Microsoft

start here!

Build Windows 8 Apps with HTML5 and JavaScript

Beginner

Dino Esposito
Francesco Esposito

Ready to learn Windows 8 programming?

start here!™

Learn the fundamentals of Windows 8 programming—and begin creating apps for desktops, laptops, tablets, and other devices. If you have previous experience with HTML5 and JavaScript—simply start here! This book introduces must-know concepts and getting-started techniques through easy-to-follow explanations, examples, and exercises.

Here's where you start learning Windows 8 app development

- Build on your knowledge of HTML5, CSS, and JavaScript
- Create photo and media galleries with built-in HTML widgets
- Interact with the system through live tiles, contracts, and view state detection
- Store and access data on the local device and via the Internet
- Access webcam, GPS, and other sensors embedded in the device
- Create your first programs and publish them to the Windows Store

Download HTML5 and JavaScript code samples at:

http://aka.ms/SH_W8AppsHTML5JS/files

Build Windows 8 Apps with HTML5 and JavaScript

About You

SKILL LEVEL: Some experience required
PREREQUISITES: Beginner-level HTML5 and JavaScript skills

About the Authors

Dino Esposito, CTO of a software and mobile services company, has written a dozen Microsoft Press books, including *Architecting Mobile Solutions for the Enterprise*.

Francesco Esposito, 15 years old, already has significant experience developing mobile applications for Windows Phone, Android, iOS, and BlackBerry.

microsoft.com/mspress

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To Michela and Silvia, who are stronger and smarter than they think.

—Dino

To Grandma Concetta, for providing free calories through amazing quantities of unbeatable homemade prosciutto.

—Francesco

Contents at a glance

Contents

Introduction

For years, programming has been the nearly exclusive domain of people that others typically thought of as super-experts, gurus, or geniuses. The advent of mobile programming, however, changed things a bit because the idea of programming for these devices regained its appeal for youngsters. Today, a teenager appearing suddenly in the spotlight due to his or her ability to build a cool Android or iPhone app is not uncommon. There are a few reasons why this is happening, and why it's happening now.

One reason is certainly that today's teenagers are the first generation of digital natives. You're far more likely to find a few programmers among this group than among the members of previous generations. Another reason is that mobile apps are much easier to write than any other type of modern software. Mobile apps are small pieces of code built around a smart idea. It's one thing to build a mobile app, and quite another to plan and maintain a multitiered enterprise system.

Being mobile added a new dimension to software development. In this context, Windows Phone is not simply yet another mobile platform to code for; It is by far the simplest (and even most pleasant) platform to code for, regardless of background. This makes coding for Windows Phone an excellent way to get started with programming. This is particularly true for the smart kids who constantly hunger after new technology and seek emotional gratification in that technology. I've seen this happen with my 14-year-old son, Francesco—who is the effective coauthor of this book.

Microsoft Windows 8 takes the "programming with pleasure" approach one step further. With Windows 8, you can not only build mobile apps for tablets, but also build standalone applications for yourself, either for fun or to help automate some of the repetitive tasks of everyday life. Windows 8, with its overall simplicity, brings back a dimension of craftsmanship in applications that went missing as the complexity of software architectures and websites increased over the past decade or so. On one hand, Windows 8 is a powerful client front end for rich and sophisticated middleware; on the other, it is simple enough for nearly everybody to program via HTML5 and JavaScript.

This book is intended as a quick (but juicy) beginner's guide for getting started crafting Windows 8 applications, and how to publish and sell them through the Windows Store. The key point of this book is to make it clear that if you have a good idea and are a quick learner, you can create a Windows 8 app regardless of your age or programming background. You'll see how to write functional applications for the new Microsoft operating system and have them run on desktop computers, as well as tablets. As evidence, consider that Francesco is a teenager—and he wrote most of the examples and a few chapters of this book.

After completing the book, you won't be a super-expert, but you'll surely know enough to start writing your own apps, at least for fun.

Who should read this book

This book is a beginner's guide to Windows 8 programming using web technologies, such as HTML5 and JavaScript. But the scope of the word "beginner" needs some further explanation. One definition of a beginner, in a programming sense, is a person who has never learned any serious programming. While this book does target such beginners, it does require some minimal background knowledge about HTML5, JavaScript, and some familiarity with basic concepts of logic and formalism, such as *IF*, *WHILE*, and assignments. Another definition of a beginner, however, would include people who have never learned Windows programming, or people who perhaps wrote COBOL for decades—or even perhaps a person who built and maintained a Visual Basic 6 application for the past 15 years. While this book can also be useful for those more experienced "beginners," people with serious programming experience are not the target audience for this book.

This book attempts to provide a smooth approach to key topics of Windows 8 programming. If you are primarily interested in Windows 8 and are new to Windows Phone, Microsoft Silverlight, or even single-page applications, then you should definitely consider getting this book.

Who should not read this book

This book won't make you a top-notch Windows 8 developer. If you have some solid experience with Windows 8, with Windows Phone or Silverlight, or with other programming languages, then you might want to try another, more advanced book instead, or just rely on online MSDN documentation or StackOverflow links. You should be a true Windows 8 beginner to enjoy this book.

Organization of this book

This book is divided into three sections. Chapters 1-5 cover the basics of acquiring and using Microsoft Visual Studio 2012 Express and also provide a summary of what you need to know about HTML, CSS, and JavaScript. Chapters 6-11 deal with programming Windows 8 apps and cover the foundation of Windows 8 programming while providing step-by-step exercises that help you understand and deal with the user interface of Windows 8 apps, graphics, video, data storage, and Internet calls. Finally, Chapters 12-14 focus on advanced Windows 8 programming, with an emphasis on working with device sensors and accessories (such as printers, GPS, webcams, and so forth), interacting with the system (Live tiles), and publishing your completed application.

Finding your best starting point in this book

Overall, the scenarios for using this book are quite simple. We recommend you read it cover to cover, because it is designed to guide you through the key topics you need to know to program Windows 8 with HTML5 and JavaScript. However, if you already have a solid grasp of the technologies used in this book—Visual Studio 2012 Express, HTML5, CSS, and JavaScript—you may be able to skip Chapters 1-4 without compromising your understanding of the rest of the book.

Conventions and features in this book

This book presents information using 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.
- Boxed elements with labels such as “Note” provide additional information or alternative methods for completing a step successfully.
- Text that you type (apart from 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 (such as, 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 set up yourself on the various mobile platforms and compile the sample code:

- A PC equipped with Windows 8 and Visual Studio 2012 Express for Windows 8.

Code samples

Most of the chapters in this book are built around exercises that are reflected in the sample code for the chapter. All sample projects in their finalized form can be downloaded from the following page:

http://aka.ms/SH_W8AppsHTML5JS/files

Follow the instructions to download the starthere-buildapps-winjs-sources.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 starthere-buildapps-winjs-sources.zip file that you downloaded from the book's website (name a specific directory along with directions to create it, if necessary).
2. If prompted, review the displayed end user license agreement. If you accept the terms, select the accept option, and then click Next.

Note If the license agreement doesn't appear, you can access it from the same webpage from which you downloaded the starthere-buildapps-winjs-sources.zip file.

Errata and book support

We've made every effort to ensure the accuracy of this book and its companion content. Any errors that have been reported since this book was published are listed on our Microsoft Press site:

http://aka.ms/SH_W8AppsHTML5JS/errata

If you find an error that is not already listed, you can report it to us through the same page.

If you need additional support, email Microsoft Press Book Support at *mspinput@microsoft.com*.

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The survey is short, and we read every one of your comments and ideas. Thanks in advance for your input!

Stay in touch

Let's keep the conversation going! We're on Twitter: *http://twitter.com/MicrosoftPress*

Acknowledgements

Dino:

I'll be honest: **Russell Jones**, my editor at O'Reilly Media, convinced me to try this project. If the book is in your hands, both some of the good and some of the bad are on him! When Russell first mentioned this book, when it was still just an idea, I first declined, making the point that I have never written a book for beginners.

But then my son, Francesco (proud and efficient coauthor), made me look at the subject from a different perspective. It was one of those powerful forms of lateral thinking that only young people can sometimes contribute. Francesco said something like, "Dad, I don't think you only admit experts to your software design or ASP.NET MVC classes. If I were a true expert, I'd probably rarely take a class; if I need a class it is because I want someone to show me the way slowly and effectively. If I decide to invest money on a class it is because I feel somehow that I'm a beginner. Why should this be different for a book?"

That message hit home; I found that to be a valuable bit of wisdom; even coming from a 14-year-old boy.

So with that change of heart, I embarked enthusiastically on this project and asked Francesco to cooperate, because he was perfect for testing the material—essentially eating the dog food we were cooking up! Francesco did a truly fantastic job. At one point, I was on a plane about to leave and talking on the phone, giving suggestions on how to improve the gallery of photos and the downloading of JSON data from Flickr. From the outside, that phone call was nothing more than a classic business phone call—the last-minute kind you make just moments before the plane leaves the gate. But I was talking to my son! And, more importantly, he had diligently accomplished all the tasks by the time I got back. Thank you, Francesco!

Francesco:

I love technology and love the Microsoft software platform and tooling. In the beginning, for me, writing the book was primarily a way to get my hands on a Surface device. In the end, though, I spent most of the time working with the simulator and a secondary laptop.

Dad told me that exploring a technology near its birth is usually quite difficult, because you can't always rely on documentation or good examples being available. Frankly, to me that just sounded like one of those excuses that parents trot out when they're unable to do something themselves. Not knowing it might be hard, I just rolled up my sleeves and worked out some examples. And in doing so, I also was able to contribute a list of points for Dad to expand on. I'm not sure this project would have been as pleasant for Dad without my help.

Working on the book was mostly fun, but I do recognize that this book is an important achievement for me. I know I'll feel better if I can share this moment with some people who make my life happier: my mom, my sister, Michela, my friends Francesco and Mattia, and all my waterpolo teammates at UISP Monterotondo. I love you all!

PS: Michela, do you remember that Christmas of 2009 when I was really giving you a hard time and in order to "save" you, Dad decided to initiate (or actually initialize?) me to programming?

Chapter 1

Using Visual Studio 2012 Express edition for Windows 8

Differences of habit and language are nothing at all if our aims are identical.

— *J. K. Rowling,* Harry Potter and the Goblet of Fire

Microsoft Windows 8 marks the debut of a significantly revised runtime platform—the Windows RunTime (WinRT) platform. Like the .NET platform, WinRT supports several programming languages. You will find a pleasant surprise (and an old acquaintance) side by side with the popular .NET languages (such as, C#, Visual Basic, C++, F#)—the JavaScript language.

Note You may not even recall that a decade ago, when Microsoft first shipped the .NET Framework, developers were also given a chance to write applications using an adapted version of JavaScript called JScript .NET. It was not exactly a success; indeed, today you won't even find JScript .NET supported in Visual Studio—the premiere development environment for .NET code. Ten years ago, JavaScript was probably close to the bottom of its popularity. JScript .NET was a dialect of the standard JavaScript, and using JScript .NET didn't mean you could use HTML and CSS to shape up the user interface of the resulting application. This is different in Windows 8.

Building Windows 8 applications with JavaScript means that you define the layout of the user interface with HTML and add style and graphics using CSS. As for the application's logic, you use the standard JavaScript language enriched by any JavaScript libraries you wish (such as the common jQuery library), while you access WinRT system classes using an ad hoc Microsoft-created JavaScript wrapper—the WinJs library.

