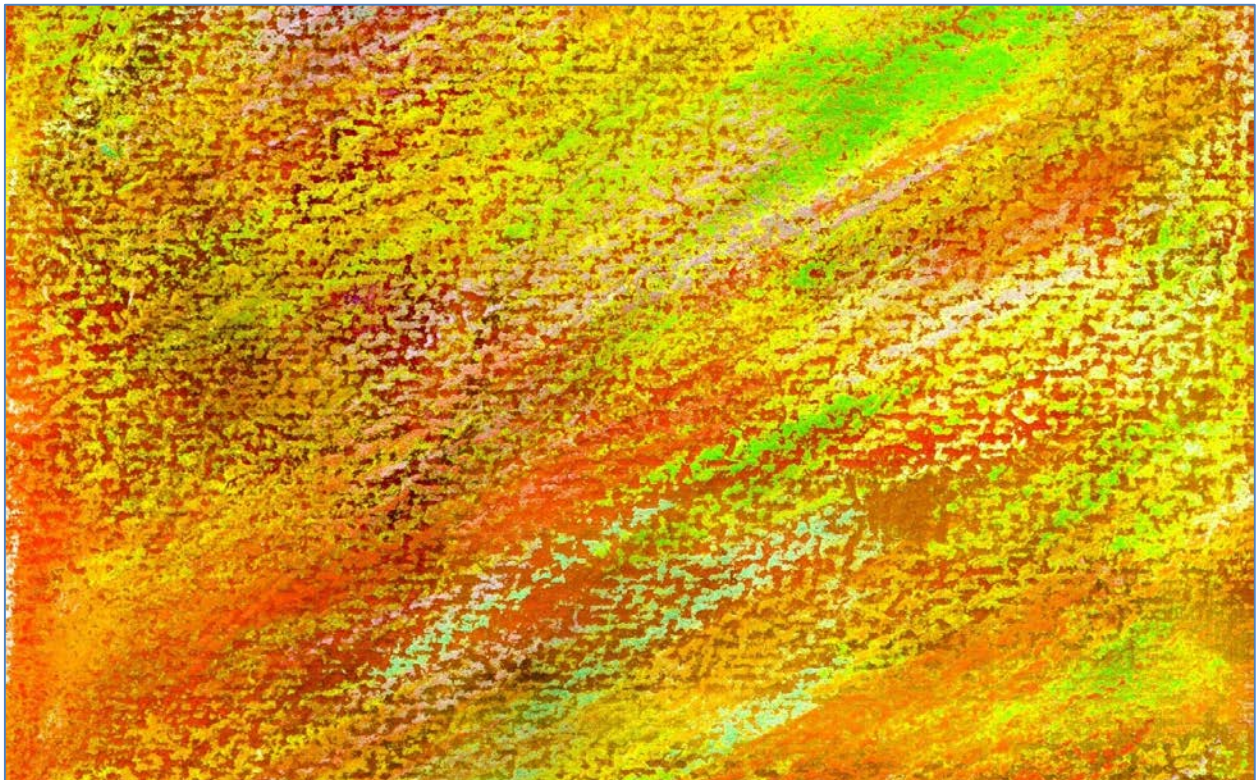# Database Concepts

7th Edition

David M. Kroenke • David J. Auer

Online Appendix I

Getting Started with
Web Servers, PHP, and the NetBeans IDE

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Chapter Objectives

- To know how to install and manage the Microsoft IIS Web server
- To understand the file system structure used by IIS
- To know how to use the Microsoft Internet Explorer Web browser
- To know how to download and store files from Web sites
- To know how to download and install the Java Software Development Kit (JDK)
- To know how to download, install and use the NetBeans IDE
- To know how to download, install and use PHP

What Is the Purpose of This Appendix?

In *Database Concepts*, we use **PHP** as our scripting language for Web page design and **NetBeans** as our **Integrated Development Environment (IDE)**.

While the chapters in the book cover the use of PHP to create Web pages, we necessarily omitted the details of installing and configuring PHP, Java and NetBeans. This appendix provides coverage of these steps, with the intention of making it easier for the reader to get PHP and NetBeans up and running so that the chapters in the book can be used without interruptions to figure out how to get started with these two excellent tools.

In this appendix, we will focus on using these tools with the Microsoft Windows operating system and the Microsoft Internet Information Services (IIS) Web server. We do this for consistency with the book, which uses the same Web server environment, and to keep this appendix to a reasonable length. For users of the Linux operating system (and its variants and cousins) and the Apache Web server, the instal-lation steps will differ, but the same general sequence will occur, while using NetBeans after installation is essentially the same regardless of operating system environment.

Which Operating System Are We Discussing?

Both Chapter 7 in Database Concepts and this appendix describe installations on the Windows 8.1 operating system. We do this because most students and other readers of this book will probably be working with their own personal computer, and not with a server class computer. Therefore, we want to show you how to install these components in your own environment, not in a business environment. Further, most of you will be using a Windows operating system, and if you are using a version of Windows earlier than Windows 8.1, the procedures will still be about the same. Installations of Windows Server 2012 are also very similar. If you are using a version of Linux, the basic outlines are the same, but the exact details will be different.

How Do I Install a Web Server?

Although this appendix focuses on PHP and the NetBeans IDE, before you can install and use either of these tools, you must have a Web server installed and operating on your computer. The Web server for users of Microsoft operating systems (both workstation and server) is the Microsoft **Internet Information Services (IIS)** Web server (see http://www.iis.net for more information about IIS). Users of Linux (and its relatives) will use the **Apache** Web server (see http://www.apache.org for information on the Apache Foundation, and specifically http://httpd.apache.org for information on the Apache Web server itself). Both of these Web servers are typically included with their respective operating systems, which simplifies obtaining a copy of the software for installation.

How Do I Set Up IIS in Windows 8.1?[1]

After Windows 8.1 is installed, there is no need to do a separate installation of IIS. We do, however, have to activate it.

Turning On Windows 8 Features—Internet Information Services:

1.   Move to the Windows Desktop, the click the **Windows + X** keys to display the Windows shortcut menu, as shown in Figure I-1.
2.   Click the **Control Panel** command to display the Control Panel window, as shown in Figure I-2.
3.   In the Control Panel window, click the **Programs** link to display the Programs window, as shown in Figure I-3.
4.   In the Programs window, click the **Turn Windows features on or off** link to display the Windows Features dialog box, as shown in Figure I-4.
5.   In the Windows Features dialog box, click the **plus (+) symbol** for Internet Information Server and resize the dialog box so that it appears as shown in Figure I-5.

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[1] Although we are using *Microsoft Windows 8.1* as the Windows OS in this appendix, the same basic techniques apply to the *Microsoft Windows 7* OS and *Microsoft Windows* 8 OS, with minor variations.

Use the **Windows+X** keys to display the menu

Programs and Features
Power Options
Event Viewer
System
Device Manager
Disk Management
Computer Management
Command Prompt
Command Prompt (Admin)

Task Manager
Control Panel
File Explorer
Search
Run

Desktop

The **Control Panel** command
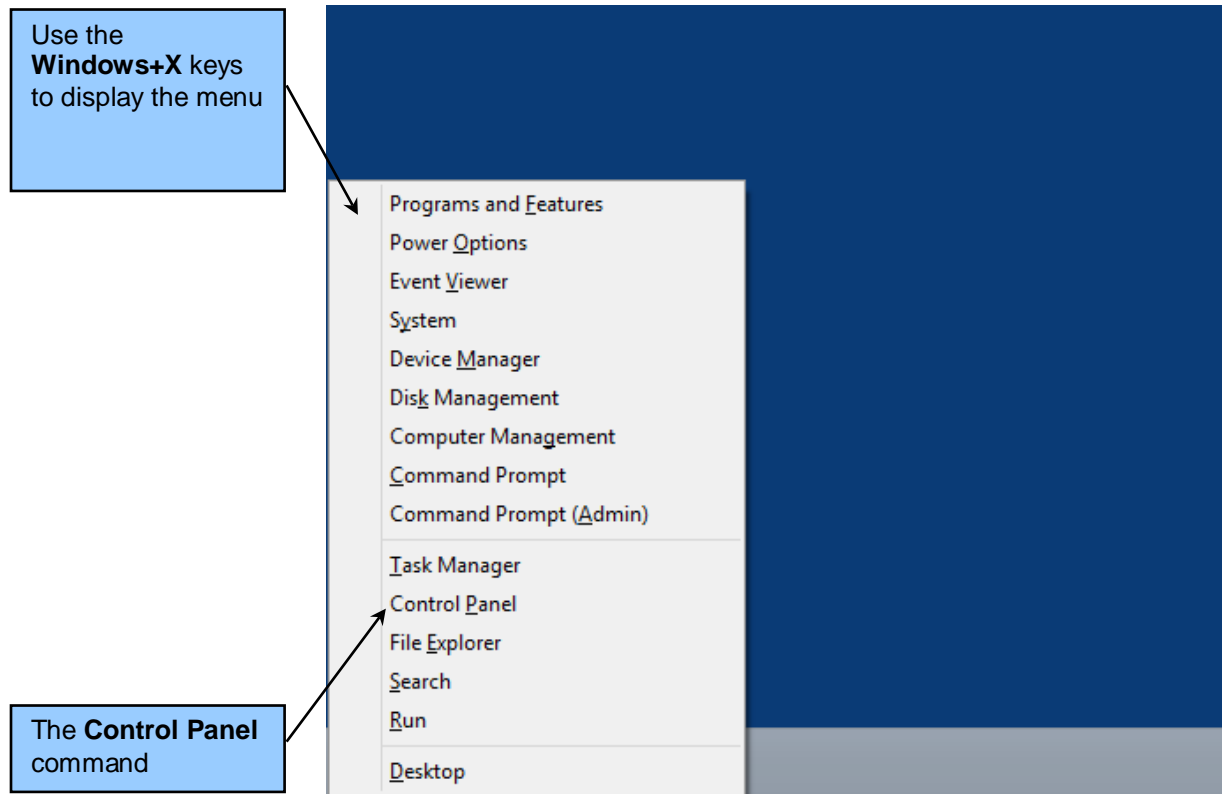
Figure I-1 — Opening Control Panel

The **Control Panel** window

The **System and Security** link

The **Programs** link

Control Panel

↑ Control Panel

Adjust your computer's settings   View by: Category

System and Security
Review your computer's status
Save backup copies of your files with File History
Find and fix problems

User Accounts and Family Safety
Change account type
Set up Family Safety for any user

Appearance and Personalization
Change the theme
Change desktop background
Adjust screen resolution

Network and Internet
View network status and tasks
Choose homegroup and sharing options

Hardware and Sound
View devices and printers
Add a device

Clock, Language, and Region
Add a language
Change input methods
Change date, time, or number formats

Programs
Uninstall a program

Ease of Access
Let Windows suggest settings
Optimize visual display

Figure I-2 — The Control Panel Window

The **Programs** window

The **Turn Windows features on or off** link

Figure I-3 — The Programs Window

The **Windows Features** dialog box

Click this **+** button to expand Internet Information Services
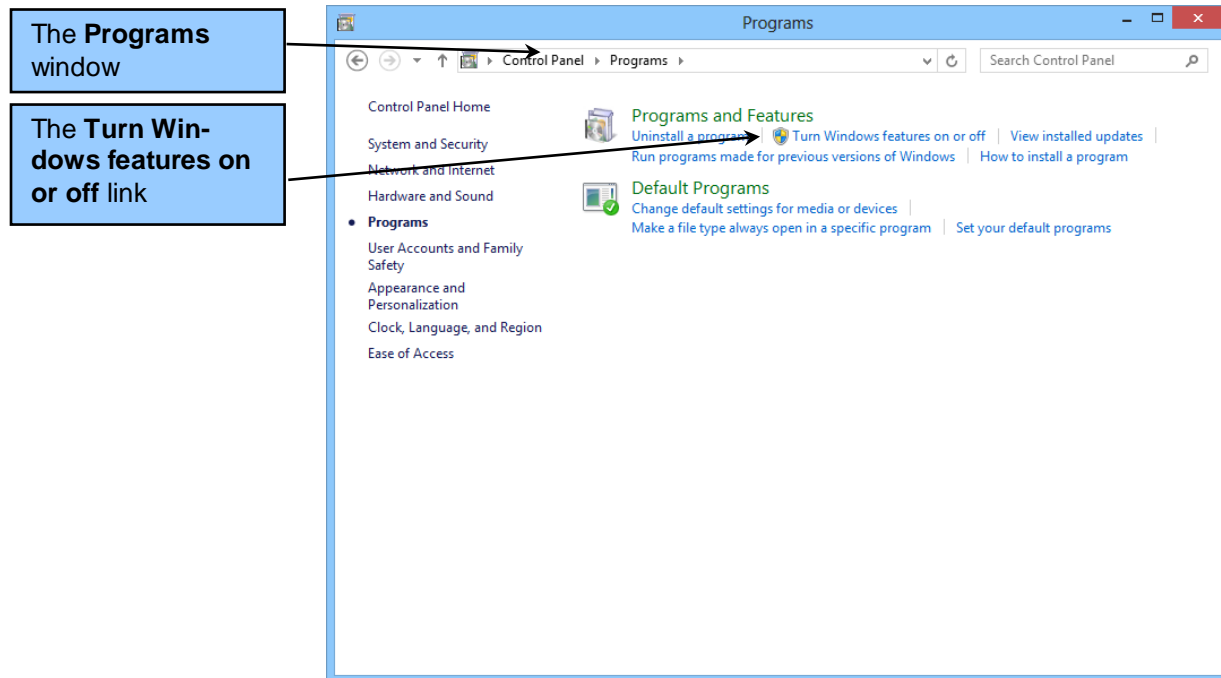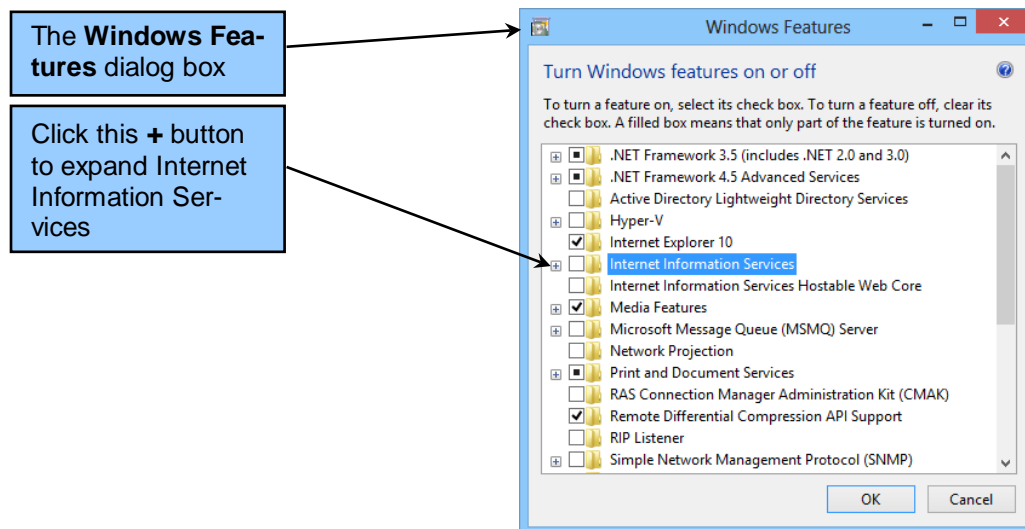
Figure I-4 — The Windows Features dialog box

6. In the Windows Features dialog box, expand the subsections of Internet Information Services and select the options shown in Figure I-5.

7. Click the **OK** button.

8. A Microsoft Windows dialog box appears informing you that Windows is making the requested changes, and that this may take several minutes, and may require download files from Microsoft. When the Windows reconfiguration process is complete, click the Close button to close the dialog box and return to the Control Panel – Programs dialog box.

9. Click the red **Close** button in the upper right corner of the Control Panel – Programs window to close the Control Panel.
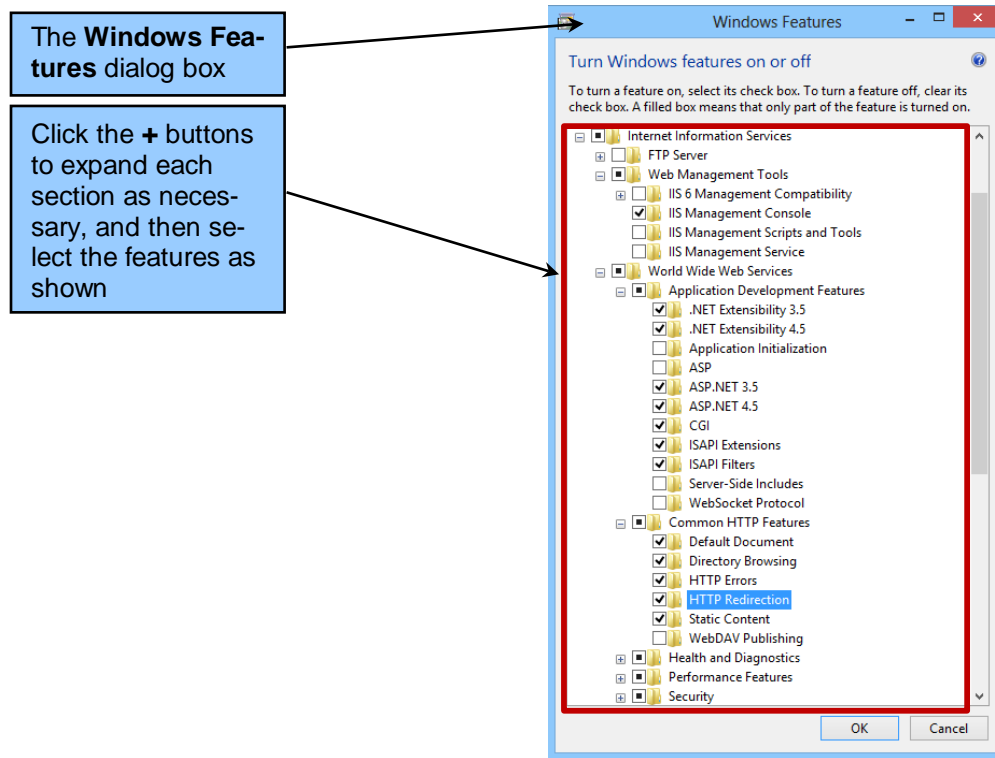
The **Windows Features** dialog box

Click the **+** buttons to expand each section as necessary, and then select the features as shown

Figure I-5 — The Selected Internet Information Services Features

How Do I Manage IIS in Windows 8.1?

After IIS is installed, it is managed using the **Internet Information Services (IIS) Manager**. While we can always open Internet Information Services (IIS) Manager via the Windows Control Panel, we will be using the program often enough that we will find it more convenient to add an icon to the Windows task bar.

While we are doing this, we will also add an icon for the **ODBC Data Source Administrator** to the Windows task bar. The ODBC Data Source Administrator is a utility that we use in Chapter 7, and it will again be more convenient to have it on the Windows Start menu.

Adding Programs to the Microsoft Windows Start Menu:

1. Move to the Windows Desktop, the click the **Windows + X** keys to display the Windows shortcut menu.
2. Click the **Control Panel** command to display the Control Panel window.
3. In the Control Panel window, click the **System and Security** link (shown in Figure I-2) to display the System and Security window, as shown in Figure I-6.

4.   In the System and Security window, click the **Administrative Tools** link to display the Administrative Tools window, as shown in Figure I-7.

5.   In the Administrative Tools window, right-click **Internet Information Services (IIS) Manger** icon to display the shortcut menu shown in Figure I-7, and then click **Pin to Taskbar**.
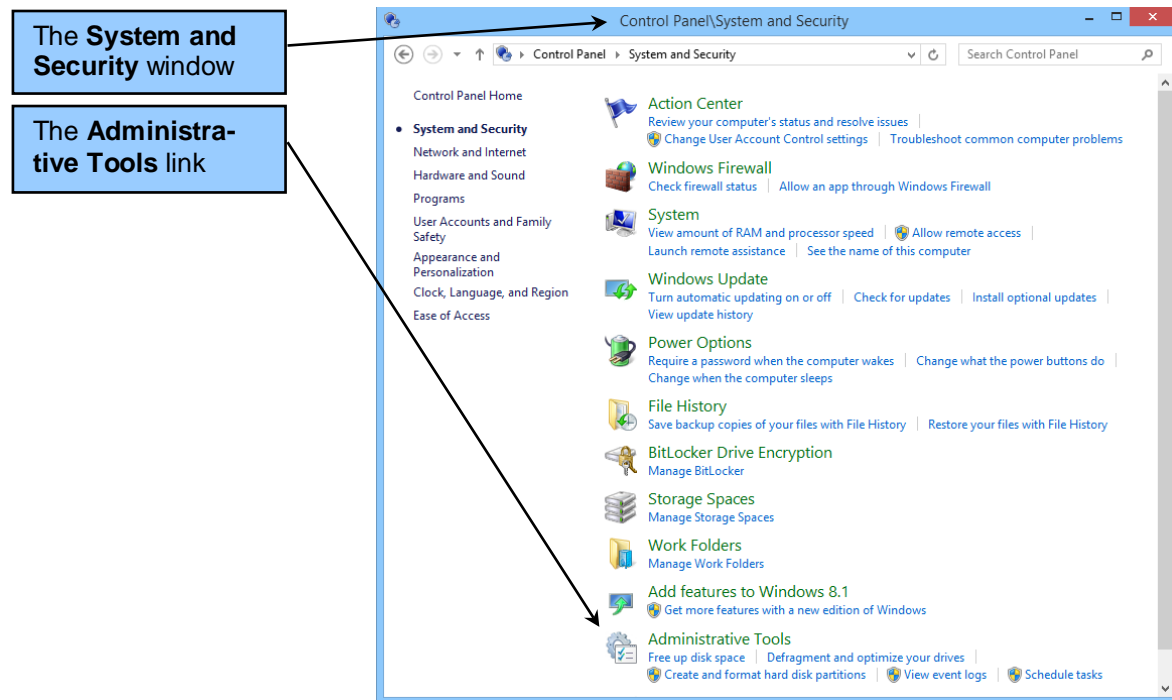

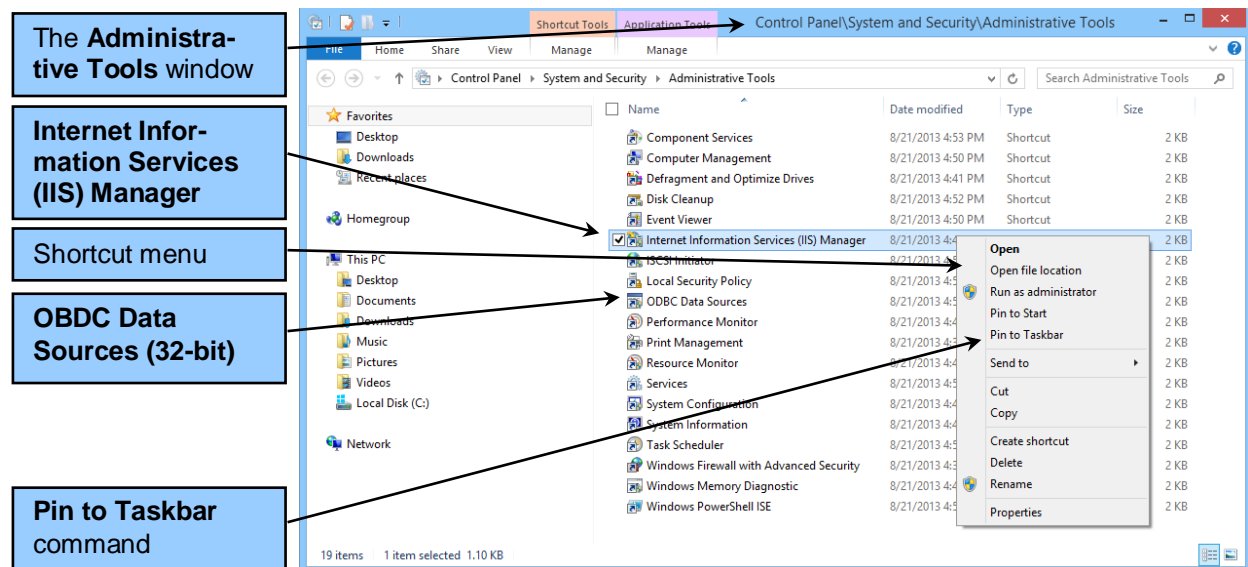**Figure I-6 — The System and Security Window**

Figure I-7 — The Administrative Tools Window

6.   In the Administrative Tools window, right-click the **ODBC Data Sources** icon to display the shortcut menu shown, and then click **Pin to Taskbar**. If you are running the 64-bit version of Windows 8, pin *both* the **OBDC Data Sources (32-bit)** and **ODBC Data Sources (64-bit)** to the taskbar.

