



developer

// Step by step

Microsoft Visual Basic 2013

**FREE
SAMPLER**

Intermediate



Michael Halvorson

// Step by step

Your hands-on guide to Visual Basic fundamentals

Expand your expertise—and teach yourself the fundamentals of Microsoft Visual Basic 2013. If you have previous programming experience but are new to Visual Basic 2013, this tutorial delivers the step-by-step guidance and coding exercises you need to master core topics and techniques.

Discover how to:

- Master essential Visual Basic programming techniques
- Begin building apps for the Windows Store, Windows Phone 8, and ASP.NET
- Design apps using XAML markup, touch input, and live tiles
- Tackle advanced language concepts, such as polymorphism
- Manage data sources, including XML documents and web data
- Create a Windows Phone 8 app that manages key lifecycle events

Technologies Covered

- Windows 8.1
- Microsoft Visual Basic 2013
- Microsoft .NET Framework 4.5.1
- ASP.NET 4.5.1
- Windows Phone 8

About the Author

Michael Halvorson, a former Visual Basic localization manager at Microsoft, is the award-winning author of more than 35 books, including *Microsoft Visual Basic 2010 Step by Step* and *Start Here! Learn Microsoft Visual Basic 2012*.

Practice Files + Code

Available at:

http://aka.ms/VB2013_SbS/files

Microsoft Visual Basic Express 2013 is available as a free download at Microsoft.com/express. See the Introduction.

Companion eBook

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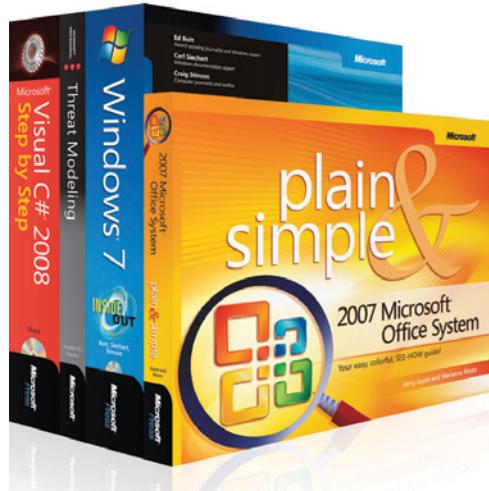
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Introduction

Microsoft Visual Basic 2013 is an important upgrade and enhancement of the popular Visual Basic programming language and compiler, a technology that enjoys an installed base of millions of programmers worldwide. Visual Basic 2013 is not a stand-alone product but a key component of Microsoft Visual Studio 2013—a comprehensive development system that allows you to create powerful applications for Microsoft Windows 8.1, the Windows desktop, the web, Windows Phone 8, and a host of other environments.

Whether you purchase one of the commercial editions of Visual Studio 2013 or you download Visual Basic Express 2013 for a free test-drive of the software, you are in for an exciting experience. The latest features of Visual Basic will increase your productivity and programming prowess, especially if you enjoy using and integrating information from databases, entertainment media, webpages, and websites. In addition, an important benefit of learning Visual Basic and the Visual Studio Integrated Development Environment (IDE) is that you can use many of the same tools to write programs for Microsoft Visual C# 2013, Microsoft Visual C++ 2013, HTML5 and JavaScript, and other popular languages.

Microsoft Visual Basic 2013 Step by Step is a comprehensive introduction to Visual Basic programming using the Visual Basic 2013 software and Windows 8.1. I've designed this practical, hands-on tutorial with a variety of skill levels in mind. In my opinion, the best way to master a complex technology like Visual Basic is to follow the premise that programmers learn by doing. Therefore, by reading this book and working through the examples, you'll learn essential programming techniques through carefully prepared tutorials that you can complete on your own schedule and at your own pace.

Although I have significant experience with college teaching and corporate project management, this book is not a dry textbook or an "A to Z" programmer's reference; instead, it is a practical hands-on programming tutorial that puts *you* in charge of your learning, developmental milestones, and achievements. By using this book, programmers who are new to this topic will learn Visual Basic software development fundamentals in the context of useful, real-world applications; and intermediate Visual Basic programmers can quickly master the essential tools and techniques offered in the Visual Basic 2013 and Windows 8.1 upgrades.

I've taken a multiplatform approach in this book, so in addition to learning Visual Basic programming skills you'll learn to create a wide variety of applications, including Windows Store apps, Windows Forms (Windows desktop) apps, console apps, web apps

(ASP.NET), and Windows Phone 8 apps. Each of these application types has a place and a purpose in real-world development.

To complement this comprehensive approach, the book is structured into 5 topically organized parts, 21 chapters, and dozens of step-by-step exercises and sample programs. By using this book, you'll quickly learn how to create professional-quality Visual Basic 2013 applications for the Windows operating system, Windows Phone 8 platform, and a variety of web browsers. You'll also have fun!

Who should read this book

This is a step-by-step programming tutorial for readers who enjoy learning to do new things by doing them. My assumption is that you already have some experience with programming, possibly even an earlier version of Visual Basic, and that you are ready to learn about the Visual Studio 2013 product in the context of building applications that you can market in the Windows Store, Windows Forms (Windows desktop) for personal and enterprise purposes, web (ASP.NET) applications that run in browsers, and apps for the Windows Phone 8 platforms.

This book's content will supply you with concrete Visual Basic coding techniques as well as a broad overview of programming strategies suitable for Visual Basic development. The book's extensive collection of step-by-step exercises has a broad focus; they are written for technical people who understand programming and are not simply targeted toward hobbyists or absolute beginners. In addition, you will learn about the capabilities of the Windows 8.1 operating system and the specific design guidelines that Microsoft recommends for Windows 8.1 and Windows Phone 8 applications.

