

Developing Applications Using Visual Basic 2010

Table of Contents

INTRODUCTION	INTRO-1
Prerequisites	INTRO-2
Installing the Practice Files	INTRO-3
Software Requirements	INTRO-3
Sample Database	INTRO-3
Security	INTRO-4
Installation	INTRO-4
About the Authors	INTRO-6
INTRODUCTION TO WINDOWS FORMS	1-1
.NET Does Windows	1-2
Adding Controls to a Form	1-7
Investigating Snap Lines	1-8
Adjusting Control Sizes and Positions	1-9
Controlling Tab Order	1-11
A Peek behind the Scenes	1-13
Viewing the Code	1-13
Adding Event Handling Code	1-20
Adding a Menu to the Form	1-23
Adding Non-Graphical Components	1-29
The ToolTip Component	1-29
The Timer Component	1-31
LAB 1: INTRODUCTION TO WINDOWS FORMS	1-38
Lab 1 Overview	1-39
Create a Windows Application	1-40
Anchor the Controls	1-44
Add Event-Handling Code	1-46
TAKING ADVANTAGE OF THE FORM EVENT MODEL	2-1
How Visual Basic Handles Events	2-2
Working with Forms	2-7
Peeking under the Event “Covers”	2-15
Exploring Form and Control Events	2-30
Form Events	2-30

Keyboard Events.....	2-33
Mouse Events	2-40
Control Events	2-44
Validating User Input.....	2-44
LAB 2: TAKING ADVANTAGE OF THE FORM EVENT MODEL.....	2-55
Lab 2 Overview.....	2-56
Creating an Event Handler Using Visual Studio	2-57
Creating a Dynamic Event Handler	2-59
COMMON WINDOWS FORMS CONTROLS.....	3-1
Windows Forms Controls.....	3-2
Label Control.....	3-3
TextBox Control	3-9
Button Control	3-16
CheckBox Control	3-20
RadioButton Control.....	3-23
ComboBox Control.....	3-26
ListBox Control.....	3-29
CheckedListBox Control	3-31
LinkLabel Control	3-34
NumericUpDown Control	3-36
PictureBox Control	3-38
ProgressBar Control	3-40
LAB 3: COMMON WINDOWS FORMS CONTROLS.....	3-46
Lab 3 Overview.....	3-47
Create a Simple Data Entry Form.....	3-48
Modify the Data Entry Form.....	3-55
Add Validation to the Data Entry Form	3-60
EXCEPTION HANDLING	4-1
Perspectives on Exception Handling	4-2
Exception Handling in .NET	4-2
The Demonstration Code.....	4-4
Getting Started with Exception Handling	4-5
No Error Handling	4-5
Adding a Simple Try/Catch Block	4-8
Unhandled Exceptions	4-9
Using an Exception Object.....	4-10
Catching Specific Exceptions	4-14

Taking Advantage of the Exception Hierarchy	4-17
Raising Errors	4-20
Using the Throw Keyword	4-20
Exception-Handling Options	4-21
Passing Error Information	4-22
Running Code Unconditionally	4-25
The Finally Block	4-25
Cleaning Up: The <i>Using</i> Statement	4-26
Handling Unhandled Exceptions	4-28
Creating Exception Classes	4-31
LAB 4: EXCEPTION HANDLING	4-39
Lab 4 Overview	4-40
Add Simple Exception Handling	4-42
Handle Individual Exceptions	4-44
Add Code Running Unconditionally	4-46
WORKING WITH STRINGS AND DATES	5-1
Basic .NET Data Types	5-2
Working with Text: The String Class	5-3
Investigating the String Class	5-3
Creating Strings	5-4
String Properties	5-5
Shared String Methods	5-6
Instance String Methods	5-12
Manipulating Text with the StringBuilder Class	5-14
Working with Dates and Times	5-18
DateTime Constructors	5-19
Shared Members	5-21
Simple Properties	5-21
Conversion Methods	5-22
Calculation Methods	5-24
Shared Methods	5-25
Using the DateTime Type	5-26
Handling Elapsed Times with the TimeSpan Type	5-31
Measuring Elapsed Time	5-36
LAB 5: WORKING WITH STRINGS AND DATES	5-41
Lab 5 Overview	5-42