7.   Close the Administrative Tools window.

8.   Close the Control Panel – System and Security window to close the Control Panel.

32-bit Versus 64-bit Programs

Microsoft Windows 8.1, Microsoft Windows 8, and Microsoft Windows 7 are available in both 32-bit and 64-bit versions. We are running the 64-bit version. And therein is a potential problem, which also applies to other Windows 64-bit operating systems such as Microsoft Server 2014.

The ODBC Data Sources program (or, actually, a shortcut icon for the program) we have just added to the Start menu is for the *64-bit* version of the ODBC data sources administration program, and will create *64-bit ODBC data sources* (ODBC drivers as described in Chapter 7). These will **only** work as long as **every** component in the Web application program chain (again as described in Chapter 7) is a 64-bit program. But, if **any** component is a 32-bit program, the 64-bit ODBC data source will **not** work.

In fact, when you are building the Web database applications in Chapter 7, if everything seems to be correctly done but the system still does not work, the most likely cause is a 32-bit program in the chain. To resolve your Web database application problem, create a 32-bit ODBC data source using OBDC Administrator, and then revise your Web page code to use that ODBC data source.

To resolve this problem, you will need to use the *32-bit* version of the ODBC Data Sources program. In Microsoft Windows 8, fortunately, both ODBC programs are immediately available and clearly labeled. In Windows 7 it is located at *C:\Windows\SysWOW64\odbcad32.exe*. Locate this program in Windows Explorer, and then right-click it and pin it to the start menu. For Windows 7, the two ODBC program icons will appear as shown in Figure I-8. Note that although the program icons are the same, the program names are different. Data Source (OBDC) is the 64-bit version, and OBDC Administrator is the 32-bit version.

For more information on the programs in the Windows\SysWOW64 folder, see the Wikipedia article on WoW64 at http:// en.wikipedia.org/wiki/WoW64 .

The Windows 7 *64-bit* version of the **ODBC Data Source Administrator** program icon

→ Data Sources (ODBC)

→ OBDC Administrator

The Windows 7 *32-bit* version of the **ODBC Data Source Administrator** program
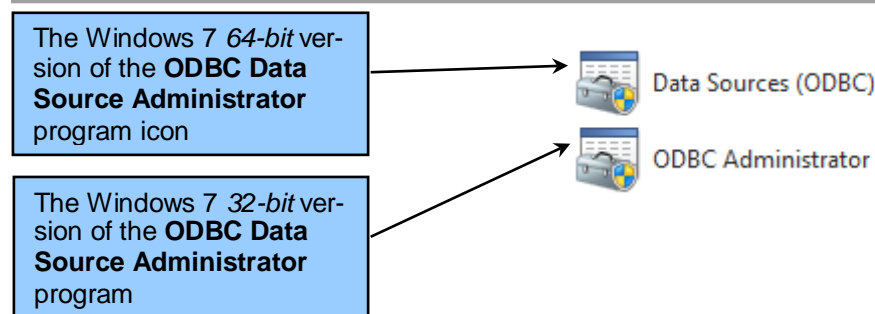
Figure I-8 — The Windows 7 64-bit and 32-bit Versions of the ODBC Data Source Administrator

Now we can open and use the Internet Information Services (IIS) Manager.

Opening the Internet Information Services (IIS) Manager:

1.   The Windows 8 taskbar now appears as shown in Figure I-9. Note that the icons for *Internet Information Services (IIS) Manager*, the *ODBC Data Sources (32-bit)*, and *ODBC Data Sources (64-bit)* are now on the taskbar.

2.   Click the **Internet Information Services (IIS) Manager** menu item to open the Internet Information Services (IIS) Manager. When asked if you want to get started with the Microsoft Web Platform, click the No button. The Internet Information Services (IIS) Manager is displayed as shown in Figure I-10.

3.   Expand the IIS tree in the Connections pane to view the settings for the Default Web Site, as shown in Figure I-11.

4.   Leave the Internet Information Services (IIS) Manager open.

We can see that IIS has created a Web site named Default Web Site on our computer. But what does this mean? And just where is this Web site?

The **Internet Information Services (IIS) Manager** icon

The **Windows Explorer** icon

The **Internet Explorer** icon

This **OBDC Data Sources** icon opens the 32-bit **ODBC Data Source Administrator** program

This **OBDC Data Sources** icon opens the 64-bit **ODBC Data Source Administrator** program
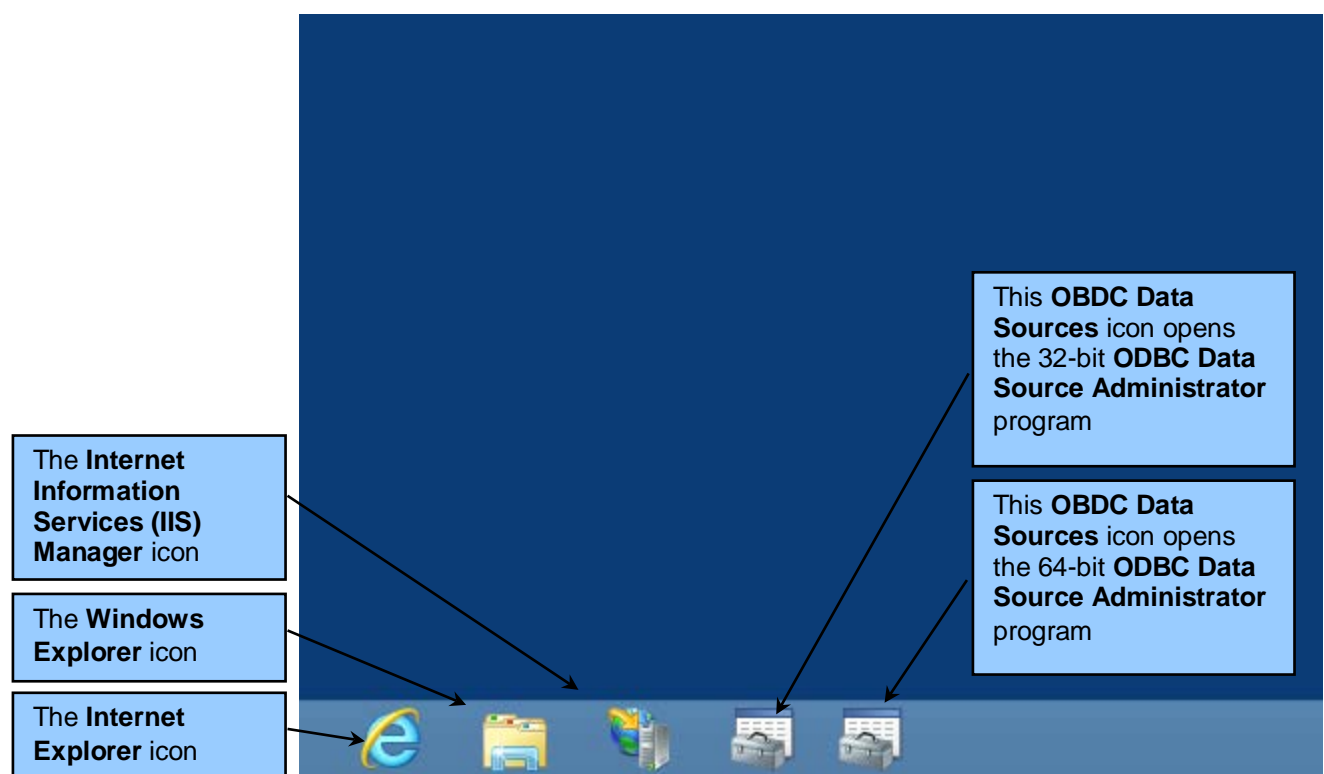
Figure I-9 — The New Program Icons on the Windows 8.1 taskbar

The **Internet Infor-mation Services (IIS) Manager**

Click here to expand the IIS tree structure

The name of the computer hosting IIS is **WIN81-001**
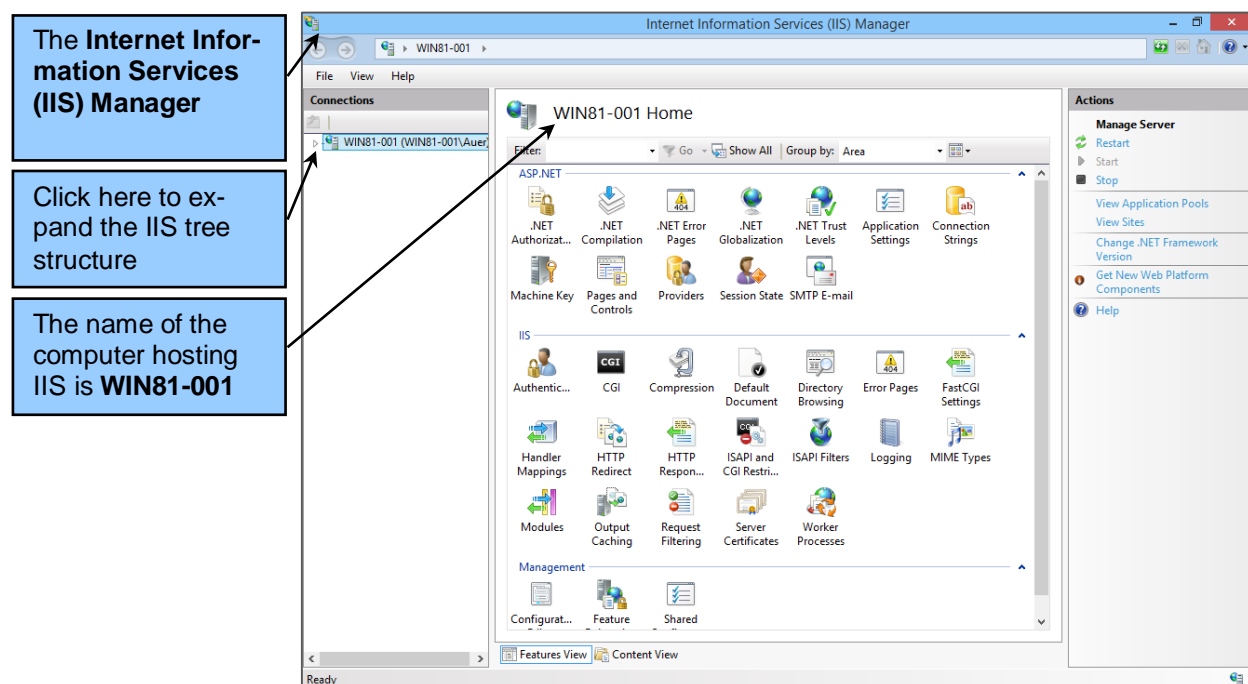
Figure I-10 — The Internet Information Services (IIS) Manager

The **Default Web Site**

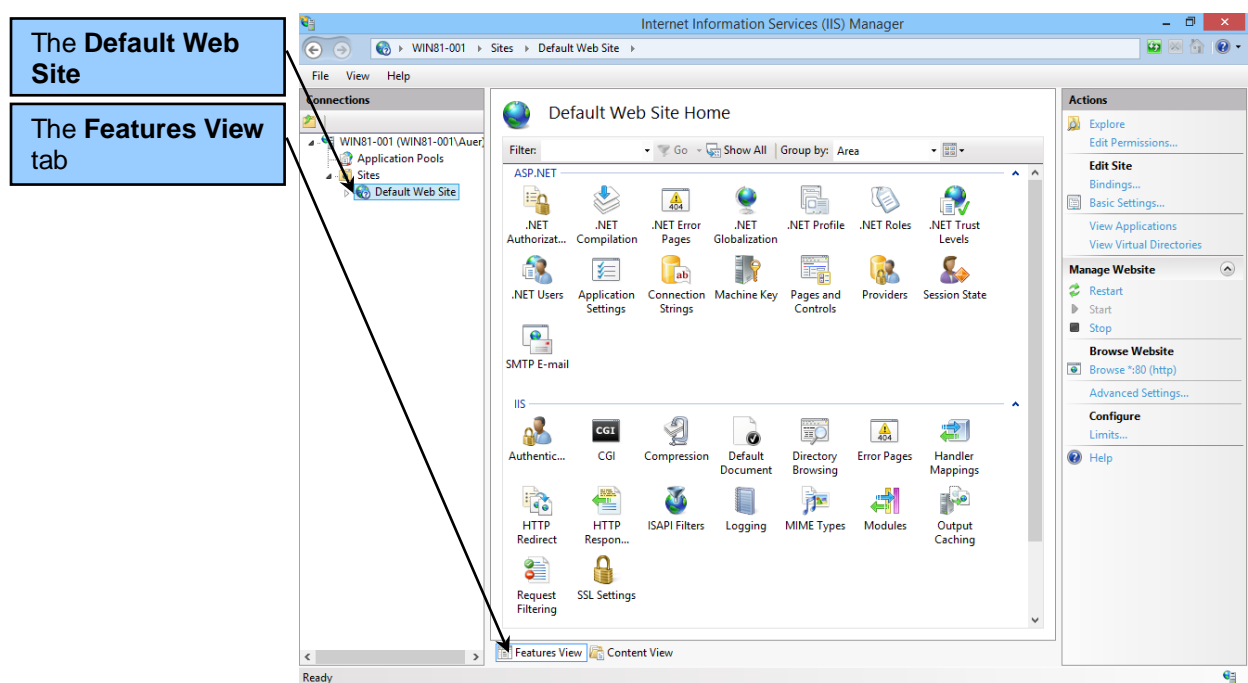The **Features View** tab

Figure I-11 — The Default Web Site

How Is a Web Site Structured?

Web sites are collections of files, and these files are stored in the file system on our computers. We will now see exactly where these files are stored.

When IIS is installed, it creates an **inetpub folder** on the C: drive as C:\inetpub. Within the inetpub folder is the **wwwroot folder**, which is where IIS stores the most basic Web pages used by the Web server. We can see these folders using the Windows Explorer file management utility.

Viewing the Web Site File Structure in Windows Explorer:

1.   Click the **Windows Explorer** icon on the Taskbar to open Windows Explorer, as shown in Figure I-12.
2.   Expand the C: Drive structure to display the inetpub directory structure, as shown in Figure I-12.
3.   Leave Windows Explorer open.

Note that Figure I-12 is basically the same as Figure 7-10 in Chapter 7, and at this point we are discussing the same IIS Web site structure discussed in Chapter 7. The files shown in the wwwroot folder in Figure I-12 are the default files created by IIS when it is installed. In Windows 8.1, the file **iisstart.htm** generates the Web page that Internet Explorer (or any other Web browser) contacting this Web server over the Internet will see displayed. We can also see this same structure in the Internet Information Services (IIS) Manager.
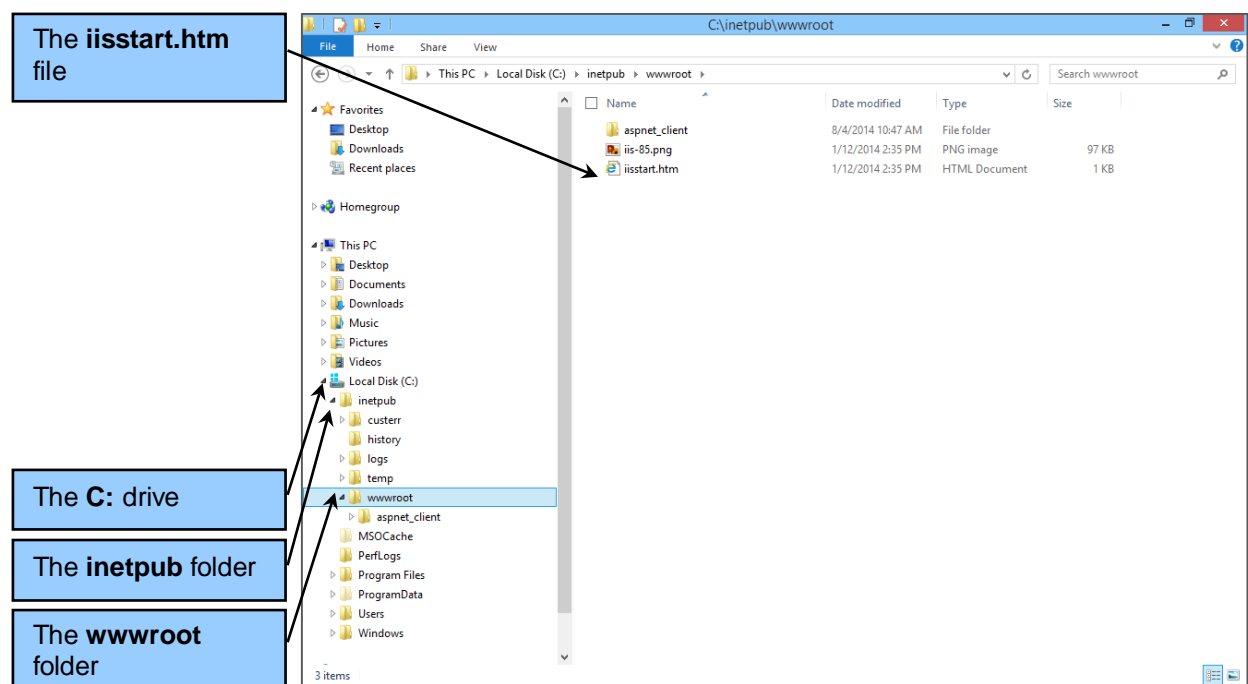

Figure I-12 — The IIS Inetpub Directory Structure and the *wwwroot* folder

Viewing the Web Site File Structure in the Internet Information Services (IIS) Manager:

1.   We left the IIS Manager open, so switch to that program.
2.   Click the **Content View** tab at the bottom of the utility to switch to IIS content view, as shown in Figure I-13.
3.   Leave the IIS Manager open.

Note that Figure I-13 is basically the same as Figure 7-11 in Chapter 7, and again shows the same IIS Web site structure discussed in Chapter 7. The files shown in the wwwroot folder in Figure I-13 are again the default files created by IIS when it is installed.

How Do I View a Web Page from the IIS Web Server?

At this point, we can test the Web server installation. To do this, we open our Web browser, type in the URL **http://localhost**, and press the Enter key. If the appropriate Web page is not displayed in your Web browser, your Web server is not installed properly.

Viewing the Web Site in Windows Internet Explorer:

1.   Click the icon for the Microsoft **Internet Explorer** Web browser on the taskbar, as shown in Figure I-9 to open Internet Explorer
2.   Type in the URL http://localhost, and then press the **Enter** key.
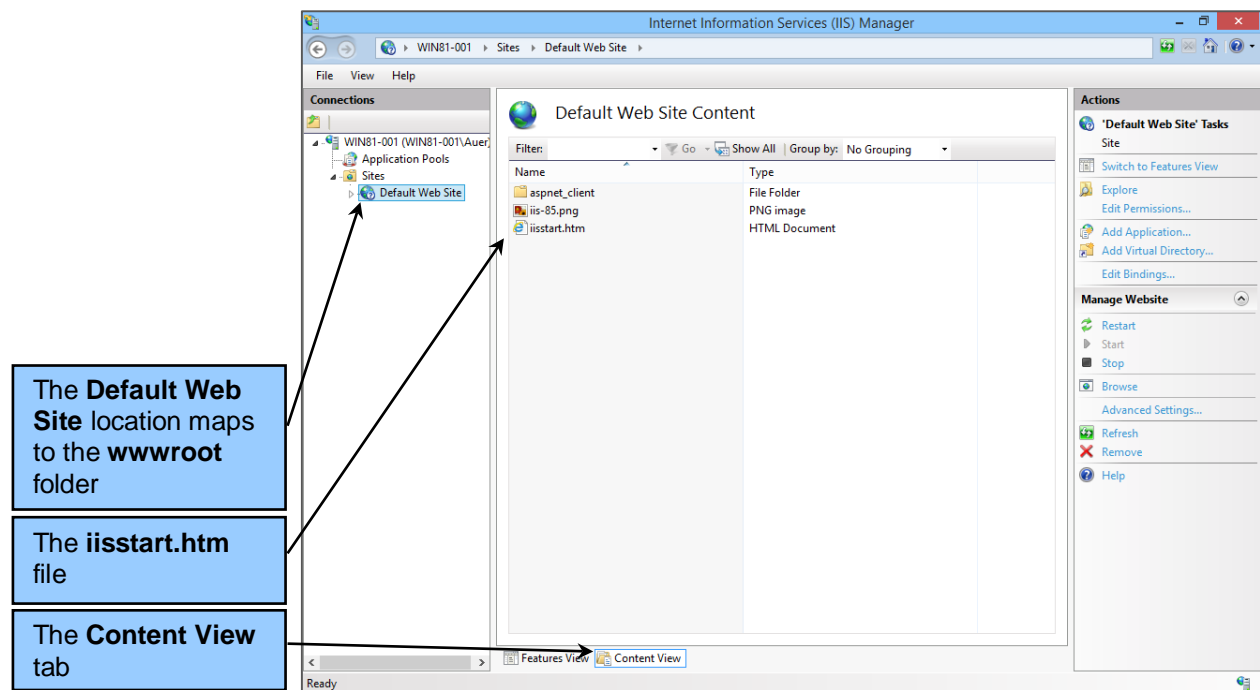

Figure I-13 — The Internet Information Services (IIS) Manager

3.   The IIS 8.5 Web page shown in Figure I-14 is displayed. Note that this figure is basically the same as Figure 7-12 in the book.

4.   Click the **Close** button to close the Windows Internet Explorer Web browser.

5.   Close the IIS Manager.

6.   Close Windows Explorer.

How Is Web Site Security Managed?

Folders and files in Web sites are protected by security settings on the Web server. In order to allow Web site developers to create, modify and delete Web site folders and files, we have to grant **security permissions** to the appropriate users.

