James Foxall

Sams Teach Yourself

Visual Basic® 2010

in 24 Hours

SAMS

Sams Teach Yourself Visual Basic 2010 in 24 Hours Complete Starter Kit

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Introduction

Visual Basic 2010 is Microsoft's latest incarnation of the enormously popular Visual Basic language, and it's fundamentally different from the versions that came before it. Visual Basic is more powerful and more capable than ever before, and its features and functionality are on par with "higher-level" languages such as C++. One consequence of this newfound power is added complexity. Gone are the days when you could sit down with Visual Basic and the online Help and teach yourself what you needed to know to create a functional program.

Audience and Organization

This book is targeted toward those who have little or no programming experience or who might be picking up Visual Basic as a second language. The book has been structured and written with a purpose: to get you productive as quickly as possible. I've used my experiences in writing large commercial applications with Visual Basic and teaching Visual Basic to create a book that I hope cuts through the fluff and teaches you what you need to know. All too often, authors fall into the trap of focusing on the technology rather than on the practical application of the technology. I've worked hard to keep this book focused on teaching you practical skills that you can apply immediately to a development project. Feel free to post your suggestions or success stories at www.jamesfoxall.com/forums.

This book is divided into five parts, each of which focuses on a different aspect of developing applications with Visual Basic. These parts generally follow the flow of tasks you'll perform as you begin creating your own programs with Visual Basic. I recommend that you read them in the order in which they appear.

- Part I, "The Visual Basic 2010 Environment," teaches you about the Visual Basic environment, including how to navigate and access Visual Basic's numerous tools. In addition, you'll learn about some key development concepts such as objects, collections, and events.
- Part II, "Building a User Interface," shows you how to build attractive and functional user interfaces. In this part, you'll learn about forms and controls—the user interface elements such as text boxes and list boxes.
- Part III, "Making Things Happen: Programming," teaches you the nuts and bolts of Visual Basic 2010 programming—and there's a lot to learn. You'll dis-

cover how to create modules and procedures, as well as how to store data, perform loops, and make decisions in code. After you've learned the core programming skills, you'll move into object-oriented programming and debugging applications.

- Part IV, "Working with Data," introduces you to working with graphics, text files, and programming databases and shows you how to automate external applications such as Word and Excel. In addition, this part teaches you how to manipulate a user's file system and the Windows Registry.
- Part V, "Deploying Solutions and Beyond," shows you how to distribute an application that you've created to an end user's computer. In Hour 24, "The 10,000-Foot View," you'll learn about Microsoft's .NET initiative from a higher, less-technical level.

Many readers of previous editions have taken the time to give me input on how to make this book better. Overwhelmingly, I was asked to have examples that build on the examples in the previous chapters. In this book, I have done that as much as possible. Instead of learning concepts in isolated bits, you'll be building a feature-rich Picture Viewer program throughout the course of this book. You'll begin by building the basic application. As you progress through the chapters, you'll add menus and toolbars to the program, build an Options dialog box, modify the program to use the Windows Registry and a text file, and even build a setup program to distribute the application to other users. I hope you find this approach beneficial in that it enables you to learn the material in the context of building a real program.

Conventions Used in This Book

This book uses several design elements and conventions to help you prioritize and reference the information it contains:

By the Way

By the Way boxes provide useful sidebar information that you can read immediately or circle back to without losing the flow of the topic at hand.

Did you Know?

Did You Know? boxes highlight information that can make your Visual Basic programming more effective.

Watch Out!

Watch Out! boxes focus your attention on problems or side effects that can occur in specific situations.

New terms appear in an *italic* typeface for emphasis.

In addition, this book uses various typefaces to help you distinguish code from regular English. Code is presented in a `monospace` font. Placeholders—words or characters that represent the real words or characters you would type in code—appear in *`italic monospace`*. When you are asked to type or enter text, that text appears in **bold**.

Menu options are separated by a comma. For example, when you should open the File menu and choose the New Project menu option, the text says "Select File, New Project."

Some code statements presented in this book are too long to appear on a single line. In these cases, a line-continuation character (an underscore) is used to indicate that the following line is a continuation of the current statement.

Onward and Upward!

This is an exciting time to be learning how to program. It's my sincerest wish that when you finish this book, you feel capable of using many of Visual Basic's tools to create, debug, and deploy modest Visual Basic programs. Although you won't be an expert, you'll be surprised at how much you've learned. And I hope this book will help you determine your future direction as you proceed down the road to Visual Basic mastery.

I love programming with Visual Basic, and sometimes I find it hard to believe I get paid to do so. I hope you find Visual Basic as enjoyable as I do!

HOUR 1

Jumping in with Both Feet: A Visual Basic 2010 Programming Tour

What You'll Learn in This Hour:

- Building a simple (yet functional) Visual Basic application
- Letting a user browse a hard drive
- Displaying a picture from a file on disk
- Getting familiar with some programming lingo
- Learning about the Visual Studio 2010 IDE

Learning a new programming language can be intimidating. If you've never programmed before, the act of typing seemingly cryptic text to produce sleek and powerful applications probably seems like a black art, and you might wonder how you'll ever learn everything you need to know. The answer, of course, is one step at a time. I believe the first step to mastering a programming language is *building confidence*. Programming is part art and part science. Although it might seem like magic, it's more akin to illusion. After you know how things work, a lot of the mysticism goes away, and you are free to focus on the mechanics necessary to produce the desired result.

Producing large, commercial solutions is accomplished by way of a series of small steps. After you've finished this hour, you'll have a feel for the overall development process and will have taken the first step toward becoming an accomplished programmer. In fact, you will build on the examples in this hour in subsequent chapters. By the time you complete this book, you will have built a robust application, complete with resizable screens, an intuitive interface including menus and toolbars, manipulation of the Windows Registry, and robust code with professional error handling. But I'm getting ahead of myself.

In this hour, you'll complete a quick tour of Visual Basic that takes you step by step through creating a complete, albeit small, Visual Basic program. Most introductory programming books start by having the reader create a simple Hello World program. I've yet to see a Hello World program that's the least bit helpful. (They usually do nothing more than print `hello world` to the screen—what fun!) So, instead, you'll create a Picture Viewer application that lets you view Windows bitmaps and icons on your computer. You'll learn how to let a user browse for a file and how to display a selected picture file on the screen. The techniques you learn in this chapter will come in handy in many real-world applications that you'll create, but the goal of this chapter is for you to realize just how much fun it is to program using Visual Basic 2010.

