Driving the Class Average Application	202
10.2	Do...Loop While Repetition Statement	204
10.3	Do...Loop Until Repetition Statement	206
10.4	Creating the Class Average Application	208
10.5	Wrap-Up	214
11	Interest Calculator Application	221
	<i>Introducing the For...Next Repetition Statement</i>	
11.1	Test-Driving the Interest Calculator Application	221
11.2	Essentials of Counter-Controlled Repetition	223
11.3	Introducing the For...Next Repetition Statement	224
11.4	Examples Using the For...Next Statement	227
11.5	Constructing the Interest Calculator Application	228
11.6	Wrap-Up	235
12	Security Panel Application	242
	<i>Introducing the Select Case Multiple-Selection Statement</i>	
12.1	Test-Driving the Security Panel Application	242
12.2	Introducing the Select Case Multiple-Selection Statement	244
12.3	Constructing the Security Panel Application	246
12.4	Wrap-Up	255
13	Enhancing the Wage Calculator Application	262
	<i>Introducing Function Procedures and Sub Procedures</i>	
13.1	Test-Driving the Enhanced Wage Calculator Application	262
13.2	Classes and Procedures	263
13.3	Function Procedures	264
13.4	Using Sub Procedures in the Wage Calculator Application	273
13.5	Using the Debugger: Debug Toolbar	277
13.6	Wrap-Up	281
14	Shipping Time Application	288
	<i>Using Dates and Timers</i>	
14.1	Test-Driving the Shipping Time Application	288
14.2	Date Variables	289
14.3	Building the Shipping Time Application: Design Elements	291
14.4	Creating the Shipping Time Application: Inserting Code	296
14.5	Wrap-Up	304
15	Fund Raiser Application	311
	<i>Introducing Scope, Pass-by-Reference and Option Strict</i>	
15.1	Test-Driving the Fund Raiser Application	311
15.2	Constructing the Fund Raiser Application	313
15.3	Passing Arguments: Pass-by-Value vs. Pass-by-Reference	319
15.4	Option Strict	321
15.5	Wrap-Up	327
16	Craps Game Application	333
	<i>Introducing Random-Number Generation</i>	
16.1	Test-Driving the Craps Game Application	333
16.2	Random-Number Generation	335

16.3	Using Enumerations in the Craps Game Application	337
16.4	Using Random Numbers in the Craps Game Application	341
16.5	Wrap-Up	348
17	Flag Quiz Application	354
	<i>Introducing One-Dimensional Arrays and ComboBoxes</i>	
17.1	Test-Driving the Flag Quiz Application	354
17.2	Introducing Arrays	356
17.3	Declaring and Allocating Arrays	358
17.4	Constructing the Flag Quiz Application	360
17.5	Sorting Arrays	371
17.6	Wrap-Up	375
18	Sales Data Application	382
	<i>Introducing Two-Dimensional Arrays, RadioButtons and the MSChart Control</i>	
18.1	Test-Driving the Sales Data Application	382
18.2	Two-Dimensional Rectangular Arrays	384
18.3	Creating and Customizing a Chart Graphic by Using the MSChart Control	386
18.4	Using RadioButtons	392
18.5	Inserting Code into the Sales Data Application	393
18.6	Wrap-Up	398
19	Microwave Oven Application	407
	<i>Building Your Own Classes and Objects</i>	
19.1	Test-Driving the Microwave Oven Application	408
19.2	Designing the Microwave Oven Application	410
19.3	Adding a New Class to the Project	414
19.4	Initializing Class Objects: Constructors	416
19.5	Properties	419
19.6	Completing the Microwave Oven Application	423
19.7	Controlling Access to Members	428
19.8	Using the Debugger: The Autos and Locals Windows	435
19.9	Wrap-Up	438
20	Shipping Hub Application	448
	<i>Introducing Collections, the For Each...Next Statement and Access Keys</i>	
20.1	Test-Driving the Shipping Hub Application	448
20.2	Package Class	451
20.3	Using Properties TabIndex and TabStop	451
20.4	Using Access Keys	453
20.5	Collections	454
20.6	Shipping Hub Application: Using Class ArrayList	455
20.7	For Each...Next Repetition Statement	462
20.8	Wrap-Up	469
21	“Cat and Mouse” Painter Application	478
	<i>Introducing the Graphics Object and Mouse Events</i>	
21.1	Test-Driving the Painter Application	478
21.2	Constructing the Painter Application	480
21.3	Using a Graphics Object	481
21.4	Handling the MouseDown Event	482
21.5	Handling the MouseUp Event	485
21.6	Handling the MouseMove Event	487

