Programming in Visual Basic 6.0

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Version 6.0

Julia Case Bradley
Mt. San Antonio College

Anita C. Millspaugh
Mt. San Antonio College

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PROGRAMMING IN VISUAL BASIC 6.0

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Preface

As the world turns to graphical user interfaces, computer programming languages are changing to accommodate the shift. Visual Basic 6 is designed to allow the programmer to develop applications that run under Windows without the complexity generally associated with Windows programming. With very little effort, the programmer can design a screen that holds standard Windows elements such as command buttons, check boxes, option buttons, text boxes, and list boxes. Each of these Windows objects operates as expected, producing a "standard" Windows user interface.

Visual Basic is easy to learn, which makes it an excellent tool for understanding elementary programming concepts. In addition, it has evolved into such a powerful and popular product that skilled Visual Basic programmers are in demand in the job market.

About This Text

This textbook is intended for use in an introductory programming course, which assumes no prior knowledge of computer programming. However, many of the later chapters are appropriate for an advanced-level course. The later chapters are also appropriate for professional programmers who are learning a new language to upgrade their skills.

This text assumes that the student is familiar with the Windows operating environment.

Approach

This text incorporates the basic concepts of programming, problem solving, and programming logic, as well as the design techniques of an event-driven language.

Chapter topics are presented in a sequence that allows the programmer to learn how to deal with a visual interface while acquiring important programming skills such as creating projects with loops, decisions, and data management.

The later chapters may be used in various sequences to accommodate the needs of beginning and advanced-level courses, as well as a shorter quarter system or a semester-long course. For a shorter course, the professor may choose to skip the chapter on data files and cover only the first of the two database chapters.

New in Visual Basic 6

The upgrade from Visual Basic version 5 to version 6 is significant, but not as great a change as the upgrade from version 4 to version 5. The major changes allow developers to use VB for Web page development and perform more robust data management.

VB version 6 introduces new formatting functions to simplify formatting output for display or print. Many new string and numeric functions are also introduced, as well as the new Validate event for input controls and the CausesValidation property for most controls.

New in Visual Basic 5

Visual Basic 5:

- Runs much faster than previous versions and incorporates more features required for professional application development. VB5 is now competitive with C++ for object-oriented program development.
- Incorporates many helpful new features in the editor, making it easier for beginners as well as advanced programmers to enter and edit code. For example:
  - Drag-and-drop editing for moving and copying lines.
  - Pop-up lists of available data types when declaring variables.
  - Pop-up lists of allowable properties and methods for controls.
  - Tips showing formats and arguments for functions and statements that appear automatically as you enter program code.
- Is easier to debug than previous versions. For example:
  - Data tips, similar to tooltips, display the current contents of variables, properties, and expressions, and pop up when you point to the expression during break time.
  - You can easily set breakpoints in code by clicking in the margin of a statement.
  - During break time, you can drag the highlighted line to set the next statement to execute.
- Includes many new controls. For example:
  - Many ActiveX controls for programming on the Web.
  - A new Web Browser control that allows you to retrieve and display Web pages in an application.

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New in This Edition of the Text

This edition is a major revision of the text. The biggest change is the inclusion of object-oriented programming, which is introduced in Chapter 9 and applied in the later chapters.

The text is updated to Windows 98 and Visual Basic 6. It now conforms to Microsoft's newly published coding conventions, which define a three-character prefix for variable names to indicate data type.

The new formatting functions (`FormatNumber`, `FormatCurrency`, `FormatPercent`, and `FormatDateTime`) simplify the formatting of output. And the new Validate event and CausesValidation properties simplify the validation of input data.

In response to many helpful suggestions from students and reviewers, several sections of the text have been reorganized and expanded. The material on creating functions and sub procedures has been expanded, the data file handling has been greatly modified to incorporate object-oriented programming, and the database updating has been simplified through the use of the Validate event.

The advanced techniques chapter (Chapter 15) now includes sections on creating an MDI project with parent and child forms, as well as creating shortcut menus.

This edition places emphasis on the planning steps of project design to encourage students to develop good programming habits from the start.