Starting Visual Basic 2010

Before you begin creating programs in Visual Basic 2010, you should be familiar with the following terms:

- **Distributable component:** The final, compiled version of a project. Components can be distributed to other people and other computers, and they don't require the Visual Basic 2010 development environment (the tools you use to create a .NET program) to run (although they do require the .NET runtime, which I'll discuss in Hour 23, "Deploying Applications"). Distributable components are often called *programs*. In Hour 23, you'll learn how to distribute the Picture Viewer program that you're about to build to other computers.
- **Project:** A collection of files that can be compiled to create a distributable component (program). There are many types of projects, and complex applications might consist of multiple projects, such as Windows application projects and support dynamic link library (DLL) projects.
- **Solution:** A collection of projects and files that make up an application or component.

By the Way

In the past, Visual Basic was an autonomous language. This has changed. Now, Visual Basic is part of a larger entity known as the *.NET Framework*. The .NET Framework encompasses all the .NET technology, including Visual Studio .NET (the suite of development tools) and the common language runtime (CLR), which is the set of files that make up the core of all .NET applications. You'll learn about these items in more detail as you progress through this book. For now, realize that Visual Basic is one of many languages that exist within the Visual Studio family. Many other languages, such as C#, are also .NET languages, make use of the CLR, and are developed within Visual Studio.

Visual Studio 2010 is a complete development environment, and it's called the *IDE* (short for *integrated development environment*). The IDE is the design framework in which you build applications; every tool you'll need to create your Visual Basic projects is accessed from within the Visual Basic IDE. Again, Visual Studio 2010 supports development using many different languages, Visual Basic being the most popular. The environment itself is not Visual Basic, but the language you'll be using within Visual Studio 2010 *is* Visual Basic. To work with Visual Basic projects, you first start the Visual Studio 2010 IDE.

Start Visual Studio 2010 now by choosing Microsoft Visual Basic 2010 Express Edition from the Start/Programs menu. If you are running the full retail version of Visual Studio, your shortcut may have a different name. In this case, locate the shortcut on the Start menu and click it once to start the Visual Studio 2010 IDE.

Creating a New Project

When you first start Visual Studio 2010, you see the Start Page tab within the IDE, as shown in Figure 1.1. You can open projects created previously or create new projects from this Start page. For this quick tour, you'll create a new Windows application, so select File, New Project to display the New Project dialog box shown in Figure 1.2.

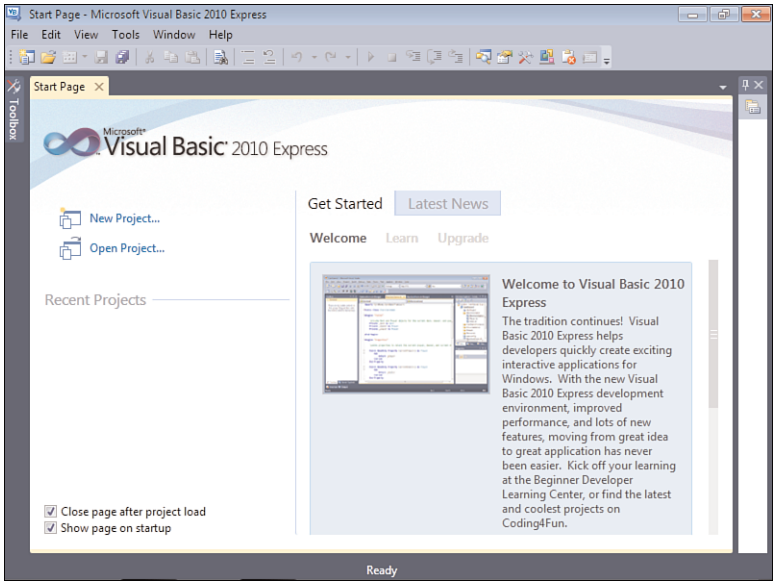

FIGURE 1.1 You can open existing projects or create new projects from the Visual Studio Start page.

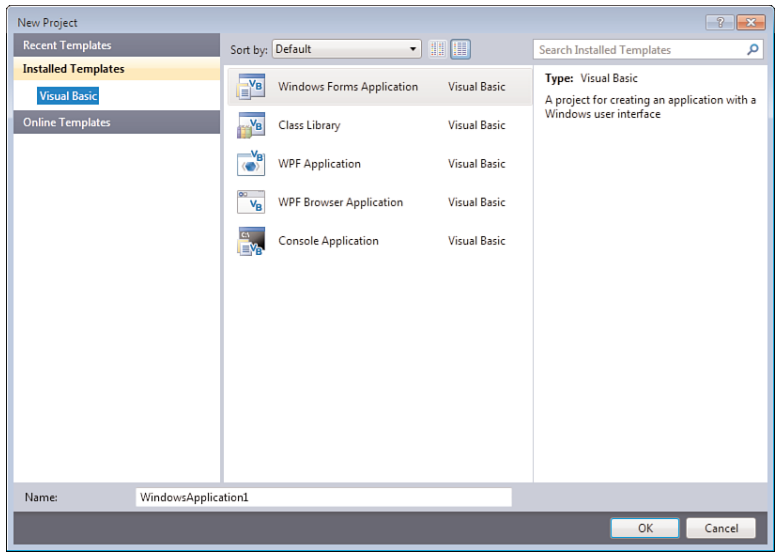

FIGURE 1.2
The New Project dialog box enables you to create many types of .NET projects.

By the Way

If your Start page doesn't look like the one shown in Figure 1.1, chances are that you've changed the default settings. In Hour 2, "Navigating Visual Basic 2010," I'll show you how to change them back.

The New Project dialog box is used to specify the type of Visual Basic project to create. (You can create many types of projects with Visual Basic, as well as with the other supported languages of the .NET Framework.) The options shown in Figure 1.2 are limited because I am running the Express edition of Visual Basic for all examples in this book. If you are running the full version of Visual Studio, you will have many more options available.

Create a new Windows Forms Application now by following these steps:

1. Make sure that the Windows Forms Application item is selected. (If it's not, click it once to select it.)
2. At the bottom of the New Project dialog box is a Name text box. This is where, oddly enough, you specify the name of the project you're creating. Enter **Picture Viewer** in the Name text box.
3. Click OK to create the project.

Did you Know?

Always set the Name text box to something meaningful before creating a project, or you'll have more work to do later if you want to move or rename the project.

When Visual Basic creates a new Windows Forms Application project, it adds one form (the empty gray window) for you to begin building the *interface* for your application, as shown in Figure 1.3.

