

Course Notes for:

**Programming
Microsoft Windows
with**



© Lou Tylee, 1998

Notice

These notes were developed aid for the course, "Programming Microsoft Windows with Visual Basic." They are not intended to be a complete reference to Visual Basic. Consult the ***Microsoft Visual Basic Programmer's Guide*** and ***Microsoft Visual Basic Language Reference Manual*** for detailed reference information.

The notes refer to several software and hardware products by their trade names. These references are for informational purposes only and all trademarks are the property of their respective companies.

Lou Tylee
Course Instructor

Programming Microsoft Windows with Visual Basic

Contents

1. Introduction to the Visual Basic Language and Environment

Preview.....	1-1
Course Objectives.....	1-1
What is Visual Basic?.....	1-2
Visual Basic 5.0 versus Visual Basic 4.0.....	1-3
16 Bits versus 32 Bits.....	1-3
Structure of a Visual Basic Application.....	1-4
Steps in Developing Application.....	1-4
Drawing the User Interface and Setting Properties.....	1-5
Example 1-1: Stopwatch Application - Drawing Controls.....	1-9
Setting Properties of Objects at Design Time.....	1-10
Setting Properties at Run Time.....	1-11
How Names Are Used in Object Events.....	1-11
Example 1-2: Stopwatch Application - Setting Properties.....	1-12
Variables.....	1-14
Visual Basic Data Types.....	1-14
Variable Declaration.....	1-14
Example 1-3: Stopwatch Application - Attaching Code.....	1-18
Quick Primer on Saving Visual Basic Applications.....	1-20
Exercise 1: Calendar/Time Display.....	1-21

2. The Visual Basic Language

Review and Preview.....	2-1
A Brief History of Basic.....	2-1
Visual Basic Statements and Expressions.....	2-2
Visual Basic Operators.....	2-3
Visual Basic Functions.....	2-4
A Closer Look at the Rnd Function.....	2-5
Example 2-1: Savings Account.....	2-6
Visual Basic Symbolic Constants.....	2-10
Defining Your Own Constants.....	2-10
Visual Basic Branching - If Statements.....	2-11
Key Trapping.....	2-12
Example 2-2: Savings Account - Key Trapping.....	2-14
Select Case - Another Way to Branch.....	2-16
The GoTo Statement.....	2-17
Visual Basic Looping.....	2-17
Visual Basic Counting.....	2-19
Example 2-3: Savings Account - Decisions.....	2-20
Exercise 2-1: Computing a Mean and Standard Deviation.....	2-23
Exercise 2-2: Flash Card Addition Problems.....	2-28

3. Exploring the Visual Basic Toolbox

Review and Preview.....	3-1
The Message Box.....	3-1
Object Methods.....	3-3
The Form Object.....	3-4
Command Buttons.....	3-5
Label Boxes.....	3-5
Text Boxes.....	3-6
Example 3-1: Password Validation.....	3-8
Check Boxes.....	3-11
Option Buttons.....	3-11
Arrays.....	3-12
Control Arrays.....	3-12
Frames.....	3-13
Example 3-2: Pizza Order.....	3-15
List Boxes.....	3-20
Combo Boxes.....	3-21
Example 3-3: Flight Planner.....	3-23
Exercise 3: Customer Database Input Screen.....	3-27

4. More Exploration of the Visual Basic Toolbox

Review and Preview.....	4-1
Display Layers.....	4-1
Line Tool.....	4-2
Shape Tool.....	4-3
Horizontal and Vertical Scroll Bars.....	4-4
Example 4-1: Temperature Conversion.....	4-7
Picture Boxes.....	4-12
Image Boxes.....	4-14
Quick Example: Picture and Image Boxes.....	4-14
Drive List Box.....	4-15
Directory List Box.....	4-15
File List Box.....	4-16
Synchronizing the Drive, Directory, and File List Boxes.....	4-17
Example 4-2: Image Viewer.....	4-18
Common Dialog Boxes.....	4-23
Open Common Dialog Box.....	4-24
Quick Example: The Open Dialog Box.....	4-25
Save As Common Dialog Box.....	4-27
Quick Example: The Save As Dialog Box.....	4-28
Exercise 4: Student Database Input Screen.....	4-29

5. Creating a Stand-Alone Visual Basic Application

Review and Preview.....	5-1
Designing an Application.....	5-1
Using General Sub Procedures in Applications.....	5-2
Creating a Code Module.....	5-5
Using General Function Procedures in Applications.....	5-5
Quick Example: Temperature Conversion.....	5-7
Quick Example: Image Viewer (Optional).....	5-8
Adding Menus to an Application.....	5-8
Example 5-1: Note Editor.....	5-12
Using Pop-Up Menus.....	5-16
Assigning Icons to Forms.....	5-17
Designing Your Own Icon with IconEdit.....	5-17
Creating Visual Basic Executable Files.....	5-19
Example 5-2: Note Editor - Building an Executable and Attaching an Icon.....	5-21
Using the Visual Basic Application Setup Wizard.....	5-22
Example 5-3: Note Editor - Creating a Distribution Disk.....	5-24
Exercise 5: US Capitals Quiz.....	5-25