Work with Strings.....	5-43
Work with the StringBuilder Class	5-47
Use Stopwatch and TimeSpan to Measure Elapsed Time	5-51
ACCESSING DATA.....	6-1
Overview of ADO.NET	6-2
ADO.NET Classes	6-2
The ADO.NET Architecture.....	6-3
Creating ADO.NET Data Objects.....	6-4
Connecting to Data	6-9
Setting Up Connection Information	6-9
Creating Connection Strings in the Configuration File	6-12
Using the Connection Object	6-14
Executing Commands.....	6-17
Working with Data Readers	6-17
Using the SqlDataReader	6-18
Working with Data.....	6-22
Working with Data Using a Data Adapter	6-22
Managing Data with the DataSet Object.....	6-22
Filling a DataTable within a DataSet.....	6-24
Filling a DataTable from SQL Server	6-27
Choosing an ADO.NET Provider	6-32
The SQL Server .NET Data Provider.....	6-32
The OLE DB .NET Data Provider	6-33
The ODBC Data Provider	6-33
Writing Code for Multiple Providers	6-34
LAB 6: ACCESSING DATA	6-45
Lab 6 Overview.....	6-46
Create a Connection String in the Configuration File	6-47
Use the DataReader to Fill a ListBox with Categories.....	6-49
Use a DataSet to Fill a DataGridView with Products	6-53
INTRODUCING LINQ.....	7-1
Language Integrated Query.....	7-2
LINQ Using Visual Basic and C#	7-4
LINQ Syntax	7-7
Basic LINQ Syntax.....	7-7
Extension Methods	7-10
LINQ and More Complex Objects	7-12

Anonymous Types	7-18
Some Interesting Examples	7-20
LINQ to SQL	7-26
Creating a Data Model	7-26
Calling Stored Procedures	7-33
Using Anonymous Types with SQL	7-34
Modifying SQL Data	7-35
LINQ to DataSets	7-41
LINQ to Typed DataSets	7-41
LINQ to Untyped DataSets	7-44
LINQ to XML	7-46
Generating XML	7-46
Querying XML	7-50
Transforming XML	7-54
Are You Done? Is there More?	7-56
LAB 7: INTRODUCING LINQ	7-61
Lab 7 Overview	7-62
Use LINQ to Objects	7-63
Use LINQ to SQL	7-66
Use LINQ to XML	7-71
DATA BINDING TECHNIQUES	8-1
Data Binding Basics	8-2
Creating a Data Source	8-3
The Data Sources Window	8-9
Creating Data Bound Forms	8-10
Data Binding Components and Controls	8-15
The DataSet	8-15
The TableAdapter	8-18
The TableAdapterManager	8-20
The BindingSource Component	8-21
The BindingNavigator Control	8-23
Displaying Data from Related Tables	8-25
Enforcing Referential Integrity	8-30
Displaying Data from Lookup Tables	8-39
Adding Search Capabilities to a Form	8-42
Filtering by Values from a Lookup Table	8-49

Validating Data	8-55
Determining Whether the User Made Changes	8-55
Validating Data at the Form Level.....	8-57
Validating Data at the Data Level	8-62
Working with Local Data	8-68
LAB 8: DATA BINDING TECHNIQUES.....	8-75
Lab 8 Overview.....	8-76
Create a Simple Data Bound Form.....	8-77
Search and Filter Based on Criteria.....	8-87
Validate Data	8-96
USING THE DATA CONTROLS	9-1
Data Controls.....	9-2
The BindingNavigator Control.....	9-3
BindingNavigator ToolStripItems	9-4
Built-In and Custom Functionality	9-5
Adding a BindingNavigator Control to a Form	9-6
The BindingSource Component.....	9-7
Data Navigation	9-8
Data Manipulation	9-9
Sorting and Filtering.....	9-11
Working with the Underlying Data.....	9-12
The DataGridView Control.....	9-17
Customizing How Data is Displayed.....	9-17
Formatting Cells at Runtime	9-22
Displaying Calculated Values	9-24
Displaying Images.....	9-26
Adding Controls to a DataGridView	9-29
The ReportViewer Control	9-32
Creating and Viewing Reports	9-32
LAB 9: USING THE DATA CONTROLS.....	9-47
Lab 9 Overview.....	9-48
Navigate and Manipulate Data with the BindingSource Component	9-49
Format the DataGridView Control.....	9-56
Display Reports with the ReportViewer Control.....	9-64
HANDLING INPUT/OUTPUT TASKS.....	10-1
Introducing the System.IO Namespace	10-2