For our purposes here, these permissions need to be granted to the users of the computer that hosts the Web server. The permissions are assigned to the wwwroot folder. We can grant these permissions to folders using the Windows Explorer file management utility. First, however, we need to change a Windows Explorer setting.
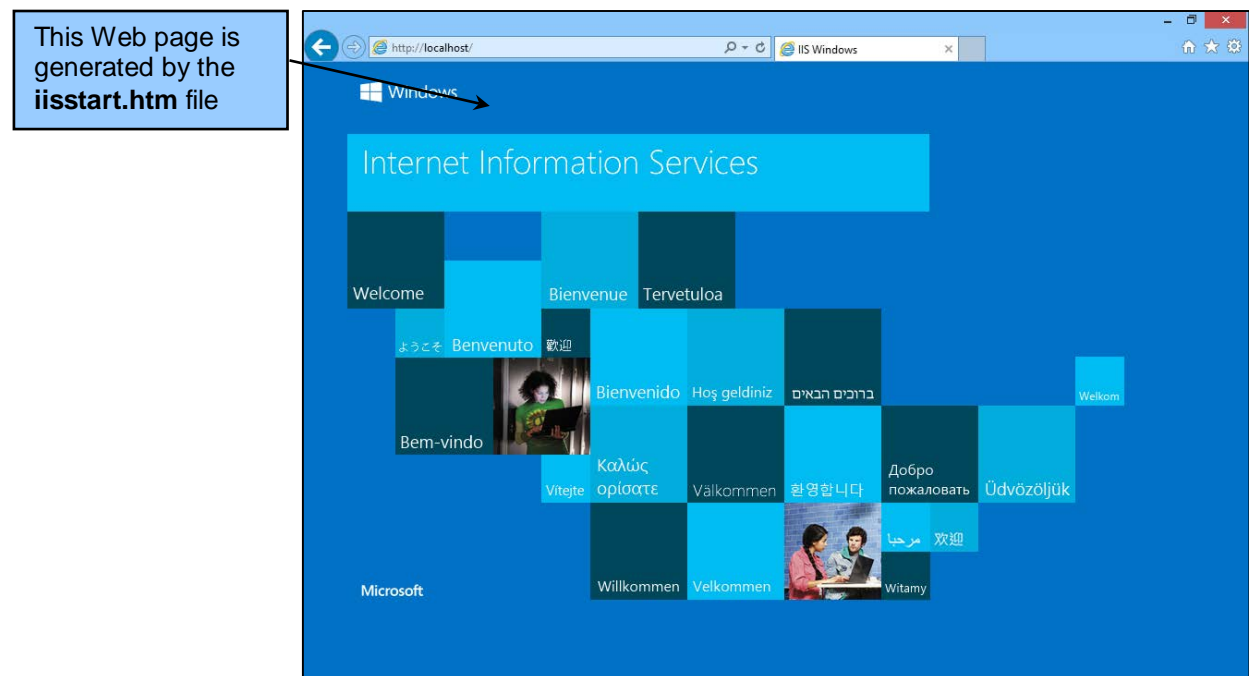
This Web page is generated by the **iisstart.htm** file

Figure I-14 — The Default IIS Web Page

Granting Web Site Security Permissions Using Windows Explorer

1.   Click the icon for the Microsoft **Windows Explorer** on the taskbar, as shown in Figure I-9. Note that in Figure I-9, we have also pinned the same icon to the Taskbar.
2.   Click **Local Disk (C:)** in the object browser to select it, the click the **View** tab to open the View ribbon as shown in Figure I-15.
3.   In the Layout command group, click **Details**, and then click the **Options** button to display the Folder Options dialog box.
4.   In the Folder Options dialog box, click the **View** tab to display the *View* page as shown in Figure I-16. Uncheck the **Hide extensions for known file types** check box—we want to see the types of files were are working with.
5.   In the *View* page, scroll to the end of the **Advanced settings** options. Uncheck the **Use Sharing Wizard (Recommended)** check box—we want complete manual control of sharing and security permissions—as shown in Figure I-17.
   ▪   NOTE: There are many other options that you could set in Advanced settings, and you may want to make some other changes while you have the Folder Options dialog box open.
6.   Click the **Apply to Folders** button to standardize the options for all folders. When prompted to confirm the action, click the **Yes** button.
7.   Click the **OK** button to implement the setting changes and close the Folder Options dialog box.
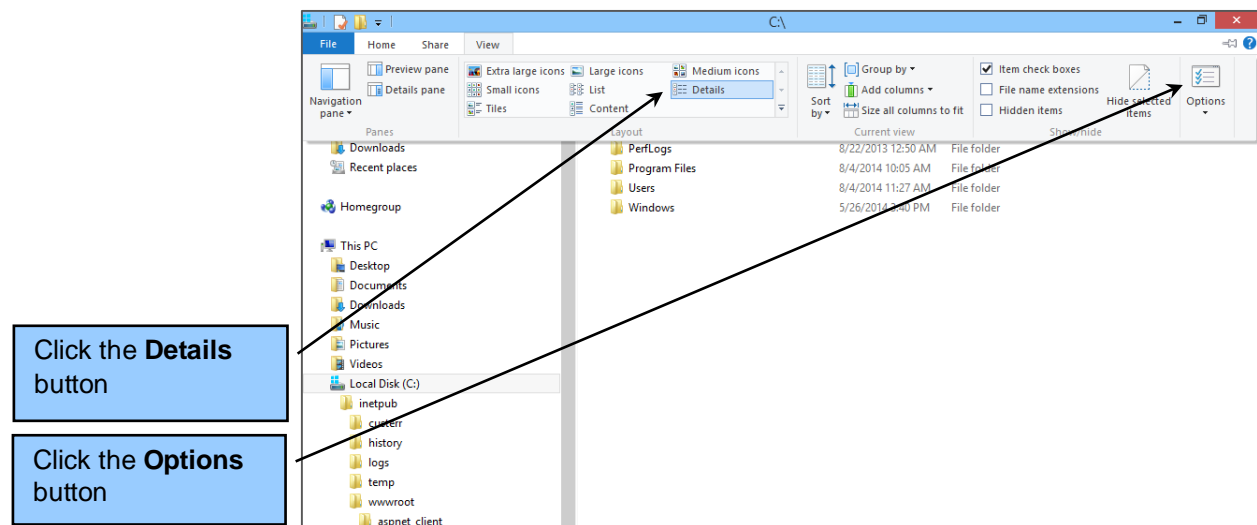8.   Leave Windows Explorer open.

Figure I-15 — The Folder and Search Options Command

The **Folder Options** dialog box

The **View** tab

Advanced settings

Uncheck the **Hide extensions for known file types** checkbox
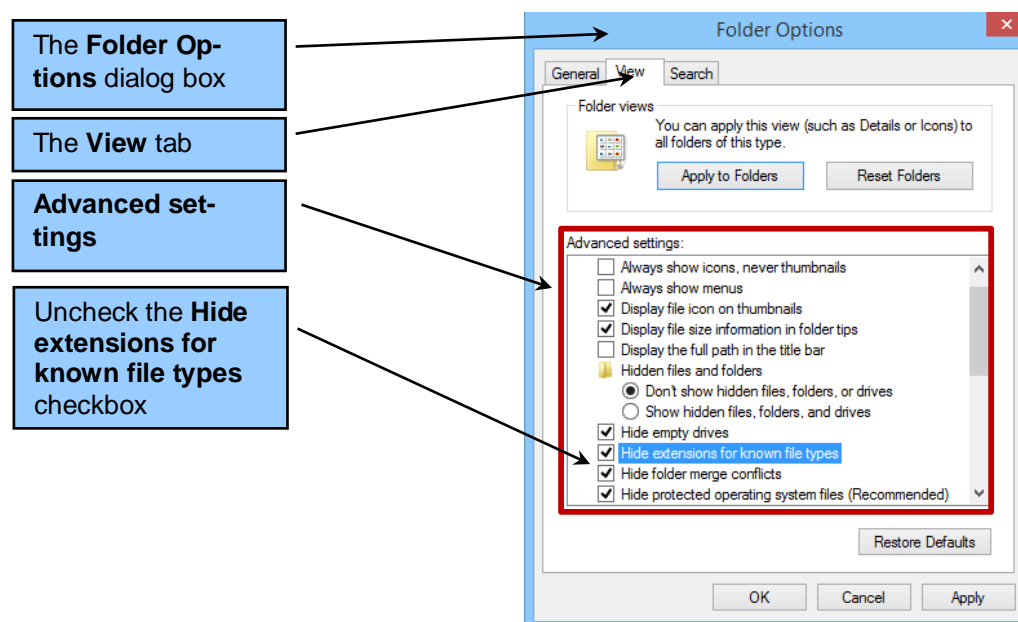
Figure I-16 — The View Page in the Folder Options Dialog Box

The **Apply to Folders** button

Advanced settings

Uncheck the **Use Sharing Wizard (Recommended)** checkbox

The **OK** button
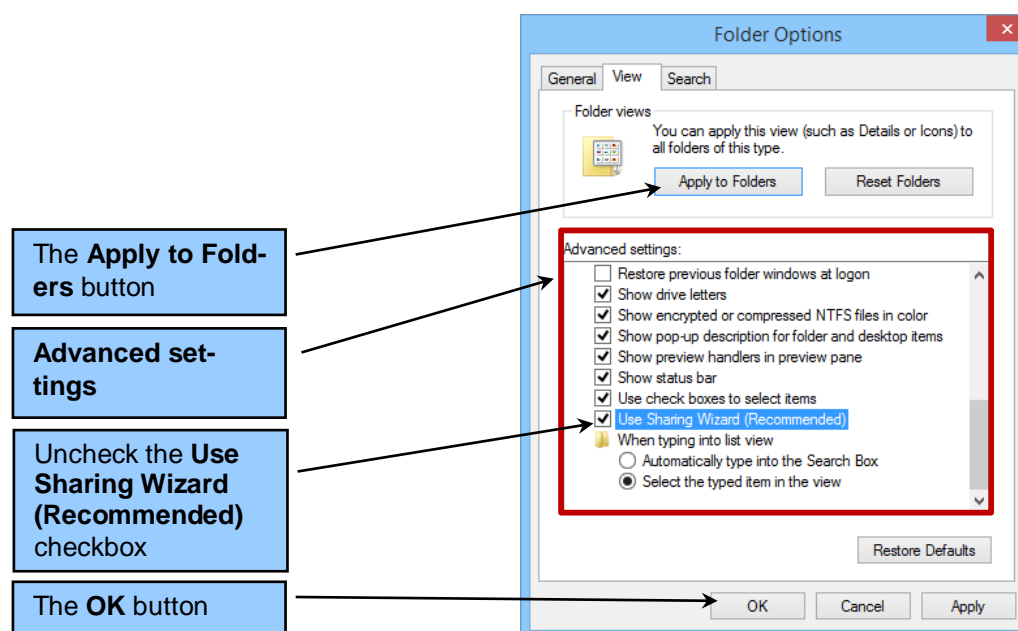
Figure I-17 — The Use Sharing Wizard (Recommended) Setting

Granting Web Site Security Permissions Using Windows Explorer

1.   Windows Explorer should still be open. If not, open Windows Explorer.
2.   In Computer section, expand the C: Drive structure to display the **C:\inetpub\wwwroot** folder.
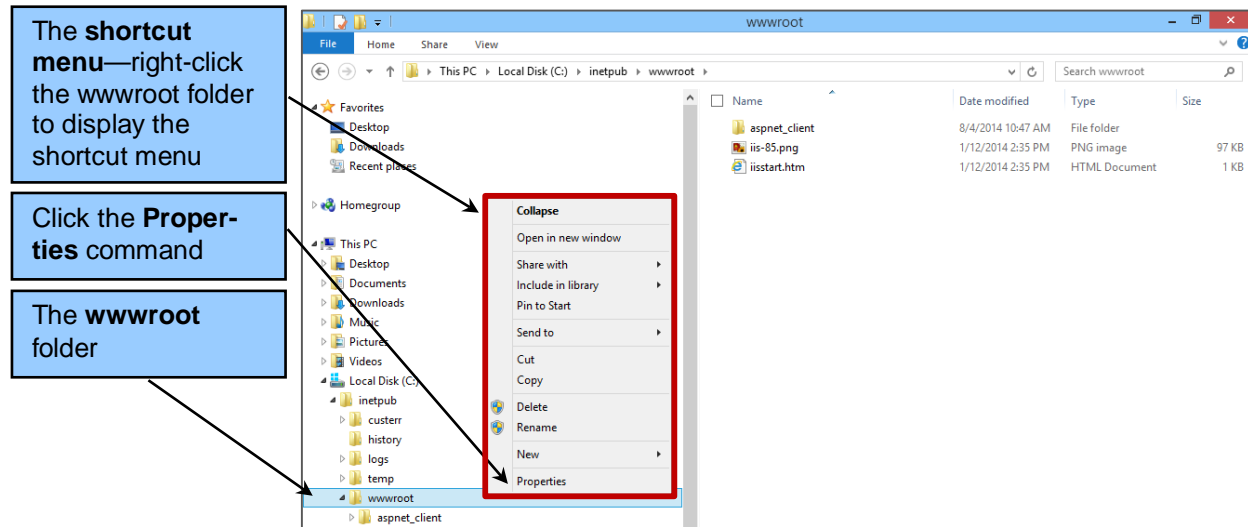
The **shortcut menu**—right-click the wwwroot folder to display the shortcut menu

Click the **Properties** command

The **wwwroot** folder

Figure I-18 — The Properties Command

The **wwwroot Properties** dialog box

Click the **Security** tab
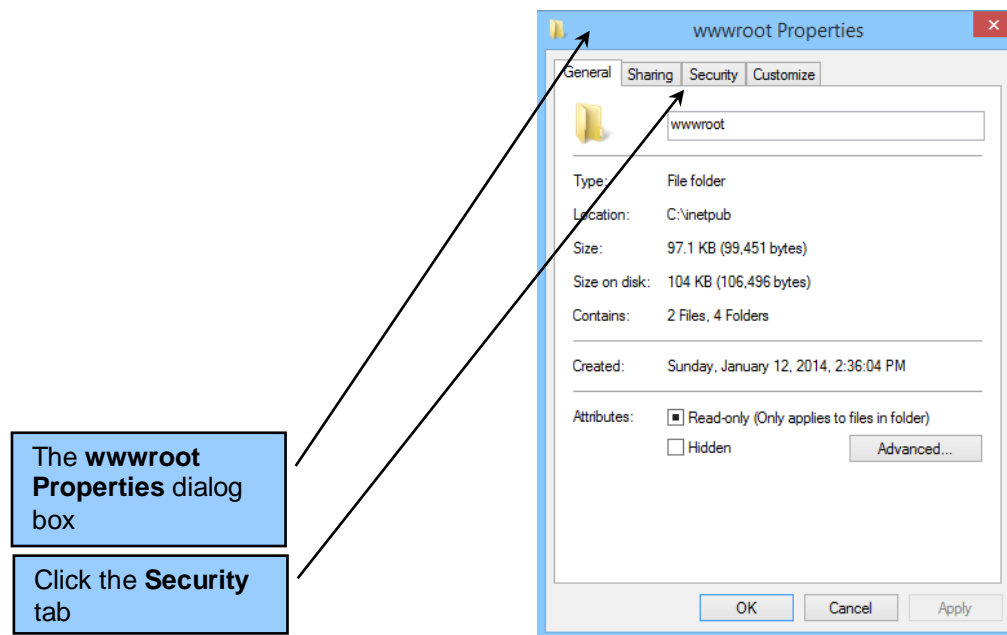
Figure I-19 — The wwwroot Properties Dialog Box

3.   Right-click the **wwwroot** folder to display the shortcut menu as shown in Figure I-18.

4.   In the shortcut menu, click **Properties** to display the wwwroot Properties dialog box, as shown in Figure I-19.

5.   In the wwwroot Properties dialog box, click the **Security** tab to display the *Security* page.

6.   On the *Security* page, scroll through the list of **Group or user names** until you can see the Users group, and then click the **Users** group to select it. The Permissions for the Users group are displayed as shown in Figure I-20.
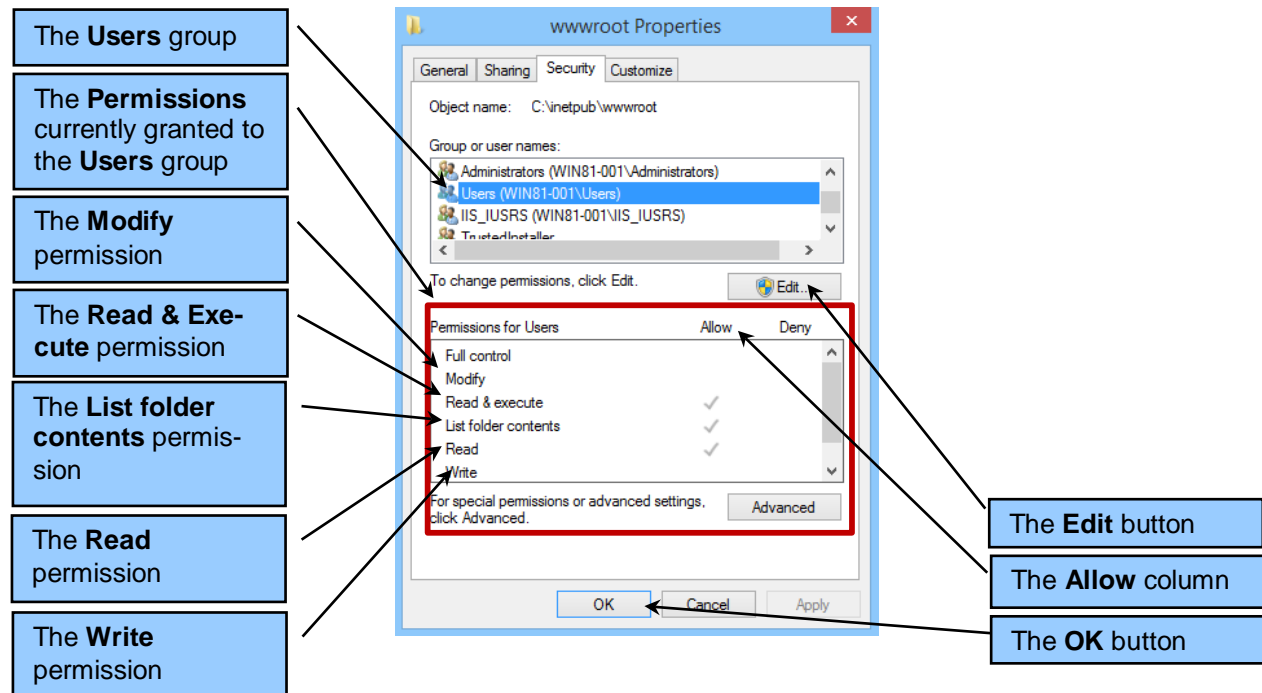
The **Users** group

The **Permissions** currently granted to the **Users** group

The **Modify** permission

The **Read & Execute** permission

The **List folder contents** permission

The **Read** permission

The **Write** permission

The **Edit** button

The **Allow** column

The **OK** button

Figure I-20 — The Users Group Permissions

7.   Note that the Users group currently has permissions to (1) see the wwwroot folder and the folders and files in it [the *List folder contents* permission], (2) read the files [the *Read* permission], and (3) to run any program files in the folder [the *Read & Execute* permission].

8.   Note that the Users group currently does **not** have permissions to (1) create new files in the wwwroot folder [the *Write* permission], (2) change the data in the files in the folder [again, the *Write* permission], nor to delete files in the folder [the *Modify* permission]. We need to grant these permissions to the Users group.

- NOTE: This example uses the Windows 7 operating system. In other versions of the Windows operating system, the Write and Modify permissions may already be granted. If so, having confirmed that the Users group has the necessary permissions, go directly to step 13.

9.   In the wwwroot Properties dialog box, click the **Edit** button to display the Permissions for wwwroot dialog box.

10.   In the Permissions for wwwroot dialog box, click the **Users** group to select it, and scroll through the Permissions for Users until you can see both the Modify and Write permissions, as shown in Figure I-21.

11.   In the Permissions for wwwroot dialog box, check both (1) the **Write** checkbox in the Allow column and (2) the **Modify** checkbox in the Allow column (note that checking the Modify checkbox will all also grant the Write permission). The Permissions for wwwroot dialog box now appears as shown in Figure I-22.

12.   In the Permissions for wwwroot dialog box, click the **OK** button to close the dialog box.
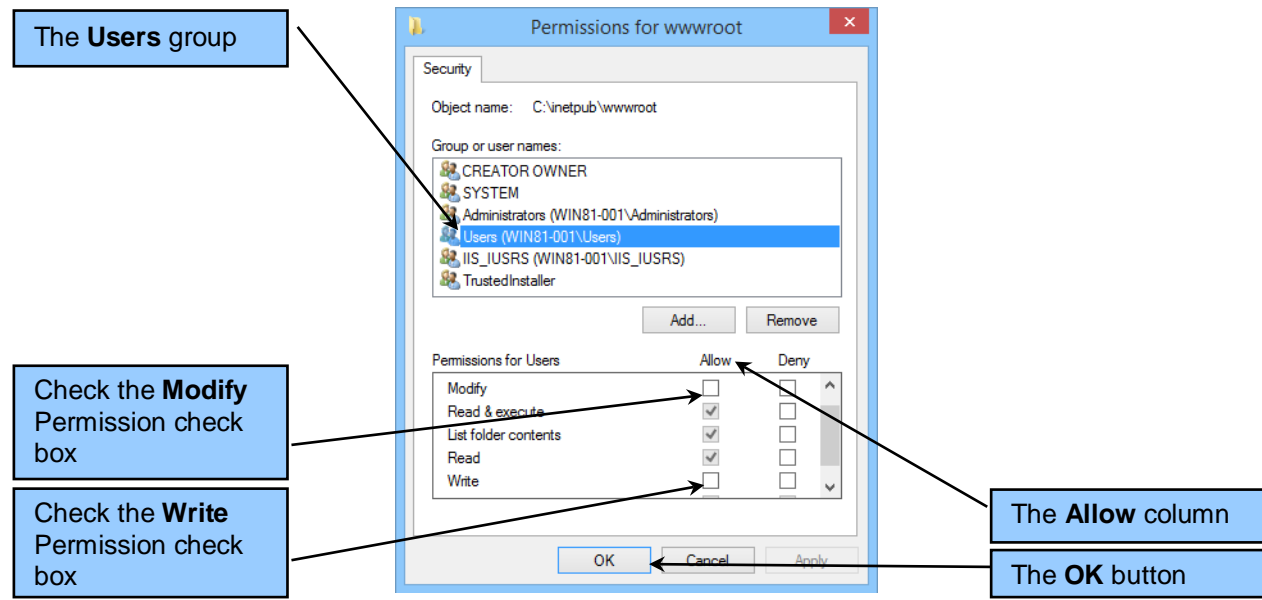
The **Users** group

Check the **Modify** Permission check box

Check the **Write** Permission check box

The **Allow** column

The **OK** button

Figure I-21 — Editing the Users Group Permissions

The **Modify** permission

The **Read & execute** permission

The **List folder contents** permis-

The **Read** permission

The **Write** permission
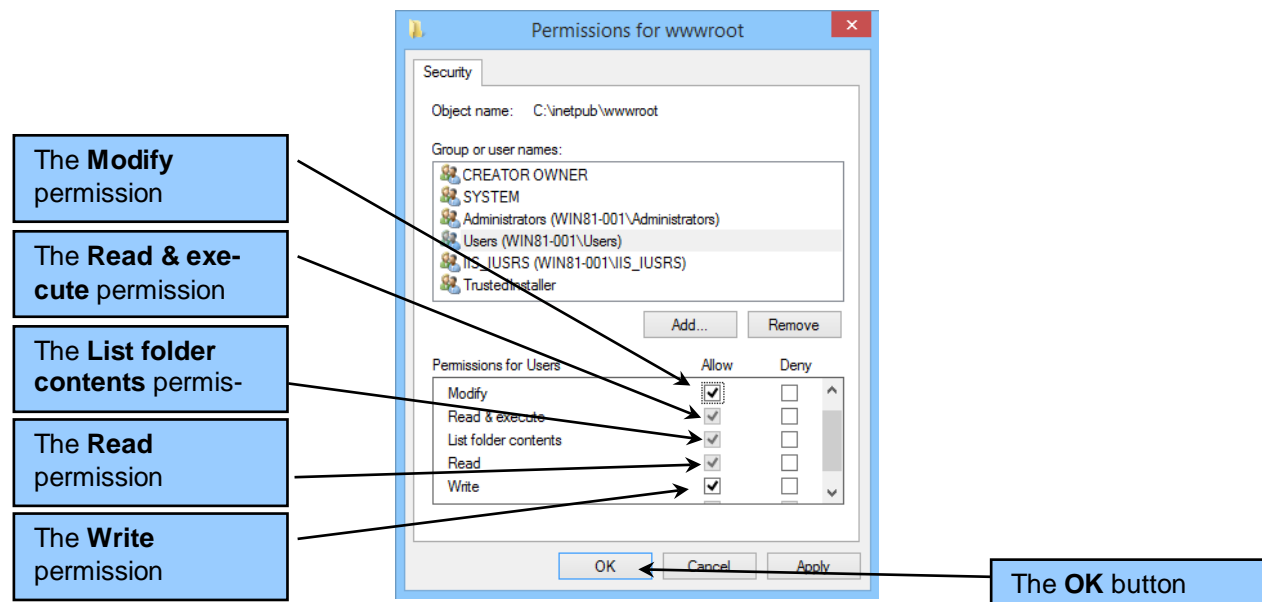
The **OK** button

Figure I-22 — The Final Users Group Permissions

13.   In the wwwroot Properties dialog box, click the **OK** button to close the dialog box.

14.   Close Windows Explorer.

We now know that the Web server has been correctly installed, and that it is displaying Web pages correctly. Now we are ready to install and test PHP and the NetBeans IDE. We will install the NetBeans IDE first, and then we'll use it to help test our installation of PHP. But first, we have to deal with Java!