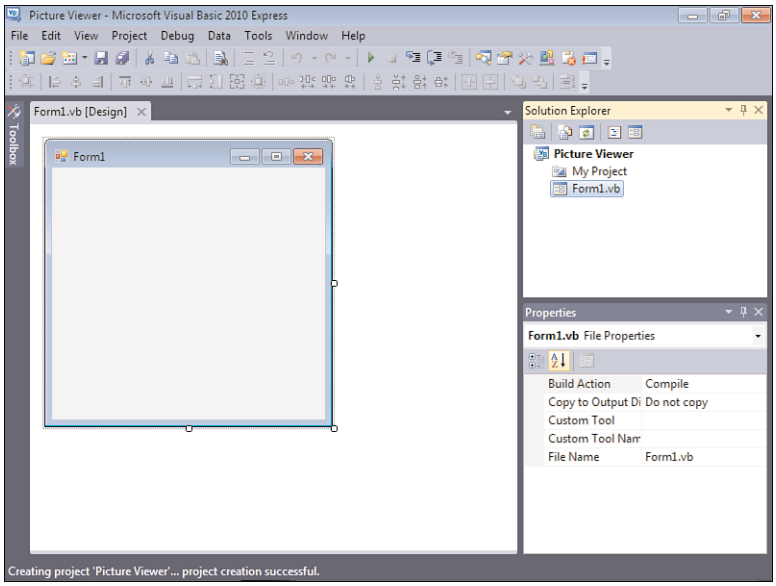

FIGURE 1.3
New Windows Forms Applications start with a blank form; the fun is just beginning!

By the Way

Within Visual Studio 2010, *form* is the term given to the design-time view of a window that can be displayed to a user.

Your Visual Studio 2010 environment might look different from that shown in the figures in this hour, depending on the edition of Visual Studio 2010 you're using, whether you've already played with Visual Studio 2010, and other factors, such as your monitor's resolution. All the elements discussed in this hour exist in all editions of Visual Studio 2010, however. (If a window shown in a figure doesn't appear in your IDE, use the View menu to display it.)

By the Way

To create a program that can be run on another computer, you start by creating a project and then compiling the project into a component such as an *executable* (a program a user can run) or a *DLL* (a component that can be used by other programs and components). The compilation process is discussed in detail in Hour 23. The important thing to note at this time is that when you hear someone refer to *creating or writing a program*, just as you're creating the Picture Viewer program now, that person is referring to the completion of all steps up to and including compiling the project to a distributable file.

Understanding the Visual Studio 2010 Environment

The first time you run Visual Studio 2010, you'll notice that the IDE contains a number of windows, such as the Properties window on the right, which is used to view and set properties of objects. In addition to these windows, the IDE contains a number of tabs, such as the vertical Toolbox tab on the left edge of the IDE (refer to Figure 1.3). Try this now: Click the Toolbox tab to display the Toolbox window (clicking a tab displays an associated window). You can hover the mouse over a tab for a few seconds to display the window as well. To hide the window, simply move the mouse off the window (if you hovered over the tab to display it) or click another window. To close the window, click the Close (X) button in the window's title bar.

By the Way

If you opened the toolbox by clicking its tab rather than hovering over the tab, the toolbox does not close automatically. Instead, it stays open until you click another window.

You can adjust the size and position of any of these windows, and you can even hide and show them as needed. You'll learn how to customize your design environment in Hour 2.

Watch Out!

Unless specifically instructed to do so, don't double-click anything in the Visual Studio 2010 design environment. Double-clicking most objects produces an entirely different result than single-clicking does. If you mistakenly double-click an object on a form (discussed shortly), a code window appears. At the top of the code window is a set of tabs: one for the form design and one for the code. Click the tab for the form design to hide the code window and return to the form.

The Properties window on the right side of the design environment is perhaps the most important window in the IDE, and it's the one you'll use most often. If your computer display resolution is set to 800×600, you can probably see only a few properties at this time. This makes it difficult to view and set properties as you create projects. All the screen shots in this book were captured on Windows 7 running at 800×600 because of size constraints, but you should run at a higher resolution if you can. I highly recommend that you develop applications with Visual Basic at a screen resolution of 1024×768 or higher to have plenty of work space. To change your display settings, right-click the desktop and select Screen Resolution. Keep in mind, however, that end users might be running at a lower resolution than you are using for development.

Changing the Characteristics of Objects

Almost everything you work with in Visual Basic is an object. Forms, for instance, are objects, as are all the items you can put on a form to build an interface, such as list boxes and buttons. There are many types of objects, and objects are classified by type. For example, a form is a `Form` object, whereas items you can place on a form are called `Control` objects, or controls. (Hour 3, "Understanding Objects and Collections," discusses objects in detail.) Some objects don't have a physical appearance but exist only in code. You'll learn about these kinds of objects in later hours.

Watch Out!

You'll find that I often mention material coming up in future chapters. In the publishing field, we call these *forward reference*s. For some reason, these tend to unnerve some people. I do this only so that you realize you don't have to fully grasp a subject when it's first presented; the material will be covered in more detail later. I try to keep forward references to a minimum, but unfortunately, teaching programming is not a perfectly linear process. There will be times I'll have to touch on a subject that I feel you're not ready to dive into fully yet. When this happens, I give you a forward reference to let you know that the subject will be covered in greater detail later.

Every object has a distinct set of attributes known as *properties* (regardless of whether the object has a physical appearance). Properties define an object's characteristics. You have certain properties, such as your height and hair color. Visual Basic objects have properties as well, such as `Height` and `BackColor`. When you create a new object, the first thing you need to do is set its properties so that the object appears and behaves the way you want it to. To display an object's properties, click the object in its designer (the main work area in the IDE).

Click anywhere in the default form now, and check to see that its properties are displayed in the Properties window. You'll know because the drop-down list box at the top of the Properties window contains the form's name: `Form1` `System.Windows.Forms.Form. Form1` is the object's name, and `System.Windows.Forms.Form` is the object's type.

Naming Objects

The property you should always set first when creating any new object is the `Name` property. Press F4 to display the Properties window (if it's not already visible), and scroll toward the top of the properties list until you see the `(Name)` property, as shown in Figure 1.4. If the `Name` property isn't one of the first properties listed, the Properties

window is set to show properties categorically instead of alphabetically. You can show the list alphabetically by clicking the Alphabetical button that appears just above the properties grid.