If you already know a bit of JavaScript development, building Windows 8 applications will not be a huge, new type of adventure. If you are not already a JavaScript developer, the JavaScript route probably represents the shortest path for learning to build Windows 8 applications.

This chapter sets up the preliminary aspects of such a learning path and discusses what you need to install—specifically Windows 8 and Microsoft Visual Studio—and how to configure the environment. In the next chapters you'll first see a summary of HTML (in particular, the latest version of HTML, known as HTML5), CSS, and JavaScript, and then attack the task of building Windows 8 applications with topics more specifically related to Windows 8 programming.

Important If you are already familiar with HTML5, CSS, and JavaScript, you might want to start directly with Chapter 5. If not, at the very minimum I recommend you look carefully at Chapters 2, 3, and 4. Better yet, I suggest you look into specific books for HTML5 and JavaScript, as the chapters you find here represent about 10 percent of the content you would find in a dedicated book. You might want to explore other books in this Microsoft Press series that address these topics directly: *Start Here! Learn HTML5* by Faithe Wempen (Microsoft Press, 2012) and *Start Here! Learn JavaScript* by Steve Suehring (Microsoft Press, 2012).

Getting ready for development

So you want to start building applications for Windows 8 using HTML, CSS, and JavaScript. First, you need to make sure that some software is properly installed on your development machine. The following section discusses the details.

The software you need

As obvious as it may sound, you need to have Windows 8 installed to develop, test, and run Windows 8 applications. The easiest way to develop and test applications for Windows 8 is by using the current version of Visual Studio—Visual Studio 2012.

There are various editions of both Windows 8 and Visual Studio 2012, but for the purposes of this book, you'll need at least the minimal versions of each product: Windows 8 Basic edition and the free Visual Studio 2012 Express edition for Windows 8 applications.

Installing Windows 8

Having a machine equipped with Windows 8 is a fundamental prerequisite to working through the information and exercises in this book. Windows 8 comes in a few flavors, as detailed in Table 1-1.

TABLE 1-1 Windows 8 editions

Version	Description
Windows 8	The Basic edition of Windows 8 is available for both the x86 and x86-64 architecture. It provides a new Start screen and redesigned user interface, live tiles, Internet Explorer 10, and more.
Windows 8 Pro	This edition offers additional features such as booting from VHD and support for virtualization via Hyper-V.
Windows 8 Enterprise	This edition adds IT-related capabilities such AppLocker and Windows-To-Go (booting and running from a USB drive). This version also supports installation of internally developed applications from locations other than the Windows Store.
Windows 8 RT	Only available pre-installed on ARM-based tablets, it also natively includes touch-optimized versions of main Office 2013 applications.

If you don't have your copy of Windows 8 already, you can get a free 90-day trial version from the following location: *http://msdn.microsoft.com/en-us/evalcenter/jj554510.aspx*. Note that this link gets you a non-upgradeable copy of Windows 8 Enterprise. Before you embark on the download, consider that because it is a few gigabytes in size, it may not be quick!

Installing Visual Studio Express

Once you have Windows 8 installed, you can proceed to download Visual Studio 2012 Express edition. (Note that in the rest of the chapter—and the entire book—we'll be using the term *Visual Studio* or *Visual Studio 2012* often just to mean the Visual Studio 2012 Express edition.) As shown in Table 1-2, Visual Studio is available in different flavors.

TABLE 1-2 Visual Studio 2012 editions

Version	Description
Ultimate	The feature-complete version of Visual Studio 2012, offering the top-quality support for every feature.
Premium	Lacks some extensions in the area of modeling, debugging, and testing.
Professional	Lacks even more functionalities in the area of modeling, debugging, and testing but still offers a great environment to write and test code.
Express	Free but basic version of Visual Studio 2012 optimized for specific development scenarios. In particular, it is available for building web applications or Windows 8 applications.

You can read more about and compare Visual Studio features at the following page: *http://www.microsoft.com/visualstudio/11/en-us/products/compare*.

To start downloading Visual Studio Express for Windows 8, go to the Dev Center for Windows 8 applications at *http://msdn.microsoft.com/en-us/windows/apps* (see Figure 1-1).

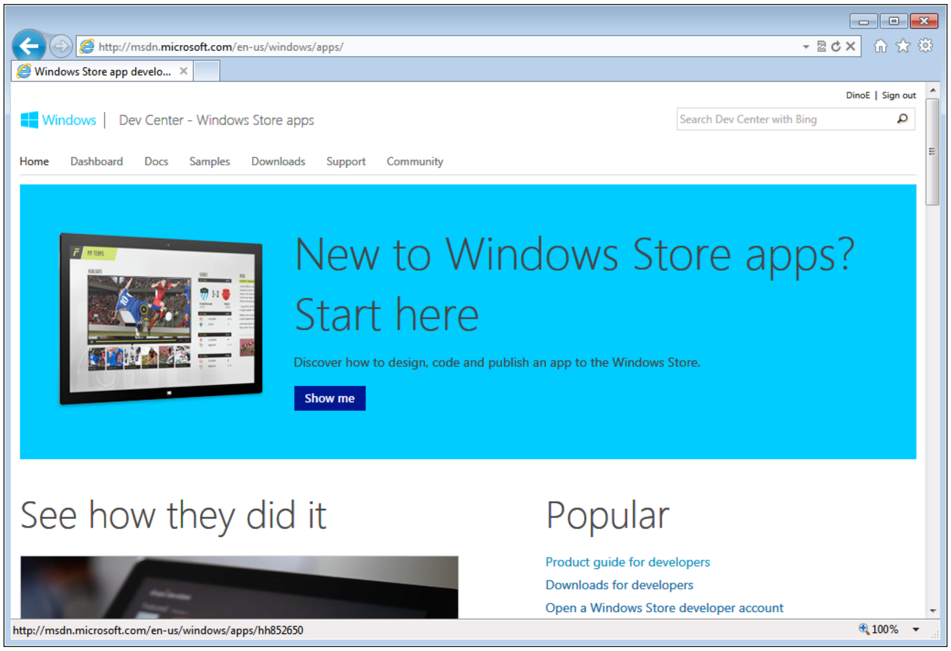
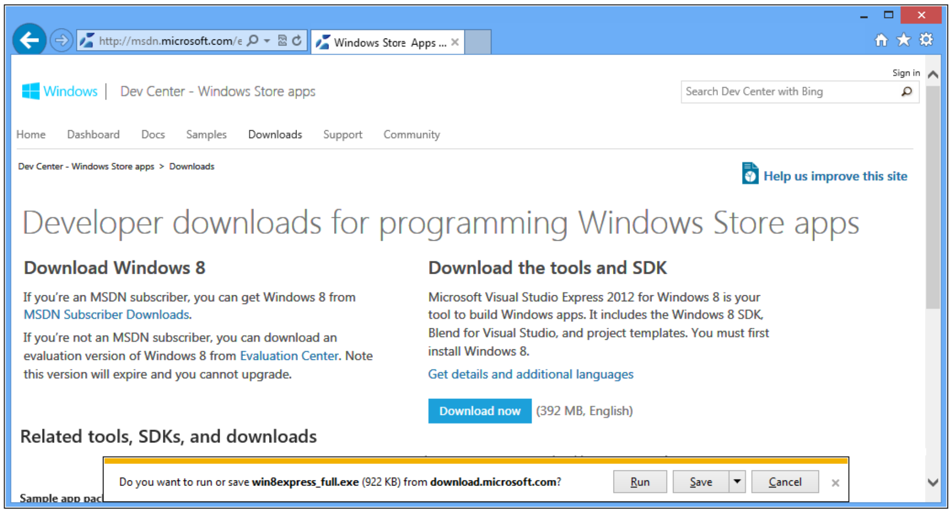

http://msdn.microsoft.com/en-us/windows/apps/
Windows Store app develo...
DinoE | Sign out
Windows | Dev Center - Windows Store apps
Search Dev Center with Bing
Home Dashboard Docs Samples Downloads Support Community
New to Windows Store apps? Start here
Discover how to design, code and publish an app to the Windows Store.
Show me
See how they did it
Popular
Product guide for developers
Downloads for developers
Open a Windows Store developer account
http://msdn.microsoft.com/en-us/windows/apps/hh852650
100%

FIGURE 1-1 The home page of the Dev Center for Windows 8 applications.

After clicking the link to download the tools and Software Development Kit (SDK), you will be sent to another page where you can finally start the download process, as shown in Figure 1-2.


http://msdn.microsoft.com/e
Windows Store Apps ...
Sign in
Windows | Dev Center - Windows Store apps
Search Dev Center with Bing
Home Dashboard Docs Samples Downloads Support Community
Dev Center - Windows Store apps > Downloads
Help us improve this site

Developer downloads for programming Windows Store apps

Download Windows 8

If you're an MSDN subscriber, you can get Windows 8 from MSDN Subscriber Downloads.

If you're not an MSDN subscriber, you can download an evaluation version of Windows 8 from Evaluation Center. Note this version will expire and you cannot upgrade.

Download the tools and SDK

Microsoft Visual Studio Express 2012 for Windows 8 is your tool to build Windows apps. It includes the Windows 8 SDK, Blend for Visual Studio, and project templates. You must first install Windows 8.

Get details and additional languages

Download now (392 MB, English)

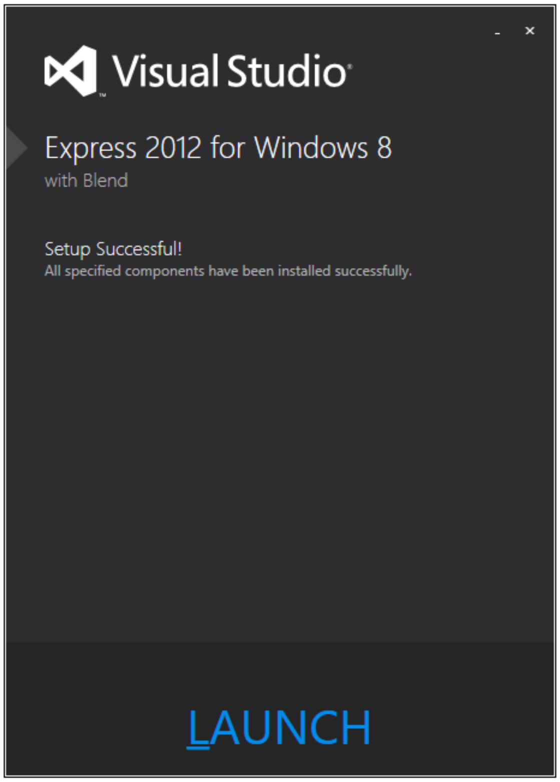
Related tools, SDKs, and downloads

Do you want to run or save win8express_full.exe (922 KB) from download.microsoft.com?

FIGURE 1-2 Downloading the tools for Windows 8 application programming.

Note that you can choose to save the setup program to your local disk or you can run it directly. If you plan to reuse the program on different machines, it could be useful to save it to a known location first.

At various times during the setup, you'll be prompted to accept or modify options. For the purposes of this book, you can simply accept all the default options. The default setup installs the newest .NET Framework 4.5, the Windows 8 SDK, plus a bunch of other tools and project templates. At the end of the installation, if everything worked just fine, you should expect to see the screen reproduced in Figure 1-3. In the unfortunate case in which the software doesn't install correctly, you will get a message with some helpful directions. Please follow them carefully.