What is Java?

Java is a programming language, and NetBeans is written in Java. For more information, see the Wikipedia article on Java.

Java programs require that you install a **Java Virtual Machine (JVM)** on your computer in order to run them, and since NetBeans is a Java program, you will have to install a JVM on your computer before you can install and run NetBeans. The easiest way to do this is by installing the Oracle **Java Runtime Environment (JRE)** or the **Java Software Development Kit (JDK)** for your operating system.

What is the NetBeans IDE?

While a simple text editor such as Notepad is fine for simple Web pages, as soon as we start creating more complex pages, we will move to an **Integrated Development Environment (IDE)**. An IDE gives you the most robust and user-friendly means of creating and maintaining your Web pages. If you're working with Microsoft products, you'll likely use Microsoft Visual Studio (or the freely downloadable Visual Web Developer component of Visual Studio 2013 Express Edition, available at http://www.visualstudio.com/en-us/products/visual-studio-express-vs.aspx). If you're working with JavaScript or Java, you might prefer the Eclipse IDE (downloadable at http://eclipse.org/). In this book, we will use the **NetBeans IDE**. NetBeans provides a framework that can be modified by add-in modules for many purposes.

How Do I Install the Java Development Kit (JDK) and the NetBeans IDE?

The easiest way to install Java is to install it at the same time you install the NetBeans IDE. In fact, they are available for download as a package from the Oracle Web site at http://www.oracle.com/technetwork/java/javase/downloads/jdk-netbeans-jsp-142931.html . As of the writing of this appendix, the associated JDK is JDK 8 Update 11, but Chapter 7 is based on JDK 7 Update 70 which was current then (Note that regular updates are issued – just use the most current version.

We will do this, but note that if you are using a 64-bit operating system, you should install *both* the 32-bit and 64-bit versions of the Java. You should install the JRE (not JDK) of the version not covered by the JDK.

Installing the Java JRE:

1. Open Windows Internet Explorer (or the Web browser that you use).
2. Type in the URL http://www.oracle.com/technetwork/java/javase/downloads/jdk-netbeans-jsp-142931.html and then press the **Enter** button. The JDK 8up11 with NetBeans 8.0 Web page is displayed as shown in Figure I-23.
3. Click the **Accept License Agreement** button, then click the **download link** for your operating system.
4. As shown in Figure I-24, a *Do you want to run or save {FileName}?* message box is displayed asking if you want to run (install) or save the file.
5. Normally, we would save the file, and then install it ourselves. However, in this case, it is easier and faster to install the Java JRE at this point, so click the **Run** button.
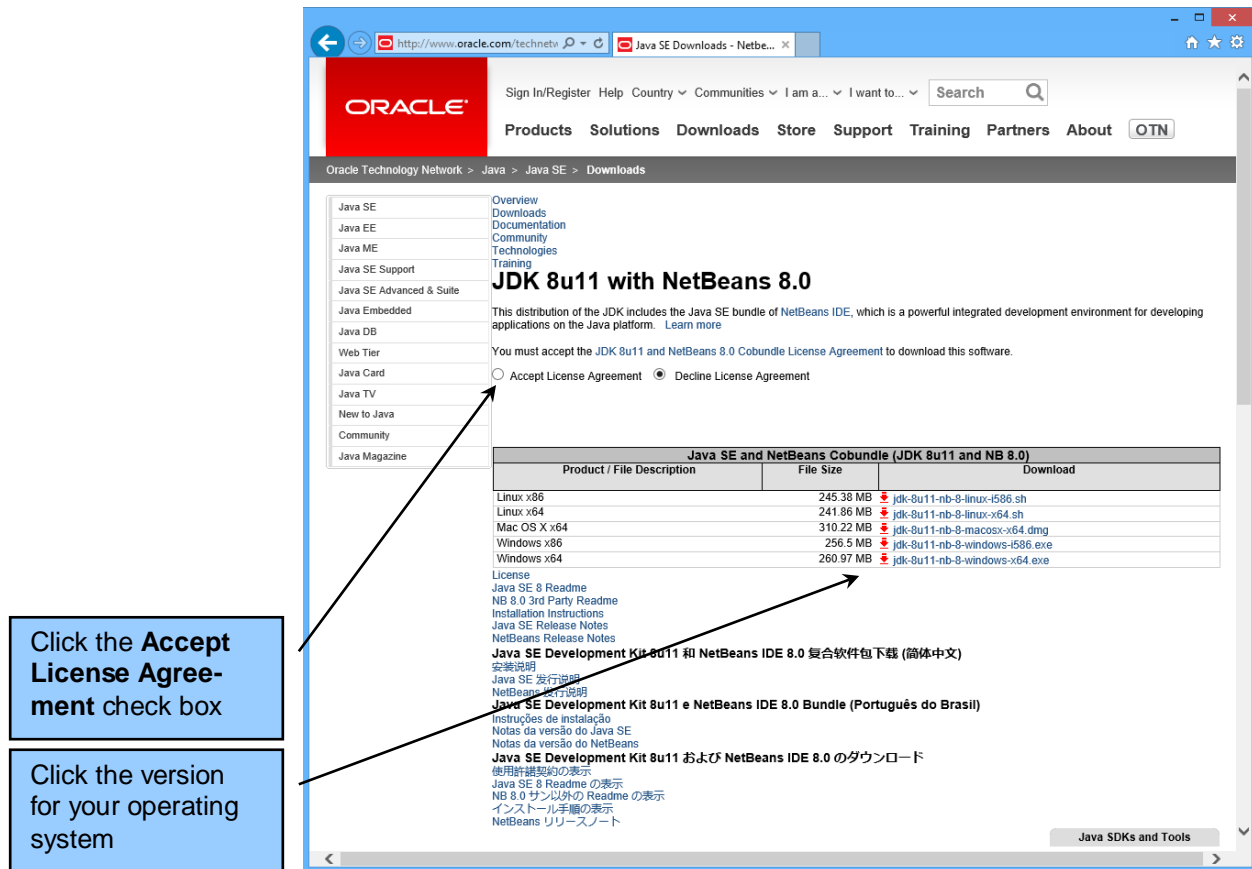
Click the **Accept License Agreement** check box

Click the version for your operating system

Figure I-23 — The Java JDK 8up11 with NetBeans 8.0 Web Page

6.   Windows displays a User Account Control dialog box as shown in Figure I-25, asking if you want to allow the program to make changes to your computer. Click the **Yes** button.

7.   The *Java SE Development Kit and NetBeans IDE Installer* dialog box is displayed, as shown in Figure I-26. Click the **Next** button.

8.   The *JUnit License Agreement* page is displayed, as shown in Figure I-27. Click the radio button accepting the license agreement, and then click the Next button.

9.   The *Java SE Developer Kit (JDK) 8 Update 11 Installation* page is displayed, as shown in Figure I-28. This page determines the installation location for the JDK. Use the default, and click the **Next** button.

10.   The *NetBeans IDE 8.0 Installation* page is displayed, as shown in Figure I-29. This page determines the installation location for the NetBeans IDE. Use the default, and click the **Next** button.

11.   The *Summary* page is displayed, as shown in Figure I-30. This page reviews the setup data. Use the defaults, and click the **Install** button.
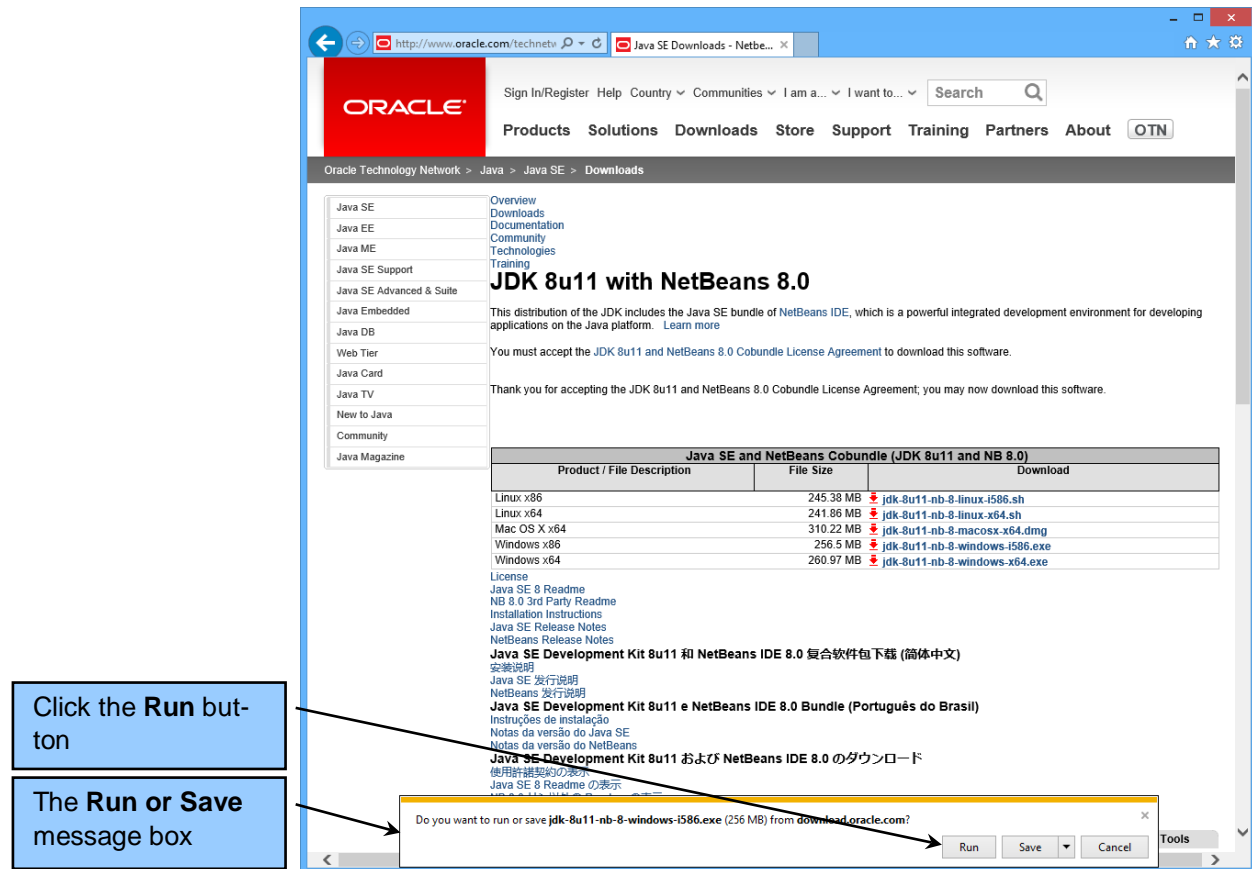
Figure I-24 — The Do You Want to Run or Same {*FileName*}? Message Box
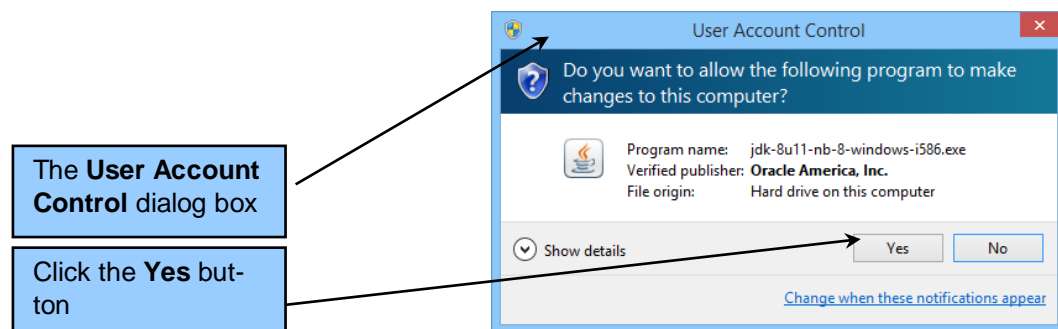

Figure I-25 — The User Account Control Dialog Box

12.   The Java JDK and NetBeans IDE are installed on your computer.

13.   When the installation is complete, the *Java SE Development Kit and NetBeans IDE Installer* dialog box Setup Complete page is displayed as shown in Figure I-31. Click the **Finish** button to close the *Java SE Development Kit and NetBeans IDE Installer* dialog box.

14.   Close Windows Internet Explorer (or the Web browser that you used).

The **Java SE Development Kit and NetBeans IDE Installer** dialog box

Click the **Next** button
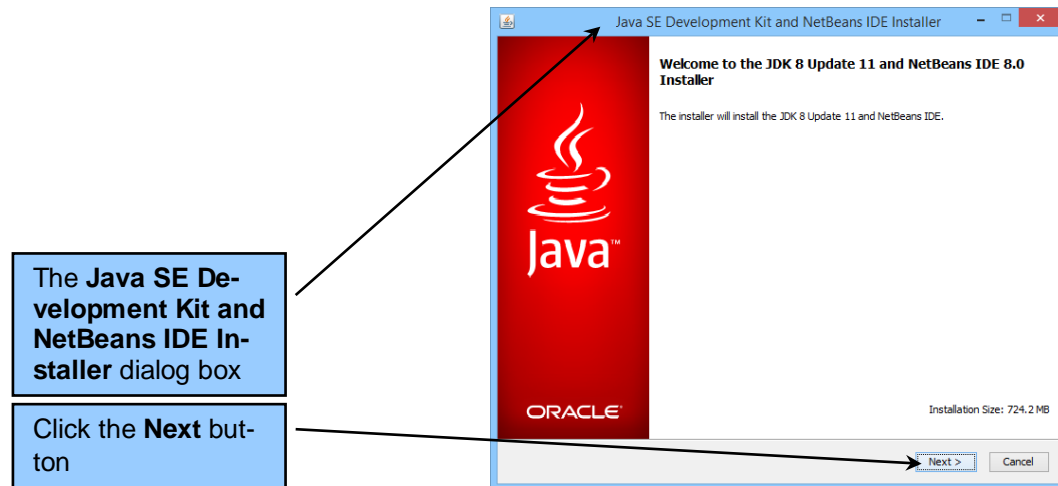
Figure I-26 — The Java SE Development Kit and NetBeans IDE Installer Dialog Box

Click this radio button

Click the **Next** button

Figure I-27 — The JUnit License Agreement Page

Click the **Next** button
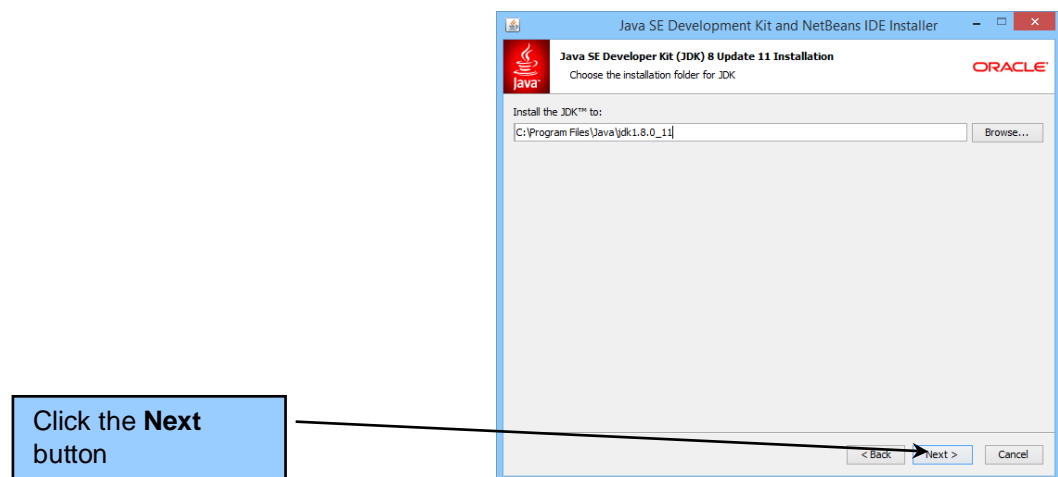
Figure I-28 — The Java SE Developer Kit (JDK) 8 Update 11 Installation Page

Click the **Next** button
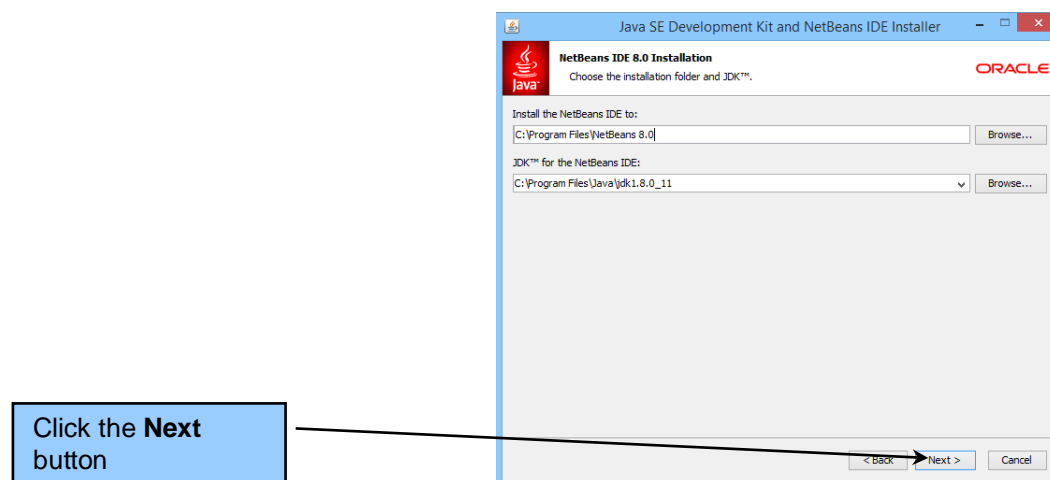
Figure I-29 — The NetBeans IDE 8.0 Installation Page

If necessary, check the **Check for Updates** check box

Click the **Install** button
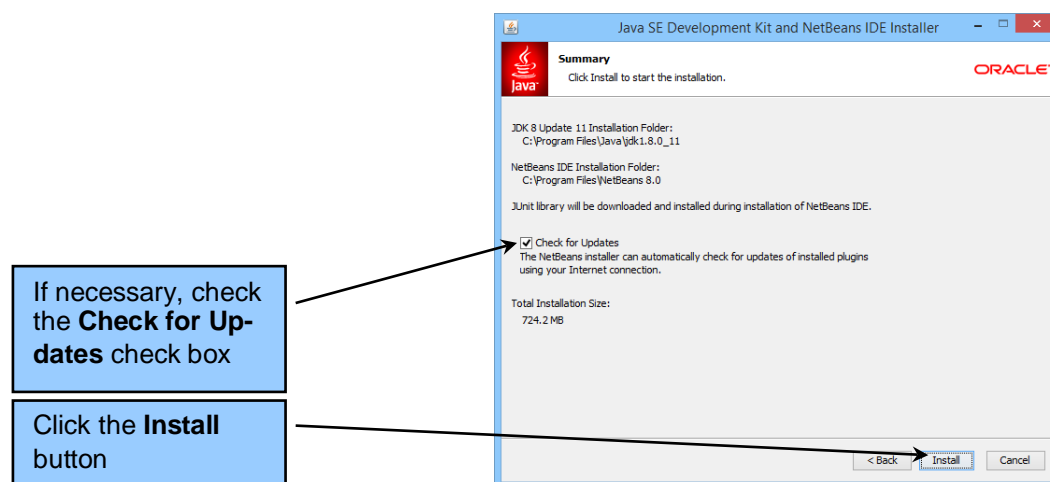
Figure I-30 — The Summary Page

If you do not want to participate in providing anonymous user data, the uncheck this check box