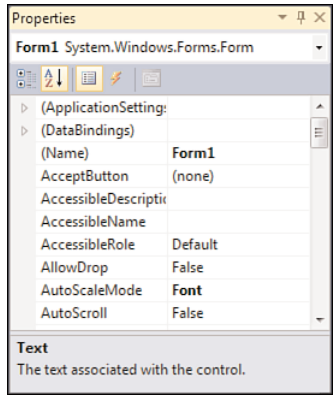

FIGURE 1.4
The `Name` property is the first property you should change when you add a new object to your project.

By the Way

I recommend that you keep the Properties window set to show properties in alphabetical order; doing so makes it easier to find properties that I refer to in the text. Note that the `Name` property always stays toward the top of the list and is called `(Name)`. If you're wondering why it has parentheses around it, it's because the parentheses force the property to the top of the list; symbols come before letters in an alphabetical sort.

When saving a project, you choose a name and a location for the project and its files. When you first create an object within the project, Visual Basic gives the object a unique, generic name based on the object's type. Although these names are functional, they simply aren't descriptive enough for practical use. For instance, Visual Basic named your form Form1, but it's common to have dozens (or even hundreds) of forms in a project. It would be extremely difficult to manage such a project if all forms were distinguishable only by a number (Form2, Form3, and so forth).

By the Way

What you're actually working with is a *form class*, or *template*, that will be used to create and show forms at runtime. For the purposes of this quick tour, I simply call it a form. See Hour 5, "Building Forms: The Basics," for more information.

To better manage your forms, give each one a descriptive name. Visual Basic gives you the chance to name new forms as they're created in a project. Visual Basic created this default form for you, so you didn't get a chance to name it. It's important

not only to change the form's name but also to change its filename. Change the programmable name and the filename by following these steps:

1. Click the `Name` property and change the text from Form1 to ViewerForm. Notice that this does not change the form's filename as it's displayed in the Solution Explorer window, located above the Properties window.
2. Right-click Form1.vb in the Solution Explorer window (the window above the Properties window).
3. Choose Rename from the context menu that appears.
4. Change the text from Form1.vb to ViewerForm.vb.

By the Way

I use the Form suffix here to denote that the file is a form class. Suffixes are optional, but I find that they really help you keep things organized.

The form's `Name` property is actually changed for you automatically when you rename the file. In future examples, I will have you rename the form file so that the `Name` property is changed automatically. I had you set it in the Properties window here so that you could see how the Properties window works.

Setting the Form's `Text` Property

Notice that the text that appears in the form's title bar says Form1. Visual Basic sets the form's title bar to the name of the form *when it's first created,* but doesn't change it when you change the name of the form. The text in the title bar is determined by the value of the form's `Text` property. Change the text now by following these steps:

1. Click the form once more so that its properties appear in the Properties window.
2. Use the scrollbar in the Properties window to locate the `Text` property.
3. Change the text to Picture Viewer. Press the Enter key or click a different property. You'll see the text in the form's title bar change.

Saving a Project

The changes you've made so far exist only in memory. If you were to turn off your computer at this time, you would lose all your work up to this point. Get into the habit of frequently saving your work, which commits your changes to disk.

Click the Save All button on the toolbar (the picture of a stack of floppy disks) now to save your work. Visual Basic displays the Save Project dialog box, shown in Figure 1.5. Notice that the `Name` property is already filled in because you named the project when you created it. The Location text box is where you specify the location in which the project is to be saved. Visual Basic creates a subfolder in this location, using the value in the Name text box (in this case, Picture Viewer). You can use the default location or change it to suit your purposes. You can have Visual Basic create a solution folder, and if you do Visual Basic creates the solution file in the folder, and it creates a subfolder for the project and the actual files. On large projects, this is a handy feature. For now, it's an unnecessary step, so uncheck the Create Directory for Solution box and then click Save to save the project.

Giving the Form an Icon

Everyone who's used Windows is familiar with icons—the little pictures that represent programs. Icons most commonly appear on the Start menu next to the name of their respective programs. In Visual Basic, not only do you have control over the icon of your program file, but you also can give every form in your program a unique icon if you want to.

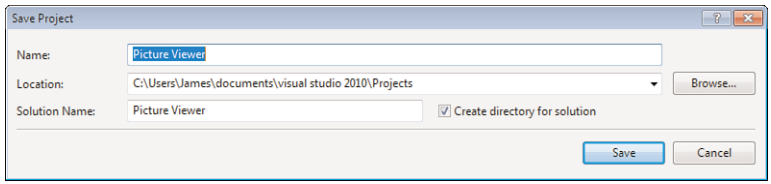

FIGURE 1.5
When saving a project, choose a name and location for the project and its files.

By the Way

The following instructions assume that you have access to the source files for the examples in this book. They are available at http://www.samspublishing.com. You can also get these files, as well as discuss this book, at my website at http://www.jamesfoxall.com/books.aspx. When you unzip the samples, a folder is created for each hour, and within each hour's folder are subfolders for the sample projects. You'll find the icon for this example in the folder Hour 01\Picture Viewer.

You don't have to use the icon I've provided for this example; you can use any icon. If you don't have an icon available (or you want to be a rebel), you can skip this section without affecting the outcome of the example.

To give the form an icon, follow these steps:

1. In the Properties window, click the `Icon` property to select it.
2. When you click the `Icon` property, a small button with three dots appears to the right of the property. Click this button.

3. Use the Open dialog box that appears to locate the Picture Viewer.ico file or another icon file of your choice. When you've found the icon, double-click it, or click it once to select it and then choose Open.

After you've selected the icon, it appears in the `Icon` property along with the word `Icon`. A small version of the icon appears in the upper-left corner of the form as well. Whenever this form is minimized, this is the icon displayed on the Windows taskbar.

Changing the Form's Size

Next, you'll change the form's `Width` and `Height` properties. The `Width` and `Height` values are shown collectively under the `Size` property; `Width` appears to the left of the comma, and `Height` to the right. You can change the `Width` or `Height` property by changing the corresponding number in the `Size` property. Both values are represented in pixels. (That is, a form that has a `Size` property of 200, 350 is 200 pixels wide and 350 pixels tall.) To display and adjust the `Width` and `Height` properties separately, click the small triangle next to the `Size` property (see Figure 1.6). (After you click it, it changes to a triangle pointing diagonally down.)

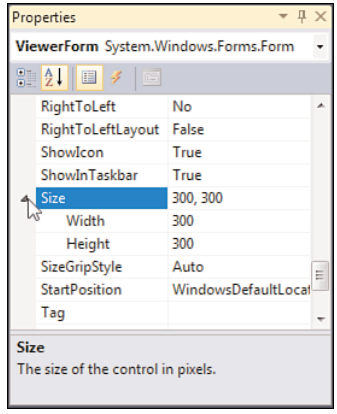

FIGURE 1.6
Some properties can be expanded to show more specific properties.