Setup Successful!
All specified components have been installed successfully.

FIGURE 1-3 Visual Studio 2012 is ready to launch.

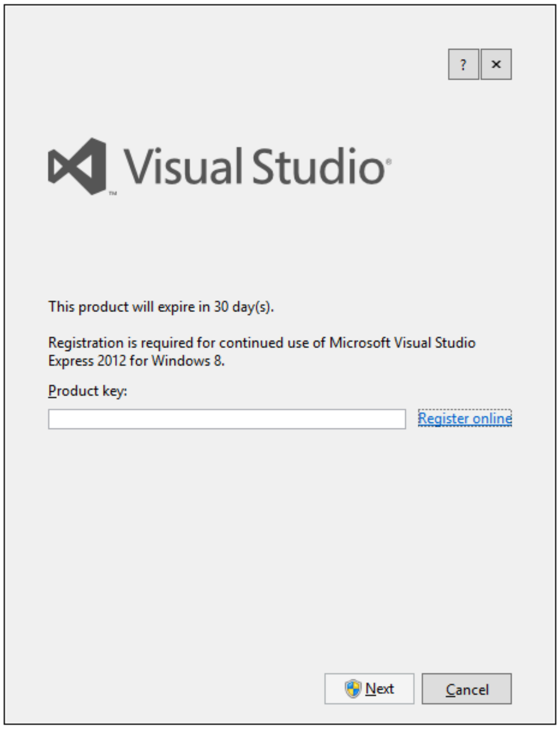
Now you're ready for some real fun: launching and configuring Visual Studio for your first Windows 8 application!

Configuring Visual Studio 2012

After completing the setup, Visual Studio 2012 Express requires a couple of more steps before it is ready to run.

Getting a product key

Upon launching for the first time, Visual Studio 2012 requires that you activate your copy. This happens through a screen like the one shown in Figure 1-4.



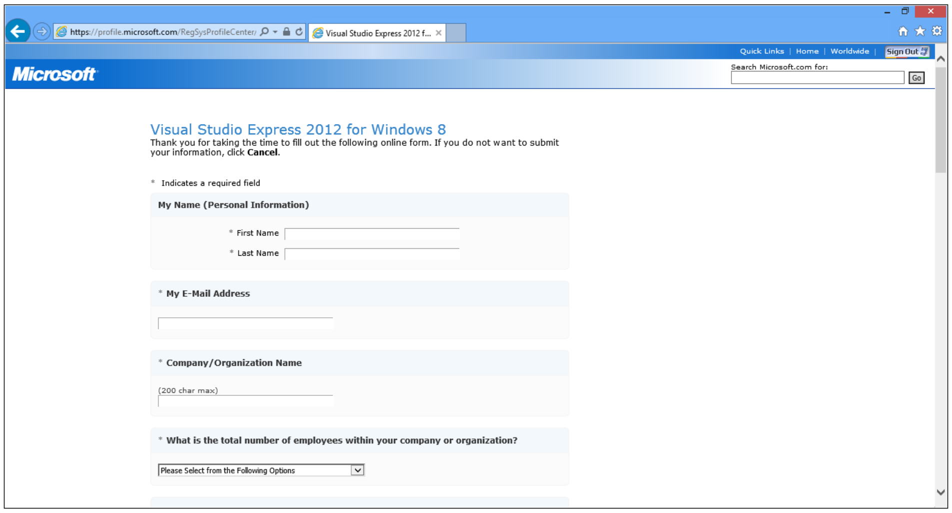
This product will expire in 30 day(s).

Registration is required for continued use of Microsoft Visual Studio Express 2012 for Windows 8.

Product key:

FIGURE 1-4 Product key required for Visual Studio 2012 Express.

Clicking the "Register online" link takes you to a page where you can insert your name, email address, and company details (see Figure 1-5).



https://profile.microsoft.com/RegSysProfileCenter/

Visual Studio Express 2012 for Windows 8

Thank you for taking the time to fill out the following online form. If you do not want to submit your information, click **Cancel**.

* Indicates a required field

My Name (Personal Information)

* First Name

* Last Name

* **My E-Mail Address**

* **Company/Organization Name**

(200 char max)

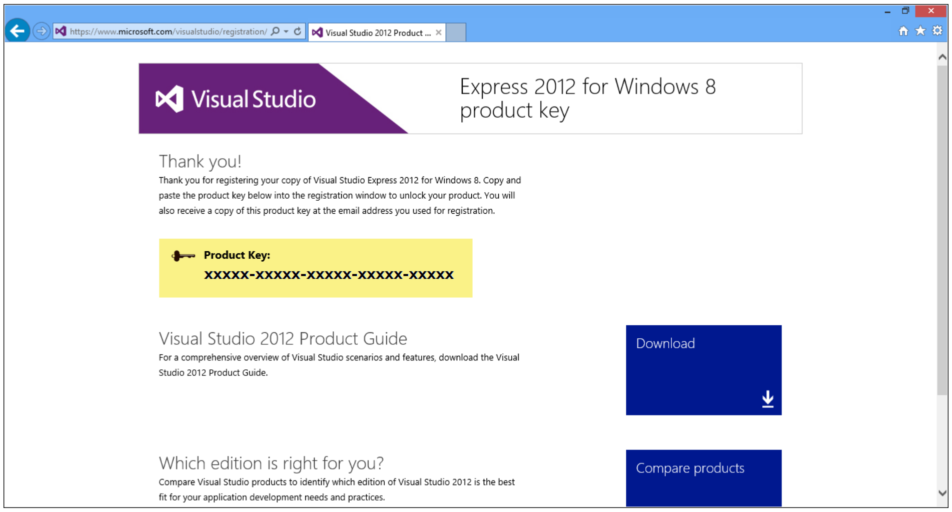
* **What is the total number of employees within your company or organization?**

Please Select from the Following Options

Visual Studio Express 2012 f...
Quick Links | Home | Worldwide | Sign Out
Microsoft
Search Microsoft.com for:
Go

FIGURE 1-5 Registration required for Visual Studio 2012 Express.

You then submit the form. You'll receive an email containing the product key to unlock the current version of Visual Studio (see Figure 1-6).


https://www.microsoft.com/visualstudio/registration/

Visual Studio 2012 Product ...

Visual Studio

Express 2012 for Windows 8 product key

Thank you!

Thank you for registering your copy of Visual Studio Express 2012 for Windows 8. Copy and paste the product key below into the registration window to unlock your product. You will also receive a copy of this product key at the email address you used for registration.

Product Key:
XXXXX-XXXXX-XXXXX-XXXXX-XXXXX

Visual Studio 2012 Product Guide

For a comprehensive overview of Visual Studio scenarios and features, download the Visual Studio 2012 Product Guide.

Download

Which edition is right for you?

Compare Visual Studio products to identify which edition of Visual Studio 2012 is the best fit for your application development needs and practices.

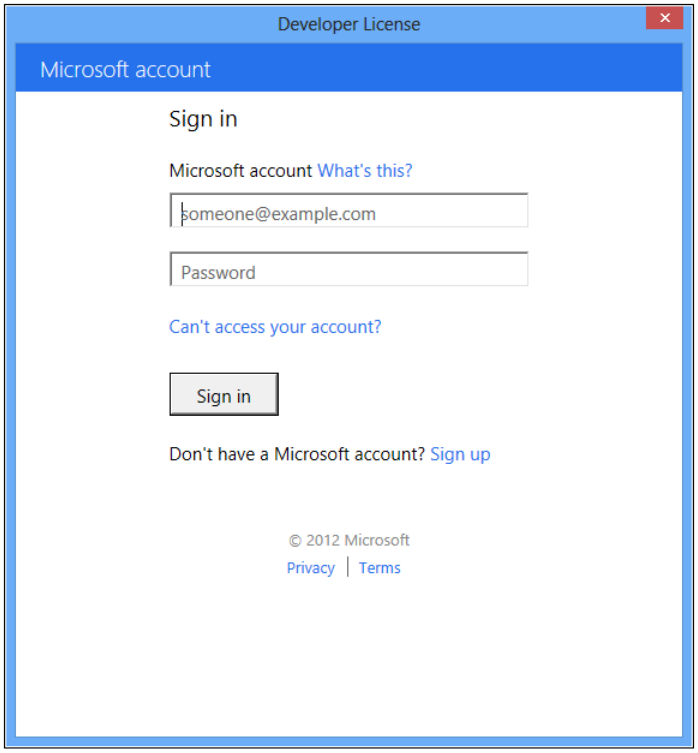
Compare products

FIGURE 1-6 Product key retrieval for Visual Studio 2012 Express.

It usually takes only a few seconds to receive an email from Microsoft to your specified address. The email contains the product key as text; copy it to the clipboard and switch back to Visual Studio. In the same window you saw in Figure 1-4, paste the product key you just received.

Creating a developer account

To write and test Windows 8 applications, you need a developer license from Microsoft. The license is free and entitles you to be a registered Microsoft developer. Getting such a license requires only that you sign in using your Windows Live ID, as shown in Figure 1-7. (If you don't have a Windows Live ID, the dialog box that prompts you to enter it provides a quick "Sign Up" link.)


Developer License

Microsoft account

Sign in

Microsoft account What's this?

someone@example.com

Password

Can't access your account?

Sign in

Don't have a Microsoft account? Sign up

© 2012 Microsoft

Privacy | Terms

FIGURE 1-7 Creating your developer account.

A developer license successfully installed on a machine enables you to freely create and run Windows 8 applications outside the official Windows Store.

Note A Windows 8 machine can install only *certified applications*, either downloaded from the Windows Store (in much the same way in which it works for Windows Phone applications), or created by registered developers on a "signed" machine, so you'll need the developer license to complete the examples in this book.

You won't receive any further warning from the system until the developer license expires or you remove it from the machine. If your license expires, you can renew it directly from the Visual Studio environment. To renew a license, users of Visual Studio Express click the Store menu and then select Acquire Developer License, as shown in Figure 1-8.

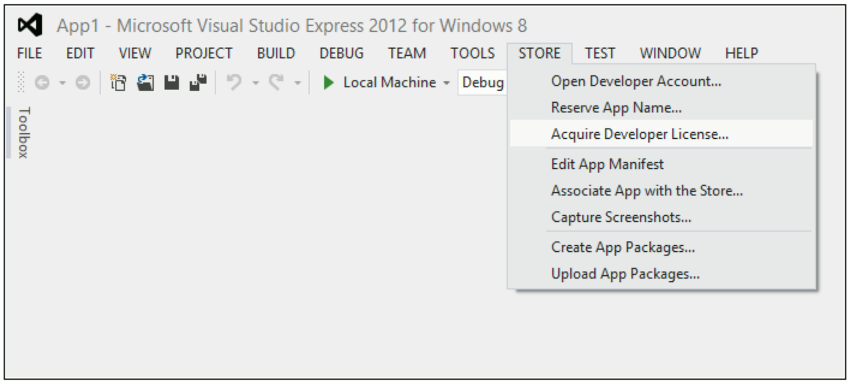

App1 - Microsoft Visual Studio Express 2012 for Windows 8
FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS STORE TEST WINDOW HELP
Local Machine
Debug
Toolbox
Open Developer Account...
Reserve App Name...
Acquire Developer License...
Edit App Manifest
Associate App with the Store...
Capture Screenshots...
Create App Packages...
Upload App Packages...

FIGURE 1-8 Renewing your developer license.