Click the **Finish** button

Figure I-31 — The Setup Complete Page

The **NetBeans IDE 8.0** icon on the desktop

The **NetBeans IDE 8.0** icon on the taskbar

Figure I-32 — The NetBeans Icon on the Windows Desktop and Taskbar

Now we can open the NetBeans IDE and set up our file storage in *C:\Documents\NetBeansProjects*. We will not use NetBeans to create any files at this point—we will only set it up for future work.
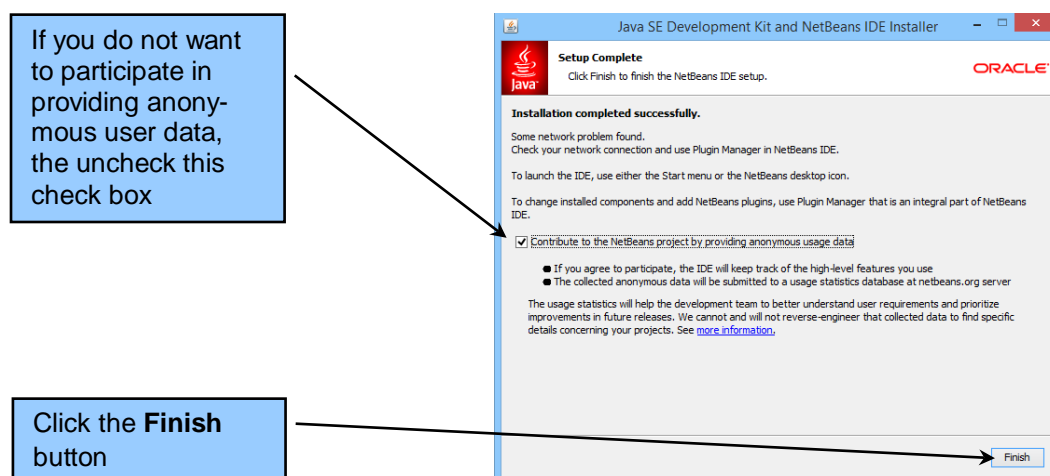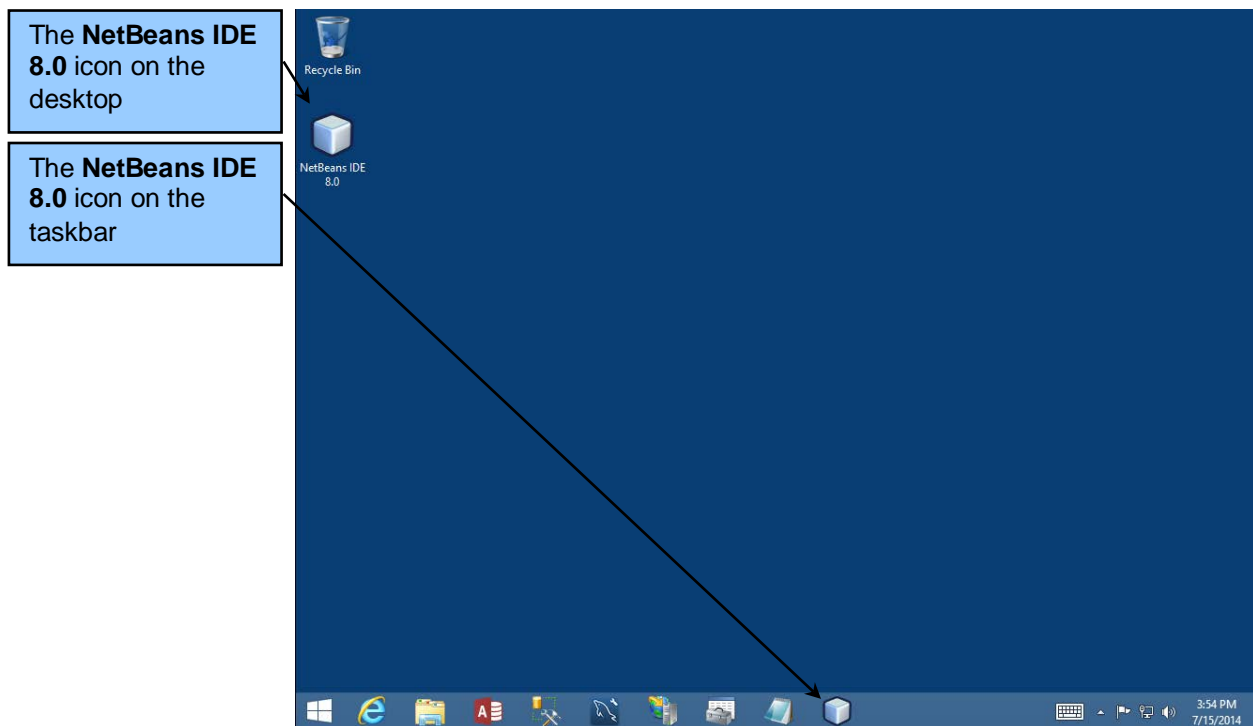
Running the NetBeans IDE:

1.   Right-click the NetBeans IDE 8.0 of the desktop to display the shortcut menu, then click the **Pin to Taskbar** command. NetBeans icon now appear on the Desktop and Taskbar as shown if Figure I-32.

2.   Double-click the **NetBeans Desktop icon**, or click the **NetBeans Taskbar icon**. The NetBeans window is displayed as shown in Figure I-33.

3.   Click the **Tools** command, and then the **Plugins** command to display the Plugins dialog box.

4.   Click **Available** Plugins tab, type **PHP** in the Search box, and click the **Check for Newest** button as shown in Figure I-34.

5.   From the resulting list, choose the plugin labeled as only **PHP**, and then click the **Install** button that appears. Note that installing the PHP plugin will require some other associated plugins to be installed, so accept installing the entire set of plugins and complete the installation process.

6.   The PHP plugin installation process will finish by restarting the NetBeans IDE.

7.   Close the NetBean IDE.

The **NetBeans IDE 8.0** window
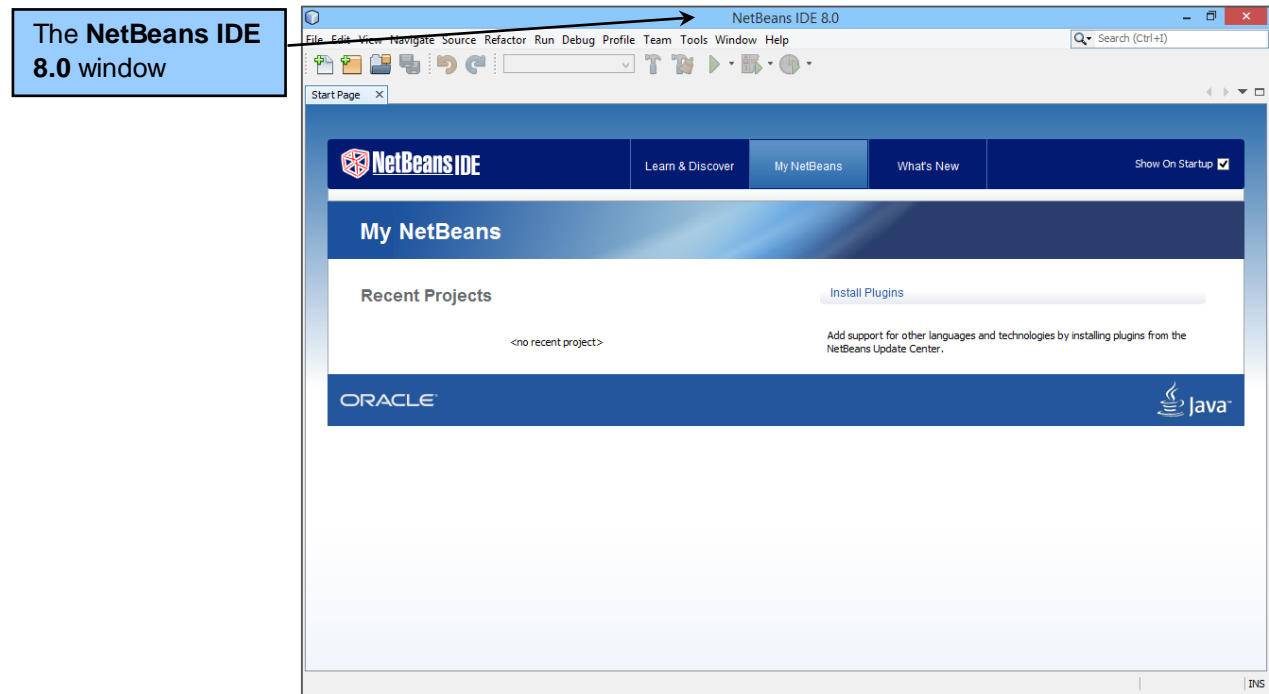
Figure I-33 — The NetBeans IDE 8.0 Window

The **Plugins** dialog box

The **Available Plugins** tab

The **Check for Newest** button

The **Search** text box

Scroll down and select the **PHP** plugin

The **Install** button

The **Close** button
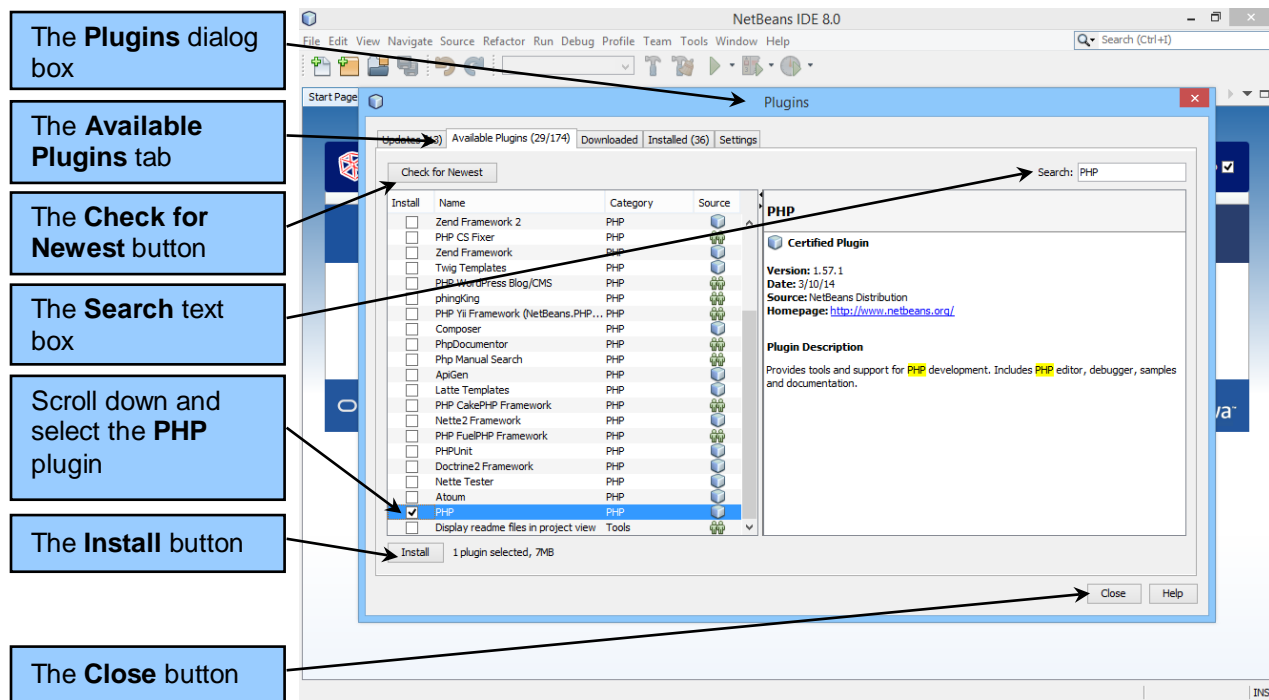
Figure I-34 — The Plugins Dialog Box Window

We now have the NetBeans IDE ready for use. We will need it to create and edit Web page files, particularly PHP Web page files. All we need now is to install PHP itself.

What Is PHP?

PHP, which is an abbreviation for **PHP: Hypertext Processor** (which was previously known as the *Personal Hypertext Processor*), is a scripting language that can be embedded in Web pages. PHP is extremely popular. In January of 2013, more than 2 million Internet domains had servers running PHP.[2] The May 2014 TIOBE Programming Community Index ranked PHP as the seventh most popular programming language (following, in order, C, Java, Objective–C, C++, Visual Basic and C#). PHP appears to be maintaining popularity among programmers and Web page designers. PHP is easy to learn and can be used in most Web server environments and with most databases. It is also an open-source product that is freely downloadable from the PHP Web site.

To organize downloaded files, we suggest that you create a **Download folder** on your C:\ drive (as *C:\Download*) to hold your downloaded files. Within this folder, create folders for each company (i.e., Microsoft, PHP), and within these folders create a folder for each file downloaded. For example, the PHP file we download will be stored in the *C:\Download\PHP* folder.

How Do I Install PHP?

The question of installing PHP is a bit more complicated because there are more options. These include:

- Downloading and installing PHP manually.
- Downloading an installer version of PHP (for Windows operating systems).
- Downloading the **Microsoft Web Platform Installer (WPI) 3.0**, and installing PHP using that utility (for Windows operating systems only).
- Using Microsoft Installations from Microsoft Web sites

In general, manually downloading and installing gives us the most control over the installation, it is also the most complex installation. Further, while the WPI 2.0 was a viable choice, the WPI 3.0 does not do what we want it to, so that choice is out. The choice is complicated by the fact the latest version of PHP on Windows on the Microsoft Web site (www.microsoft.com/web/platform/phponwindows.aspx) is PHP 5.3.5, the latest PHP version of PHP 5.3.x is actually 5.3.28 [Note that although PHP 5.4 and PH 5.5 are available, we are using PHP 5.3 in this text]. So, we have to choose between the PHP installer version and a manual installation.

---

[2] See the PHP Web site.

Since a preconfigured installation is preferred, we'll use that. We'll start by downloading PHP.

Creating the C:\Download\PHP Folder:

1.   Open Windows Explorer (not Windows Internet Explorer).
2.   Expand the **Computer** tree.
3.   Expand **Local Disk [C]**, and browse to the **Download** folder.
4.   Click the **Download** folder to select it, and then click the **New Folder** button.
5.   Name the new folder **PHP**.
6.   Leave Windows Explorer open.

Downloading the PHP Installation File:

1.   Open Windows Internet Explorer (or the Web browser that you use).
2.   Type in the URL http://windows.php.net/download/ and then press the **Enter** button. The PHP downloads for the Windows operating system are displayed.
3.   Scroll down to the **PHP 5.3** section of the downloads page, as shown in Figure I-35.
4.   Click the **VC9 x86 Non Thread Safe Installer** link.
5.   A Windows Internet Explorer dialog box appears asking what you want to do with this file. Click the **Save as** button.
6.   Scroll until you can see C:\Download\PHP folder, and click the **folder name** to select it.
7.   Click the Save button. The file is saved to the C:\Download\PHP folder.
8.   When the download is completed, a message bar is displayed in Windows Explorer stating that the file is "not commonly downloaded and could harm your computer". Click the Close button (the X symbol) to close the message box.
9.   Close Internet Explorer (or the Web browser that you use).

This version of PHP is installed using the normal Windows installation process. During the installation, we will be asked to select some features. In particular, we will be asked if we want to use the **FastCGI protocol**, which is a variant of the older **Common Gateway Interface (CGI)**. Microsoft prefers that we use FastCGI with PHP for IIS,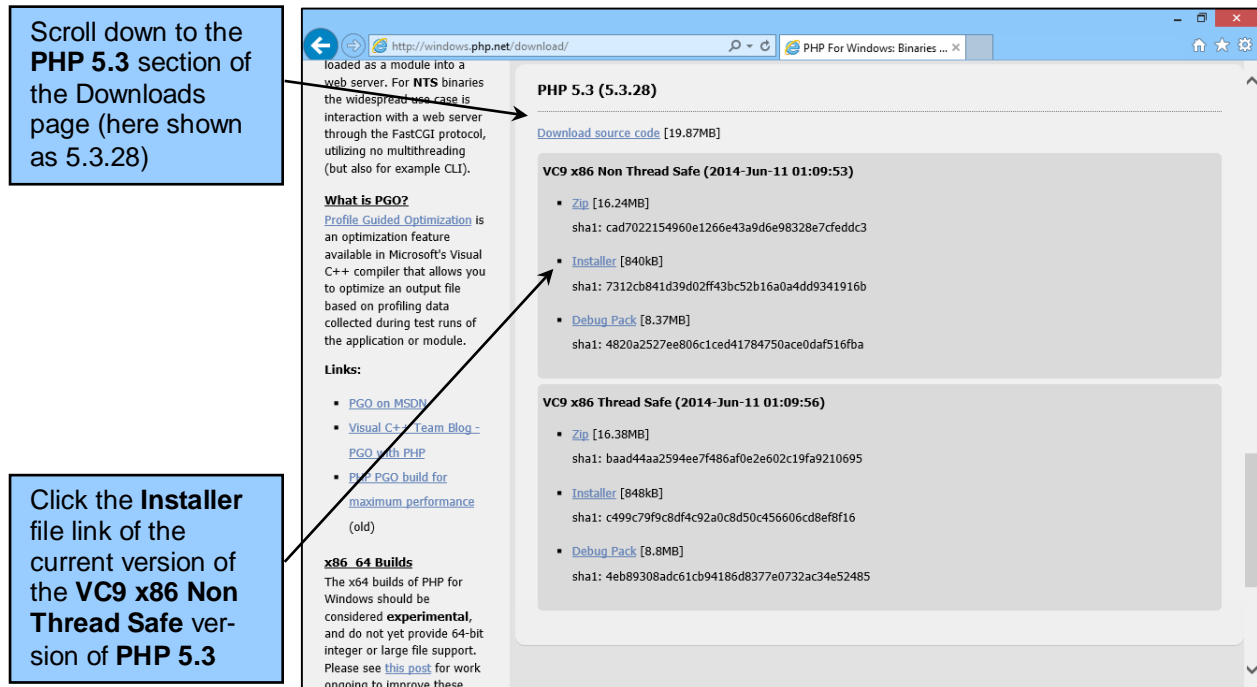 so we will use it. For more information on FastCGI, see: http://en.wikipedia.org/wiki/FastCGI and http://www.iis.net/downloads/microsoft/fastcgi-for-iis

Figure I-35 — Downloading PHP

Installing PHP

1.   In Windows Explorer, expand the **Computer** tree.

2.   Expand **Local Disk [C]**.

3.   Expand the **Download** Folder.

4.   Click the **PHP** folder to select it, so that the downloaded php-5.3.28-nts-Win32-VC9-x86.msi in-stallation file is visible in the right hand pane, as shown in Figure I-36.

5.   Double-click the **php-5.3.28-nts-Win32-VC9-x86.msi** file to begin the installation process.

6.   An Open File – Security Warning dialog box is displayed, stating the publisher of the file could not be verified and are you sure you want to run this software? Click the **Run** button.

7.   The PHP 5.3.28 Setup dialog box and the *Welcome to the PHP 5.3.28 Setup Wizard* page are dis-played, as shown in Figure I-37. Read the message in the dialog box, and then click the **Next** but-ton.

8.   The *End-User License Agreement* page is displayed, as shown in Figure I-38. Click the **I accept the terms in the License Agreement** check box, and then click the **Next** button.

9.   The *Destination Folder* page is displayed, as shown in Figure I-39. Note that PHP is a 32-bit pro-gram, and therefore the PHP folder is located in C:\Program Files (x86). Click the **Next** button.

10.   The *Web Server Setup* page is displayed, as shown in Figure I-40. This is the place in the installa-tion where we specify that we want to use FastCGI, so click the **IIS FastCGI** radio button to select it, and then click the **Next** button.

Downloads\PHP folder

Double-click the **php-5.3.28-nts-Win32-VC9-x86.msi** file to start the installation
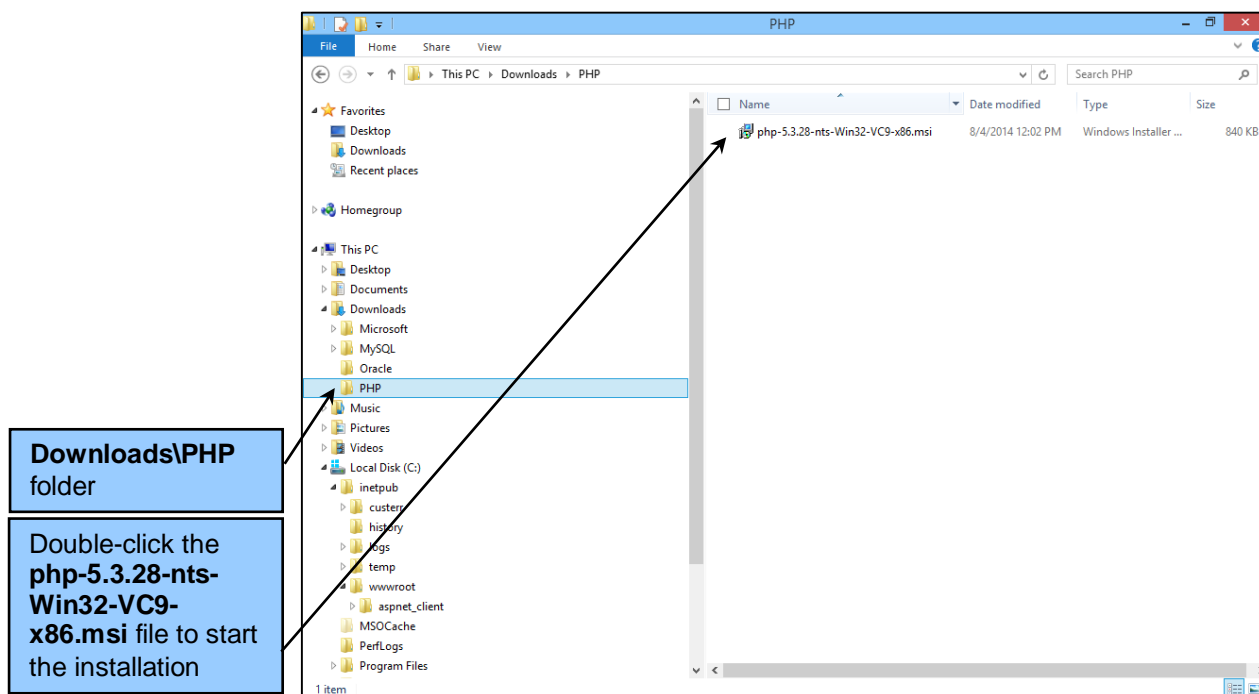
Figure I-36 — Starting the PHP Installation

The **PHP 5.3.28 Setup dialog box—Welcome to the PHP 5.3.28 Setup Wizard** page

The **Next** button
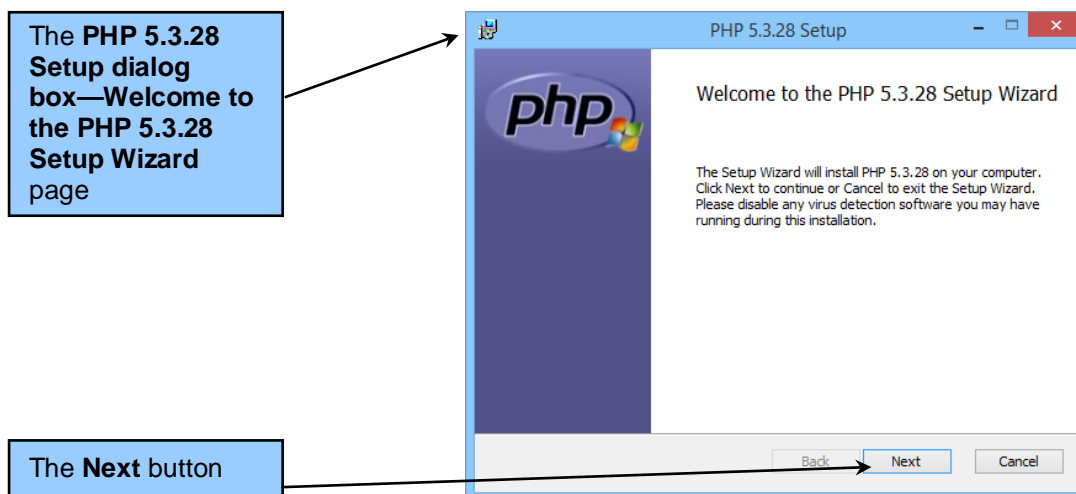
Figure I-37 — Starting the PHP Installation