By the Way

A pixel is a unit of measurement for computer displays; it's the smallest visible "dot" on the screen. The resolution of a display is always given in pixels, such as 800×600 or 1024×768. When you increase or decrease a property by one pixel, you're making the smallest possible visible change to the property.

Change the `Width` property to 400 and the `Height` to 325 by typing in the corresponding box next to a property name. To commit a property change, press Tab or Enter,

or click a different property or window. Your screen should now look like the one shown in Figure 1.7.

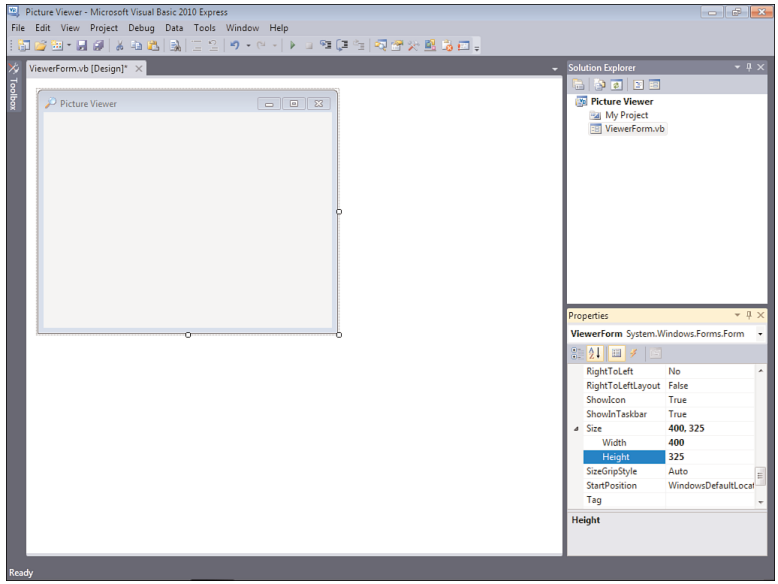

FIGURE 1.7 Changes made in the Properties window are reflected as soon as they're committed.

By the Way

> You can also size a form by dragging its border, which you'll learn about in Hour 2, or by using code to change its properties, which you'll learn how to do in Hour 5.

Save the project now by choosing File, Save All from the menu or by clicking the Save All button on the toolbar—it has a picture of stacked floppy disks.

Adding Controls to a Form

Now that you've set the initial properties of your form, it's time to create a user interface by adding objects to the form. Objects that can be placed on a form are called *controls*. Some controls have a visible interface with which a user can interact, whereas others are always invisible to the user. You'll use controls of both types in this example. On the left side of the screen is a vertical tab titled Toolbox. Click the Toolbox tab to display the Toolbox window to see the most commonly used controls, expanding the Common Controls section if necessary (see Figure1.8). The toolbox contains all the controls available in the project, such as labels and text boxes.

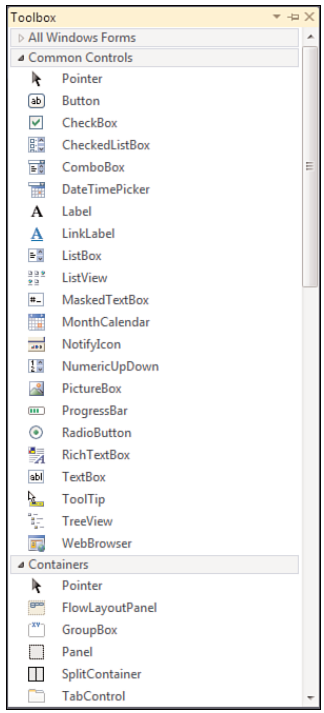

FIGURE 1.8
The toolbox is used to select controls to build a user interface.

The toolbox closes as soon as you've added a control to a form and when the pointer is no longer over the toolbox. To make the toolbox stay visible, click the little picture of a pushpin located in the toolbox's title bar.

I don't want you to add them yet, but your Picture Viewer interface will consist of the following controls:

- **Two `Button` controls:** The standard buttons that you're used to clicking in pretty much every Windows program you've ever run
- **A `PictureBox` control:** A control used to display images to a user
- **An `OpenFileDialog` control:** A hidden control that exposes the Windows Open File dialog box functionality

Designing an Interface

It's generally best to design a form's user interface and then add the code behind the interface to make the form functional. You'll build your interface in the following sections.

Adding a Visible Control to a Form

Start by adding a `Button` control to the form. Do this by double-clicking the Button item in the toolbox. Visual Basic creates a new button and places it in the upper-left corner of the form, as shown in Figure 1.9.

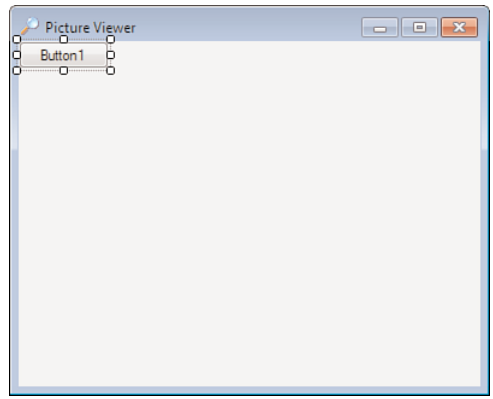

FIGURE 1.9
When you double-click a control in the toolbox, the control is added to the upper-left corner of the form.

Using the Properties window, set the button's properties as shown in the following list. Remember, when you view the properties alphabetically, the `Name` property is listed first, so don't go looking for it down in the list or you'll be looking a while.

Property	Value
Name	btnSelectPicture
Location	295,10 (295 is the x coordinate; 10 is the y coordinate.)
Size	85,23
Text	Select Picture

Now you'll create a button that the user can click to close the Picture Viewer program. Although you could add another new button to the form by double-clicking the `Button` control on the toolbox again, this time you'll add a button to the form by creating a copy of the button you've already defined. This enables you to easily create a button that maintains the size and other style attributes of the original button when the copy was made.