21.7	Distinguishing Between Mouse Buttons	490
21.8	Wrap-Up	494
22	Typing Application	501
	<i>Introducing Keyboard Events, Menus and Dialogs</i>	
22.1	Test-Driving the Typing Application	501
22.2	Analyzing the Typing Application	504
22.3	Keyboard Events	505
22.4	Menus	511
22.5	Wrap-Up	525
23	Screen Scraping Application	534
	<i>Introducing String Processing</i>	
23.1	Test-Driving the Screen Scraping Application	534
23.2	Fundamentals of Strings	536
23.3	Analyzing the Screen Scraping Application	537
23.4	Locating Substrings in Strings	537
23.5	Extracting Substrings from Strings	541
23.6	Replacing Substrings in Strings	542
23.7	Other String Methods	544
23.8	Wrap-Up	546
24	Ticket Information Application	553
	<i>Introducing Sequential-Access Files</i>	
24.1	Test-Driving the Ticket Information Application	553
24.2	Data Hierarchy	555
24.3	Files and Streams	557
24.4	Writing to a File: Creating the Write Event Application	557
24.5	Building the Ticket Information Application	567
24.6	Wrap-Up	577
25	ATM Application	586
	<i>Introducing Database Programming</i>	
25.1	Test-Driving the ATM Application	586
25.2	Planning the ATM Application	589
25.3	Creating Database Connections	590
25.4	Programming the ATM Application	602
25.5	Wrap-Up	613
26	CheckWriter Application	621
	<i>Introducing Graphics and Printing</i>	
26.1	Test-Driving the CheckWriter Application	621
26.2	GDI+ Introduction	624
26.3	Constructing the CheckWriter Application	625
26.4	PrintPreviewDialogs and PrintDocuments	627
26.5	Creating an Event Handler for the CheckWriter Application	628
26.6	Graphics Objects: Colors, Lines and Shapes	632
26.7	Printing Each Control of the CheckWriter Application	634
26.8	Font Class	636
26.9	Previewing and Printing the Check	638
26.10	Wrap-Up	645
27	Phone Book Application	652
	<i>Introducing Multimedia Using Microsoft Agent</i>	
27.1	Microsoft Agent	652

27.2	Downloading Microsoft Agent Components	653
27.3	Test-Driving the Phone Book Application	655
27.4	Constructing the Phone Book Application	658
27.5	Wrap-Up	671
28	Bookstore Application: Web Applications <i>Introducing Internet Information Services</i>	678
28.1	Multi-Tier Architecture	678
28.2	Web Servers	679
28.3	Internet Information Services (IIS)	681
28.4	Test-Driving the Bookstore Application	690
28.5	Wrap-Up	694
29	Bookstore Application: Client Tier <i>Introducing Web Controls</i>	699
29.1	Analyzing the Bookstore Application	699
29.2	Creating ASPX Pages	700
29.3	Designing the Books.aspx Page	704
29.4	Designing the BookInformation Page	709
29.5	Wrap-Up	715
30	Bookstore Application: Information Tier <i>Examining the Database and Creating Database Components</i>	725
30.1	Reviewing the Bookstore Application	725
30.2	Information Tier: Database	726
30.3	Using the Server Explorer and Query Builder in ASPX Pages	727
30.4	Wrap-Up	735
31	Bookstore Application: Middle Tier <i>Introducing Code-Behind Files</i>	738
31.1	Reviewing the Bookstore Application	738
31.2	Programming the Books Page's Code-Behind File	739
31.3	Coding the BookInformation Page's Code-Behind File	744
31.4	Internet and Web Resources	751
31.5	Wrap-Up	752
A	Operator Precedence Chart	757
B	ASCII Character Set	758
C	GUI Design Guidelines	759
D	Visual Studio .NET Windows Form Designer Tools	764
D.1	Internet and Web Resources	767
E	Controls, Events, Properties & Methods	768
F	Keyword Chart	792
G	Internet Information Services (IIS) Setup Instructions	794
G.1	Installing IIS	794
	Glossary	798
	Index	810