Assumptions

This book is designed to teach readers how to use the Visual Basic programming language. You will also learn how to use the Visual Studio 2013 IDE and development tools. This book assumes no previous experience with Visual Studio 2013, but it is written for readers who understand programming and are not absolute beginners. I assume that you are familiar with programming basics or have studied some version of BASIC or Visual Basic in the past and are now ready to move beyond elementary skills to platform-specific techniques.

If you have no prior knowledge of programming or Visual Basic, you might want to fill in some of the gaps with my introduction to Visual Basic 2012 and Windows Store development, *Start Here! Learn Visual Basic 2012* (Microsoft Press, 2012). From time

to time, I will refer to the exercises in that book to give you additional resources for your learning.

Microsoft Visual Basic 2013 Step by Step also assumes that you have acquired and are running the Windows 8.1 operating system and that you want to learn how to create applications for the Windows Store platform and other environments. To make the most of your programming practice, you will need to know a little about how to perform common tasks in Windows 8.1, how to customize the Start page and user interface, how to work with information on the web, and how to adjust basic system settings. If you also have Windows 8.1 installed on a tablet or touchpad device, all the better, because a fundamental design emphasis of Windows 8.1 is to make touch and gestures a natural way to manipulate content. You can build your applications on a laptop or desktop running Visual Studio 2013 and Windows 8.1 and then test out the applications on your tablet or touchpad.

In terms of the Visual Studio software, I assume that you are using one of the full, retail versions of Visual Studio 2013, such as Visual Studio Professional, Premium, or Ultimate. This will enable you to create the full range of application types that I describe in this book, including Windows Store apps, Windows Forms (Windows desktop) apps, console apps, Web Forms (ASP.NET) apps, and Windows Phone 8 apps.

If you don't have access to a full, retail version of Visual Studio 2013, you can experiment with the Visual Studio 2013 software by downloading free versions of the suite designed for specific platforms. These limited-feature or "Express" versions of Visual Studio 2013 are called Express for Windows, Express for Windows Desktop, Express for Windows Phone, and Express for Web. The Visual Studio website (<http://www.microsoft.com/visualstudio>) provides access to the retail and Express versions of Visual Studio, and it explains the differences among all of the available versions.

Who should not read this book

You might be disappointed with this book if you are already a knowledgeable Visual Basic programmer and are just looking to explore the new features of Visual Studio 2013. The *Step By Step* series is targeted toward readers who are professional developers but who have little to no previous experience with the topic at hand. If you are an advanced Visual Basic developer, you are likely to grow weary of the step by step exercises that introduce essential features such as decision structures, XAML markup, data access strategies, or using the .NET Framework.

Developers who have a lot of experience will feel that I'm exploring the obvious—but what is obvious to experienced programmers often isn't obvious at all to someone who is learning to use a new development platform. If Windows Store or Windows Phone programming with Visual Basic is a new concept for you, this is the place to start.

Organization of this book

This book is divided into five sections, each of which focuses on a different aspect or technology within the Visual Studio software and the Visual Basic programming language. Part I, "Introduction to Visual Studio development," provides an overview of the Visual Studio 2013 IDE and its fundamental role in .NET application creation and then moves into step-by-step development walkthroughs on the Windows Store and Windows Forms (Windows desktop) platforms.

Part II, "Designing the user interface," continues the focus on application creation in the Visual Studio IDE, emphasizing the construction of Windows Store apps, Windows Forms (Windows desktop) apps, and console apps. In particular, you'll learn how to work with XAML markup, XAML styles, important controls, and new Windows 8.1 design features, including command bar, flyout, tiles on the Windows Start page, and touch input.

Part III, "Visual Basic programming techniques," covers core Visual Basic programming skills, including managing data types, using the .NET Framework, structured error handling, working with collections and generics, data management with LINQ, and fundamental object-oriented programming skills.

Part IV, "Database and web programming," introduces data management techniques in Windows desktop and Windows Store applications, including binding data to controls and working with XML documents and Microsoft Access data sources. You'll also get an overview of ASP.NET web development strategies, along with a complete walkthrough of web development on the Web Forms (ASP.NET) platform.

Finally, Part V, "Microsoft Windows Phone programming," provides an overview of the features and capabilities presented by the Windows Phone 8 platform. You'll identify key hardware characteristics in the Windows Phone ecosystem, the marketing opportunities tendered by the Windows Phone Store, and you'll create a complete Windows Phone 8 app step by step.

Finding your best starting point in this book

This book is designed to help you build skills in a number of essential areas. You can use it if you're new to programming, switching from another programming language, or upgrading from Visual Studio 2010 or Visual Basic 2012. Use the following table to find your best starting point in this book.

If you are ...	Follow these steps
New to Visual Basic programming	<ol style="list-style-type: none">1. Install the sample projects as described in the section "Installing the code samples," later in this Introduction.2. Learn essential skills for using Visual Studio and Visual Basic by working sequentially from Chapter 1 through Chapter 21.3. Use the companion book <i>Start Here! Learn Microsoft Visual Basic 2012</i> for additional instruction as your level of experience dictates.
Upgrading from Visual Basic 2010 or 2012	<ol style="list-style-type: none">1. Install the sample projects as described in the section "Installing the code samples."2. Read Chapter 1, skim Chapters 2 through 4, and complete Chapters 5 through 21.
Interested primarily in creating Windows Store apps for Windows 8.1	<ol style="list-style-type: none">1. Install the sample projects as described in the section "Installing the code samples."2. Complete Chapters 1 through 3, Chapter 5, Chapters 7 through 16, and Chapter 18.
Interested primarily in creating Windows Forms (Windows desktop) apps for Windows 8.1, Windows 8, or Windows 7	<ol style="list-style-type: none">1. Install the sample projects as described in the section "Installing the code samples."2. Complete Chapters 1 through 2, Chapter 4, Chapter 6, Chapter 10, and Chapters 11 through 17.