Students and instructors will appreciate the appendix "Tips and Shortcuts for Mastering the VB Environment." This reference brings together many helpful tips that can save programmers a significant amount of time.

The instructor materials are also updated and expanded. New materials include suggested coding standards and masters of forms for project planning that can be reproduced and distributed to students.

Chapter Organization

Each chapter begins with identifiable objectives and a brief overview. Numerous coding examples as well as hands-on projects with guidance for the coding appear throughout. Thought-provoking feedback questions give students time to reflect on the current topic and to evaluate their understanding of the details. The end-of-chapter items include a chapter review, questions, programming exercises, and two case studies. The case studies provide a continuing-theme exercise that may be used throughout the course.

Chapter 1 walks the student through the creation of a first Visual Basic project, incorporating command buttons and labels. The programming environment is introduced along with the concepts of objects and their related properties, methods, and events. Students are taught to create a new diskette folder and store their project inside the folder.

Chapter 2 continues coverage of controls, including text boxes, option buttons, check boxes, frames, images, lines, and shapes. It also covers some of the finer points of using the environment and working with keyboard access keys, multiple controls, and alignment. The color constants are used at this point to lead the novice programmer into Chapter 3, which introduces variables and constants. The text includes naming conventions to make the scope and data type of a variable or constant easier to determine from the coding syntax. Standards also provide for the use of `Option Explicit` to force the declaration of all variables and constants.

Chapter 4 introduces the relational and logical operators and their use with the `If` statement. Input validation and message boxes are also covered. In Chapter 5 students learn to set up custom menus and to write their own sub functions and sub procedures. Multiple forms, global variables, and standard code modules are presented in Chapter 6.

Chapter 7 incorporates list boxes and combo boxes into the projects, providing the opportunity to discuss looping procedures and printing lists of information. The list concept leads logically into the use of variable arrays and control arrays in Chapter 8.

The all-new Chapter 9 introduces the terminology of object-oriented programming and provides a step-by-step tutorial for creating a new class, instantiating objects of the new class, creating a collection class to hold references to the objects, and displaying and modifying objects from the collection.

Chapter 10 covers both sequential and random files, but the material may be covered in sections. The section on random file handling is accomplished using the object-oriented techniques from Chapter 9.

Chapters 11 and 12 deal with the use of Visual Basic as a front end for database programming. The projects display and update tables created by a database application such as Microsoft Access. Chapter 12 includes using a data-bound grid, error trapping, and writing queries in SQL.

The drag-and-drop feature of Windows programming is introduced in Chapter 13. This chapter normally brings great enthusiasm from students as they learn to deal with the source and target objects. The examples and assignments provide a blend of practical and just-for-fun applications. This approach is also true of Chapter 14, which introduces the graphics methods and graphics controls.

Chapter 15, the final chapter, covers various topics that build a bridge from Visual Basic to other applications. These include using and creating ActiveX controls, the Windows API, DLLs, OLE, Visual Basic for Applications, and MDI and SDI applications, and creating shortcut menus.

Acknowledgments

We would like to express our appreciation to the many people who have contributed to the successful completion of this text. Most especially, we thank our students at Mt. San Antonio College who helped class-test the material and who greatly influenced the manuscript.

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The Authors

We have had fun teaching and writing about Visual Basic. We hope that this feeling is evident as you read this book and that you will enjoy learning or teaching this outstanding programming language.

Julia Case Bradley
Anita C. Millspaugh

To the Student

The best way to learn to program in Visual Basic is to do it. If you enter and run the sample projects, you will be on your way to writing Windows applications. Reading the examples without trying to run them is like trying to learn a foreign language or mathematics just by reading about it. Enter the projects, look up your questions in Visual Basic's excellent Help files, and make those projects *run*.

Format Used for Visual Basic Statements

Visual Basic statements and functions are shown in `this font`. Any values you must supply are in *`italics`*. Optional items are in [square brackets]. Braces and a vertical bar indicate that you must choose one or the other value {one | other}.