You can get as many developer licenses as you need, provided that you have a Windows Live ID account.

Windows Store account

Getting a developer license for Windows 8 is only the first mandatory step in developing and testing Windows 8 applications. Armed solely with a developer account, you can't publish a Windows 8 application to the Windows Store for others to download and install.

There's no direct relationship between developer accounts and Windows Store accounts. Each plays a specific role and you can get one without having the other. However, if you own a Windows Store account and then qualify for a developer license, then the default expiration of your developer license is automatically set to a longer time.

The point to remember here is that before you can publish your Windows 8 application to the Windows Store, you need to get a Windows Store account. You'll see how to obtain a Windows Store account later, in Chapter 14.

Important As a developer and user of a Windows 8 system, keep in mind that your machine can only run Windows 8 applications that have been downloaded from the Windows Store or custom applications for which a developer license has been installed on the machine. Another scenario enables you to host custom applications—when those applications have been "sideloaded" onto the machine by your organization, which in turn holds an enterprise store account.

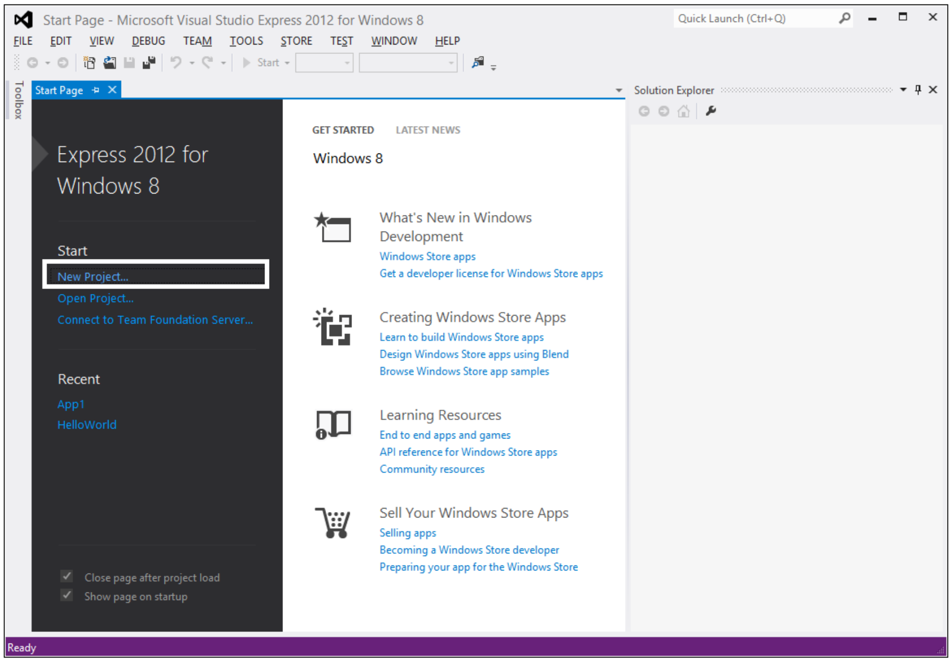
Start playing with Windows 8 apps

With a developer license installed on your Windows 8 machine, you're now ready to play with Windows 8 applications. When you are about to create a brand new project, you must first choose a project template and a programming language. After you do that, Visual Studio provides some help by generating some vanilla code appropriate to that template and language that you can customize and extend.

For the purposes of this book, your programming language of choice is JavaScript. It's worth remembering, though, that you could use other languages, such as C#, Visual Basic, and even C++.

The "Hello Windows 8" application

Without further ado, launch Visual Studio and discover what it takes to create a new project. It couldn't be simpler, actually; from the start page, you just click the New Project link, as shown in Figure 1-9.

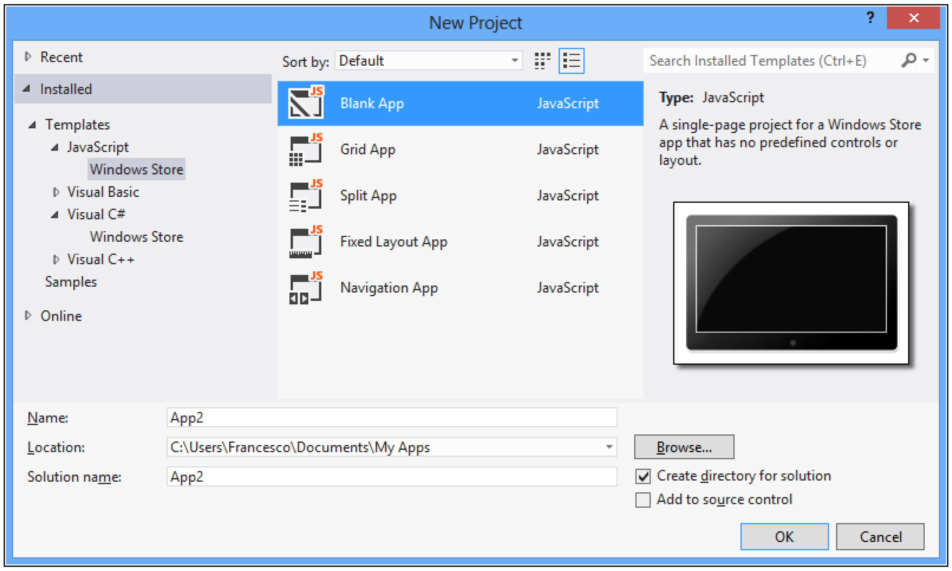


Start Page - Microsoft Visual Studio Express 2012 for Windows 8
Quick Launch (Ctrl+Q)
FILE EDIT VIEW DEBUG TEAM TOOLS STORE TEST WINDOW HELP
Start
Toolbox
Start Page
Solution Explorer
Express 2012 for Windows 8
Start
New Project...
Open Project...
Connect to Team Foundation Server...
Recent
App1
HelloWorld
Close page after project load
Show page on startup
GET STARTED
LATEST NEWS
Windows 8
What's New in Windows Development
Windows Store apps
Get a developer license for Windows Store apps
Creating Windows Store Apps
Learn to build Windows Store apps
Design Windows Store apps using Blend
Browse Windows Store app samples
Learning Resources
End to end apps and games
API reference for Windows Store apps
Community resources
Sell Your Windows Store Apps
Selling apps
Becoming a Windows Store developer
Preparing your app for the Windows Store
Ready

FIGURE 1-9 Creating a new project.

Choosing a project template

Visual Studio offers a few predefined templates for your new project, but choosing the project template only appears to be an easy task. It requires that you have a reasonably clear idea of the final result you want to achieve. The template you truly want to use depends on the interaction model you have in mind, the graphics, and the content you need to work on. Figure 1-10 shows the New Project window you will see after electing to create a new project.



Type: JavaScript

A single-page project for a Windows Store app that has no predefined controls or layout.

Name: App2

Location: C:\Users\Francesco\Documents\My Apps

Solution name: App2

[✓] Create directory for solution

[ ] Add to source control

FIGURE 1-10 Choosing a project template.

Templates are grouped by programming language. In the Express edition of Visual Studio considered here, you can create just one type of application—a Windows 8 application for the Windows Store. If you acquire a more advanced edition of Visual Studio, you should expect to see more options available, including web, console, and desktop applications.

So how do you decide which template to use?

Templates have the primary purpose of saving you some work, at least for common application layouts. You are not forced to pick up a specific template, however. If none of the predefined templates seems to be right for you or, more likely, if you don't know exactly which one to pick, then you just select the template for a blank application. Table 1-3 provides more information on the predefined templates for JavaScript.

TABLE 1-3 Predefined project templates for Windows Store applications

Template	Description
Blank App	The application consists of a single and nearly empty page: no visual controls, no widgets, and no layout defined.
Grid App	A master-detail application made of three pages. The master page groups items in a grid. Additional pages provide details on groups and individual items.
Split App	A two-page master-detail application in which the master page shows selectable items and the details page lists related items alongside.
Fixed Layout App	A single-page application whose layout scales using a fixed aspect ratio.
Navigation App	A multipage application with predefined controls to navigate between pages.

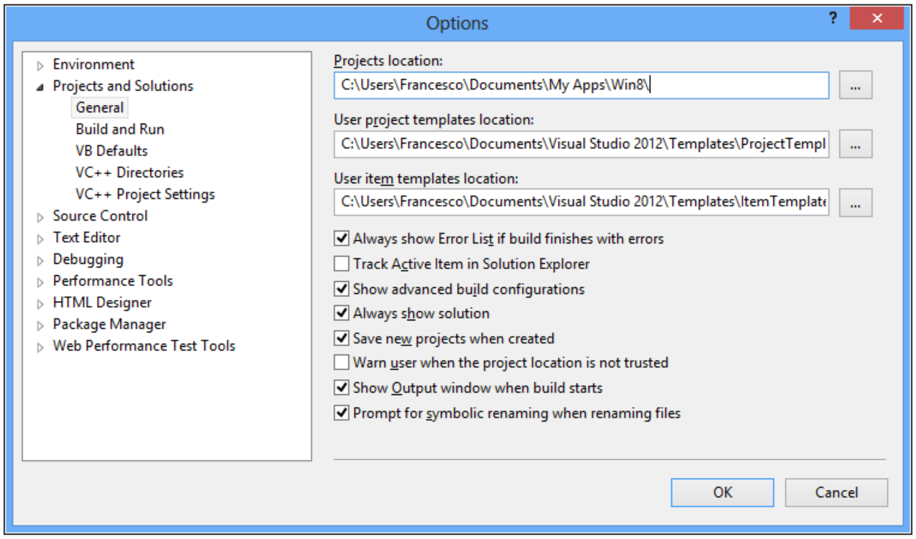
For the purposes of this book, the easiest is starting with a brand new blank application. You'll experiment with other types of templates in the upcoming chapters.

Creating the sample project

Before you give Visual Studio the green light to create files, you might want to spend some time thinking about the location of the project. In Figure 1-10, you see Location; that's the place where you enter the disk path to the files being created for the project.

It is always preferable to save your sample applications in a well-organized structure. For the sample code of this book, you'll use a root directory named *Win8* containing *ChXX* directories for each chapter, where *XX* is a two-digit chapter number.

By default, Visual Studio saves your project files right under the *Documents* folder and creates a new directory for each solution. You can change the default location of a project by simply editing the path in the *Location* every time. Alternatively, you can set a new default path for every project by selecting Options from the Tools menu and then picking up the *General* node under the *Projects and Solutions* element (see Figure 1-11).