Selecting Files	10-4
Browsing for Folders.....	10-13
Handling Path Information	10-17
Working with Directories and Files	10-21
Retrieving Information about Drives.....	10-23
Investigating the Objects.....	10-26
Calling Methods of the Directory Class.....	10-29
Filling the TreeView	10-31
Displaying Drive, File, and Directory Information.....	10-35
Using Stream-Based Objects to Read and Write File Contents	10-40
Reading and Writing Text Files.....	10-41
Investigating the Code	10-42
Alternate Solutions.....	10-46
Writing to Files Using the StreamWriter	10-47
LAB 10: HANDLING INPUT/OUTPUT TASKS.....	10-53
Lab 10 Overview.....	10-54
Browse for Files	10-55
Display Selected File Information	10-57
Load File Contents.....	10-59
PROJECT SETTINGS IN VISUAL STUDIO 2010.....	11-1
The Project Designer	11-2
Application Properties.....	11-4
Assembly Name.....	11-5
Default Namespace	11-5
Icon	11-5
Startup Form	11-5
Assembly Information	11-6
Application Framework Properties	11-8
Application Events	11-10
Compilation Properties	11-12
Option Explicit and Option Strict	11-14
Compiler Errors and Warnings.....	11-15
Build Events	11-16
Conditional Compilation	11-18
Target Framework.....	11-19
Debugging Properties	11-21
Start Action	11-21

Start Options	11-22
Enable Debuggers	11-23
Project References	11-24
Adding Project References	11-26
Unused References	11-29
Imported Namespaces	11-29
Project Resources	11-32
Project Resources and Local Resources	11-34
Project Settings.....	11-42
LAB 11: PROJECT SETTINGS IN VISUAL STUDIO 2010	11-49
Lab 11 Overview	11-50
Control Application Behavior and Appearance	11-51
Build the Project.....	11-55
Manage Project Resources and Settings	11-59
WORKING WITH THE MY NAMESPACE.....	12-1
The My Namespace.....	12-3
My.Application	12-4
My.Application.Info.....	12-7
My.Application.Log.....	12-9
My.Computer	12-12
My.Computer.Screen	12-12
My.Computer.Audio	12-14
My.Computer.Clipboard	12-16
My.Computer.Clock	12-17
My.Computer.FileSystem.....	12-19
My.Computer.Info	12-22
My.Computer.Keyboard	12-23
My.Computer.Network	12-24
My.Computer.Registry	12-25
My.User	12-28
My.Forms.....	12-29
My.Resources.....	12-30
My.Settings	12-32
My.WebServices.....	12-34
LAB 12: WORKING WITH THE MY NAMESPACE	12-41
Lab 12 Overview	12-42

Work with the File System	12-43
Use the My.Application Object.....	12-50
Use the My.User and My.Computer Objects	12-53
DEBUGGING YOUR APPLICATIONS	13-1
Debugging Applications	13-2
Setting Breakpoints and Stepping through Code.....	13-3
Setting a Breakpoint.....	13-3
Continuing Program Execution	13-5
Setting Conditional Breakpoints.....	13-6
Specifying a Breakpoint Hit Count	13-7
Setting a Breakpoint on a Method.....	13-8
Using the Breakpoints Window	13-9
Breaking on Exceptions	13-10
Evaluating Variables and Objects.....	13-12
Viewing DataTips and Visualizers.....	13-12
Using the Watch Window and QuickWatch Dialog Box	13-15
Using the Locals Window.....	13-18
Using the Autos Window.....	13-19
Using the Immediate Window	13-19
Using the Edit and Continue Feature.....	13-21
Debugging Code in Assemblies.....	13-25
Stepping into Code in an Assembly	13-26
Stepping into Code Written in Another Language.....	13-27
Tracing and Instrumenting Applications.....	13-28
Trace Sources.....	13-29
Trace Switches	13-32
Trace Listeners	13-33
Trace Filtering	13-36
Using Configuration Files to Control Tracing	13-37
Testing Code with Unit Tests.....	13-40
LAB 13: DEBUGGING YOUR APPLICATIONS	13-51
Lab 13 Overview	13-52
Set Breakpoints and Step Through Code	13-53
Evaluate Expressions and Use Edit and Continue	13-58
Trace Applications	13-66
CONTAINER CONTROLS	14-1