The **End-User License Agreement** page

Click this check box to select it

The **Next** button
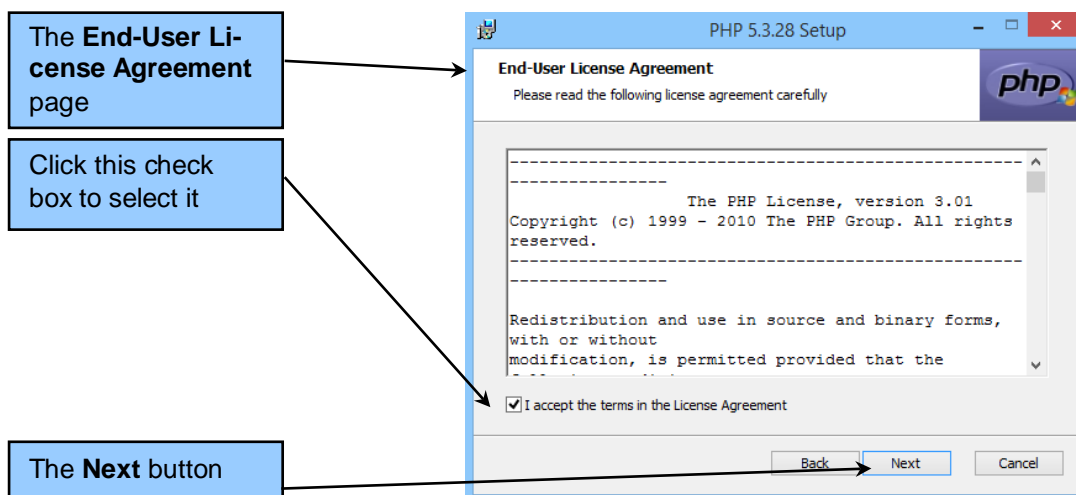
Figure I-38 — The End-User Agreement Page

The **Destination Folder** page

PHP will be installed in this folder

The **Next** button
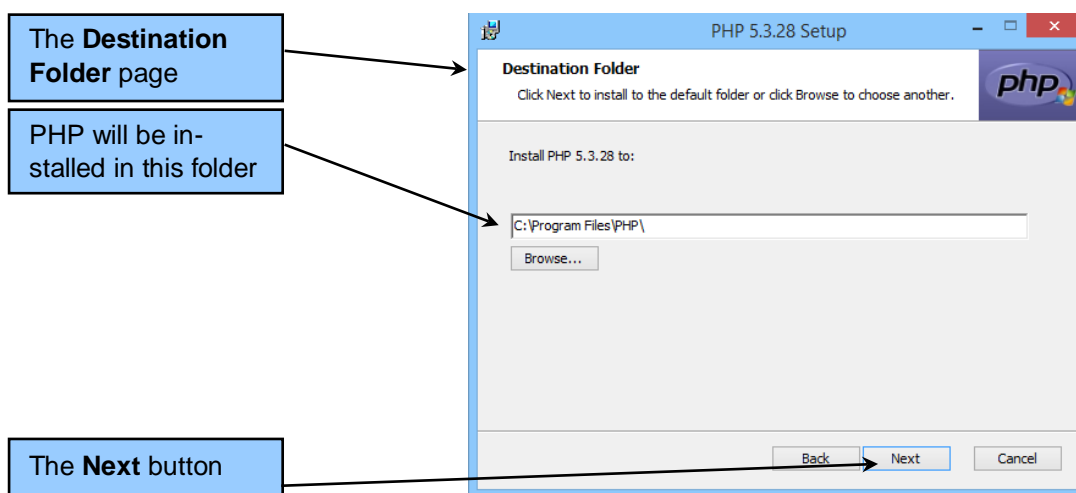
Figure I-39 — The Destination Folder Page

The **Web Server Setup** page

Click this radio button to select **IIS FastCGI** support

The **Next** button
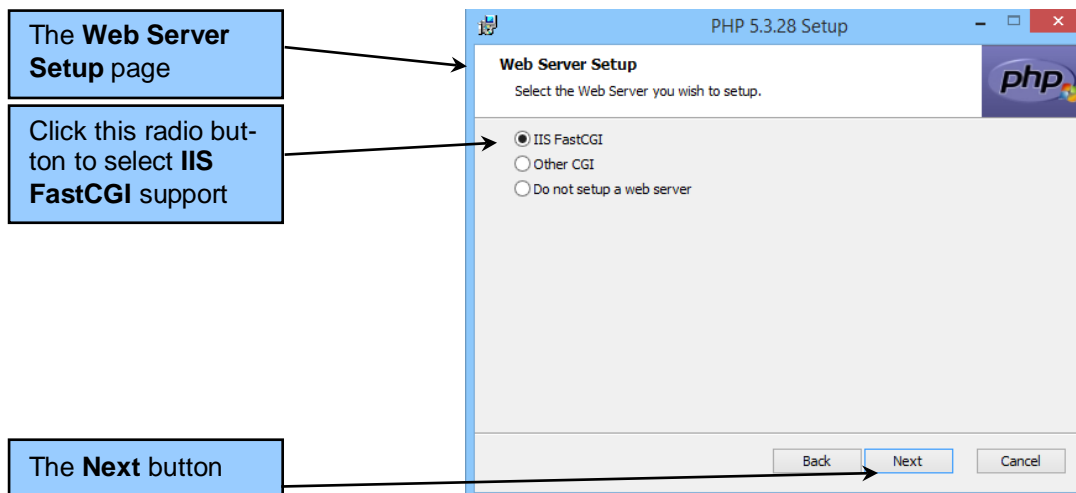
Figure I-40 — The Web Server Setup Page

The **Choose Items to Install** page

Modify **Extensions** to install Oracle (11g)

The **Next** button

Figure I-41 — The Choose Items to Install Page

11.   The *Choose Items to Install* page is displayed, as shown in Figure I-41. There are actually a lot of features that can be selected on this page to modify the PHP installation, and we will add in the driver for Oracle Database Express Editio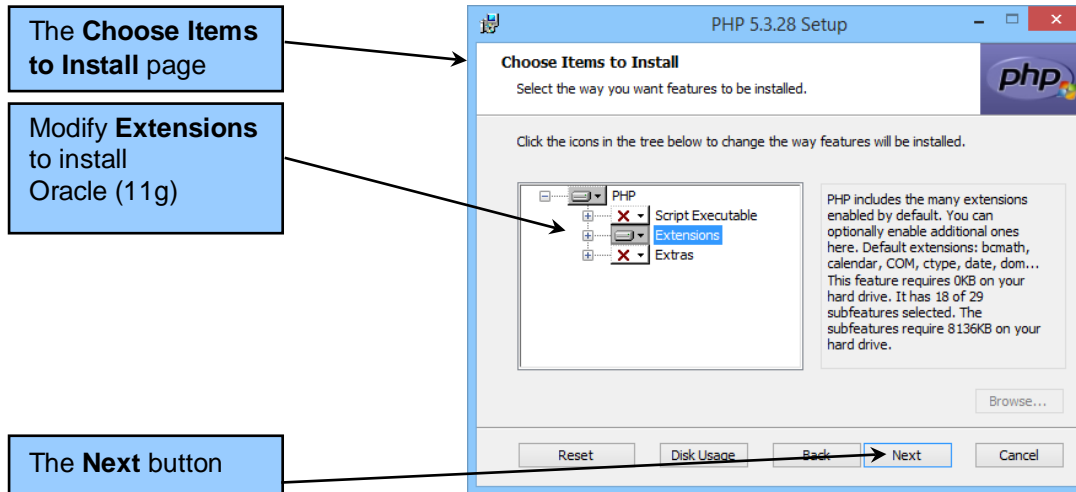n 11*g* Release 2. Because we need to understand the use of the php.ini configuration file, we will make any needed configuration changes during our discussion of that file. Click the **Next** button to display the *Ready to Install PHP 5.3.28* page.

12.   On the *Ready to Install PHP 5.3.28* page, click the **Install** button.

13.   The *Installing PHP 5.3.28* page is displayed, as shown in Figure I-42.

The **Installing PHP 5.3.28** page

The **User Account Control** dialog box *may* be hidden until you click the User Account Control icon to display it, or it may display correctly.

If you see a **User Account Control** icon on the Taskbar, click on it to display the User Account Control dialog box

Figure I-42 — The Installing PHP 5.3.28 Page

The **User Account Control** dialog box—this may be hidden until you click the User Account Control icon to display it

Click the **Yes** button
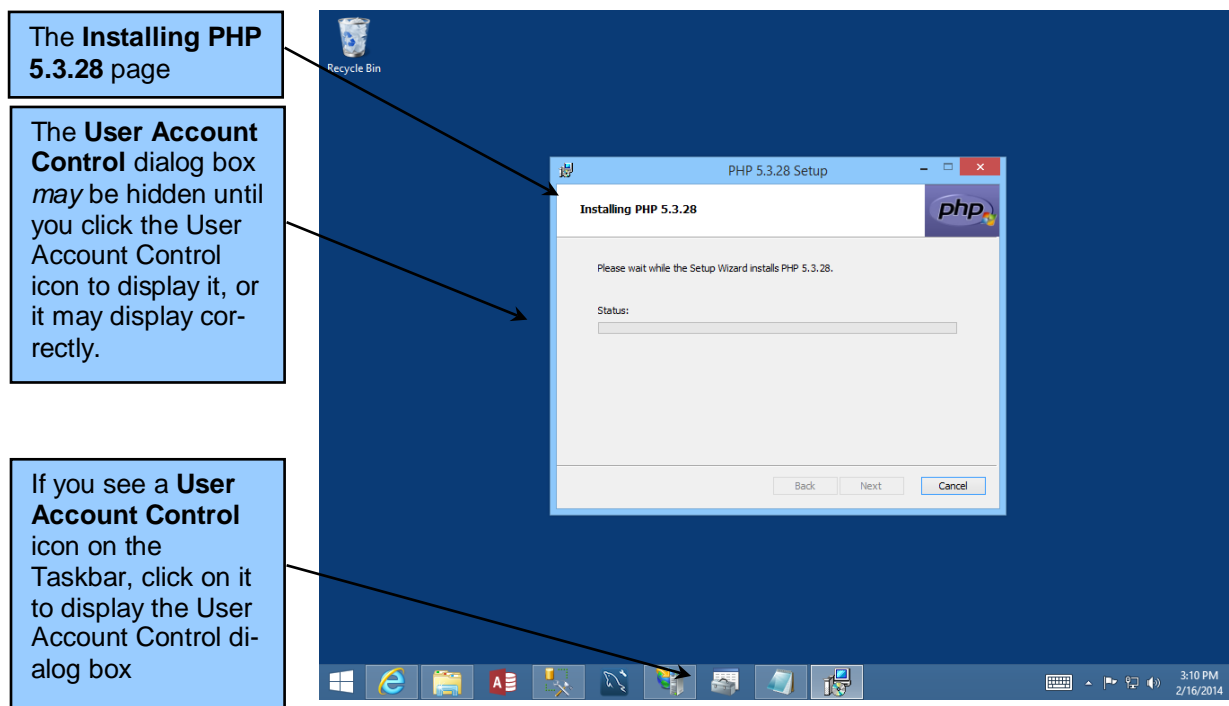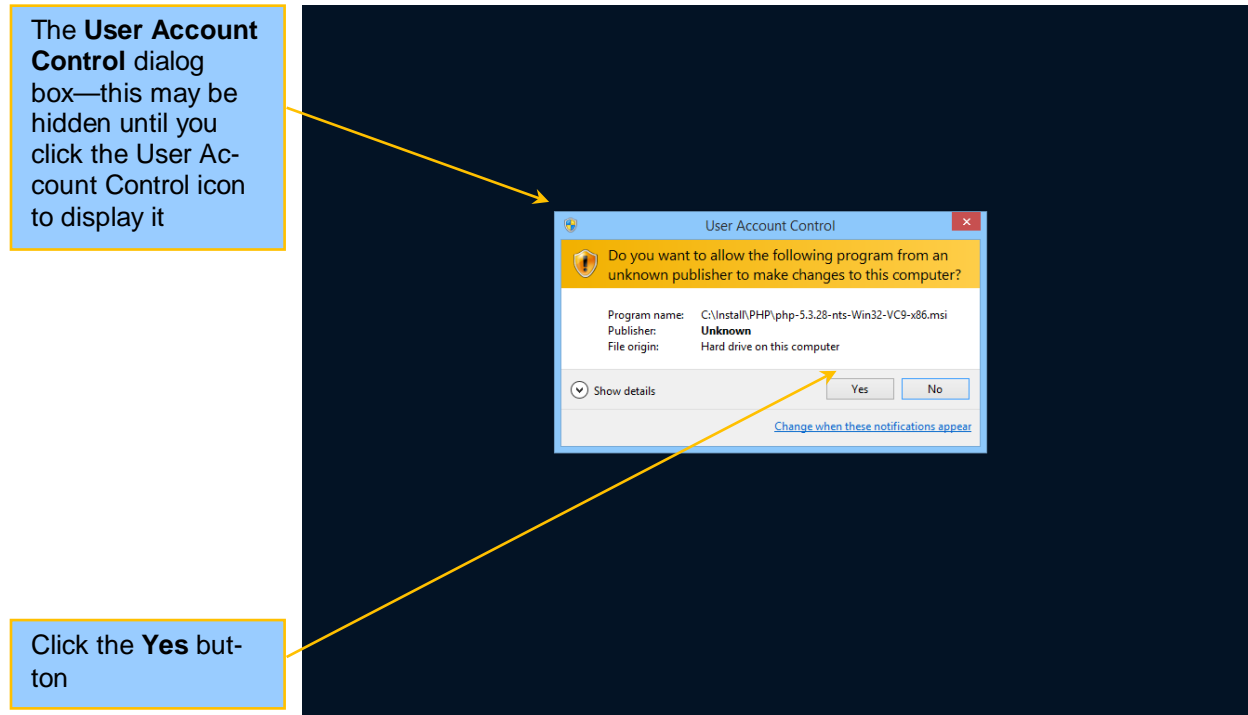
Figure I-43 — The User Account Control Dialog Box

The **Complete the PHP 5.3.27 Setup Wizard** page

The **Finish** button
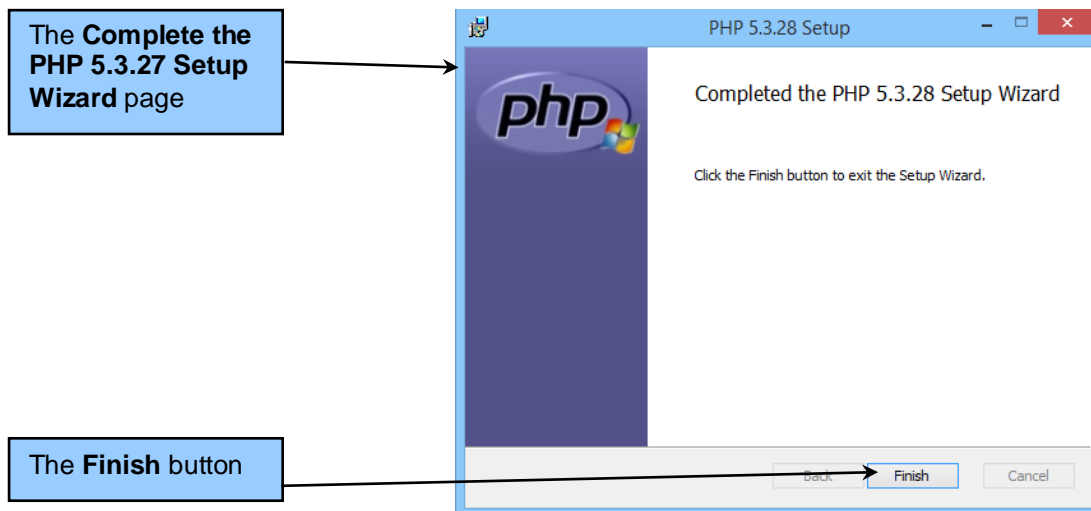
Figure I-44 — The Competed the PHP 5.3.28 Setup Wizard Page

14.   At this point Windows also displays the User Account Control dialog box, asking *Do you want to allow the following program from an unknown publisher to make changes to this computer?* Unfortunately, Windows *may hide* this dialog box behind the PHP 5.3.28 Setup dialog box, and it can appear that the installation is frozen. As shown in Figure I-42, click the User Account Control

icon on the task bar to display the User Account Control dialog box itself, as also shown in Figure I-43.

- ■ **NOTE:** This behavior is very common during installations of Windows OS programs. If a program installation seems to be inexplicably stopped, look for a hidden dialog box—check for an unexpected icon on the taskbar.

15. In the User Account Control dialog box, click the **Yes** button.
16. PHP 5.3.28 is installed, and appropriate modifications are made to the Windows 8 operating system and the Microsoft IIS Web server.
17. The *Completed the PHP 5.3.28 Setup Wizard* page is displayed, as shown in Figure I-44. Click the **Finish** button to complete the installation.

How Do I Check PHP to Make Sure It Is Running Correctly?

PHP should now be ready for use. However, there is an easy test we can perform to be sure PHP is running properly. This will also give us an opportunity to use NetBeans to create our first PHP Web page.

How Do I Create a Web Page Using the NetBeans IDE?

The NetBeans IDE organizes Web pages into NetBeans Projects, and projects with PHP pages can be organized as NetBeans PHP projects. We will create a project for testing our PHP installation, and then create our PHP test page in that project.

Creating a NetBeans PHP Project:

1. Click the **NetBeans** icon.
2. The NetBeans IDE is loaded.
3. Click **File**, and then **New Project** to issue the *File | New Project* command. The New Project dialog box is displayed, as shown in Figure I-45.
4. Using the default Category **PHP** and the default **PHP Application**, click the **Next** button. The New PHP Project dialog box *Name and Location* page is displayed, as shown in Figure I-46.
5. On the New PHP Project dialog box *Name and Location* page, type in the project name **DBC-e07-PHP-Test**, and select **PHP 5.3** as the PHP version. Click the **Next** button.
6. The New PHP Project dialog box *Run Configuration* page is displayed, as shown in Figure I-47. There is nothing we need to configure on the *Run Configuration* page, so click the **Next** button.
7. The New PHP Project dialog box *PHP Frameworks* page is displayed, as shown in Figure I-48. There is nothing we need to configure on this page, so click the **Finish** button.
8. The DBC-e07-PHP-Test project and an associated index.php Web page is created and available for use, as shown in Figure 1-49.
9. Leave the NetBeans IDE open.

The **File** command

The **New Project** dialog box

The **Choose Project** page

Type the project name in this text box

The **Next** button
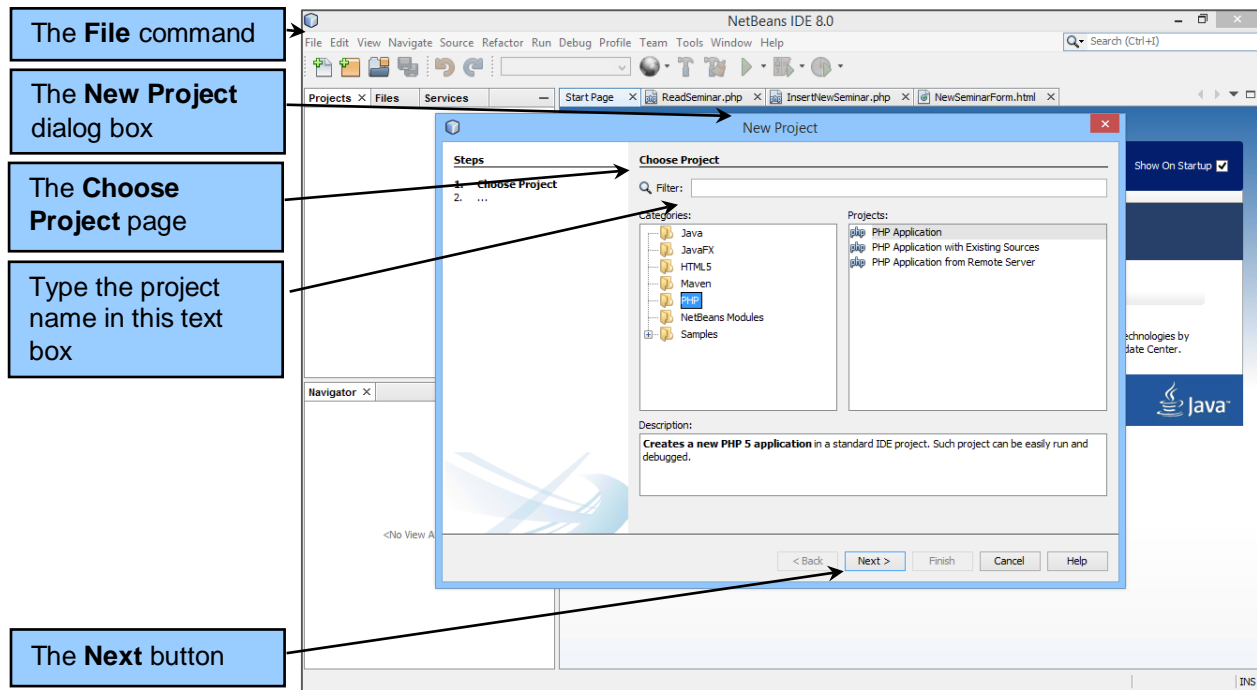
Figure I-45 — The New Project Dialog Box—Choose Project Page

The **New Project** dialog box

The **Name and Location** page

Type the project name **DBC-e07-PHP-Test** into the Project Name text box.