To do this, right-click the Select Picture button, and choose Copy from its context menu. Next, right-click anywhere on the form, and choose Paste from the form's

shortcut menu. (You can also use the keyboard shortcuts Ctrl+C to copy and Ctrl+V to paste.) The new button appears centered on the form, and it's selected by default. Notice that it retains almost all the properties of the original button, but the name has been reset. Change the properties of the new button as follows:

Property	Value
Name	btnQuit
Location	295,40
Text	Quit

The last visible control you need to add to the form is a `PictureBox` control. A `PictureBox` has many capabilities, but its primary purpose is to show pictures, which is precisely what you'll use it for in this example. Add a new `PictureBox` control to the form by double-clicking the `PictureBox` item in the toolbox, and set its properties as follows:

Property	Value
Name	picShowPicture
BorderStyle	FixedSingle
Location	8,8
Size	282,275

After you've made these property changes, your form will look like the one shown in Figure 1.10. Click the Save All button on the toolbar to save your work.

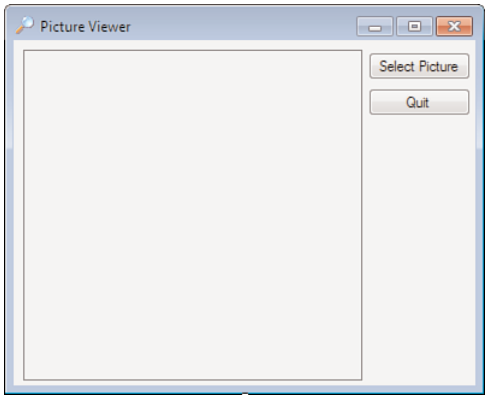

FIGURE 1.10
An application's interface doesn't have to be complex to be useful.

Adding an Invisible Control to a Form

All the controls you've used so far sit on a form and have a physical appearance when a user runs the application. Not all controls have a physical appearance, however. Such controls, called *nonvisual controls* (or *invisible-at-runtime controls*), aren't designed for direct user interactivity. Instead, they're designed to give you, the programmer, functionality beyond the standard features of Visual Basic.

To enable users to select a picture to display, you need to give them the ability to locate a file on their hard drives. You might have noticed that whenever you choose to open a file from within any Windows application, the dialog box displayed is almost always the same. It doesn't make sense to force every developer to write the code necessary to perform standard file operations, so Microsoft has exposed the functionality via a control that you can use in your projects. This control is called `OpenFileDialog`, and it will save you dozens of hours that would otherwise be necessary to duplicate this common functionality.

By the Way

> Other controls in addition to the `OpenFileDialog` control give you file functionality. For example, the `SaveFileDialog` control provides features for allowing the user to specify a filename and path for saving a file.

Display the toolbox and scroll down using the down arrow in the lower part of the toolbox until you can see the `OpenFileDialog` control (it's in the Dialogs category), and then double-click it to add it to your form. Note that the control isn't placed on the form; rather, it appears in a special area below the form (see Figure 1.11). This

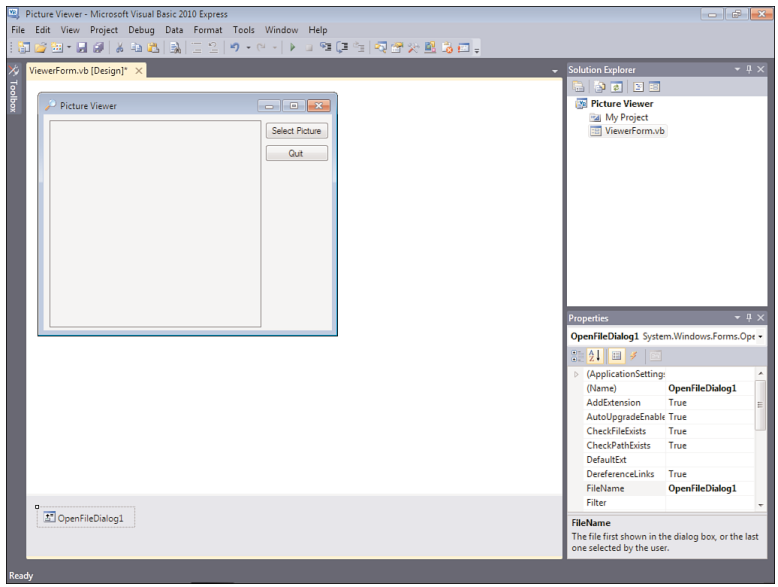

FIGURE 1.11 Controls that have no interface appear below the form designer.

happens because the `OpenFileDialog` control has no form interface to display to the user. It does have an interface (a dialog box) that you can display as necessary, but it has nothing to display directly on a form.

Select the `OpenFileDialog` control and change its properties as follows:

Property	Value
Name	ofdSelectPicture
Filename	`<make empty>`
Filter	Windows Bitmaps|*.BMP|JPEG Files|*.JPG
Title	Select Picture

By the Way

Don't actually enter the text `<make empty>` for the filename; I really mean delete the default value and make this property value empty.

The `Filter` property is used to limit the types of files that will be displayed in the Open File dialog box. The format for a filter is description|filter. The text that appears before the first pipe symbol is the descriptive text of the file type, whereas the text after the pipe symbol is the pattern to use to filter files. You can specify more than one filter type by separating each description|filter value with another pipe symbol. Text entered into the `Title` property appears in the title bar of the Open File dialog box.

The graphical interface for your Picture Viewer program is now finished. If you pinned the toolbox open, click the pushpin in the title bar of the toolbox now to close it. Click Save All on the toolbar now to save your work.

Writing the Code Behind an Interface

You have to write code for the program to be capable of performing tasks and responding to user interaction. Visual Basic is an *event-driven* language, which means that code is executed in response to events. These events might come from users, such as a user clicking a button and triggering its `Click` event, or from Windows itself (see Hour 4, "Understanding Events," for a complete explanation of events). Currently, your application looks nice, but it won't do anything. Users can click the Select Picture button until they can file for disability with carpel tunnel syndrome, but nothing will happen, because you haven't told the program what to do when the user clicks

the button. You can see this for yourself now by pressing F5 to run the project. Feel free to click the buttons, but they don't do anything. When you're finished, close the window you created to return to Design mode.

You'll write code to accomplish two tasks. First, you'll write code that lets users browse their hard drives to locate and select a picture file and then display it in the picture box (this sounds a lot harder than it is). Second, you'll add code to the Quit button that shuts down the program when the user clicks the button.

Letting a User Browse for a File

The first bit of code you'll write enables users to browse their hard drives, select a picture file, and then see the selected picture in the `PictureBox` control. This code executes when the user clicks the Select Picture button; therefore, it's added to the `Click` event of that button.

When you double-click a control on a form in Design view, the default event for that control is displayed in a code window. The default event for a `Button` control is its `Click` event, which makes sense, because clicking is the most common action a user performs with a button. Double-click the Select Picture button now to access its `Click` event in the code window (see Figure 1.12).