Projects location:
C:\Users\Francesco\Documents\My Apps\Win8\

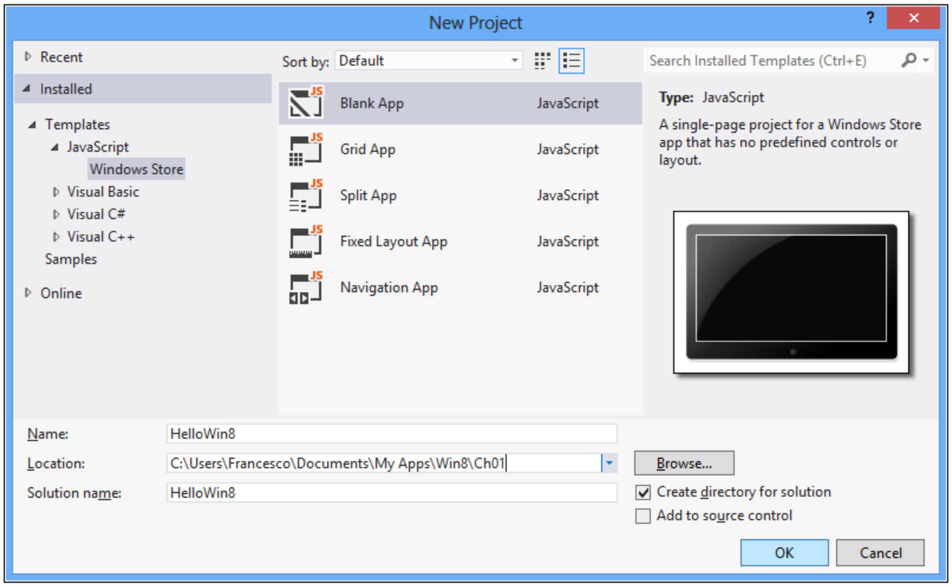
User project templates location:
C:\Users\Francesco\Documents\Visual Studio 2012\Templates\ProjectTempl

User item templates location:
C:\Users\Francesco\Documents\Visual Studio 2012\Templates\ItemTemplate

- [x] Always show Error List if build finishes with errors
- [ ] Track Active Item in Solution Explorer
- [x] Show advanced build configurations
- [x] Always show solution
- [x] Save new projects when created
- [ ] Warn user when the project location is not trusted
- [x] Show Output window when build starts
- [x] Prompt for symbolic renaming when renaming files

FIGURE 1-11 Changing the default project location.

For the "Hello Windows 8" application, you'll create a new blank application project named **HelloWin8** in the Win8/Ch01 folder, as shown in Figure 1-12.



Type: JavaScript

A single-page project for a Windows Store app that has no predefined controls or layout.

Name: HelloWin8

Location: C:\Users\Francesco\Documents\My Apps\Win8\Ch01

Solution name: HelloWin8

[✓] Create directory for solution

[ ] Add to source control

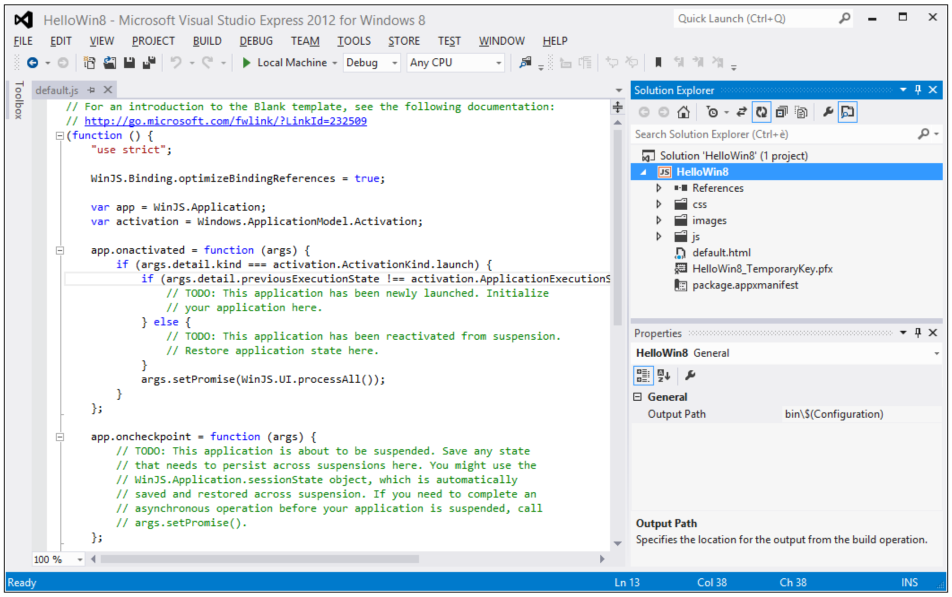
FIGURE 1-12 Creating the HelloWin8 project.

Click OK and you're officially a Windows 8 developer.

Note Visual Studio 2012 comes with a dark theme for windows and controls by default. For the sake of print, we changed it to the light theme which makes for screenshots that render better in print. Anyway, to change the Visual Studio theme, open the Tools | Options menu, and then select Environment from the window shown in Figure 1-11.

Tweaking the sample project

Right after creation, the *HelloWin8* project looks like the image shown in Figure 1-13. It references the Windows Library for JavaScript (under the References folder) and is centered on a HTML page named *default.html*. This page defines the entire user interface of the application and links a Cascading Style Sheet (CSS) file (*css/default.css*) for graphics and a JavaScript file for the logic that loads up the page content and provides any expected behavior (*js/default.js*). Just the *default.js* file is opened in Visual Studio by default.


HelloWin8 - Microsoft Visual Studio Express 2012 for Windows 8
Quick Launch (Ctrl+Q)
FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS STORE TEST WINDOW HELP
Local Machine
Debug
Any CPU
default.js
Toolbox
Solution Explorer
Search Solution Explorer (Ctrl+è)
Solution 'HelloWin8' (1 project)
HelloWin8
References
css
images
js
default.html
HelloWin8_TemporaryKey.pfx
package.appxmanifest
Properties
HelloWin8 General
General
100 %
Ready
Ln 13
Col 38
Ch 38
INS

```
// For an introduction to the Blank template, see the following documentation:
// http://go.microsoft.com/fwlink/?LinkId=232509
(function () {
    "use strict";

    WinJS.Binding.optimizeBindingReferences = true;

    var app = WinJS.Application;
    var activation = Windows.ApplicationModel.Activation;

    app.onactivated = function (args) {
        if (args.detail.kind === activation.ActivationKind.launch) {
            if (args.detail.previousExecutionState !== activation.ApplicationExecutionS
                // TODO: This application has been newly launched. Initialize
                // your application here.
            } else {
                // TODO: This application has been reactivated from suspension.
                // Restore application state here.
            }
            args.setPromise(WinJS.UI.processAll());
        }
    };

    app.oncheckpoint = function (args) {
        // TODO: This application is about to be suspended. Save any state
        // that needs to persist across suspensions here. You might use the
        // WinJS.Application.sessionState object, which is automatically
        // saved and restored across suspension. If you need to complete an
        // asynchronous operation before your application is suspended, call
        // args.setPromise().
    };
```

Output Path   bin\$(Configuration)

Output Path
Specifies the location for the output from the build operation.

FIGURE 1-13 The *HelloWin8* project.

It turns out that a Windows 8 application written using JavaScript looks like a self-contained web application made of HTML pages properly styled using CSS and powered by JavaScript logic. If you are familiar with the web paradigm and client-side web development, then you only need to make sense of the Windows 8-specific application programming interface (API) exposed to you via a few JavaScript files to link.

Before compiling the project to see what happens, let's make some minimal change: Close the *default.js* file and open up the *default.html* file, which is responsible for the home page of the application (see Figure 1-14). To open a file that is part of the current project, you locate the file by name in the Solution Explorer panel and then double-click it. In general, if you need to open a file that is not included in the project for your reference, then you might want to use the Open item on the File menu.

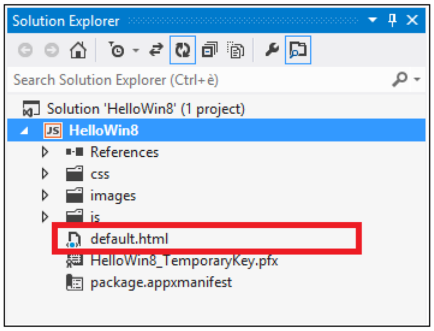

Solution Explorer
Search Solution Explorer (Ctrl+è)
Solution 'HelloWin8' (1 project)
HelloWin8
References
css
images
js
default.html
HelloWin8_TemporaryKey.pfx
package.appxmanifest

FIGURE 1-14 Opening *default.html*.

The body of the sample HTML page is all here:

```
<body>
    <p>Content goes here</p>
</body>
```

Let's just replace the placeholder text with some custom text. For example:

```
<body>
    <p> Hello, Windows 8!<p>
</body>
```

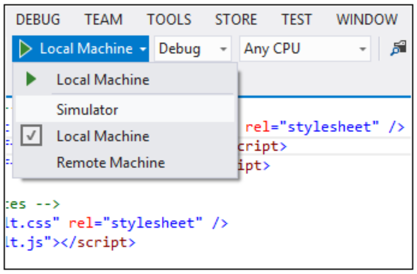
In HTML, the *<body>* element indicates the entire content of a page. The *<p>* element, instead, defines a paragraph of text. The net effect of the change is making the page display the text "Hello, Windows 8."

The next step is building the application and admiring it in action live.

Admiring the app in action

To build the application, you hit F5 or click Build | Start Debugging. *Debugging* is the action of finding and fixing errors in computer programs. However, the sequence Build+Debugging more generally refers to giving the application a try. You launch the application and interact with it to see if it behaves as you expect.

For an even quicker start, you can click the Play button in the toolbar, as shown in Figure 1-15.



```
rel="stylesheet" />
cript>
ipt>
es -->
t.css" rel="stylesheet" />
t.js"></script>
```

FIGURE 1-15 Starting the debug of the application.

Note that Local Machine is only the default choice where you can choose to run the application. By selecting it, you open up a menu with various options. Running the application on the local machine means switching from the Windows classic desktop mode (where you execute Visual Studio) to the specific UI of Windows 8. If you don't like doing that, you can run applications in a simulator. Using the simulator is helpful for testing the application using various screen orientations and resolutions. Finally, you can even run the application on a remote machine, provided that you have sufficient rights to access that machine.

The Debug option in Figure 1-15 refers to the way in which the compiler produces the code. In debug mode, the binaries include additional information that allows you to set *breakpoints* on specific lines of code and proceed step by step. A breakpoint is a line of code where execution will pause. You typically use breakpoints to stop execution at a given point and investigate the state of the application and its internal data. You can have multiple breakpoints in the program. The Release mode is required for finished applications ready for distribution. In the book, you'll be using the Debug mode predominantly.

Figure 1-16 shows the application in action on the local machine.

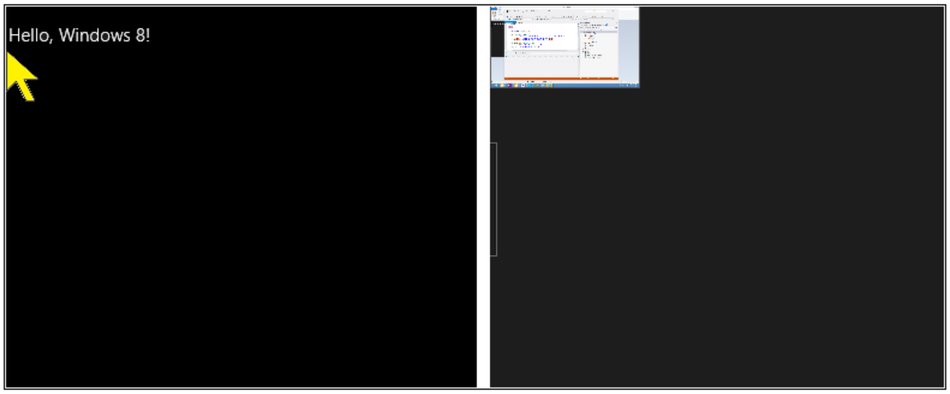

Hello, Windows 8!

FIGURE 1-16 The HelloWin8 app in action.