Conventions and features in this book

This book presents information using the following conventions designed to make the information readable and easy to follow:

- Each exercise consists of a series of tasks, presented as numbered steps (1, 2, and so on) listing each action you must take to complete the exercise.
- The names of all program elements—controls, objects, methods, functions, properties, classes, variable names, and so on—appear in *italics*.
- As you work through steps, you'll occasionally see tables with lists of properties that you'll set in Visual Studio. Text properties appear within quotes, but you don't need to type the quotes.
- Boxed elements with labels such as "Note" provide additional information or alternative methods for completing a step successfully.
- Text that you type (including some code blocks) appears in **bold**.
- A plus sign (+) between two key names means that you must press those keys at the same time. For example, "Press Alt+Tab" means that you hold down the Alt key while you press the Tab key.
- A vertical bar between two or more menu items (for example, File | Close) means that you should select the first menu or menu item, then the next, and so on.

System requirements

You will need the following hardware and software to work through the examples in this book:

- The Windows 8.1 operating system. (Depending on your Windows configuration, you might also require Local Administrator rights to install or configure Visual Studio 2013.) Note that while the full versions of Visual Studio 2013 do support earlier versions of Windows, such as Windows 8 and Windows 7 SP1, the features described in this book require Windows 8.1, and the screen shots will all show this environment.

- A full retail edition of Visual Studio 2013, required for completing all of the exercises in this book (Visual Studio 2013 Professional, Premium, or Ultimate). The Visual Studio website (<http://www.microsoft.com/visualstudio>) explains the differences among these versions. Alternatively, you can experiment with the Visual Studio 2013 software by downloading free versions of the suite designed for specific platforms. The limited-feature versions of Visual Studio 2013 are called Express for Windows, Express for Windows Desktop, Express for Windows Phone, and Express for Web. You will need to download all four of these Express versions to get the necessary software to complete the book's exercises. (However, even with these Express editions, there will be a few gaps; for example, you will be unable to complete Chapter 10, "Creating console applications.")
- An Internet connection to view Visual Studio help files, try out the Windows Store and Windows Phone Store, and download this book's sample files.
- A computer with 1.6 GHz or faster processor.
- 1 GB RAM (32-bit) or 2 GB RAM (64-bit).
- 16 GB available hard disk space (32-bit) or 20 GB (64-bit) for Windows 8.1.
- DirectX 9 graphics device with WDDM 1.0 or higher driver.
- 1024 × 768 minimum screen resolution.

If you want to use touch for user input, you'll need a multitouch-capable laptop, tablet, or display. A multitouch-capable device is optional for the exercises in this book, although one is useful if you want to understand what such devices are capable of. Typically, a programmer will develop software on a desktop or laptop computer and then test multitouch functionality on a multitouch-capable device.

Although this book develops applications for Windows Phone 8, a Windows Phone is not required to complete the book's step-by-step exercises.

Code samples

Most of the chapters in this book include step-by-step exercises that let you interactively try out new material learned in the main text. All sample projects can be downloaded from the following page:

http://aka.ms/VB2013_SBS/files

Follow the instructions to download the Visual_Basic_2013_SBS_Sample_Code.zip file.

Installing the code samples

Follow these steps to install the code samples on your computer so that you can use them with the exercises in this book:

1. Unzip the Visual_Basic_2013_SBS_Sample_Code.zip file that you downloaded from the book's website. (Name a specific directory along with directions to create it, if necessary.) I recommend My Documents\Visual Basic 2013 SBS for the files.
2. If prompted, review the displayed end user license agreement. If you accept the terms, select the accept option, and then click Next.

Using the code samples

The code samples .zip file for this book creates a folder named Visual Basic 2013 SBS that contains 19 subfolders—one for each of the chapters in the book that have exercises. To find the examples associated with a particular chapter, open the appropriate chapter folder. You'll find the examples for that chapter in separate subfolders. The subfolder names have the same names as the examples in the book. For example, you'll find an example called Music Trivia in the My Documents\Visual Basic 2013 SBS\Chapter 02 folder on your hard drive. If your system is configured to display file extensions of the Visual Basic project files, look for .sln as the file extension. Depending on how your system is configured, you might see a Documents folder rather than a My Documents folder.

Acknowledgments

This book is a very substantial revision of an earlier Visual Basic Step by Step book published by Microsoft Press. In fact, in almost every way, it is an entirely new book, and it is the first programming title that I have written specifically to be a multiplatform guidebook, covering Visual Basic development on the Windows Store, Windows Forms, Web Forms, and Windows Phone platforms. I am very grateful to the many talented programmers and editors who offered their ideas and contributions to this volume.

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Finally, I offer thanks and admiration to my immediate family for their continued support of my writing projects and various academic pursuits. Once again I was able to involve my son, Henry Halvorson, with the creation of electronic music and artwork, and his contributions appear in Chapters 3, 4, 5, and 9.

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Visual Basic 2013 development opportunities and the Windows Store

After completing this chapter, you will be able to

- Describe the development opportunities provided by Microsoft Visual Basic 2013.
- Understand requirements for distributing applications in the Windows Store.

Are you ready to start working with Microsoft Visual Basic 2013? In this chapter, you'll get an overview of the features and capabilities of the Microsoft Visual Studio 2013 development system and the different editions of Visual Studio that you can purchase or download for *free*. You'll learn about emerging hardware and software platforms and their uses and the impressive range of applications that you can create for these platforms, including Windows Store apps for Windows 8.1; Windows desktop apps for Windows 7, Windows 8, and Windows 8.1; Windows Phone 8 apps; web apps; console apps; and much more.

You'll also learn about the Windows Store, an exciting new distribution point for apps designed especially for Windows 8.1. You'll review a checklist of planning tasks to consider before you begin building a Windows Store application, and you'll learn the procedures for selling and distributing apps through the Windows Store. After you have a clear list of the Windows Store requirements and program features in mind, you'll be ready to build your own programs, including Windows Store apps that you can distribute to millions of potential customers worldwide.