Example:

```
Open "FileName" For {Input|Output|Append|Random} As #FileNumber [Len=RecLength]
```

As you work your way through this textbook, note that you may see a subset of the available options for a Visual Basic statement. Generally, the options that are included will reflect those covered in the chapter. If you want to see the complete format for any statement, refer to online Help in the MSDN library or on the Web.

J.C.B.
A.C.M.

Contents

1

Introduction to Visual Basic 1

Writing Windows Applications with Visual Basic 2
The Windows Graphical User Interface 2

Programming Languages—Procedural, Object Oriented, and Event Driven 3
The Object Model 3
Versions of Visual Basic 4

Writing Visual Basic Projects 4
The Three-Step Process 4
Visual Basic Projects 5

The Visual Basic Environment 6
The Form Window 6
The Project Explorer Window 6
The Properties Window 7
The Form Layout Window 7
The Toolbox 7
The Main Visual Basic Window 7
The Toolbar 7
The Form Location and Size Information 8
Help 8
Design Time, Run Time, and Break Time 8

Writing Your First Visual Basic Project 8
Set Up Your Visual Basic Workspace 9
Plan the Project 13
Define the User Interface 13
Set Properties 17
Write Code 22
Visual Basic Code Statements 22
Code the Event Procedures for Hello World 24
Run the Project 26
Save the Project 28
Open the Project 30
Modify the Project 30
Print the Project Documentation 35

Sample Printout 36
The Form Image 36
The Code 37
The Form as Text 38

Finding and Fixing Errors 39
Compile Errors 39
Run-Time Errors 40
Logic Errors 40
Project Debugging 41
Naming Rules and Conventions for Objects 41

Visual Basic Help 42
The MSDN Viewer 43
Context-Sensitive Help 44

2

More Controls 51

Introducing More Controls 52
Text Boxes 53
Frames 53
Check Boxes 53
Option Buttons 54
Images 54
Setting a Border and Style 56
The Shape Control 56
The Line Control 57

Working with Multiple Controls 57
Selecting Multiple Controls 57
Deselecting a Group of Controls 58
Moving Controls as a Group 58
Setting Properties for Multiple Controls 59
Aligning Controls 59

Designing Your Applications for User Convenience 61
Designing the User Interface 61
Defining Keyboard Access Keys 62

Setting the Default and Cancel Properties of Command Buttons 63
Setting the Tab Order for Controls 63
Setting the Form's Location on the Screen 64
Creating ToolTips 65
Coding for the Controls 66
Clearing Text Boxes and Labels 66
Resetting the Focus 66
Setting the Value Property of Option Buttons and Check Boxes 66
Changing the Font Properties of Controls 67
Changing the Color of Text 68
Changing Multiple Properties of a Control 68
Concatenating Text 69
Continuing Long Program Lines 69
Using the Default Property of a Control 70
Programming Hints 77

3
Variables, Constants, and Calculations 85

Data—Variables and Constants 86
Data Types 87
Naming Rules 88
Naming Conventions 88
Constants—Named and Intrinsic 90
Declaring Variables 92
Scope of Variables 94
Calculations 97
Val Function 97
Arithmetic Operations 98
Order of Operations 99
Using Calculations in Code 100
Formatting Data 100
A Calculation Programming Example 104
Counting and Accumulating Sums 109
Summing Numbers 109
Counting 109
Calculating an Average 110
Programming Hints 116

4
Decisions and Conditions 123

If Statements 124
Flowcharting If Statements 126
Conditions 126
Comparing Numeric Variables and Constants 127
Comparing Strings 128
Testing for True or False 131
Comparing the Text Property of Text Boxes 131
Comparing Uppercase and Lowercase Characters 132
Compound Conditions 132
Nested If Statements 133
Using If Statements with Option Buttons and Check Boxes 136
A "Simple Sample" 137
Checking the Value of an Option Button Group 138
Checking the Values of Multiple Check Boxes 138
Displaying Messages in Message Boxes 139
Selecting the MsgBox Icon 140
Displaying a Message String 140
Input Validation 141
Checking for Numeric Values 141
Checking for a Range of Values 142
Checking for a Required Field 142
Performing Multiple Validations 143
Calling Event Procedures 143
Debugging Visual Basic Projects 152
Pausing Execution with the Break Button 152
Forcing a Break 152
Using the Immediate Window 153
Checking the Current Values of Expressions 154
Stepping through Code 154
Debugging Step-by-Step Tutorial 155
Test the Project 155
Break and Step Program Execution 156
View the Contents of Properties, Variables, and Conditions 157
Continue Project Execution 158
Test the White Total 159