If you run the application in the simulator, then the application runs in a separate window you can control at will. When you run it on the local machine, then the app runs full screen and it is not immediately apparent what you need to do to get back to Visual Studio to terminate the app. Here's how to exit the application: move the mouse towards the left border until you see a window icon to click to return to the desktop mode. To terminate the app, you then click the Stop button that has replaced the Play button in the Visual Studio user interface.

You're done. But it was way too simple, wasn't it? So let's make the sample application more colorful and add a bit of action too.

Adding a bit more action

Create a new project and name it **HelloWin8-Step2**. First, you'll make it more colorful by simply adding more HTML elements and style information. Next, you will transform it into a simple but fully functional application that generates a random number.

Adding style to the page

Open up the *default.html* page and edit its body tag. The body should now include title and subtitle separated with a line. You use a couple of HTML5 elements for this. Note that in the next chapter you'll learn a lot more about HTML5. Here's the modified body of the page:

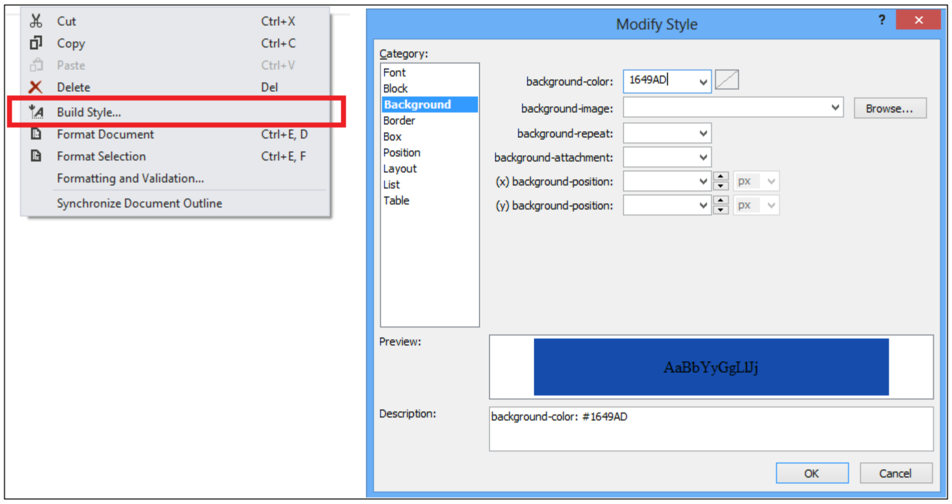
```
<body>
   <header>
     Start Here! Build <b>Windows 8</b> Applications with <b>HTML5</b> and
<b>JavaScript</b>
     <hr />
   </header>
   <footer>
     <hr />
     Dino Esposito | Francesco Esposito
   </footer>
</body>
```

Now let's proceed with colors and fonts. The style of the page is defined in the *default.css* file from the CSS folder. By editing a CSS file, you can change nearly everything in a HTML page that has to do with appearance and layout. You'll find a summary of what's important to know about CSS in Chapter 3, "Making sense of CSS."

In the *default.css* file, you initially find something like below:

```
body {
}
```

This code describes the style to be applied to the tag body of any page that links the CSS file. You can edit the CSS file manually or you can create CSS styles using a builder tool available in Visual Studio. To use the tool, right-click a CSS element (that is, *body*) and select Build Style, as shown in Figure 1-17.



background-color: 1649AD

background-color: #1649AD

FIGURE 1-17 Editing the style of the page.

Here's a modified style for the page body that changes the background color and adds a bit of space around the content:

```
body {
    background-color: #1649AD;
    padding: 10px;
}
```

You can also customize the header and footer elements slightly to define the color of the text, font size, and a vertical offset, as shown below:

```
header {
    font-size: x-large;
    color: #ffffff;
    padding-bottom: 50px;
}
footer {
    font-size: large;
    color: #eeee00;
    padding-top: 50px;
}
```

Now run the application and be proud of it! (See Figure 1-18.)

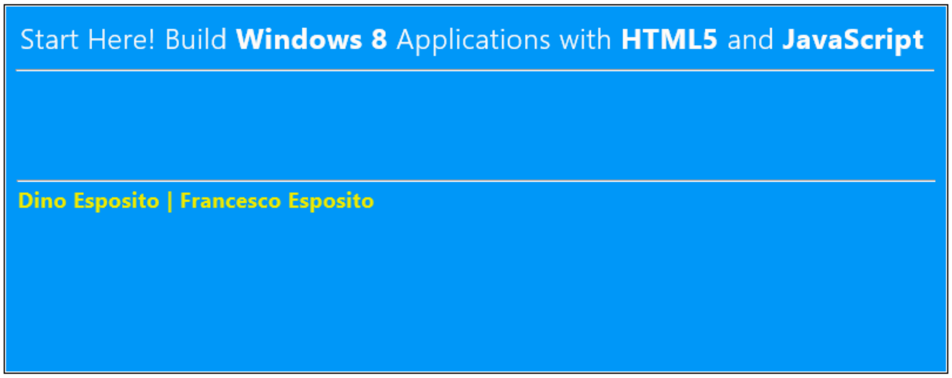

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FIGURE 1-18 The application running with a modified style.

Generating a random number

So far the application has no behavior at all and is limited to displaying some static text. Let's make it a bit less obvious and add any necessary structure and logic to make it generate and display a random number.

First off, add the following markup to the body of the page in *default.html*. The markup consists of two *DIV* blocks containing the placeholder for generated number and the button to click to get a new number. You insert the following markup between the header and footer elements:

```
<div>
    <label id="numberLabel">?</label>
</div>
<div>
    <input id="numberButton" type="button" value="Get number" />
</div>
```

Next, open the default.js file and add the following JavaScript functions at the bottom of the file:

```
function numberButtonClick() {
    var number = generateNumber();
    document.getElementById("number").innerHTML = number;
}
function generateNumber() {
    var number = 1 + Math.floor(Math.random() * 1000);
    return number;
}
```

The first function is the handler for the click event on the button. The second function just generates and returns a random number between 1 and 1000. The final step consists of binding the click handler to the actual button in the HTML markup. There are a number of ways to do this, the simplest of which is shown below:

```
<input id="numberButton" type="button" value="Get number"
       onclick="numberButtonClick()" />
```

A more elegant way—and the recommended way of doing it in Windows 8 programming—consists of making the binding dynamically as the page is loaded. So open the *default.js* file and modify the code of the *app.onactivated* function, as shown below:

```
app.onactivated = function (args) {
   if (args.detail.kind === activation.ActivationKind.launch) {
       if (args.detail.previousExecutionState !==
           activation.ApplicationExecutionState.terminated) {
             // TODO: This application has been newly launched. Initialize
             // your application here.
             document.getElementById("numberButton").addEventListener(
                "click", numberButtonClick)
      } else {
             // TODO: This application has been reactivated from suspension.
             // Restore application state here.
```

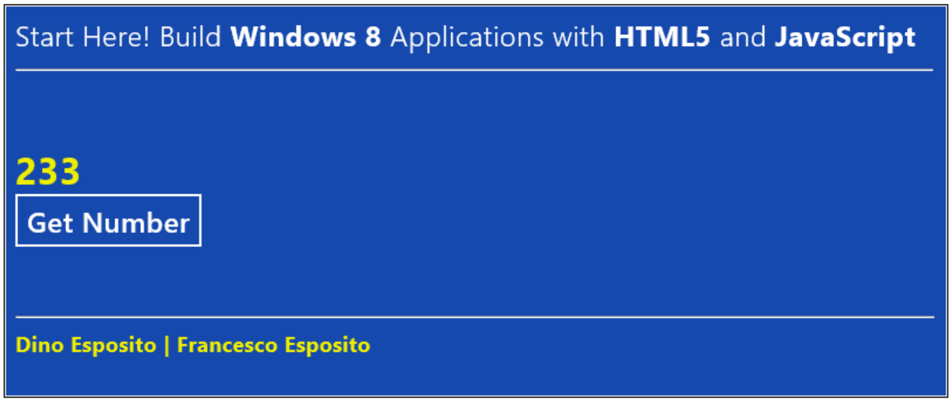
```
        }
        args.setPromise(WinJS.UI.processAll());
    }
};
```

In the end, you just add one line to run when the application has been newly launched. The line just registers a handler for any click event raised by the specified button.

You can give the final touch to the application with a second pass on CSS to adjust the rendering of the label and button. Add the following to the *default.css* file:

```
#numberButton {
    font-size: x-large;
}
#numberLabel {
    font-size: xx-large;
    color: #eeee00;
    font-weight: bold;
}
```

The leading pound (#) symbol indicates that the style applies to any HTML element whose ID matches the name—for example, the style defined as *#numberButton* applies to all elements with an ID of *numberButton*. Figure 1-19 shows the modified application in action.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Get Number
Dino Esposito | Francesco Esposito

FIGURE 1-19 A Windows 8 application to get random numbers.

Although this is still a fairly simple application, it should be enough to get you started and to give you the overall feeling of how you approach Windows 8 programming with HTML5 and JavaScript. You'll start building more sophisticated applications in Chapter 5, "First steps with Windows 8 development."

Summary

This chapter provided a step-by-step guide to getting ready for Windows 8 programming. You started with the operating system and tools necessary for writing code, then installed and configured Visual Studio 2012 Express edition for Windows 8, and finally played a bit with the simplest type of application.

Before digging into more Windows 8 development, it is necessary to ensure that everybody reading this book is aligned to a minimum level of knowledge of web technologies such as HTML5, CSS, and JavaScript. Therefore, the next three chapters provide a summary of what you need to know about HTML5, CSS, and JavaScript to successfully work through the later chapters. If you feel you already know enough, then feel free to jump directly to Chapter 5. If the later chapters prove too difficult, I recommend you review Chapters 2–4 and/or brush up your knowledge with other resources on HTML5, JavaScript, and CSS.

Chapter 2

Making sense of HTML5

Broadly speaking, the short words are the best, and the old words best of all.

—Winston Churchill

HTML5 is the latest version of the HTML language—the popular text-based language used to define the content of webpages. HTML appeared on the scene in the early 1990s. In the beginning it was merely a *markup language* apt at describing simple documents. A markup language is a language based on a set of markers that wrap text and give it a special meaning.

Initially, the set of HTML markup elements, called "tags" or (better) "elements," was fairly limited. It contained elements to define references to other documents and headings, to link to images and paragraphs, and apply basic text styling such as bold or italic. Over the years, however, the role of HTML grew beyond imagination, progressing from being a simple language that described documents to a language used to define the user interface of web applications. That trend continues today with HTML5.

The latest version of HTML5 removes some of the older elements and makes it easier to keep elements that provide style information in one place, and elements that provide text and define the layout of the text, in another place. As you'll see in more detail in the next chapter, style information can be defined through a special distinct file known as a Cascading Style Sheet (CSS). In addition, HTML5 adds some new elements suitable for including multimedia content and drawing, and several new frameworks for manipulating the content of the page programmatically.

With HTML5 alone, you still won't be able to go too far toward building a complete application. However, the union of HTML5, CSS, and JavaScript functions as a close approximation to a full programming language.

- You use HTML5 to define the layout of the user interface and to insert text and multimedia.
- You use CSS to add colors, style, and shiny finishes.
- Finally, you use JavaScript to add behavior by gluing together pieces of native frameworks such as Document Object Model (DOM), local storage, geolocation and, for example, all the specific services of Windows 8 exposed via the Windows 8 JavaScript library (WinJs). The DOM,

in particular, is the collection of programmable objects that expose the structure of the current document to coders.