Before we begin, a word about terminology. This book has been designed and tested using the Windows 8.1 operating system. The Windows Store apps that you create will run under Windows 8.1 and will target the .NET Framework version 4.5.1. You will also learn to create Visual Basic programs using the Windows Forms and console app models, which run on what is now known as the "Windows desktop." These types of apps will run under Windows 8.1, Windows 8, Windows 7, and earlier versions of Windows, provided that the Windows installation has the proper .NET Framework files installed.

Yet another type of application you will create in this book, using Visual Studio and a technology called ASP.NET, are Web Forms apps. These apps run in a web browser, such as Internet Explorer. Finally, you'll create mobile phone apps during the course of this book, using Visual Studio and the Windows Phone SDK 8.0. These apps run on the Windows Phone 8 platform.

Visual Basic 2013 products and opportunities

I'm going to assume that you have purchased this book because you want to learn how to program in Visual Basic. In fact, my underlying assumption is that you might already have some development experience—perhaps even with an earlier version of Visual Basic—and that you are ready to learn about the Visual Studio 2013 product in the context of the Windows Store, Windows Forms, Windows Phone, and Web Forms platforms. Enhancing your Visual Basic development skills is an excellent choice; there are over four million Visual Basic programmers in the world developing innovative solutions, and Microsoft's newest operating system, Windows 8.1, presents many amazing opportunities for Visual Basic programmers.

"Visual Basic" essentially has two meanings in the software development marketplace. In a narrower engineering sense, Visual Basic is the name of a programming language with specific syntax rules and logical procedures that must be followed when a developer creates code for a compiler with the goal of making an executable program or *application*. However, Visual Basic is also used in a more comprehensive product-related sense to describe the collection of tools and techniques that developers use to build Windows-based applications with a particular software suite. In the past, developers could purchase a stand-alone version of Visual Basic, such as Microsoft Visual Basic .NET 2003 Professional Edition, but these days Visual Basic is sold only as a component within the Visual Studio software suite, which also includes Microsoft Visual C#, Microsoft Visual C++, and other development tools.

The Visual Studio 2013 development suite is distributed in several different product configurations, including Professional, Premium, and Ultimate, along with a subset of Visual Studio tools designed for test engineers, known as Visual Studio 2013 Test Professional. In addition to these retail products, you can experiment with the Visual Studio 2013 software by downloading free versions of the suite designed for specific development platforms. These limited-feature or "Express" versions of Visual Studio 2013 are called Express for Windows, Express for Windows Desktop, Express for Windows Phone, and Express for Web.

The full retail versions of Visual Studio 2013 have different prices and feature sets, with Ultimate being the most comprehensive (and expensive) development package. The Visual Studio website (<http://www.microsoft.com/visualstudio>) explains the differences among all of these versions. Typically, the full retail versions of Visual Studio are also available for a 30-day free trial period that can be extended to 90 days. These trial versions are more feature-rich than the Express products. In addition, the faculty, staff, and students of recognized academic institutions can download full editions of Visual Studio 2013 through the Microsoft DreamSpark program, and these free downloads don't expire.

I wrote this book to highlight the features and development opportunities provided by Visual Studio 2013 Professional and Visual Studio 2013 Premium. If you are using Visual Studio Ultimate, you will also have what you need to complete the exercises in this book—and then some. The extra features included in Visual Studio Ultimate primarily relate to larger team development projects and enterprise-computing scenarios that go beyond the scope of this book.

You can also complete most of the exercises in this book if you install *all four* of the Express editions of Visual Studio 2013, and then switch among them as directed. (That is, you can complete most of the exercises in this book if you install Visual Studio 2013 Express for Windows, Visual Studio 2013 Express for Windows Desktop, Visual Studio 2013 Express for Web, and Visual Studio 2013 Express for Windows Phone 8.) I will let you know which Express product is necessary for each chapter and when the individual Express products have limitations that will restrict your ability to compete the exercises. Occasionally, the instructions in this book will apply only to the full retail editions of Visual Studio 2013, such as Chapter 10, "Creating console applications."

Collectively, the chapters in this volume are designed to open up an exciting new world of technical and business opportunities to Visual Basic 2013 programmers. The book's extensive collection of step-by-step exercises has a broad focus, and they are written for technical people who understand programming and are not simply hobbyists or absolute beginners. In short, the exercises in this book will give you a taste of real-world programming practices and experiences. If you have no prior knowledge of Visual Basic or Visual Studio, you might want to fill in some of the gaps with my comprehensive introduction to Visual Basic 2012 and Windows 8 development, *Start Here! Learn Visual Basic 2012* (Microsoft Press, 2012). From time to time, I will refer to the exercises in that book to give you additional resources for your learning.

An impressive range of development opportunities and platforms

How has Visual Basic programming evolved over time, and what opportunities are available now to Visual Basic 2013 programmers? Before we start writing code, let's briefly examine some of the recent trends in software development and Windows programming.

Microsoft released Visual Basic 1.0 in 1991. From its initial announcement at Windows World, the product impressed software developers because it innovatively combined an advanced Visual Basic language compiler with an Integrated Development Environment (IDE) that allowed programmers to build Windows applications by visually arranging controls on a Windows form and then customizing the controls with property settings and Visual Basic code. From these modest beginnings, Visual Basic grew into a powerful development tool that was closely aligned with Windows programming, capable of creating fast and efficient Windows-based applications that could run on a variety of hardware platforms.

In the early 2000s, Visual Basic programmers were concerned primarily with creating applications for Windows that helped businesses manage data effectively. Visual Basic's ability to graphically display information and provide access to it with powerful user interface controls gained many supporters for the product, and the installed base grew into the millions. Over the past decade, the leading Visual Basic applications have been database front-ends, inventory management systems, web applications and utilities, purchasing tools, CAD programs, scientific applications, and games.

