Contents

About the Author ..... *xi*
Acknowledgments ..... *xiii*
Preface ..... *xv*

Chapter 1: Overview of Visual Basic Programming and the Visual Basic Development Environment *1*

An Overview of Visual Basic Application Development *1*
The Visual Basic Development Environment *2*

Chapter 2: Working with WinForms *21*

WinForms and the .NET Framework *21*

Chapter 3: Controls and Their Uses *39*

Controls and the .NET Framework *39*
Adding Controls to Your Forms *40*
Moving Controls on a Form *41*
Resizing Controls on a Form *42*
Labels *42*
Text Boxes and Rich Text Boxes *44*
Buttons *49*
List Boxes and Combo Boxes *51*
Radio Buttons *54*
Check Boxes *56*
Timers *56*
New .NET Controls *58*
Message and Input Boxes *64*
Using Multiple Controls Together: A Sample Application *67*
Third-Party Scientific Controls *69*

Chapter 4: Variables, Data Types, and Operators ..73

Data Types in VB .NET ..73
Strings ..73
The Char Data Type ..76
Numerical Data Types ..77
Guidelines for Choosing the Appropriate Numerical Data Type ..79
Numerical Operators ..80
The Boolean Data Type ..82
Private and Public Variables ..92
Static Variables ..93

Chapter 5: Arrays and Loop Structures ..95

One-Dimensional Arrays ..95
Multidimensional Arrays ..103
The Erase Statement ..105
For...Next Loops ..105
Nested For...Next Loops ..108
Gaussian Elimination ..109
Indeterminate Loops (Do...Loops) ..114
Nested Loops Revisited ..122

Chapter 6: Built-in Functions ..125

Conversion Functions ..126
String Functions ..131
Mathematical Functions ..142
UCalc Fast Math Parser ..154
MatrixVB ..155

Chapter 7: Writing Your Own Functions and Procedures ..157

Custom Functions ..157
The Trapezoidal Rule ..161
Custom Procedures ..164
Passing Arrays and Array Elements into Procedures and Functions ..169
Passing By Reference and By Value ..170
Functions and Procedure with Optional Arguments ..171

Chapter 8: Getting Data from External Sources 175

File Commands 176
File-Handling Functions 179
Basic Sequential File Handling 181
New VB .NET File-Handling Methods 191
The MSComm Control 193

Chapter 9: Programming Your Own Spreadsheets 199

The MSFlexGrid Control 199
Entering Text into MSFlexGrid Cells 204
Working with Excel Data 212
Getting Your Grids to Dynamically Respond 212

Chapter 10: Scientific Graphics 221

The MSChart Control 221
The Flipper CAD Control 234
The System.Drawing Namespace 234

Chapter 11: Debugging and Error Handling 241

Making Use of Microsoft's IntelliSense Technology 241
Compile as You Go Technology 242
Testing for Errors 242
Grammatical Errors 243
Logical Errors 244
VB Debugging Tools 246
Dr. Watson 251
Error Handling 252

Chapter 12: Packaging and Deploying Your Application *259*

First Steps *259*
The Setup Wizard *260*
Final Steps *269*

Chapter 13: Mathematical Modeling *271*

Defining the Problem *271*
Defining Variables and Parameters *272*
Relating Variables and Parameters *273*
Degree of Freedom Analysis *276*
Mathematical Modeling of a Chemical Plant *277*

Chapter 14: Bioinformatics *285*

Predicting Protein Sequences *285*
Restriction Mapping *295*

Chapter 15: Web-Based Applications *305*

Web Forms and the .NET Framework *307*
Server Controls *310*
Events and Web-Based Applications *316*
A Simple Web-Based Application *317*
Conclusion *320*

Index *321*