In the rest of this chapter, you'll briefly explore the basics of the HTML5 markup elements, including input forms and multimedia. Neither this chapter nor the rest of the book covers every aspect of the basics of HTML. If you need a refresher on the fundamentals of HTML, you can refer to the book *Start Here! Learn HTML5,* by Faithe Wempen (Microsoft Press, 2012).

Important This chapter and the next two provide an overview of HTML, CSS, and JavaScript. In these chapters, you'll get acquainted with new key elements of HTML5 and CSS3 and receive an end-to-end coverage of common programming techniques you use in JavaScript. The content of these chapters is not specific to Windows 8 apps; it is instead meant to be preliminary to upcoming chapters where you'll be using ad hoc elements from the WinJs library in a basic HTML skeleton, using custom CSS for graphics and custom JavaScript for behavior.

Elements of a webpage

HTML5 comes about a decade after its most recent predecessor (HTML4). Looking at what's new in HTML5, one could reasonably say that all these years have not passed in vain. HTML5 provides a set of new elements that offer several native functionalities that developers and designers used to have to code via artifacts and ingenious combinations of existing elements. Here's a quick look at what's relevant to creating a webpage with HTML5.

Building the page layout with HTML5

In the beginning of the web, most pages were designed as a text documents—meaning that their content developed vertically on a single logical column. Over the years, page layout became more and more sophisticated. Today, two-column and three-column layouts are much more common. In two- and three-column layouts, you also often find headers and footers surrounding the logical columns. Figure 2-1 shows the difference between the layouts at a glance.

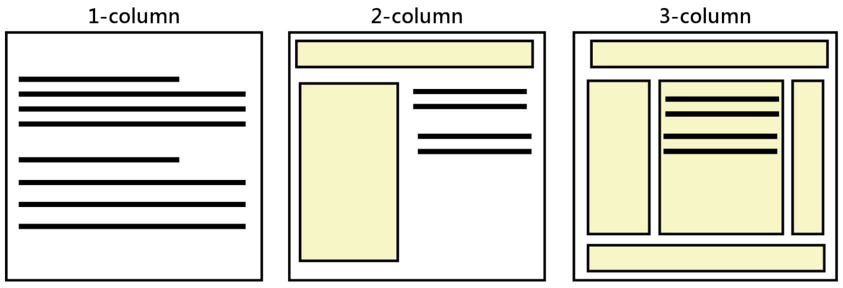


FIGURE 2-1 Different HTML page layouts.

Developers have been smart enough to build such complex layouts using basic HTML block elements such as *DIV*.

Note In HTML, a block element is an element whose content is rendered between two line breaks—one before and one after the content. Therefore, the content displays as a standalone "block" of content. One popular block element is *H1,* which renders some text as a first-level heading. The *DIV* element is another popular block element aimed at creating blocks out of any valid HTML content. Block elements are opposed to inline elements, namely elements whose content flows with the rest of the page with no line breaks applied.

Important Note that in this book, as well as in other books and articles, truly common HTML elements, such as *<div>* and *<h1>* often appear in text written without the brackets. However, the use of the angle brackets is mandatory if you are using those elements within HTML itself.

In HTML5, the multicolumn layout is recognized as a common layout and therefore gets full support via several new ad hoc markup elements.

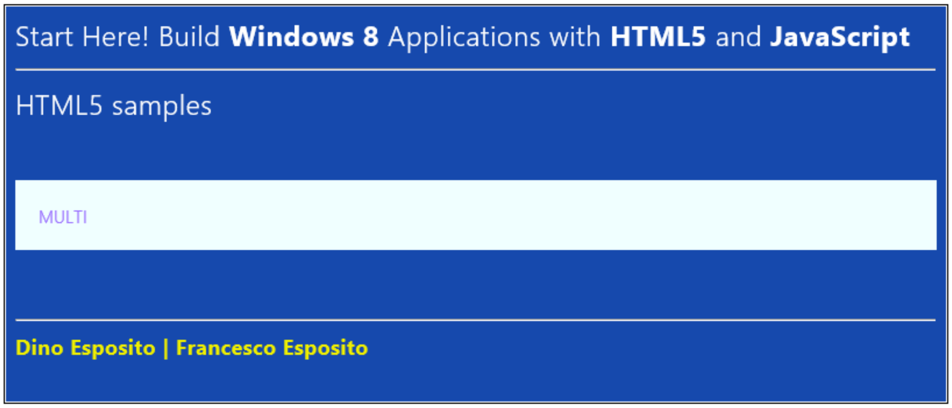
Preparing the sample application

The examples you'll be working with in this chapter are plain HTML pages showcasing some of the features available in HTML5 as supported in Internet Explorer 10. You won't be creating an ad hoc Windows 8 application for each feature, but for this early example—to refresh what you saw in Chapter 1, "Using Visual Studio 2012 Express edition for Windows 8"—go ahead and create a container Windows 8 page that ties together all the links to the various standalone HTML5 pages.

Open up Visual Studio and create a new blank application. Name it **Html5-Demos**. When done, add the following code to the body of *default.html* so that it serves as the main menu for navigating into all of the sample HTML5 pages you'll write throughout the chapter.

```
<body>
    <header>
        Start Here! Build <b>Windows 8</b> Applications with <b>HTML5</b> and
<b>JavaScript</b>
        <hr />
        HTML5 samples
    </header>
    <div id="links">
        <a href="pages/multi.html">MULTI</a>
        <!-- Add here more links to HTML pages as we proceed in the chapter. -->
    </div>
    <footer>
        <hr />
        Dino Esposito | Francesco Esposito
    </footer>
</body>
```

Figure 2-2 shows the aspect of the resulting application. By clicking the links (such as, the MULTI link in the figure below) you force the operating system to open the webpage into Internet Explorer 10—the native browser in Windows 8.


Start Here! Build **Windows 8** Applications with **HTML5** and **JavaScript**

HTML5 samples

MULTI

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FIGURE 2-2 The home page of the sample application for this chapter.

From now on, you'll be creating plain HTML5 pages and adding an anchor tag *<a>* to the body of *default.html*.

From generic blocks to semantic elements

A large share of websites out there have a common layout that includes header and footer, as well as a navigation bar on the left of the page. More often than not, these results are achieved by using *DIV* elements styled to align to the left or the right.

Let's add a new HTML page to the project: right-click the project node in Solution Explorer and choose Add | New Item from the subsequent flyout menu. What you get next is the window shown in Figure 2-3. From that window, you then choose a new HTML page and save it as *multi.html*.

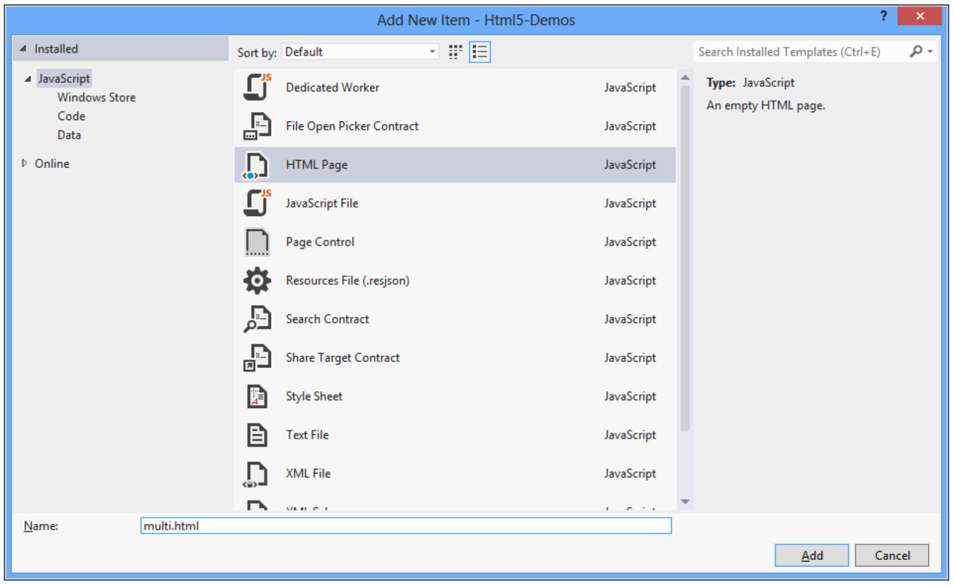

Add New Item - Html5-Demos
Installed
JavaScript
Windows Store
Code
Data
Online
Sort by: Default
Search Installed Templates (Ctrl+E)
Dedicated Worker JavaScript
File Open Picker Contract JavaScript
HTML Page JavaScript
JavaScript File JavaScript
Page Control JavaScript
Resources File (.resjson) JavaScript
Search Contract JavaScript
Share Target Contract JavaScript
Style Sheet JavaScript
Text File JavaScript
XML File JavaScript
Add
Cancel
Type: JavaScript
An empty HTML page.
Name: multi.html

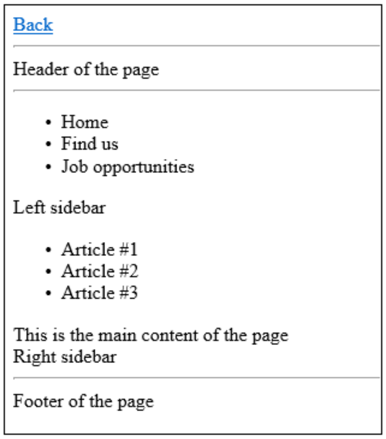
FIGURE 2-3 Creating a new HTML page in Visual Studio.

Next, from within Visual Studio double-click the newly created HTML page and replace the content with the following markup.

```
<!DOCTYPE html>
<html>
    <head>
        <title>MULTI-COLUMN LAYOUT</title>
    </head>
    <body>
        <a href="/default.html">Back</a>
        <hr />
        <div id="page">
           <div id="header">
              Header of the page
              <hr />
           </div>
           <div id="navigation-bar">
```

```
              <ul>
                 <li> Home </li>
                 <li> Find us </li>
                 <li> Job opportunities </li>
             </ul>
           </div>
              <div id="container">
                 <div id="left-sidebar">
                   Left sidebar
                   <ul>
                      <li> Article #1 </li>
                      <li> Article #2 </li>
                      <li> Article #3 </li>
                    </ul>
                 </div>
                 <div id="content">
                   This is the main content of the page
                 </div>
                 <div id="right-sidebar">
                   Right sidebar
                 </div>
           </div>
           <div id="footer">
              <hr />
              Footer of the page
           </div>
        </div>
    </body>
</html>
```

The *id* attribute of the *DIV* elements are given self-explanatory names that help with understanding their intended role. Therefore, the HTML page includes header, navigation bar, footer, and a three-column layout in between the element named container. Figure 2-4 shows how *multi.html* renders on Internet Explorer.


Back

Header of the page

- Home
- Find us
- Job opportunities

Left sidebar

- Article #1
- Article #2
- Article #3

This is the main content of the page
Right sidebar

Footer of the page

FIGURE 2-4 The *multi.html* page as it is rendered by Internet Explorer 10.

The preceding markup alone, however, doesn't produce the expected results and the page doesn't really show any multicolumn layout. For that, you need to add ad hoc graphic styles to individual *DIV* elements to make them float and anchor to the left or right edge. You add graphic style to an HTML page using CSS markup, placed in a CSS file. The next chapter provides a quick summary of CSS. The real point of this demo is a little different.