However, in the 2010s, the explosion of Internet connectivity and online commerce has dramatically changed the landscape for software developers. In the past, most applications for Windows ran on a server or a desktop PC. Today, laptops, tablet devices, and smartphones are everywhere, and

often the same person owns three or four device types. Consumers need to move applications and information seamlessly across these devices, and software developers need the tools that will allow them to create applications that work on multiple platforms or that can be ported easily from one device to the next.

The Visual Studio 2013 product team took the challenge of coding for diverse platforms seriously, and they have created a software suite that allows developers to leverage their existing work while also letting them target a variety of different application models. The following list highlights the major development platforms and opportunities for Visual Basic programmers (some of which are supported only by the full retail versions of Visual Studio 2013):

- **Windows 8.1** Visual Basic developers can create Windows Store apps for Windows 8.1 that run on a wide range of devices, including desktop PCs, laptops, and Microsoft Surface tablets. (Note: To create new Windows Store apps for Windows 8, you need to use Microsoft Visual Studio 2012.)
- **Windows 8, Windows 7, and Windows Server** Visual Basic developers can create desktop applications for earlier versions of Windows and distribute them in a variety of ways. You can create desktop applications using the Windows Forms ("Win forms") model or the Windows Presentation Foundation (WPF) model.
- **Windows Phone 8** Using Visual Studio 2013, Visual Basic programmers can create applications that run on the Windows Phone 8 platform and take advantage of its unique features. You will learn to write mobile phone apps for Windows Phone devices in Chapter 20, "Introduction to Windows Phone 8 development," and Chapter 21, "Creating your first Windows Phone 8 application."
- **Web development** Developers can use Visual Basic, HTML5, CSS3, or JavaScript to create applications that will run on the web and look great in a variety of browsers. A technology known as ASP.NET allows Visual Basic programmers to build websites, web applications, and web services quickly without knowing all the details about how the information will be stored on the web. The full list of options is explored in Chapter 19, "Visual Studio web development with ASP.NET."
- **Console applications and device drivers** Visual Basic programmers can write applications that run in command-line mode, which is sometimes called the Windows text console or DOS window. While console apps primarily handle "behind the scenes" calculations, they can also use libraries in the .NET Framework. I describe console programming in Chapter 10.
- **Office applications** Visual Basic programmers can still build macros and other tools that enhance the functionality of Microsoft Office applications, such as Excel, Word, Access, and PowerPoint.
- **Xbox 360** Visual Basic programmers can write games for the Xbox using Visual Studio and Microsoft XNA Game Studio (version 4.0 and later).
- **Windows Azure applications for web servers and the cloud** Visual Basic is powerful enough to write applications that will be used on sophisticated web servers, distributed data centers, and a version of Windows designed for cloud computing known as Windows Azure.

This is an amazing list of application types! Although this list might seem daunting at first, the good news is that the fundamental Visual Basic programming skills that you will explore here remain the same from platform to platform, and there are numerous tools and techniques that help you to port work easily between them. This book provides a solid introduction to many of the core skills that you will use, and especially the new tools provided by Visual Studio 2013 to help you develop your solution for Windows 8.1, the Windows desktop, and Windows Phone 8. However, after you master the core Visual Basic programming skills, you can move on to specific platforms by acquiring materials specifically related to those markets.

Taking a multiplatform approach to learning Visual Basic

As you have probably discovered by now, applications for Windows 8.1 are often called Windows Store apps. Yes, the connection between Windows 8.1 and the Windows Store is *that* direct. However, Microsoft understands that not all developers are prepared to write applications *only* for Windows 8.1 because developers still need to support earlier versions of Windows, and many developers are designing apps for web browsers, which must be run on a variety of platforms. For this reason, I am describing Visual Basic programming techniques for a wide range of programming platforms in this book. You will learn how to create Windows Store apps, Windows desktop apps, console apps, Web apps, and Windows Phone apps.

In some cases, I will discuss Visual Basic programming techniques related to a specific platform in a chapter, such as Chapter 3, “Creating your first Windows Store application.” In other cases, I move back and forth between the platforms, showing how the Visual Basic language, or Visual Studio features related to different platforms, might be adapted to unique situations. An example of this approach is Chapter 14, “Using arrays, collections, and generics to manage data,” in which I provide data management instruction using examples from both the Windows Store and the Windows desktop (Windows Forms) platforms.

I have taken this comprehensive approach in *Microsoft Visual Basic 2013 Step by Step* because Visual Studio 2013 Professional has been designed to support all of these application types. The current reality is that Visual Basic programming is a multiplatform endeavor, and intermediate Visual Basic programmers need exposure to many environments as they expand and enhance their development skills. At the same time, Windows Store programming is quite new, so I spend a little more time exploring this platform than the others.

Evaluating the Windows Store

Because the Windows Store provides a new and potentially profitable way of selling and distributing apps to a wide audience, I want to begin this book with a description of what the Windows Store is and how you can use it to reach potential customers. In addition to providing a strong *business* incentive to developing Windows Store apps, I want you to become familiar with the technical requirements of the Windows Store before you begin this type of development so that you know what you will need to do before you get too far along in a big Windows Store project. Microsoft recommends this “up-front education” too, because teams that are creating apps for the Windows Store can be most productive when they know all the certification requirements in advance.

What is the Windows Store?

The Windows Store is an electronic marketplace that allows consumers to search for and acquire applications for Windows. The Windows Store is designed to distribute apps for Windows 8 and Windows 8.1, much like Apple’s Mac App Store allows consumers to download Mac software, and the Windows Phone Store allows consumers to download products for devices running Windows Phone 8.



Note The Windows Phone Store is described in detail in Chapter 20.