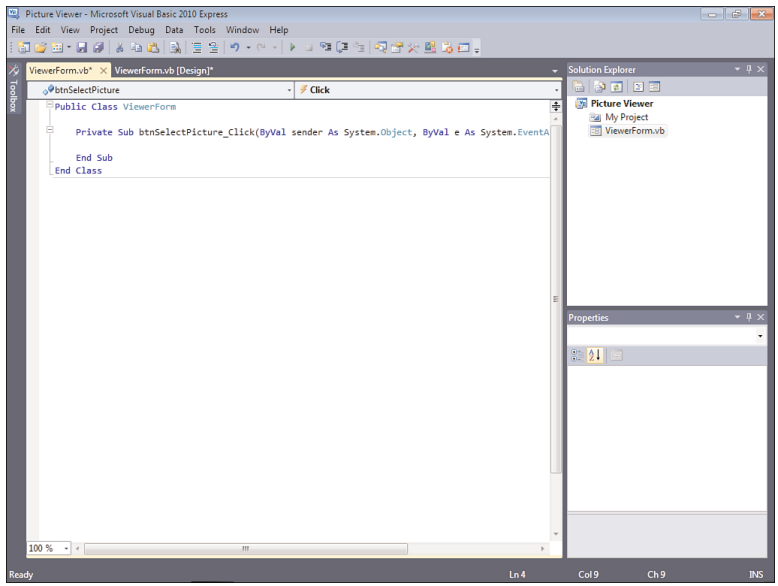

FIGURE 1.12 You'll write all your code in a window such as this.

When you access an event, Visual Basic builds an *event handler*, which is essentially a template procedure in which you add the code that executes when the event occurs.

The cursor is already placed within the code procedure, so all you have to do is add code. Although this may seem daunting, by the time you're finished with this book, you'll be madly clicking and clacking away as you write your own code to make your applications do exactly what you want them to do—well, most of the time. For now, just enter the code as I present it here.

It's important that you get in the habit of commenting your code, so the first statement you'll enter is a comment. Beginning a statement with an apostrophe (') designates that statement as a comment. The compiler won't do anything with the statement, so you can enter whatever text you want after the apostrophe. Type the following statement exactly as it appears, and press the Enter key at the end of the line:

```
' Show the open file dialog box.
```

The next statement you'll enter triggers a method of the `OpenFileDialog` control that you added to the form. Think of a method as a mechanism to make a control do something. The `ShowDialog()` method tells the control to show its Open dialog box and let the user select a file. The `ShowDialog()` method returns a value that indicates its success or failure, which you'll then compare to a predefined result (`DialogResult.OK`). Don't worry too much about what's happening here; you'll be learning the details of all this in later hours. The sole purpose of this hour is to get your feet wet. In a nutshell, the `ShowDialog()` method is invoked to let a user browse for a file. If the user selects a file, more code is executed. Of course, there's a lot more to using the `OpenFileDialog` control than I present in this basic example, but this simple statement gets the job done. Enter the following statement and press Enter to commit the code (don't worry about capitalization; Visual Basic will fix the case for you):

```
If ofdSelectpicture.ShowDialog = DialogResult.OK Then
```

By the Way

After you insert the statement that begins with `If` and press Enter, Visual Basic automatically creates the `End If` statement for you. If you type in `End If`, you'll wind up with two `End If` statements, and your code won't run. If this happens, delete one of the statements. Hour 13, "Making Decisions in Visual Basic Code," has all the details on the `If` statement.

It's time for another comment. The cursor is currently between the statement that starts with `If` and the `End If` statement. Leave the cursor there and type the following statement, remembering to press Enter at the end of the line:

```
' Load the picture into the picture box.
```

Did you Know?

Don't worry about indenting the code by pressing the Tab key or using spaces. Visual Basic automatically indents code for you.

This next statement, which appears within the `If` construct (between the `If` and `End If` statements), is the line of code that actually displays the picture in the picture box.

Enter the following statement:

```
picShowPicture.Image = Image.FromFile(ofdSelectPicture.Filename)
```

In addition to displaying the selected picture, your program also displays the path and filename of the picture in the title bar. When you first created the form, you changed its `Text` property in the Properties window. To create dynamic applications, properties need to be constantly adjusted at runtime, and you do this using code. Insert the following two statements, pressing Enter at the end of each line:

```
' Show the name of the file in the form's caption.
Me.Text = "Picture Viewer(" & ofdselectpicture.FileName & ")"
```

After you've entered all the code, your editor should look like that shown in Figure 1.13.

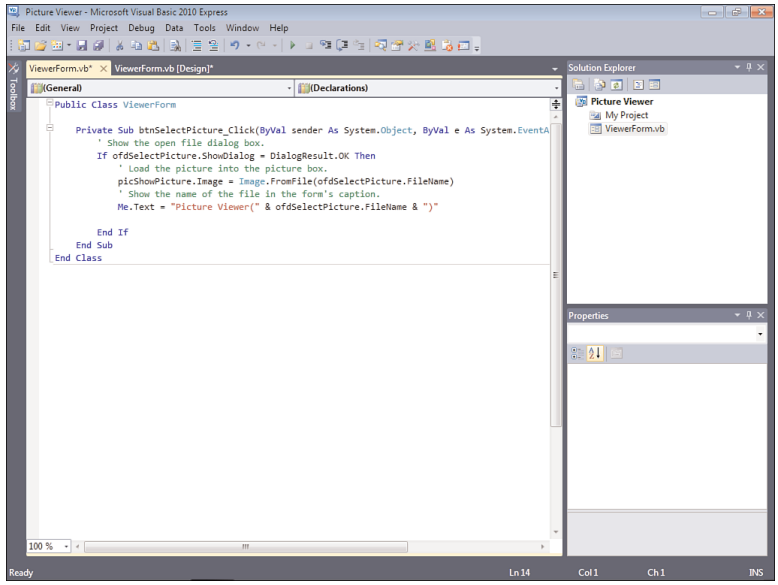

FIGURE 1.13
Make sure that your code exactly matches the code shown here.

Terminating a Program Using Code

The last bit of code you'll write terminates the application when the user clicks the Quit button. To do this, you need to access the `Click` event handler of the `btnQuit` button. At the top of the code window are two tabs. The current tab says ViewerForm.vb*. This tab contains the code window for the form that has the filename ViewerForm.vb. Next to this is a tab that says ViewerForm.vb [Design]*. Click this tab to switch from Code view to the form designer. If you receive an error when you click the

tab, the code you entered contains an error, and you need to edit it to make it the same as shown in Figure 1.13. After the form designer appears, double-click the Quit button to access its `Click` event.