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Correct the Red Total Error 159
Correct the White Total Error 160
Force a Run-Time Error 161

5
Menus, Sub Procedures, and Sub Functions 167

Menus 168
Defining Menus 168
Creating a Menu—Step-by-Step 170
Coding for Menu Commands 173
Modifying a Menu 173
Adding to Your Sample Menu 173
Toggling Check Marks On and Off 175
Standards for Windows Menus 175

Common Dialog Boxes 175
Using a Common Dialog Box 177
Using the Information from the Dialog Box 178
Setting Current Values 180

Writing General Procedures 181
Creating a New Sub Procedure 181
Passing Variables to Procedures 182
Passing Arguments ByVal or ByRef 183
Function Procedures versus Sub Procedures 184
Writing Function Procedures 184
Writing a Function with Multiple Arguments 186
Calling a Function with Multiple Arguments 186
Reusing Procedures 186
Breaking Calculations into Smaller Units 188

Programming Hints 199
Creating Executable Files 199

6
Multiple Forms 207

Multiple Forms 208
Creating New Forms 208
Adding and Removing Forms 209
The Hide and Show Methods 210
The Load and Unload Statements 212
The Me Keyword 212
Referring to Objects on a Different Form 213

Standard Code Modules 213

Variables and Constants in Multiple-Form Projects 214
Global Variables and Constants 215
Static Variables 215
Guidelines for Declaring Variables and Constants 216

An About Box 217

A Splash Screen 219

Using Sub Main for Startup 220
Coding the Standard Code Module 220
Coding the Splash Screen Event Procedure 221
Setting the Startup Form or Procedure 221

Programming Hints 238
Working with Maximized Forms 238

7
Lists, Loops, and Printing 245

List Boxes and Combo Boxes 246
Filling the List 247
Clearing the List 249
The ListIndex Property 249
The ListCount Property 250
The List Property 250
Removing an Item from a List 251
List Box and Combo Box Events 251

Do/Loops 252
The Boolean Data Type Revisited 255
Using a Do/Loop with a List Box 255

For/Next Loops 256
Negative Increment or Counting Backward 258
Conditions Satisfied before Entry 259
Altering the Values of the Loop Control Variables 259
Endless Loops 259
Exiting For/Next Loops 260

Using the MsgBox Function 261

Function Return Values 262
Specifying the Buttons and/or Icons to Display 262
MsgBox Example 263
Using String Functions 263
Examples Using Left, Right, and Mid Functions 264
The Len Function 264
Selecting Entries in a List Box 265
Sending Information to the Printer 265
Printing to the Printer 266
Formatting Lines 266
Selecting the Font 270
Terminating the Page or the Job 270
Printing the Contents of a List Box 270
Printing the Selected Item from a List 271
Aligning Decimal Columns 271

8
Arrays 287
Control Arrays 288
The Case Structure 289
Testing Option Buttons with the Case Structure 291
Single-Dimension Arrays 293
Subscripts 294
More on Subscripts 295
For Each/Next Statements 295
Initializing an Array Using For Each 296
User-Defined Data Types 297
Accessing Information with User-Defined Data Types 298
Using Array Elements for Accumulators 299
Table Lookup 300
Coding a Table Lookup 303
Using List Boxes with Arrays 303
The ItemData Property 304
Using Nonsequential ItemData Values 305
Adding Items with ItemData to a List 306
Multidimensional Arrays 307
Initializing Two-Dimensional Arrays 308
Nested For/Next Example 308
Printing a Two-Dimensional Table 308
Summing a Two-Dimensional Table 309
Lookup Operation for Two-Dimensional Tables 310
Programming Hints 318
The Array Function 318