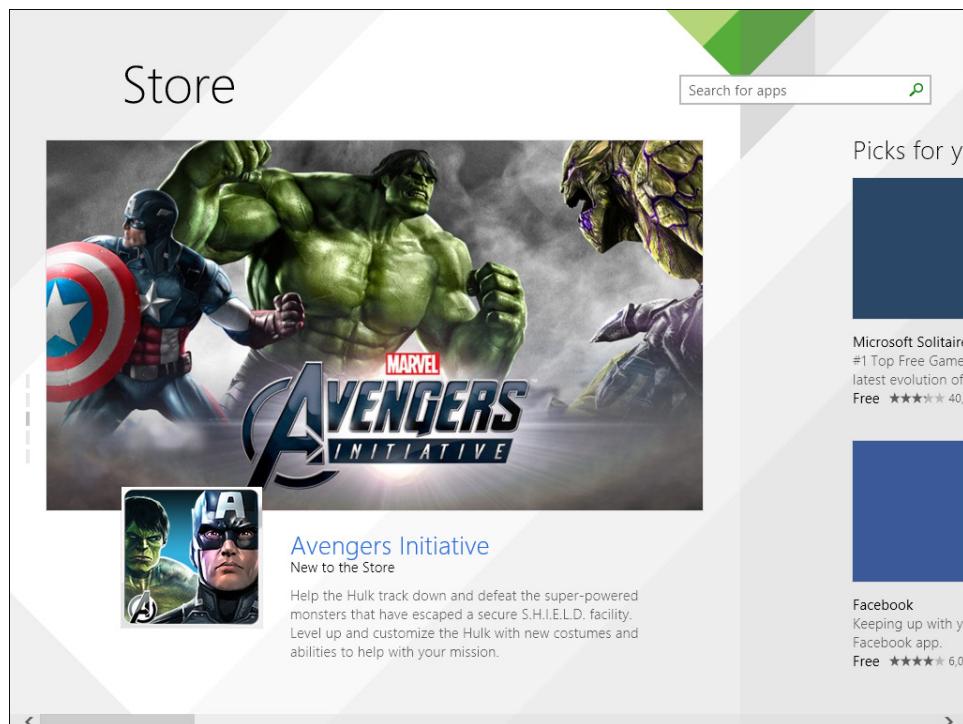
The Windows Store allows developers to reach a global marketplace in ways that have been difficult or impossible in the past. Through the Windows Store, Windows-based apps can be monetized, either by charging for an application or by including advertising in the application. Programs downloaded from the Windows Store are certified and ready to run; after you meet the requirements for preparing an app for the marketplace, the details about downloading and deploying the application are handled by the Store.

Throughout this book, you will learn how to create apps to run on Windows 8.1 by using Visual Basic and Visual Studio 2013. At this point, you just need to learn how products are bought and sold in the Windows Store, and to review a Windows Store checklist that identifies which features are necessary for certification and distribution to the global marketplace.

Accessing the Windows Store

If you are running Windows 8.1 on your computer, you will see a Windows Store tile on the Windows Start page, which is the gateway to accessing the Windows Store. If you are not currently running Windows 8.1, you can learn *about* the Windows Store at <http://www.windowsstore.com/>, but you won't be able to access the Windows Store itself, because it is designed for use only within Windows 8.1.

The following illustration shows what the Windows Store looks like when you first access it. Because the list of featured products is always changing, your screen will look different.



If you right-click in the Windows Store, you'll see a navigation pane that allows you to browse for the top paid and the top new Windows Store apps. In addition, you'll see useful product categories, such as Games, Social, Entertainment, Photo, Music & Video, Sports, and Books & Reference. When you select a category and an item, you'll see an app listing page similar to the following screen:



The app listing page is the place where software vendors get a chance to promote their products and describe app benefits. It is tremendously important to present your app in the best possible light here. The application name, description, feature list, age rating, price, and screen shots are all significant factors in making a good impression on your audience. As people purchase or download your app, the rating system (based on five possible stars for the highest level of customer satisfaction) is also an important factor in drawing people to your app.

Installing an app from the Windows Store is extremely simple; you just click the Install button, and within moments, the app will be deployed on your Start page and available for use. A reliable Internet connection is required to download the app and (often) to feed the app data as the program runs.

Sales information and price tiers

Windows-based apps can be distributed free via the Windows Store, or they can be sold for a price. A setting called a *price tier* sets the fee for the app that you plan to sell. You can set the price tier that you like; tiers start at 1.49 USD and move up in increments of 0.50 USD to 4.99 USD, with higher product prices available.

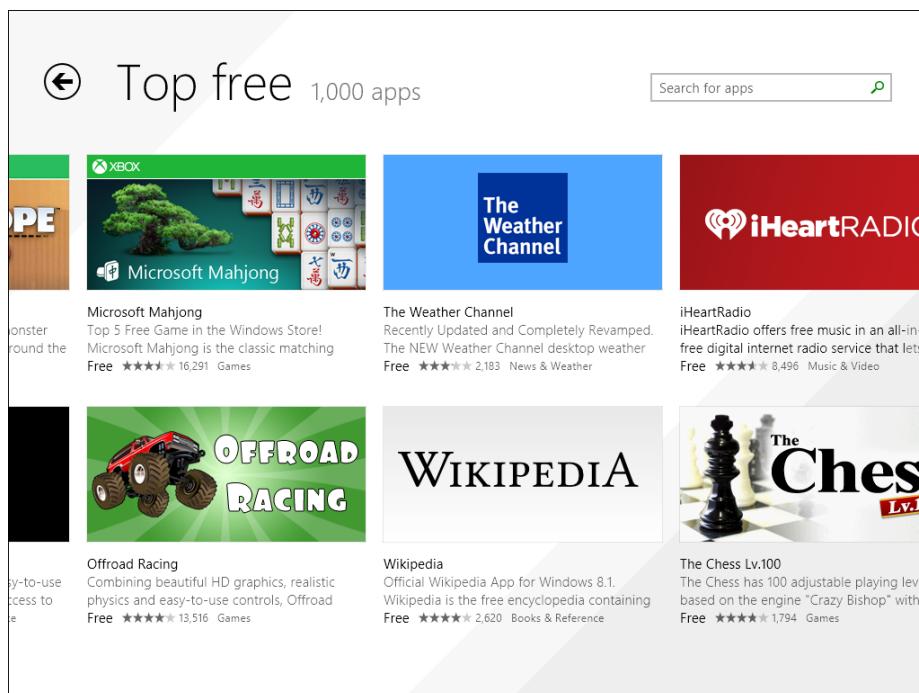
If you plan to sell apps via the Windows Store, it is important to understand a little about how that process might work, even before you begin development. For the first 25,000 USD of an app's sales, you will receive 70% of the revenues that Microsoft receives for the product. If and when an application receives more than 25,000 USD in sales, you will receive 80% of the revenues over 25,000 USD. Keep in mind that your product will be sold internationally, and in some countries, the amount that Microsoft receives will be reduced to account for taxes required by local laws.