Enter the following code in the Quit button's `Click` event handler; press Enter at the end of each statement:

```
' Close the window and exit the application
Me.Close()
```

By the Way

The `Me.Close()` statement closes the current form. When the last loaded form in a program is closed, the application shuts itself down—completely. As you build more robust applications, you'll probably want to execute all kinds of cleanup routines before terminating an application, but for this example, closing the form is all you need to do.

Running a Project

Your application is now complete. Click the Save All button on the toolbar (the stack of floppy disks), and then run your program by pressing F5. You can also run the program by clicking the button on the toolbar that looks like a right-facing triangle and resembles the Play button on a DVD player. (This button is called Start, and it can also be found on the Debug menu.) Learning the keyboard shortcuts will make your development process move along faster, so I recommend that you use them whenever possible.

When you run the program, the Visual Basic interface changes, and the form you've designed appears, floating over the design environment (see Figure 1.14).

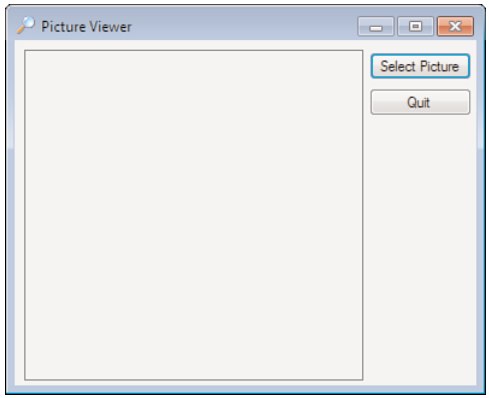

FIGURE 1.14 When in Run mode, your program executes just as it would for an end user.

You are now running your program as though it were a stand-alone application running on another user's machine; what you see is exactly what users would see if they

ran the program (without the Visual Studio 2010 design environment in the background, of course). Click the Select Picture button to display the Select Picture dialog box, shown in Figure 1.15. Use this dialog box to locate a picture file. When you've found a file, double-click it, or click once to select it and then click Open. The selected picture is then displayed in the picture box, as shown in Figure 1.16.

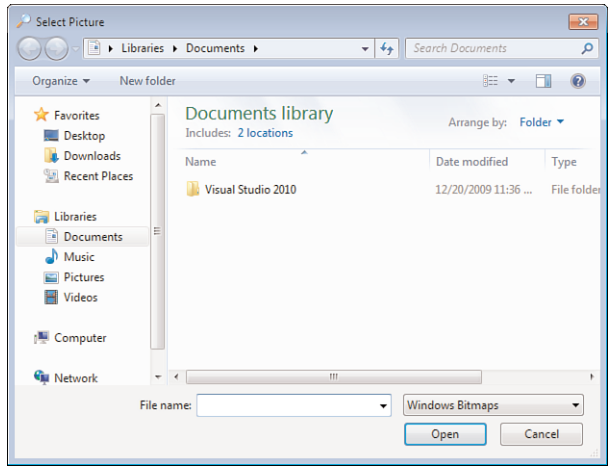

FIGURE 1.15
The `OpenFileDialog` control handles all the details of browsing for files. Cool, huh?

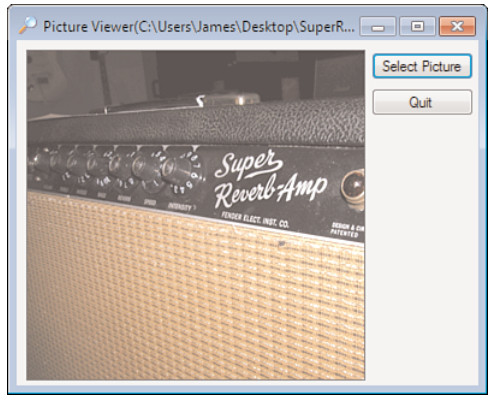

FIGURE 1.16
What could be prettier than a 1964 Fender Super Reverb amplifier?

By the Way

When you click the Select Picture button, the default path shown depends on the last active path in Windows, so it might be different for you than shown in Figure 1.15.

By the Way

If you want to select and display a picture from your digital camera, chances are the format is JPEG, so you'll need to select this from the Files of Type drop-down. Also, if your image is very large, you'll see only the upper-left corner of the image (what fits in the picture box). In later hours, I'll show you how you can scale the image to fit the picture box, and even resize the form to show a larger picture in its entirety.

Summary

When you're finished playing with the program, click the Quit button to return to Design view.

That's it! You've just created a bona fide Visual Basic program. You've used the toolbox to build an interface with which users can interact with your program, and you've written code in strategic event handlers to empower your program to do things. These are the basics of application development in Visual Basic. Even the most complicated programs are built using this fundamental approach: You build the interface and add code to make the application do things. Of course, writing code to do things *exactly* the way you want things done is where the process can get complicated, but you're on your way.

If you take a close look at the organization of the hours in this book, you'll see that I start out by teaching you the Visual Basic (Visual Studio .NET) environment. I then move on to building an interface, and later I teach you about writing code. This organization is deliberate. You might be eager to jump in and start writing serious code, but writing code is only part of the equation—don't forget the word *Visual* in Visual Basic. As you progress through the hours, you'll build a solid foundation of development skills.

Soon, you'll pay no attention to the man behind the curtain—*you'll* be that man (or woman)!

Q&A

Q. ***Can I show bitmaps of file types other than BMP and JPG?***

A. Yes. `PictureBox` supports the display of images with the extensions BMP, JPG, ICO, EMF, WMF, and GIF. `PictureBox` can even save images to a file using any of the supported file types.

Q. *Is it possible to show pictures in other controls?*

A. `PictureBox` is the control to use when you are just displaying images. However, many other controls allow you to display pictures as part of the control. For instance, you can display an image on a button control by setting the button's `Image` property to a valid picture.

Workshop

Quiz

1. What type of Visual Basic project creates a standard Windows program?
2. What window is used to change the attributes (location, size, and so on) of a form or control in the IDE?
3. How do you access the default event (code) of a control?
4. What property of a picture box do you set to display an image?
5. What is the default event for a button control?

Answers

1. Windows Forms Application
2. The Properties window
3. Double-click the control in the designer
4. The `Image` property
5. The `Click` event

Exercises

1. Change your Picture Viewer program so that the user can also locate and select GIF files. (Hint: Change the `Filter` property of the `OpenFileDialog` control.)
2. Create a new project with a new form. Create two buttons on the form, one above the other. Next, change their position so that they appear next to each other.

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