Introducing Container Controls	14-2
Working with Container Controls	14-3
Creating the Switchboard Form	14-3
Grouping Controls with the GroupBox Control	14-8
GroupBox Control Members	14-8
BackgroundImage and BackColor Properties	14-12
Visible, Enabled, and Font Properties.....	14-12
Introducing the Panel Control	14-15
BorderStyle Property.....	14-15
Scrolling Features	14-16
Displaying Multiple Panels with the SplitContainer Control	14-18
Orientation Property	14-20
IsSplitterFixed Property.....	14-20
SplitterWidth Property	14-21
SplitterDistance Property	14-21
FixedPanel Property	14-21
Panel1MinSize and Panel2MinSize Properties.....	14-22
Panel1Collapsed and Panel2Collapsed Properties	14-22
SplitContainer Control Events	14-23
Laying out Panels with the TabControl Control	14-26
Working with Tab Pages	14-29
Alignment Property	14-29
Appearance Property	14-30
MultiLine Property	14-31
SizeMode Property	14-32
ShowToolTips Property.....	14-33
Informational Properties.....	14-35
Adding Tab Pages	14-35
TabControl Events	14-36
Simple Layout Using the FlowLayoutPanel Control.....	14-38
Working with the FlowLayoutPanel Control	14-40
FlowLayoutPanel Control Properties	14-44
Advanced Layout Using the TableLayoutPanel Control	14-49
Getting Started with the TableLayoutPanel Control.....	14-49
Setting Row and Column Styles	14-51
Positioning New Controls.....	14-54
Adding Controls Programmatically.....	14-55
Working with Other Properties	14-57
Laying out the Columns or Rows	14-58
TableLayoutPanel Control Extender Properties.....	14-62

TableLayoutPanel Control Methods.....	14-65
LAB 14: CONTAINER CONTROLS.....	14-71
Lab 14 Overview.....	14-72
Lay Out a Panel Control	14-73
Use the SplitContainer Control	14-77
Work with the TableLayoutPanel Control	14-80
MENUS AND TOOLBARS	15-1
Introducing the 'Strips	15-2
Adding Menu Images	15-6
Using Visual Studio's Automatic Menus	15-8
The ToolStrip Control.....	15-10
The StatusStrip Control.....	15-13
The ContextMenuStrip Control	15-17
The ToolStripContainer Control	15-18
Working with a ToolStripItem	15-21
ToolStripItem Display Styles	15-23
Making and Saving Runtime Customizations	15-24
ToolStrip Layout Issues and Overflow	15-29
Working with the 'Strips	15-33
RichTextBox Demo	15-33
WebBrowser Demo.....	15-38
LAB 15: MENUS AND TOOLBARS.....	15-46
Lab 15 Overview.....	15-47
Add the MenuStrip	15-48
Add the ToolStrip	15-51
Add the StatusStrip.....	15-54
COMPLEX WINDOWS FORMS CONTROLS.....	16-1
Introducing Complex Controls	16-2
NotifyIcon Control	16-3
Investigating the Sample Form	16-5
WebBrowser Control.....	16-10
Investigating the Sample Form	16-13
Investigating WebBrowser Navigation	16-14
Displaying Dialog Boxes	16-16
Reacting to Environment Changes	16-17
In Summary.....	16-22

MaskedTextBox Control	16-23
Operation of the MaskedTextBox Control.....	16-24
Reacting to the MaskInputRejected Event.....	16-29
Status Properties	16-31
In Summary.....	16-31
RichTextBox Control.....	16-32
Handling State	16-33
Undo and Redo.....	16-37
Working with the Clipboard	16-40
Working with Fonts and Styles.....	16-41
Formatting Text.....	16-45
Working with Zoom, Links, and More.....	16-49
TreeView and ListView Controls.....	16-51
TreeView Control	16-53
ListView Control	16-62
Setting Up the Images	16-66
Filling the List of Files	16-67
Working with ListView Items	16-70
Showing Items in Groups.....	16-72
Sorting the Columns	16-76
MonthCalendar and DateTimePicker Controls	16-83
The MonthCalendar Control.....	16-84
The DateTimePicker Control.....	16-90
In Summary.....	16-94
LAB 16: COMPLEX WINDOWS FORMS CONTROLS	16-99
Lab 16 Overview.....	16-100
Set Up the NotifyIcon Control	16-101
Add the DateTimePicker Control	16-104
Add a Web Browser.....	16-107
INTEROPERABILITY	17-1
Interoperability Overview	17-2
COM and the .NET Framework	17-3
Understanding COM Components.....	17-3
Managed and Unmanaged Code.....	17-4
Calling COM Objects from .NET	17-6
Calling a COM DLL from .NET.....	17-6
Interop Assemblies	17-11
Exporting Data to Excel	17-12

Calling .NET Assemblies from COM.....	17-17
Creating COM DLLs in Visual Studio.....	17-17
Creating Wrappers for .NET Framework Classes.....	17-22
Using Platform Invoke.....	17-26
Using the Windows API	17-26
Platform Invoke Caveats.....	17-29
Web Services.....	17-30
Web Service Requirements and Technologies.....	17-30
Creating and Calling a Web Service.....	17-32
LAB 17: INTEROPERABILITY	17-45
Lab 17 Overview.....	17-46
Call a COM DLL from .NET	17-47
Call a COM Object from .NET	17-51
Create and Call a Web Service	17-55
INDEX.....	INDEX-1