6. Error-Handling, Debugging and File Input/Output

Review and Preview.....	6-1
Error Types.....	6-1
Run-Time Error Trapping and Handling.....	6-2
General Error Handling Procedure.....	6-4
Example 6-1: Simple Error Trapping.....	6-7
Debugging Visual Basic Programs.....	6-9
Example 6-2: Debugging Example.....	6-10
Using the Debugging Tools.....	6-11
Debugging Strategies.....	6-16
Sequential Files.....	6-17
Sequential File Output (Variables).....	6-17
Quick Example: Writing Variables to Sequential Files.....	6-19
Sequential File Input (Variables).....	6-20
Quick Example: Reading Variables from Sequential Files.....	6-21
Writing and Reading Text Using Sequential Files.....	6-22
Random Access Files.....	6-24
User-Defined Variables.....	6-25
Writing and Reading Random Access Files.....	6-26
Using the Open and Save Common Dialog Boxes.....	6-29
Example 6-3: Note Editor - Reading and Saving Text Files.....	6-31
Exercise 6-1: Information Tracking.....	6-35
Exercise 6-2: 'Recent Files' Menu Option.....	6-41

7. Graphics Techniques with Visual Basic

Review and Preview.....	7-1
Graphics Methods.....	7-1
Using Colors.....	7-8
Mouse Events.....	7-10
Example 7-1: Blackboard.....	7-13
Drag and Drop Events.....	7-18
Example 7-2: Letter Disposal.....	7-20
Timer Tool and Delays.....	7-23
Animation Techniques.....	7-24
Quick Example: Simple Animation.....	7-25
Quick Example: Animation with the Timer Tool.....	7-26
Random Numbers (Revisited) and Games.....	7-28
Randomly Sorting N Integers.....	7-29
Example 7-3: One-Buttoned Bandit.....	7-30
User-Defined Coordinates.....	7-35
Simple Function Plotting (Line Charts).....	7-36
Simple Bar Charts.....	7-38

7. Graphics Techniques with Visual Basic (continued)

Example 7-4: Line Chart and Bar Chart Application.....	7-40
Exercise 7-1: Blackjack.....	7-43
Exercise 7-2: Information Tracking Plotting.....	7-54

8. Database Access and Management

Review and Preview.....	8-1
Database Structure and Terminology.....	8-1
Data Control.....	8-5
Bound Data Tools.....	8-7
Example 8-1: Accessing the Books Database.....	8-9
Creating a Virtual Table.....	8-11
Quick Example: Forming a Virtual Table.....	8-11
Finding Specific Records.....	8-13
Example 8-2: 'Rolodex' Searching of the Books Database.....	8-14
Data Manager.....	8-17
Example 8-3: Phone Directory - Creating the Database.....	8-18
Database Management.....	8-20
Example 8-4: Phone Directory - Managing the Database.....	8-23
Custom Data Aware Controls.....	8-28
Using the Crystal Reports Writer.....	8-30
Quick Example: Tabular Phone Directory Listing.....	8-31
Using the Crystal Reports Custom Control.....	8-32
Exercise 8: Home Inventory Database.....	8-35

9. Dynamic Link Libraries and the Windows API

Review and Preview.....	9-1
Dynamic Link Libraries (DLL).....	9-1
Accessing the Windows API With DLL.....	9-2
Timing with DLL Calls.....	9-4
Quick Example 1: Using GetTickCount to Build a Stopwatch.....	9-5
Quick Example 2: Using GetTickCount to Implement a Delay.....	9-6
Drawing Ellipses.....	9-7
Quick Example 3: Drawing Ellipses.....	9-7
Drawing Lines.....	9-8
Quick Example 4: Drawing Lines.....	9-9
Drawing Polygons.....	9-10
Quick Example 5: Drawing Polygons.....	9-11
Sounds with DLL Calls - Other Beeps.....	9-14
Quick Example 6: Adding Beeps to Message Box Displays.....	9-15

9. Dynamic Link Libraries and the Windows API (continued)

More Elaborate Sounds.....	9-16
Quick Example 7: Playing WAV Files.....	9-16
Playing Sounds Quickly.....	9-17
Quick Example 8: Playing Sounds Quickly.....	9-18
Fun With Graphics.....	9-19
Quick Example 9: Bouncing Ball With Sound!.....	9-20
Flicker Free Animation.....	9-22
Quick Example 10: Flicker Free Animation.....	9-23
Quick Example 11: Horizontally Scrolling Background.....	9-24
A Bit of Multimedia.....	9-26
Quick Example 12: Multimedia Sound and Video.....	9-26
Exercise 9: The Original Video Game - Pong!.....	9-27

10. Other Visual Basic Topics

Review and Preview.....	10-1
Custom Controls.....	10-1
Masked Edit Control.....	10-3
Chart Control.....	10-4
Multimedia Control.....	10-6
Rich Textbox Control.....	10-8
Slider Control.....	10-9
Tabbed Dialog Control.....	10-12
UpDown Control.....	10-13
Toolbar Control.....	10-14
Using the Windows Clipboard.....	10-17
Printing with Visual Basic.....	10-18
Multiple Form Visual Basic Applications.....	10-21
Visual Basic Multiple Document Interface (MDI).....	10-25
Creating a Help File.....	10-29
Class Summary.....	10-36
Exercise 10: The Ultimate Application.....	10-37

Appendix I: Visual Basic Symbolic Constants.....I-1

Appendix II: Common Dialog Box Constants II-1