Select **PHP 5.3**

The **Next** button
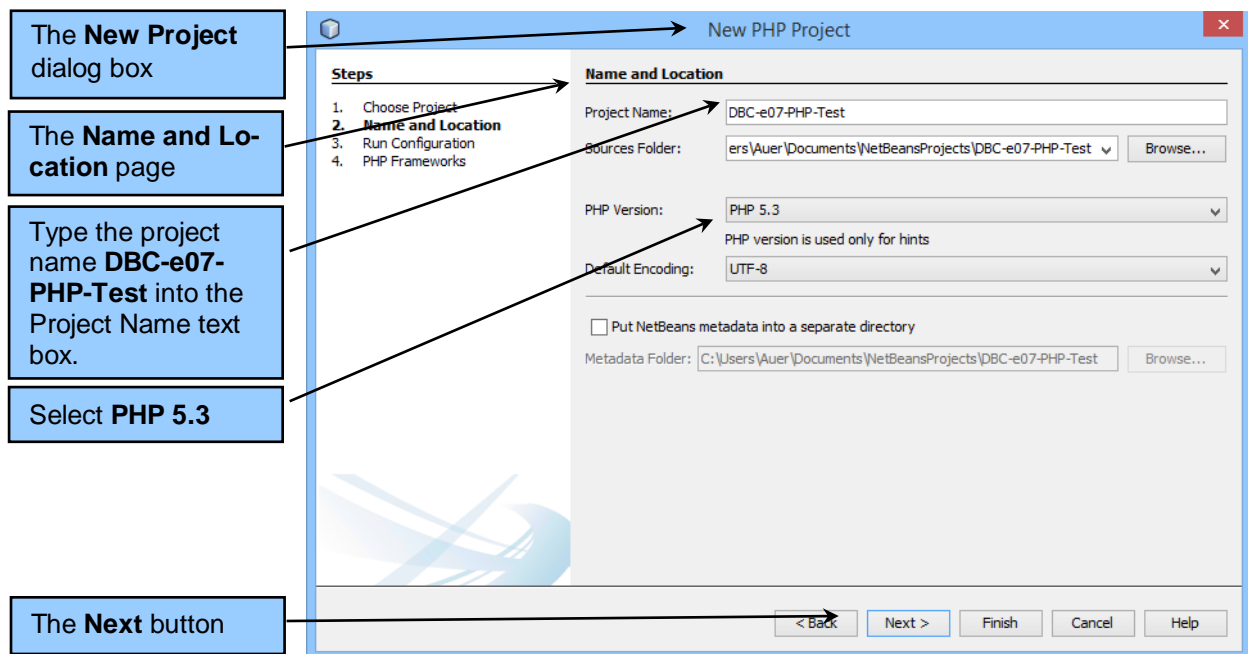
Figure I-46 — The New Local PHP Project Dialog Box—New PHP Project

The **New PHP Project** dialog box

The **Run Configuration** page—no setting changes are needed here

The **Next** button
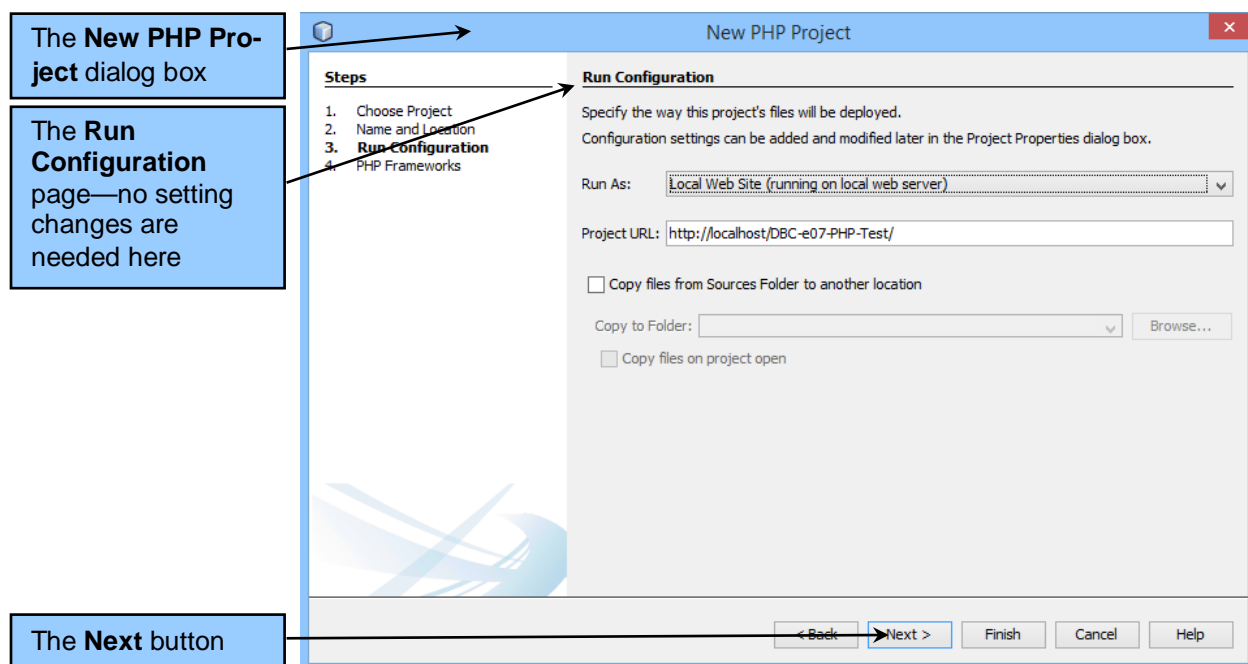
Figure I-47 — The New Project Dialog Box—Run Location Page

The **New PHP Project** dialog box

The **PHP Frameworks** page—no setting changes are needed here
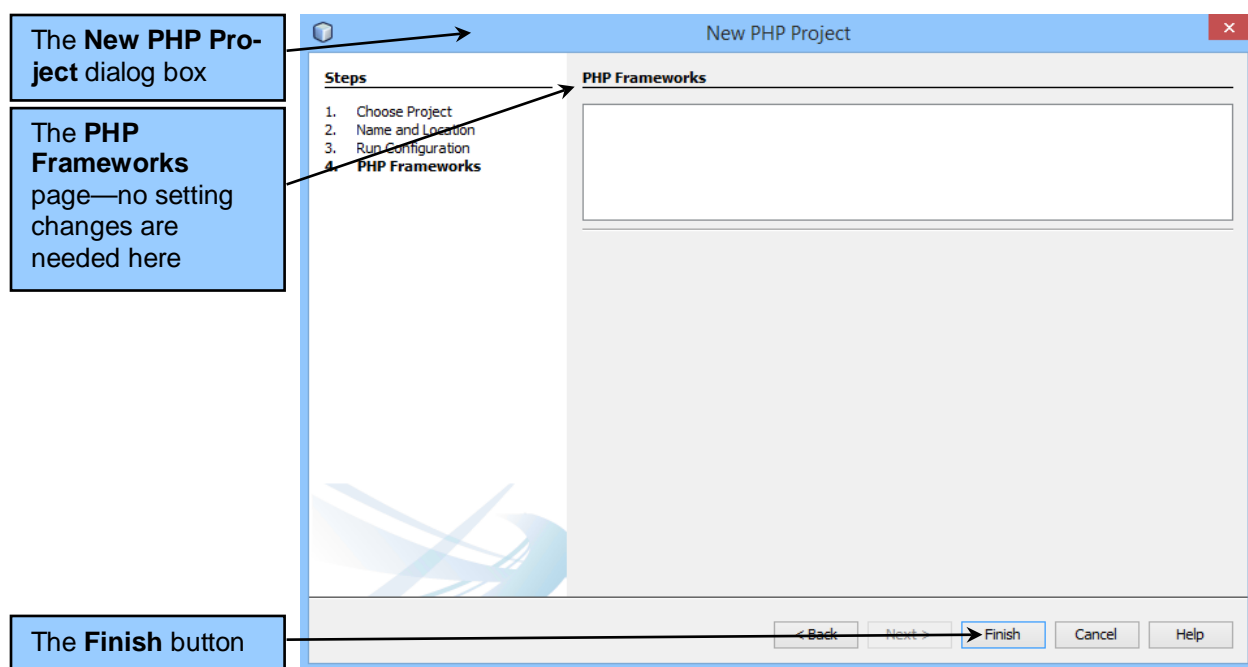
The **Finish** button

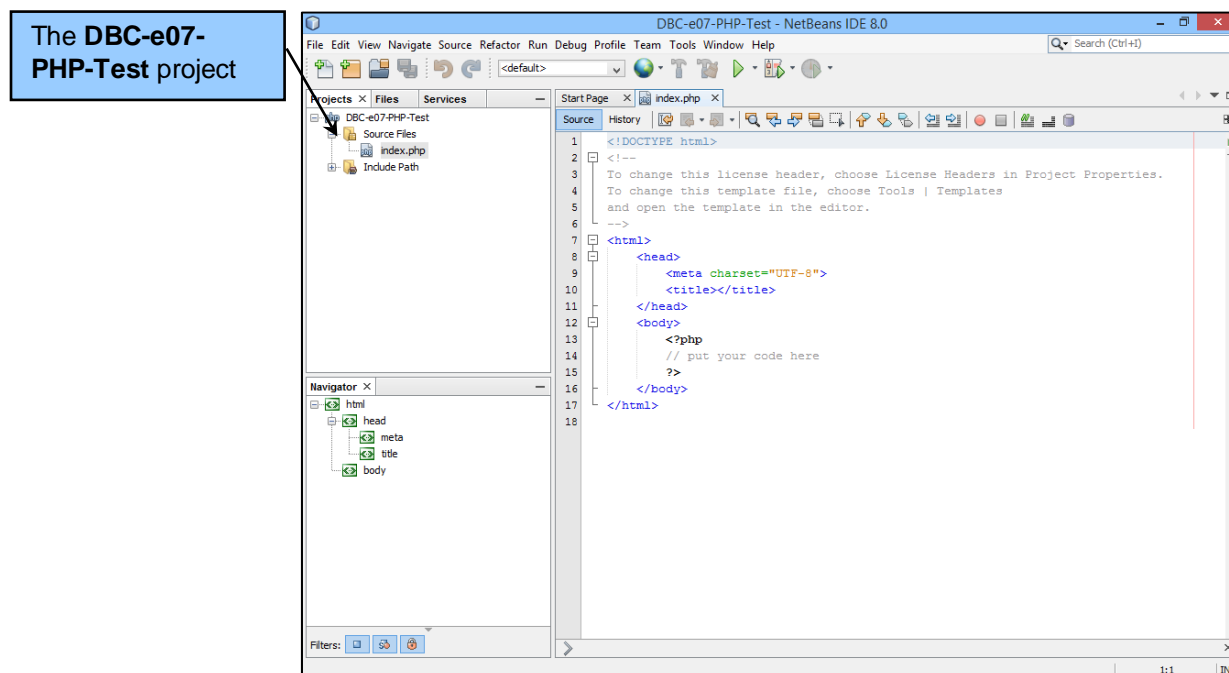**Figure I-48 — The New Project Dialog Box—PHP Frameworks Page**

Figure I-49 — The DBC-e07-PHP-Test Project

The PHP Web page that we will create has a single purpose—to demonstrate that PHP has been success-fully installed on the host computer by displaying a Web page containing PHP installation settings. The PHP settings are obtained by using the PHP **phpinfo()** command. All PHP commands must be enclosed in PHP delimiters so that the PHP processer will recognize the PHP code and execute it as such. The stand-ard PHP delimiters are **<?php** and **?>** (there are other delimiters that can be used, but we have no need for them and will not discuss them here). We will now create a well-known and often used PHP Web page that has to be the shortest possible, executable PHP page!

Creating the DBC-e07-PHP-Test Web page:

1.   Edit the index.php code in the NetBeans IDE so that it looks like the code in Figure I-50. Ignore any warnings generated by the NetBeans editor.
2.   Click the Save button.
3.   Close the index.php page and the NetBeans IDE.

Now that we have created our index.php file, it is time to see if PHP is working correctly.

Viewing the phptest.php Web Page on the Web Site:

1.   Open the **Windows Explorer** Web browser, or whichever Web browser you use.
2.   Type in the URL **http://localhost/index.php** , and then press the Enter key. The PHP information Web page is displayed in the Web browser, as shown in Figure I-51. The fact that we can see this page demonstrates that PHP is correctly installed. Note that you can scroll through this page to see the current setting for the various PHP parameters.
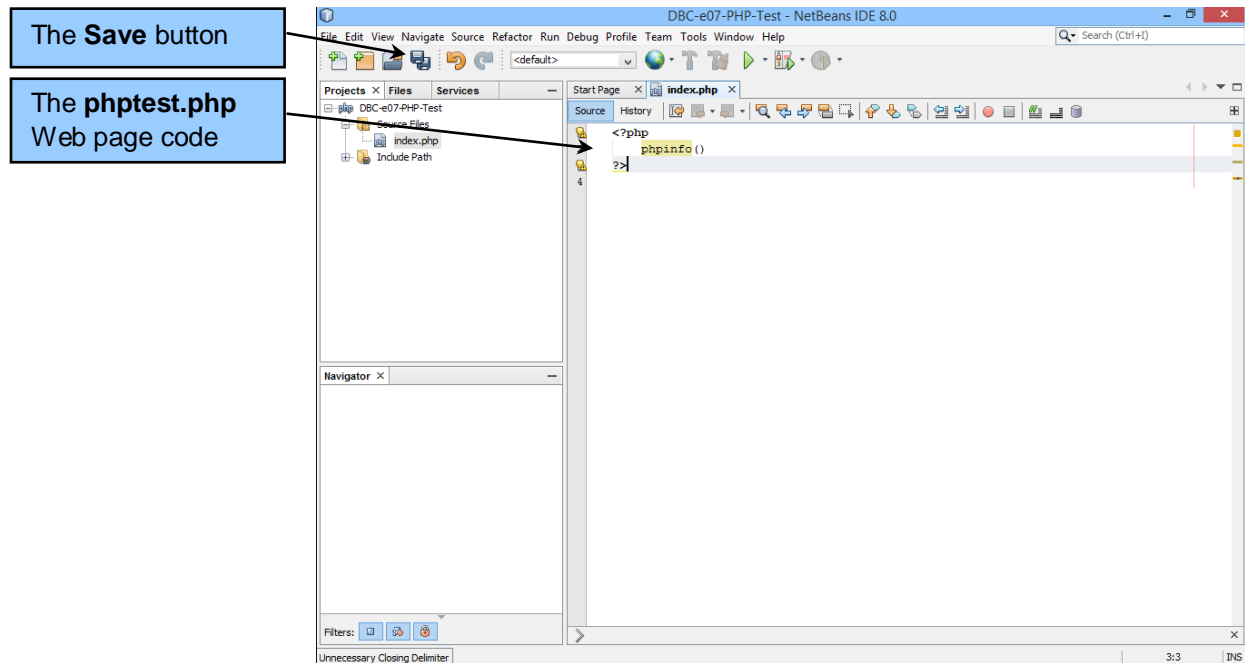3.   Close **Windows Explorer**, or whichever Web browser you are using.

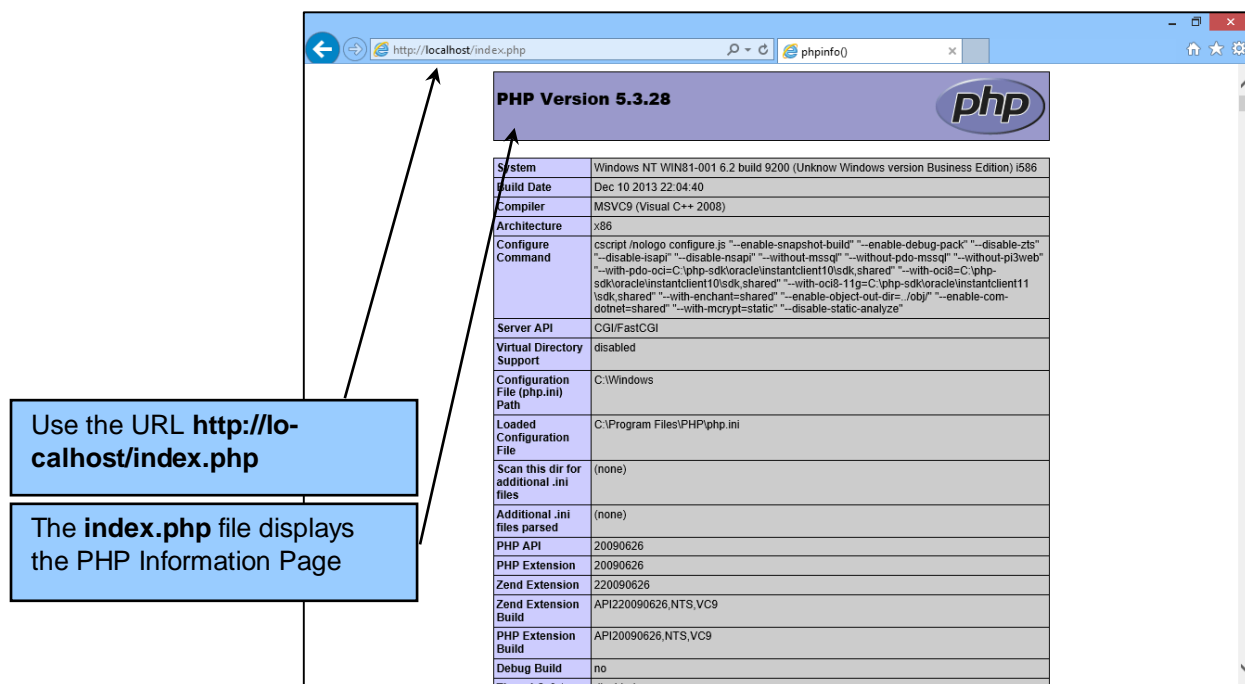**Figure I-50 — The index.php PHP code**

Figure I-51 — The PHP Information Page in the Web Browser

Now that we have demonstrated that PHP is working correctly, we have completed our main work in this Appendix. We have (1) installed and configured the IIS Web server and the associated file directory structure, (2) installed PHP, and (3) installed the NetBeans and used it to create a PHP Web page.

Before wrapping up this appendix, however, let's take a brief look at some of the finer points of PHP setup and configuration.

How Do I Manage the PHP Configuration?

In our discussion of PHP earlier in this appendix, we said that there were several options for installing PHP, including:

- Downloading and installing PHP manually.
- Downloading an installer version of PHP (for Windows operating systems).
- Downloading the **Microsoft Web Platform Installer (WPI) 4.5**, and installing PHP using that utility (for Windows operating systems only).
- Using Microsoft Installations from Microsoft Web sites.

Because it provided all the basic functionality needed for Chapter 11 on Web database processing applications, we choose to use the PHP installer for Windows to simplify the PHP installation.

However, we still need to understand how to modify the PHP installation or provide the PHP functionality that we need. Specifically, the WPI installation installs and enables a limited set of the **PHP dynamic extension *.dll files** that PHP uses to extend PHP functionality to various DBMS products. *.dll files are **Microsoft dynamic linked library** files, which provide the ability to share program capabilities and functionalities between programs by letting each of the programs use a common*.dll file.

For PHP, the dynamic extension *.dll files are stored in the *..\PHP\ext* folder, or, more specifically for our installation of PHP, *C:\Program Files (x86)\PHP\ext*. Figure I-53 shows the contents of this folder as created by the Windows installer default installation of PHP. Note the inclusion of two files for use with MySQL, one of which is the updated and preferred file, but there are *no* files for SQL Server (it would be labeled *php_mssql.ddl*).

These files provide the ability for PHP to make application calls directly to a DBMS, rather than using **Open Database Connectivity (ODBC)** as discussed in Chapter 7 (ODBC drivers are automatically installed when you install Microsoft Access 2013, SQL Server 2014 and Oracle Database Express Edition 11*g* Release 2, while the installation of the MySQL/ODBC Connector is discussed in Appendix C for MySQL 5.6). For example, the PHP statement used in Figure 7-18 to send an SQL statement to the SQL Server database using PHP's built-in OBDC capability is:

```
// Execute SQL statement
$RecordSet = odbc_exec($Conn,$SQL);
```

If we were using the php_mysqli.dll (which is the *updated* MySQL file) to add the capability to send the statement directly to SQL Server, the PHP statement would be:

```
// Execute SQL statement
$RecordSet = mysqli_query($Conn,$SQL);
```

While it is not obvious from looking at the file list in Figure I-53, some significant *.dll files are missing. Figure I-54 shows the contents of the ..\PHP\ext folder in a PHP installation based on a PHP download of the Zip version of PHP at http://www.php.net/downloads.php . We can immediately see that not only are there a lot more files, there are some very significant ones. For example, the *php_oci8_11g.dll* file that provides support for Oracle Database Express Edition 11*g* Release 2 is present only because we installed it. And while the *php_pdo_odbc.dll* file that provides additional ODBC capabilities by supporting **PHP Data Objects (PDO)** is present, the *php_pdo_oci.dll* file that provides support for PDO in Oracle Database 11*g* Release 2 is missing. PDO is very important, because it provides a nearly vendor independent DBMS access language and is one of the main PHP development initiatives. Without this module, we cannot use OBDC PDO with Oracle Database 11*g* Release 2.

If we need PHP dynamic extensions not provided in the Microsoft installer PHP installation, we have a couple of options:

- Download the PHP Zip version, extract the files manually and move any needed files into our existing PHP installation.
- Reinstall PHP and select additional needed drivers (see Figure I-49 and note the Extensions options).
- Download additional updated drivers from DBMS providers, and then update the installation manually.

Because we've already installed PHP using the Microsoft installer, we'll discuss how to update that installation manually. There are two steps. First, add the needed PHP dynamic extension *.dll files to the ..\PHP\ext folder, and second, update the PHP configuration to activate the *.dll files.

The PHP configuration is controlled by the *php.ini* file, which is stored in the ..\PHP folder. Therefore, this means we need to:

- Download a copy of the PHP *.ZIP file used for manual installation.
- Unzip the *.ZIP file in a location other than the locations of the PHP installation.
- Copy the needed dynamic extension *.dll files to the ..\PHP\ext folder.
- Update the php.ini file in the ..\PHP folder.
- Reboot the computer so that the revised PHP configuration file will be used when PHP is used.