9
OOP—Creating Object-Oriented Programs 325
Visual Basic and Object-Oriented Programming 326
Objects 326
Object-Oriented Terminology 327
Reusable Objects 328
Classes 329
Assigning Property Values 329
Creating a New Class—Step-by-Step 331
Define a New Class Module 331
Define the Class Properties 332
Add Property Procedures 332
Code a Method 335
Add General Remarks 335
Save the Class Module 335
Creating a New Object Using a Class 336
Define and Use a New Object 336
Save the Form and the Project 338
Run the Project 339
Choosing When to Create New Objects 339
Using the Set Statement 340
Early Binding versus Late Binding 341
The Initialize and Terminate Events 341
Terminating Projects 342
Collections 343
Creating a Collection 343
Creating a Unique Key in the CProduct Class 344
Creating the CProducts Class 344
Adding Objects to a Collection 345
Removing a Member from a Collection 346

Accessing a Member of a Collection 347
Returning the Count Property 347
Setting a Default Property 347
Using For Each . . . Next 348
Using a Collection in a Form—Step-by-Step **350**
Modifying the User Interface 350
Declaring the Collection Object 351
Coding the Add Procedure 351
Coding the Display Procedure 351
Coding the Clear Procedure 352
Running the Project 352
Using the Object Browser **352**
Examining VB Objects 353
Examining Your Own Classes 354
Using a List Box to Store the Keys **354**
Using the List Box to Display an Object 356
Using the List Box to Remove an Object 356
Avoiding Global Variables **356**
Adding Properties to Forms 357

10
Data Files 377

Data Files **378**
Data Files and Project Files 378
Data File Terminology 378
File Organizations 379
Opening and Closing Data Files 379
The FreeFile Function 381
Viewing the Data in a File 381
Sequential File Organization **381**
Writing Data to a Sequential Disk File 382
Creating a Sequential Data File 382
Reading the Data in a Sequential File 383
Finding the End of a Data File 384
Locating a File 384
Trapping Program Errors **385**
The On Error Statement 385
The Err Object **387**
The Err.Number Property 387
Raising Error Conditions 388
Coding Error-Handling Routines 388
The Resume Statement 389
Handling Errors 390
The Exit Function and Exit Sub Statements 391
Saving Changes to a File 393
Sequential File Programming Example 394
Random Data Files **398**
Fixed-Length Strings 398
Defining a Record for a Random File 399
Opening a Random File 399
Reading and Writing a Random File 400
Accessing Fields in a Random Record 401
Finding the End of a Random File 401
The Seek Function 402
Using a List Box to Store a Key Field **403**
Trimming Extra Blanks from Strings 403
Navigating through a Random File **404**
Coding the Browse Operation 405
Locking the Contents of Controls 405
Using Object-Oriented Programming for File Handling **405**
The Organization of an Object-Oriented File Project 406
Initialize the Collection Class 406
Terminate 408
The Read and Write Procedures 408
Updating a Random File **408**
Adding Records 409
Deleting a Record 410
Editing Records 411
Programming Hints **435**
The InputBox Function 435
Using the InputBox to Randomly Retrieve a Record 436

11
Accessing Database Files 441

Visual Basic and Database Files **442**
Database Formats Supported by Visual Basic 442
Database Terminology 442

Creating Database Files for Use by Visual Basic 443
Using the Data Control 444
The Data Control and Data-Bound Controls 445
Viewing a Database File—Step-by-Step 449
Design and Create the Form 449
Set the Properties for the Data Control 450
Set the Properties for the Data-Bound Controls 450
Write the Code 451
Run the Project 452
Navigating the Database in Code 453
The Recordset Object 453
Using the MoveNext, MovePrevious, MoveFirst, and MoveLast Methods 453
Checking for BOF and EOF 453
Using List Boxes and Combo Boxes as Data-Bound Controls 454
Setting up a Lookup Table for a Field 454
Adding a Lookup Table and Navigation—Step-by-Step 455
Modify the User Interface 455
Change the Properties 456
Write the Code 457
Testing the Navigation and Lookup Tables 459
Updating a Database File 459
Adding Records 459
Deleting Records 460
Preventing Errors 461
Protecting an Add Operation 461
Programming Hints 471