It is also required that you register to be a Windows Store developer before you can sell products through Microsoft's new electronic marketplace. The initial annual cost for a developer account in the United States was 49 USD for an individual and 99 USD for a company. You will also need to complete some registration paperwork containing contact information and other details.

Or your application could be free...

Of course, it is not necessary that you sell your application. You can also offer it as a free download to users all over the world. This might be useful if you want to provide general information or a public service or if you want to draw attention to your company or make its products or services more usable. For example, you might want to create a Windows Store app that presents the menu and other services provided by a restaurant, or publish news highlights and photos from an information service.

Within these free applications, you could then decide to use online advertising tools to generate revenue, or you could simply distribute information and know that you had fostered communication about your product throughout the world. The Windows Store has a special marketing category for free apps, as shown in the following illustration:

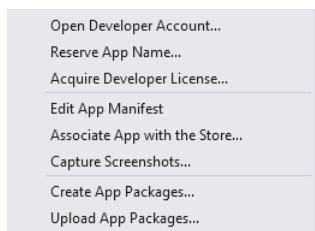


Whether you sell or distribute your app for free is up to you and the needs of your business and your customers!

Planning ahead for certification

Before you begin serious development on your project, Microsoft recommends that you review the certification requirements carefully for Windows Store apps so that you aren't surprised by the necessary steps. For the most part, these steps are simply good development practices that will make your programs robust and high quality. Microsoft is enforcing high standards so that customers come to trust the Windows Store and all of the software distributed through it. We all have a lot riding on the success of the Windows Store.

The Visual Studio Professional IDE contains a Store submenu on the Project menu, with eight commands pertaining to the Windows Store, as shown in the following illustration:



Before you begin serious development on a project that you intend to submit to the Windows Store, you should run the first three commands on the Windows Store submenu. The Open Developer Account command will get you signed up with Microsoft as an individual or a company. This enables the submission process and allows you to get more information. The Reserve App Name command lets you reserve a name for your application within the store. You want to do this before you get too far along (and then learn that you need to change the name). The Acquire Developer License command lets you get a temporary developer license, which you might have already done during your work in Visual Studio.

A helpful blog for developers preparing for the Windows Store is available at <http://blogs.windows.com/windows/b/appbuilder/>. Here you'll find Microsoft employees and other industry experts explaining key application concepts and answering pertinent questions. For example, in addition to the Windows Store checklist shown in Table 1-1 in this chapter, you'll need to fill out a complete package manifest for your project and practice other safe programming practices. You can also find useful information in the MSDN article "Take your app to market" at <http://msdn.microsoft.com/en-us/library/windows/apps/br230836.aspx>.

Windows Store requirements checklist

The formal certification process begins when you upload your app to the Windows Store. Table 1-1 contains a checklist recommended by Microsoft for developers who are creating apps for the Store. Most of these items are required for certification and will be evaluated when you register with Microsoft and fill out the required submission pages online. The certification requirements can be

updated periodically, but this checklist will help you get started. The point is that you need to do some preparation before you get online and submit your app for certification. You should have the necessary information ready, and be sure that it has been proofread carefully.