The PHP ***.dll** files installed by the Windows installer installation of PHP

The **php_mysql.dll** file is an *outdated* file for SQL Server

The **php_mysqli.dll** file is the *updated* file for MySQL

The **..\PHP\ext** folder

The **php_pdo_odbc.dll** file is the PDO support file for ODBC
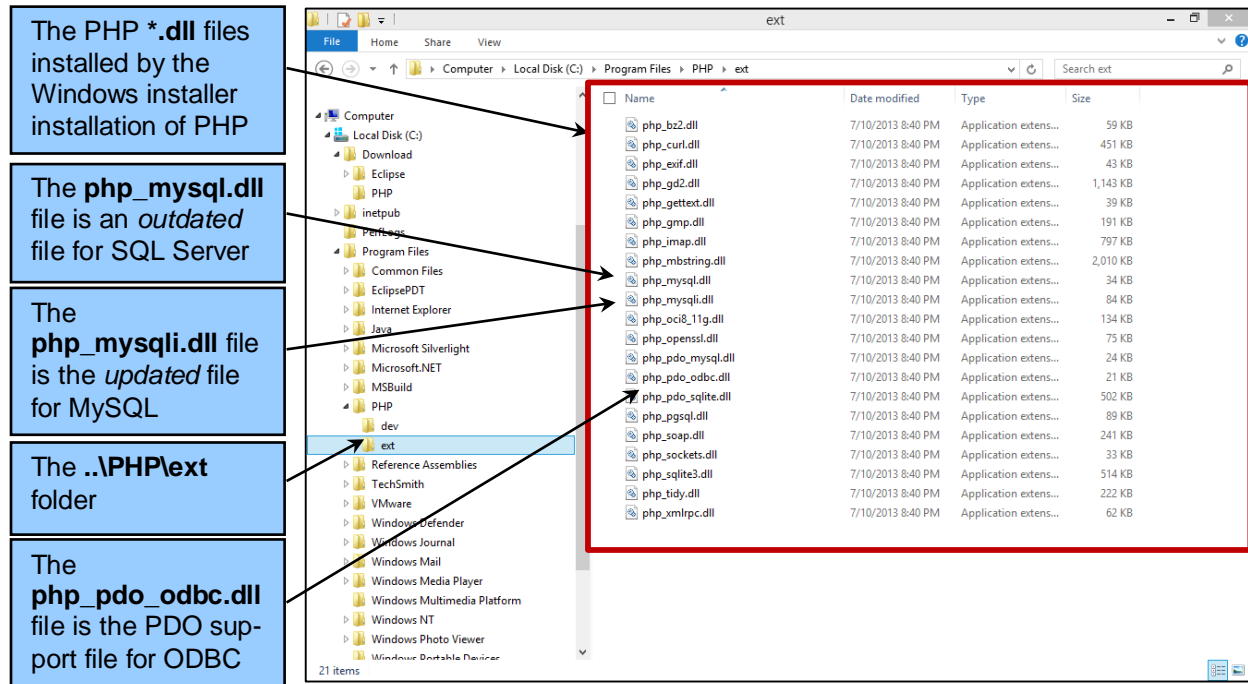
Figure I-52 — The PHP *.dll Files Installed by the Windows Installer for PHP

The **php_oci8_11g.dll** file is the file for Oracle Database Express Edition 11*g* Release 2

The **php_pdo_oci.dll** file is the PDO support file for Oracle Database Express Edition 11*g* Release 2
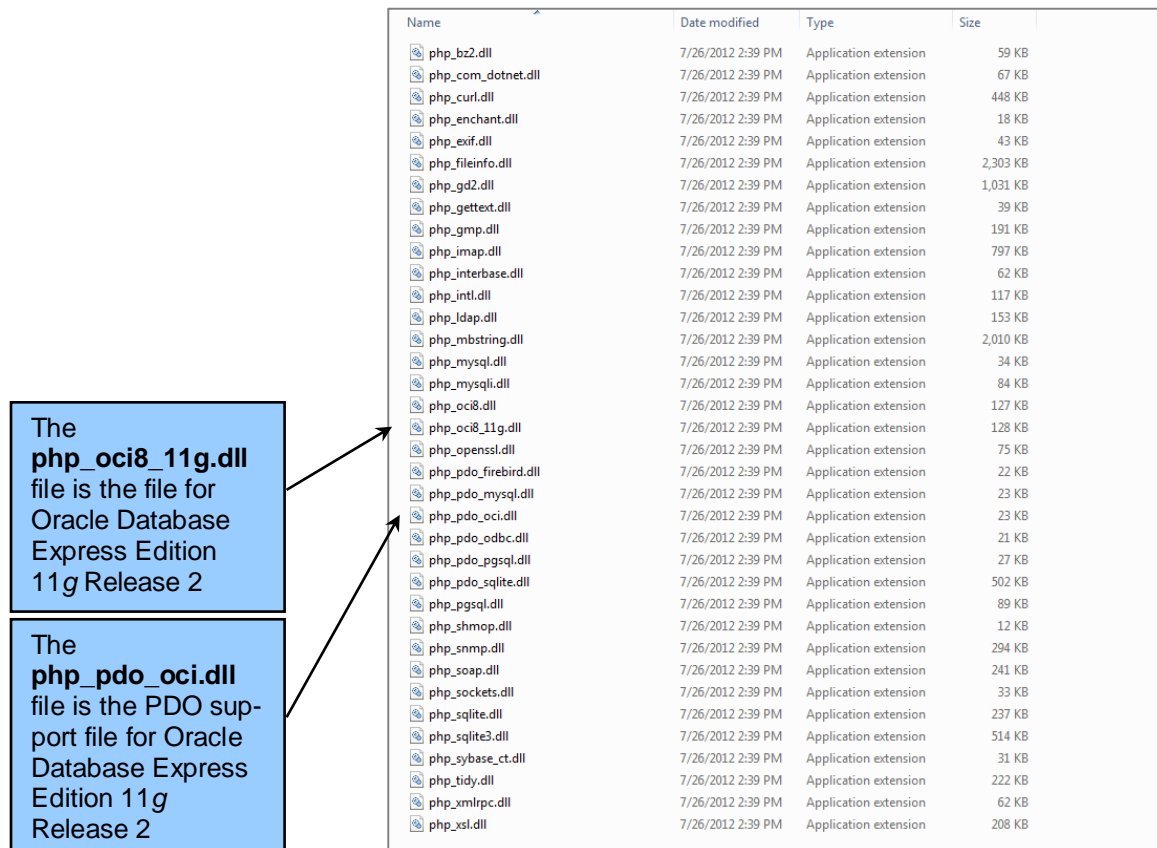
Figure I-53 — The Full Set of PHP *.dll Files

Note that the version of PHP that is installed on a Windows 8 computer running IIS 8 is the **PHP Non-Thread-Safe Windows version for FastCGI**. You don't need to worry about the technical details of this name, but if you download a version of PHP from the PHP Web site then be sure to download a non-thread-safe version to ensure compatibility. If you are interested in learning more about FastCGI or exactly what non-thread-safe means, browse the Microsoft PHP on IIS Web site at http://php.iis.net/ .

The **PHP php.ini configuration file** is a plain text file that can be edited as necessary to control the configuration of PHP on a specific computer. While in a manual or non-Windows installation of PHP the extensions are placed in a Dynamic Extensions section of the standard php.ini, in the Windows installer installation the extensions are placed at the end of the php.ini file. This does make them easier to find and edit! The extensions in the current php.ini file are shown in Figure I-54. A line is provided for each dynamic extension *.dll.
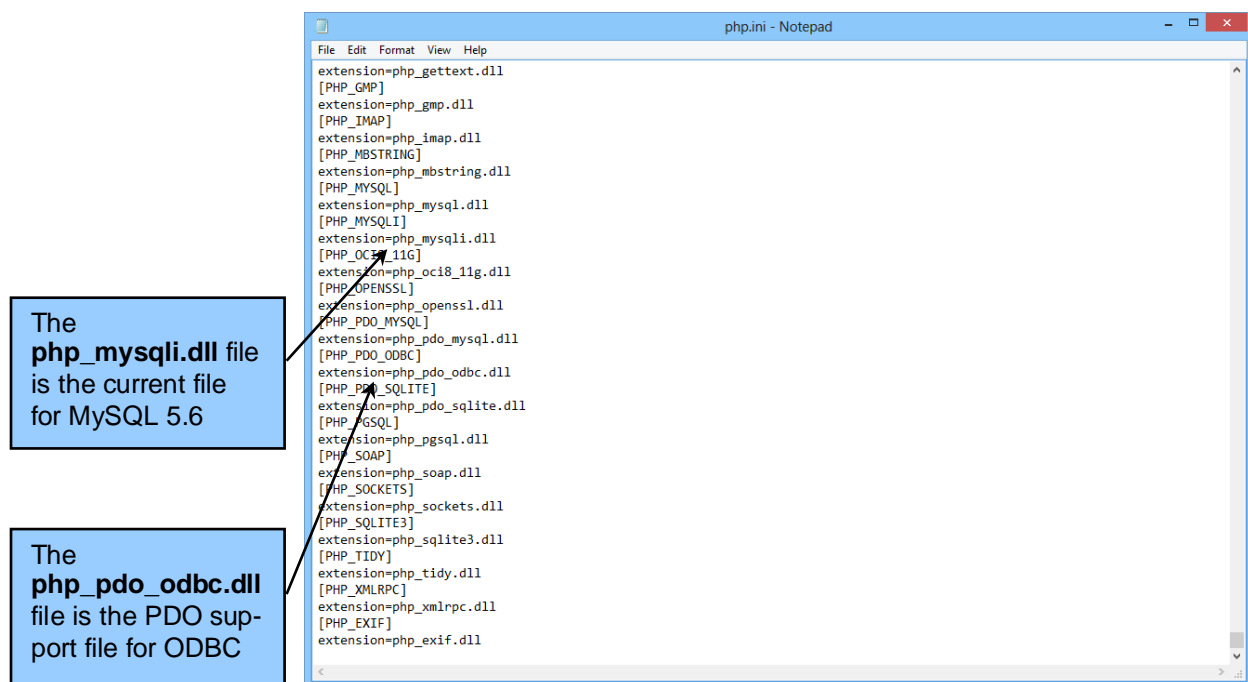

The **php_mysqli.dll** file is the current file for MySQL 5.6

The **php_pdo_odbc.dll** file is the PDO support file for ODBC

Figure I-54 — The Dynamic Extensions of the php.ini Configuration File

Now let's actually update the Windows PHP installation. Note that there are no Microsoft SQL Server *.dll files. The current Microsoft SQL Server extension is the **Microsoft Drivers 3.0 for PHP for SQL Server**. The drivers are available at http://www.microsoft.com/download/en-us/details.aspx?id=20098.

Creating the C:\Download\Microsoft\SQL-Server-Driver-For-PHP Folder:

1.   Open Windows Explorer (not Windows Internet Explorer).
2.   Expand the **Computer** tree.
3.   Expand **Local Disk [C]**.
4.   Expand **Download**.

5.   Expand **Microsoft**.
6.   Click the **Microsoft** folder to select it, and then click the **New Folder** button.
7.   Name the new folder **Microsoft-PHP-Drivers-3.0**.
8.   Leave Windows Explorer open.

Downloading the Microsoft Drivers for PHP for SQL Server File:

1.   Open Windows Internet Explorer (or the Web browser that you use).
2.   Type in the URL http://www.microsoft.com/download/en-us/details.aspx?id=20098 and then press **Enter** button. The *Microsoft Drivers 3.0 for PHP for SQL Server* Web page is displayed.
3.   Click the **Download** button.
4.   Choose the file name **SQLSRV30.EXE**, then click the **Next** button.
5.   A message bar is displayed asking if you want to run or save the file.
6.   Click the **Save drop-down list** arrow button, and click **Save as**. The Save As dialog box is displayed.
7.   Browse to the **C:\Download\Microsoft\Microsoft-PHP-Drivers-3.0** folder, and then click the **Save** button.
8.   The file is downloaded, and a message bar is displayed stating the file is downloaded. Close the message bar.
9.   Close Windows Internet Explorer (or the Web browser that you use).

Installing the Microsoft PHP drivers for SQL Server requires a different installation procedure than the one used for most Windows programs, because even though the downloaded filename is named *SQLSRV30.exe*, we actually downloaded a compressed file and the executable *.exe only indicates that the file will expand when we run it.

Installing the Microsoft Drivers 3.0 for PHP for SQL Server:

1.   In Windows Explorer, browse to the downloaded SQLSRV30.exe file in **C:\Download\Microsoft\ Microsoft-PHP-Drivers-3.0** folder.
2.   Double-click the file to run it.
3.   An Open File – Security Warning dialog may be displayed, asking "Do you want to run this file?" If it is, click the **Run** button.
4.   A Microsoft Drivers 3.0.1 for PHP for SQL Server dialog box is displayed asking you to accept a licensing agreement. Click the **Yes** button.
5.   A Microsoft Drivers 3.0.1 for PHP for SQL Server 3.0 dialog box is displayed asking you where you want to place the extracted files. Click the **Browse** button. A Browse for Folder dialog box is displayed.
6.   In the Browse for Folder dialog box, browse to **C:\Download\Microsoft\Microsoft-PHP-Drivers-3.0**, and then click the **OK** button.
7.   In the Microsoft Drivers for PHP for SQL Server 3.0 dialog box, click the **OK** button.
8.   The compressed files are expanded.

9.   A Microsoft Drivers 3.0.1 for PHP for SQL Server dialog box dialog box is displayed thanking you for downloading the file. Click the **OK** button.

10.   The expanded files are now visible in the C:\Download\Microsoft\Microsoft-PHP-Drivers-3.0 folder, as shown in Figure I-55.

   ▪   NOTE: Documentation is included in the download. The SQLSRV_help.chm file shown in Figure I-55 is a Microsoft Help System file. Double-click that file to open it in the Microsoft Help System if you want to read more about the drivers.

11.   Since we have installed PHP 5.3.28 as a non-thread-safe FastCGI program, we will use the files named **php_sqlsrv_53_nts.dll** and **php_pdo_sqlsrv_53_nts.dll**. For **each** of these files:

   a.   Right click the **filename** to display the shortcut menu. In the shortcut menu, click the **Copy** command.

   b.   Click the **C:\Program Files\PHP\ext** folder to select it.

   c.   Right click the **ext** folder to display the shortcut menu. In the shortcut menu, click the **Paste** command.

   d.   Because the *C:\Program Files (x86)\PHP\ext* folder is a protected system folder, a Destination Folder Access Denied dialog box appears. Click the **Continue** button to confirm that this is an operation that we actually want to do.

12.   The **php_sqlsrv_53_nts.dll** and **php_pdo_sqlsrv_53_nts.dll** files are now copied to the ..\PHP\ext folder.

13.   Leave Windows Explorer open.

Now that we installed the new PHP dynamic extension *.dll files in the correct location, we need to update the php.ini file to enable use of these files. However, this is a bit tricky because the file is in a protected area.
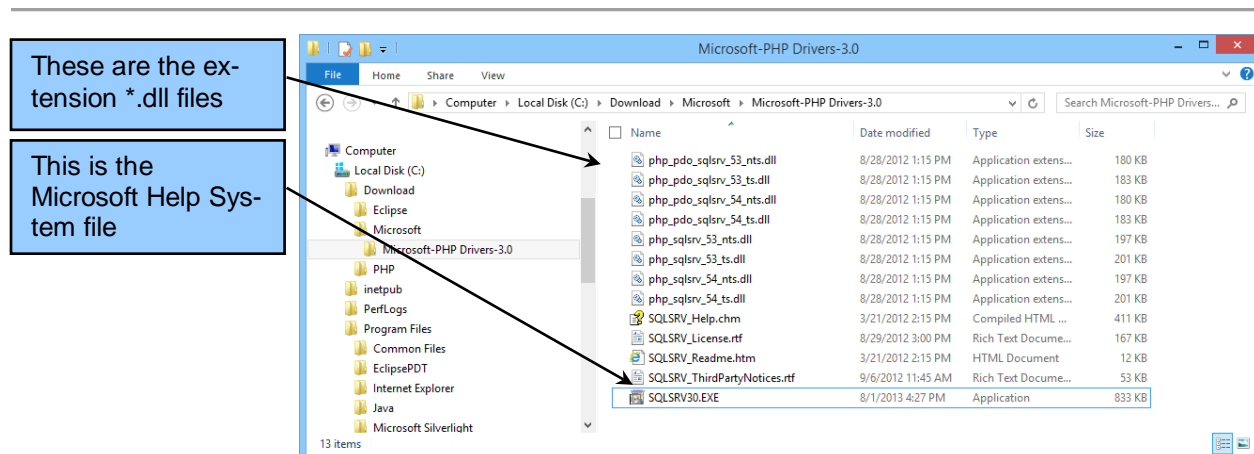

Figure I-55 — The Dynamic Extension and Help Files

Updating the PHP php.ini File:

1. Click the Windows 8 **Windows** key button, to display the Windows 8 Start window.
2. Start typing the program name **Notepad**. The Notepad app is displayed.
3. Right-click **Notepad** to display the options.
4. In options, click **Run as administrator**.
5. A User Account Control dialog box is displayed, asking if you want to allow Notepad to make changes to the computer. Click the **Yes** button. Notepad is opened.
6. In Notepad, click **File**, then click **Open** to display the Open dialog box.
7. In the Open dialog box, browse to **C:\Program Files(x86)\PHP**, change the file extensions being displayed to **All Files (*)** so that you can see all the files in the PHP folder, and then click the php.ini file to select it as shown in Figure I-56.
8. In the Open dialog box, click the **Open** button. The php.ini file is opened for editing in Notepad.
9. Scroll to the Dynamic Extensions section of the php.ini file.
10. As shown in Figure I-57, edit the file by adding the following lines:

    ```
    [PHP_SQLSRV_53_NTS]
    extension=php_sqlsrv_53_nts.dll
    [PHP_PDO_SQLSRV_53_NTS]

    extension=php_pdo_sqlsrv_53_nts.dll
    ```

11. Click **File**, then click **Save** to save the edited php.ini file.
12. Close **Notepad**.
13. Close **Windows Explorer**.
14. Close any other open programs and reboot the computer so that the new drivers are available for use.
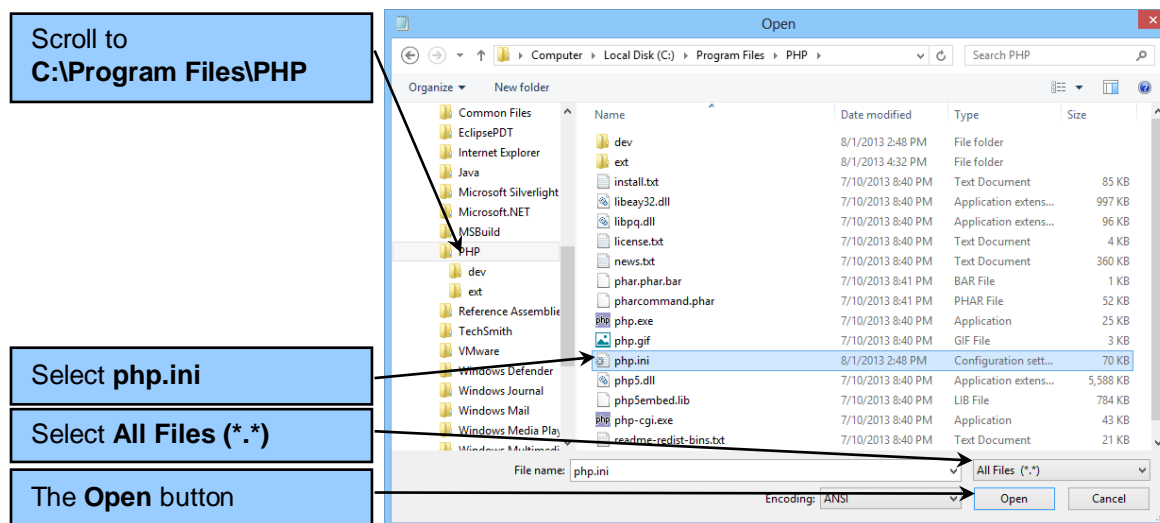
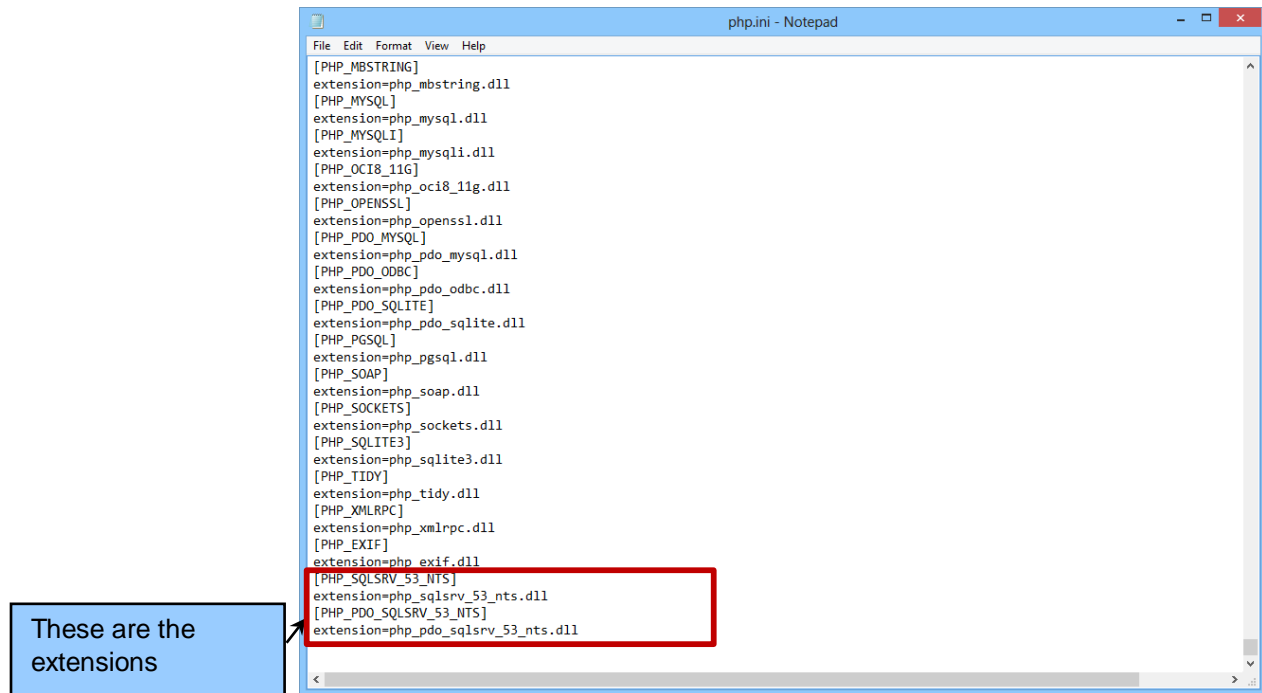**Figure I-56 — Opening the php.ini File in Notepad**

Figure I-57 — The Added Dynamic Extensions in the php.ini Configuration File

At this point, as noted in the steps above, the computer must be rebooted so that the new extensions will be enabled for use in PHP applications. In practical terms, this means that you can use the PHP programming language functionality added by these dynamic extensions in your PHP Web pages.

For example, as previously discussed, the PHP statement used in Figure 7-18 to send an SQL statement to the SQL Server database using PHP's built-in OBDC capability is:

```
// Execute SQL statement
$RecordSet = odbc_exec($Conn,$SQL);
```

If we decide to use the php_sqlsrv_53_nts.dll to add PDO capability to send the statement directly to SQL Server, the PHP statement would be:

```
// Execute SQL statement
$RecordSet = sqlsrv_query($Conn,$SQL);
```

Now you should understand the limitations of the Microsoft installer installation that we have been using, as well as know how to upgrade that installation as needed.

Key Terms

<?php and ?>	NetBeans IDE
Apache	ODBC Data Source Administrator
Download folder	Open Database Connectivity (OBDC)
http://localhost	PHP
iisstart.htm	PHP: Hypertext Processor
inetpub folder	PHP Data Objects (PDO)
Integrated Development Environment (IDE)	PHP dynamic extension *.dll files
Internet Information Services (IIS)	PHP Non-Thread-Safe Windows version for FastCGI
Internet Information Services (IIS) Manager	PHP php.ini configuration file
Java Software Development Kit (JDK)	phpinfo() command
Microsoft Drivers 3.0 for PHP for SQL Server	security permissions
Microsoft dynamic linked library	wwwroot folder
Microsoft Web Platform Installer (WPI)	

Review Questions

I.1   Why is the material in this appendix important?

I.2   What Web server is typically used with the Windows operating systems? What Web server is typically used with the Linux operating system?

I.3   Briefly describe how to install IIS on the Windows 8 operating system.

I.4   What utility is used to manage IIS?

I.5   What utility is used to manage ODBC?

I.6   How do you add a program icon to the Windows 8 Taskbar?

I.7   How is the file system that supports IIS structured?

I.8   Briefly describe how to view a Web page that has been created in the IIS Web server.

I.9   What are Windows security permissions?

I.10   Briefly describe how to manage Windows security permissions.

I.11   What is an IDE?

I.12   What is the NetBeans IDE?

I.13   What is the Java Software Development Kit (JDK)? Why is it needed for the NetBeans IDE?

I.14   Briefly describe how to install the JDK.

I.15   Briefly describe how to install the NetBeans IDE.

I.16   How do you create a workspace for files created by the NetBeans IDE? What do the authors rec-
          ommend as the name for this work space, and where should it be located?

I.17   What is PHP? Is PHP a popular Web site development language?

I.18   What are the four options for installing PHP described in this appendix? Which option do the
          authors recommend using?

I.19   Briefly describe how to install PHP.

I.20   Briefly describe how to create a PHP Web page using the NetBeans IDE.

I.21   What is the purpose of the *index.php* Web page created in this chapter?

I.22   What is the purpose of PHP dynamic extension *.dll files?

I.23   What are the *Microsoft Drivers 3.0 for PHP for SQL Server*?

I.24   Using the *Microsoft Drivers 3.0 for PHP for SQL Server* as an example, briefly describe how to in-
          stall and enable additional PHP dynamic extension *.dll files to an existing PHP installation.

Review Exercises

There are no separate exercises for this appendix—simply be sure that you completed all the steps de-
scribed in the appendix and that your Web site and PHP development environment are complete and
ready for use with Chapter 7.