12
Advanced Data Handling—Grids, Validation, Selection, and SQL 477

Displaying Data in Grids 478
A Grid Control—Step-by-Step 478
Displaying the Record Number and Record Count 482
Opening the Database 483
The Reposition Event 484
Putting It Together 484
Validation and Error Trapping 485
Locking Text Boxes 486
Validating Data in the Validate Event 486
Trap Errors with On Error 487
Trapping File Open Errors 490
Programming Example Showing Validation Techniques 493
Recordsets 499
Searching for a Specific Record—Dynasets and Snapshots 500
The NoMatch Property 501
Bookmarks 502
Seeking with Table Indexes—Table Recordsets 502
Reordering a Table Recordset 503
Working with Database Fields 505
Referring to Database Fields 505
Loading Database Fields into a List Box 506
Creating a New Dynaset 506
Using SQL 506
Setting a New RecordSource 507
Check for an Empty Recordset 508
Programming Hints 522
Trapping Database Errors 522
Advanced Database Processing 523
Get Help Coding SQL Statements 523

13
Drag-and-Drop 529

Drag-and-Drop Terminology 530
The Source and the Target 530
Source Object Properties 530
DragOver and DragDrop Events 530
A Step-by-Step Example 531
Create the User Interface 531
Set the Properties 532
Write the Code 532

Run the Project 534
Add Command Buttons 535
Run the Completed Project 536
Dragging and Dropping Multiple Objects 537
Passing the Source Argument 537
Changing the Icon of the Target Image 538
Setting the DragIcon Property of Source Controls 538
Blanking out an Image 539
The Toybox Program 540
The Procedures 541
The Project Coding Solution 541
Programming Hints 549
Manual Drag-and-Drop 549

14
Graphics 553
The Graphics Environment 554
The Coordinate System 554
Picturebox Controls 555
Colors 555
The RGB Function 555
The Visual Basic Intrinsic Color Constants 556
The QBColor Function 556
The Graphics Methods 557
The Cls Method 558
The PSet Method 558
The Line Method 560
The Circle Method 561
The Step Keyword 564
Layering 565
More Properties for Your Graphics Controls 566
Controlling Pictures at Design Time 566
Controlling Pictures at Run Time 567
Moving a Picture 567
Simple Animation 568
The Timer Control 569
More Graphics Techniques 572
Custom Coordinate Systems 572
PaintPicture Method 572
The Scroll Bar Controls 573
Scroll Bar Events 575
A Fun Programming Example 575

15
Advanced Topics in Visual Basic 581
ActiveX 582
Using ActiveX Controls 582
The Tabbed Dialog Control 583
Browsing the Web from a Visual Basic Project 587
Creating Your Own ActiveX Controls 588
Dynamic Link Libraries 591
The Declare Statement 592
Passing Arguments ByVal and ByRef 593
Calling a DLL Procedure 594
Finding the Reference Information for DLLs 594
Accessing System Information with a DLL 595
Placing Tabs for Columns in a List Box 596
Object Linking and Embedding 598
Object Linking 598
Object Embedding 598
Creating OLE Objects at Run Time 600
Visual Basic for Applications 601
Recording an Excel Macro 602
A Sample Excel Visual Basic Application 603
Help with Visual Basic in Excel 606
Multiple Document Interface (MDI) 606
Creating an MDI Project 607
Adding Menus to an MDI Project 607
Creating a Window Menu 607
Defining Shortcut Menus 610
Defining the Menu 610
Coding for the Menu 611
The Report Designer 611
Begin the Project 612
Set up the Data Source 612

Design the Report 615
Print the Report from a Form 619

Appendix A
Answers to Feedback Questions 623

Appendix B
Functions for Working with Dates, Financial Calculations, Mathematics, and String Operations 635

Appendix C
Tips and Shortcuts for Mastering the VB Environment 645

Glossary 655

Index 661

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