TABLE 1-1 Windows Store submission checklist

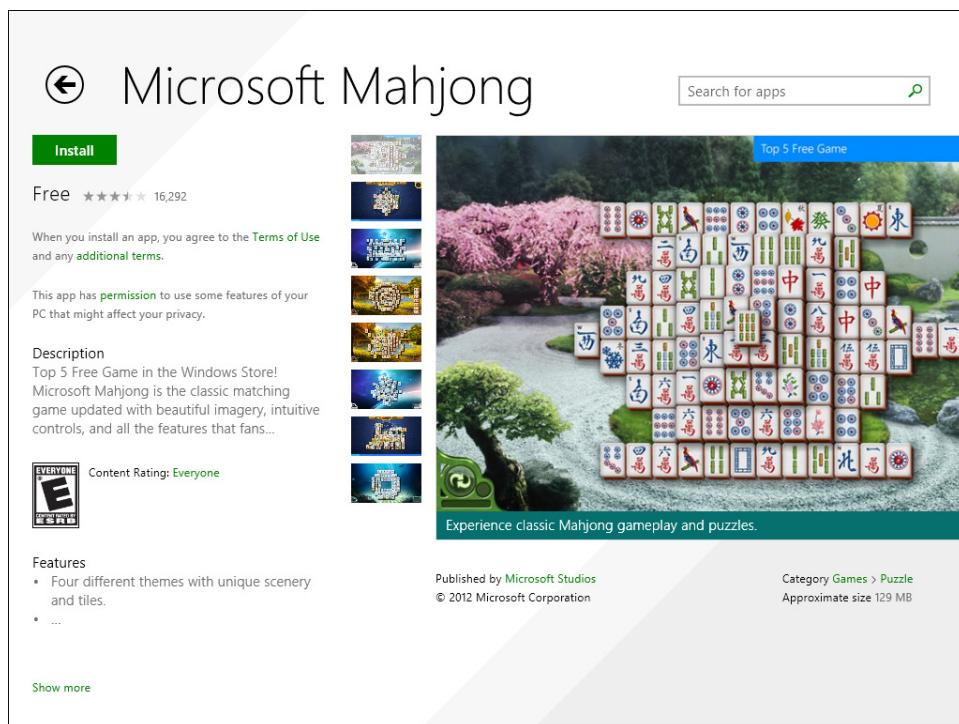
Submission page	Field name	Description
Name	App Name	Provide a name for your app that is 256 characters or less. Pick a name that will capture your customers' attention. It is best to keep this name short.
Selling Details	Price Tier	Prepare to specify a selling price for your app (or set the price to "free").
	Free Trial Period	Allow your customer to download the app for a free trial period. If the customer does not buy it in the set period of time, it will stop working.
	Countries/Regions	Identify the market for your product.
	Release Date	Set the app's release date.
	Category	Assign a category for your app so that customers can find it in the Windows Store. There is a helpful list of predefined categories to choose from.
	Accessible App	If your app has been designed to meet Microsoft's accessibility guidelines, indicate that here.
	Minimum DirectX Feature Level	Indicate the video and hardware requirements for your application.
	Minimum System RAM	Indicate how much RAM your app requires. You might want to double-check the basic system requirements for the devices that your app will run on.
Advanced Features	In-App Offers	Provide information about products that users can purchase from within your app, including what the customer must pay and how long the purchased feature can be used.
Ratings	Age Rating	Specify an appropriate age rating for your app, using the levels provided.
	Rating Certificates	If you are selling a game, you might need to provide a rating certificate from a ratings board, depending on where you plan to sell your app.
Cryptography	Question 1	Indicate whether your app makes use of cryptography or encryption.
	Question 2	Verify that any use of cryptography is within the allowable limits imposed by the Bureau of Industry and Security in the United States Department of Commerce.
Packages	Package Upload Control	Provide the path to your app's completed package.

Submission page	Field name	Description
Description	Description	Provide clear and concise marketing copy that describes your application, its features, and its benefits. Review this information carefully before posting. It must be 10,000 characters or less.
	App Features	(Optional) Provide up to 20 features of your app. (Each feature must be 200 characters or fewer.)
	Keywords	(Optional) Provide up to seven concise keywords describing your app.
	Description of Update	Provide a description of how this new version of your app updates the previous version. (Leave blank for the first release of your app.)
	Copyright and Trademark Info	Provide a brief copyright notice, 200 characters or fewer.
	Additional License Items	(Optional) Provide 10,000 characters or fewer.
	Screenshots	Up to 8 quality screen shots of your app as it is running. Each can have a description of up to 200 words. The minimum size of the image must be 1366 x 766 pixels. You can capture these screens using the Store Capture Screenshots command in Visual Studio.
	Promotional Images	(Optional) Provide other promotional images for your app (up to four).
	Recommended Hardware	(Optional) Provide up to 11 notes about the hardware requirements for your app.
	App Website	Provide the website URL for your product.
	Support Contact	Provide a contact URL for customers so that they can get support or ask additional questions. Prepare to be very responsive to customer questions and feedback.
	Privacy Policy	Prepare an appropriate statement about your privacy policy regarding data collected about users.
	In-App Offer Description	Provide information about products that users can purchase from within your app, including what the customer must pay and how long the purchased feature can be used. (This field was indicated above as well. Use the same information.)
Notes to Testers	Notes	Give the evaluators at Microsoft additional information about your app so that they can test its functionality. For example, describe hidden features or provide user name and password information if needed.

It's all in the details

The value of the preceding checklist becomes apparent when you look again at the content for Windows Store apps within the Windows Store. The more you know about your customers and your product's central features before you get started, the easier it will be to make design and layout decisions as you create your application. In the following screen illustration, notice how important the ratings, description, and features categories are for the featured app, as well as the value of the screenshot that visually describes the product.

The Details page (not shown, but accessible via the Details link) presents additional information, including release notes, supported processors, supported languages, and application permissions. The Reviews page (also not shown) contains comments from actual customers.



Now that you have reviewed the basic marketing and distribution mechanisms for apps in the Windows Store, it is time to get started building Visual Basic apps in Visual Studio. Although many of the apps that you will create in this book will be demonstration programs designed to teach discrete elements of the Visual Basic programming language, you should always keep an eye on the end-goal of your learning—creating software that other people can *use*.

Summary

Each chapter in this book concludes with a Summary section that offers a review of what the chapter has presented. You can use these sections to quickly recap what you have learned in each chapter before you move on to the one that follows.

This chapter has introduced development opportunities for Visual Basic programmers, including the many opportunities available to users of Visual Studio 2013. You've learned about the application types that you can create with Visual Studio 2013 and about the specific tools and platforms that are described by this book. You've also learned about the Windows Store, an incredible distribution point and marketing opportunity for software developers who want to sell or freely distribute their products. You've learned how the Windows Store operates and about some of the requirements you'll need to satisfy to distribute apps for Windows 8.1 via the Windows Store. Although the process will require some up-front planning, as well as technical and marketing expertise, the upside is significant. The Windows Store has the potential to reach millions of customers worldwide.

In Chapter 2, "The Visual Studio Integrated Development Environment," you'll explore the Visual Studio 2013 IDE, including how to run and test Visual Basic programs, how to use the development tools in the IDE, and how to adjust important compiler settings.

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