As you can see, each *DIV* element is made distinguishable from others only by the name of the *id* attribute. Yet, each *DIV* element plays a clear role that makes it fairly different from others—header is different from footer, and both are different from left or right sidebars.

Header and footer elements

HTML5 brings a selection of new block elements with specific names and clear behavior. The set of new elements was determined by looking at the most common layouts used by page authors. For example, in HTML5 header and footer are new plain block elements you use to indicate a header and footer. Similar elements exist for most of the semantic elements in the previous listing. Here's how you can rewrite the page *multi.html* using only HTML5-specific elements. Name this page **multi5.html**. The listing below shows the content of the body tag for the new page.

```
<header>
      Header of the page
      <hr />
</header>
<nav>
      <a href="..."> Home </a>
      <a href="..."> Find us </a>
      <a href="..."> Job opportunities </a>
</nav>
<article>
   <aside>
      Left sidebar
      <ul>
        <li> Article #1 </li>
        <li> Article #2 </li>
        <li> Article #3 </li>
      </ul>
   </aside>
   <article>
      <h1>Article #1</h1>
      <hr />
      <section> Introduction </section>
      <section> First section </section>
      <section> Second section </section>
   </article>
   <aside>
      Right sidebar
   </aside>
</article>
<footer>
      <hr />
      Footer of the page
</footer>
```

You can insert header and footer using specific elements with a very simple syntax, as below:

```
<header> Markup </header>
<footer> Markup </footer>
```

It is interesting to notice that you can have multiple header and footer elements in a HTML5 page. The most common use is to give the page a header and footer. However, you should consider these elements as blocks meant to represent heading content of a page or a section of a page and footers.

Section and article elements

HTML5 defines two similar-looking elements to represent the content of a page. The <*section*> element is slightly more generic, as it is meant to delimit a logical section of a HTML page. A logical section can be the content of a tab in a page designed as a collection of tabs.

At the same time, a logical section can also be a portion of the main content being displayed in the page. In this case, the *section* element is likely embedded in an <*article*> element.

```
<article>
   <h1>Article #1</h1>
   <hr />
   <section> Introduction </section>
   <section> First section </section>
   <section> Second section </section>
</article>
```

Note Elements such as *<section>*, *<article>*, *<header>*, and *<footer>* are semantic elements, in the sense that browsers treat them as block elements. If you look at final results, there's nearly no difference between semantic elements and plain *DIV* elements. The most significant difference is in the expressivity of the resulting markup. By using *<section>*, *<article>*, *<header>*, and *<footer>* elements, the resulting markup is much easier to read, understand, and maintain over time.

The *aside* element

A lot of HTML pages display part of their content on columns that lie side by side horizontally. The *<aside>* element has been introduced in HTML5 to quickly identify some content that is related to the content being displayed all around. The syntax of the *<aside>* element is straightforward:

```
<aside> Markup </aside>
```

A very common scenario where you might want to take advantage of the*<aside>* element is to define a sidebar in an *article* element and, more in general, to create multicolumn layouts for the content of the page or sections of the page.

The *nav* element

The *<nav>* element indicates a special section of the page content—the section that contains major navigation links. It should be noted that not all links you can have in a HTML page must be defined within a *<nav>* element. The *<nav>* element is reserved only for the most relevant links, such as those you would place on the main page navigation menu.

The syntax of the *<nav>* element is fairly intuitive. It consists of a list of *<a>* anchor elements listed within the *<nav>* element:

```
<nav>
      <a href="..."> Home </a>
      <a href="..."> Find us </a>
      <a href="..."> Job opportunities </a>
</nav>
```

The *<nav>* element plays an important role in HTML5 because it indicates the boundaries of the section of the page that contains navigation links. This allows special page readers—such as browsers for disabled users—to better understand the structure of the page and optionally skip some content.

Important All semantic elements in HTML5 are important in light of accessibility, and just for this reason, they should be considered for use in any webpage that has chances to be read by disabled users.

Miscellany of other new elements

Semantic block elements represent the largest family of new elements in HTML5. As mentioned, semantic elements are important not so much for the effect they produce in the page but because they increase the readability of the page significantly for developers, software, and especially browsers for disabled users.

Semantic block elements alone do not produce significant changes in the way in which HTML5-compliant browsers render the page. For example, to color and position a sidebar (that is, the *<aside>* element) where you like you still need to resort to CSS settings. However, using semantic elements reduces the noise of having too many generic *DIV* block elements whose role and scope is not immediately clear.

In addition to semantic elements, HTML5 provides a few new elements with an embedded behavior that couldn't be obtained in earlier versions of HTML without resorting to a combination of CSS, markup, and JavaScript. Let's see a few examples.

The *details* element

Many times you have small pieces of content in a page that you want to show or hide on demand. A good example is the title of some news and its actual content. Sometimes you want to display only the title but want to leave users free from clicking to expand the content and hide it to gain more space.

Before HTML5, you had to code all of this manually using a bit of HTML, CSS, and JavaScript code. In HTML5, the entire logic is left to the browser and all you have to do is type the following in an HTML page.

```
<details open>
   <summary>This is the title</summary>
   <div>
         This is the text of the news and was initially kept hidden from view
   </div>
 </details>
```

The *<details>* element is interpreted by the browser and used to implement a collapsible panel. The *open* attribute indicates whether you want the content to be displayed initially or not. The *<summary>* child element indicates the text for the clickable placeholder, whereas the remaining content is hidden or shown on demand. Note that all parts of the *<details>* element can be further styled at will using CSS.

Important Although the Visual Studio editor recognizes the *<details>* element and even offers IntelliSense for it, the element is not supported by Internet Explorer 10. Other HTML5-compliant browsers, however, do support it—specifically the latest versions of Chrome and Opera.

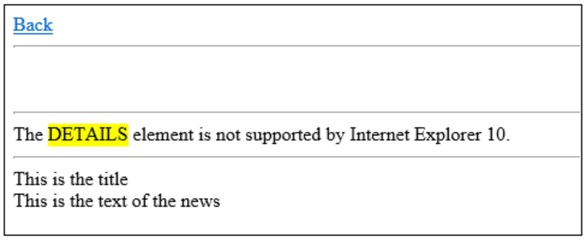
The *mark* element

HTML5 also adds the <*mark*> element as a way to highlight small portions of text as if you were using a highlighter on a paper sheet. Using the <*mark*> element is easy; all you do is wrap some text in the <*mark*> element, as shown below:

```
The <mark>DETAILS</mark> element is not supported by Internet Explorer 10.
```

The entire text is rendered with default settings except the text enclosed in the <*mark*> element. Most HTML5 browsers have default graphical settings for marked text. Most commonly, these settings entail a yellow background. Needless to say, graphical effects of the <*mark*> element can be changed at will via CSS.

Figure 2-5 shows how the previous text looks using Internet Explorer 10.


Back

The DETAILS element is not supported by Internet Explorer 10.

This is the title
This is the text of the news

FIGURE 2-5 The *mark* element in action.

The *dataList* element

For a long time, HTML developers asked loudly for the ability to offer a list of predefined options for a text field. The use-case is easy to figure out. Imagine a user required to type the name of a city in a text field. As a page author, you want to leave the user free of entering any text; at the same time, though, you want to provide a few predefined options that can be selected and entered with a single click. Up until HTML5, this feature had to be coded via JavaScript, as HTML provided only two options natively: free text with no auto-completion or a fixed list of options with no chance of typing anything. The new <*datalist*> element fills the gap. Copy the following text to the body of a new HTML page named *datalist.html*.

```
<input list="cities" />
<datalist id="cities">
   <option value="Rome">
   <option value="New York">
   <option value="London">
   <option value="Paris">
</datalist>
```

In the example, the <*datalist*> element is bound to a particular input field—the input field named cities. It is interesting to notice that the binding takes place through a new attribute defined on the

<*input*> element: the *list* attribute. The attribute gets the name of a <*datalist*> element to be used as the source of the input options.

When the input field gets the input focus, then the content of the <*datalist*> element is used to autocomplete what the user is typing. Figure 2-6 shows the element in action on Internet Explorer.

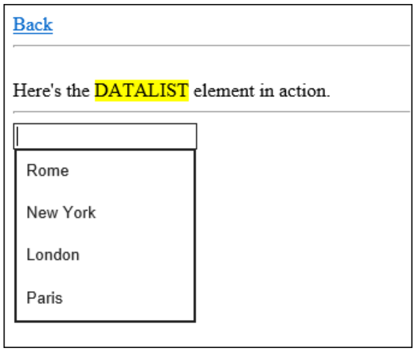


FIGURE 2-6 The *datalist* element in action.

Elements removed from older HTML versions

HTML5 adds some new elements, but also removes a few elements whose presence would only increase redundancy once combined with the new capabilities of CSS and new elements in HTML5.

The list of elements no longer supported most notably includes *frame* and *font* elements. It should be noted, though, that the <*iframe*> element remains available.

In addition, a few style elements such as <*center*>, <*u*>, and <*big*> are removed. The reason is that this functionality can be achieved easily through CSS. Probably due to the much larger use that page authors made over the years, HTML5 still supports elements such as <*b*> (for bold text) and <*i*> (for italic text) that are logically equivalent to the now unsupported <*u*> and <*big*> elements.

Collecting data

HTML was originally devised to be a language for creating hypertext documents. Over the years, the language has been enriched with layout capabilities and basic features to collect data. Writing input forms to collect data from users proved to be a nontrivial task. One thing is to collect plain text; it is quite another to collect a date, a number, or an email address.

For too many years, HTML has only offered input text fields completely unable to distinguish numbers, dates, and email addresses from plain text. Subsequently, page developers were responsible for preventing users from typing unwanted characters and for client validation of the entered text.

With HTML5, a lot of this work has been pushed to the browser side. This means that by simply using a slightly more sophisticated set of elements developers can achieve the same level of form validation in a faster and safer way.

Adjusting input fields

In HTML5, you still create an input form by using the same markup elements you used from earlier versions of the language. In other words, the following markup will still give you the opportunity to upload any typed content to the given server.

```
<form action="http://www.yourserver.com/upload">
   <span> Your name </span>
   <input type="text" value="" />
   <input type="submit" value="Save" />
</form>
```

The *<input>* element is the element that inserts a graphical element (such as, an input box or a drop-down list) to collect some input data. You also use the *<input>* element to add a push button to start the submission process to the server. In HTML5, the *<input>* element comes with more options for the type of input boxes. For example, you can have date pickers, sliders, and search boxes offered by the browser. At the same time, the browser provides free form validation for most common scenarios, such as when a field is required and can't be left empty by the user.

New input types

If you look at the HTML5 syntax of the *<input>* element, the major difference with past versions is the list of values now allowed for the *type* attribute. Table 2-1 lists some of the new input types supported in HTML5.

TABLE 2-1 HTML5 specific values for the *type* attribute

Value	Description
Color	Meant to let the browser display any UI that allows entry of a color. Note: This input type is not supported on Internet Explorer 10.
date	Meant to let the browser display any UI that allows entry of a date.
email	Meant to let the browser display any UI that allows entry of an email address.
number	Meant to let the browser display any UI that allows entry of a numeric input.
range	Meant to let the browser display any UI that allows entry of a numeric input.
search	Meant to let the browser display any UI that allows entry of a text to be searched for.
tel	Meant to let the browser display any UI that allows entry of a telephone number.
time	Meant to let the browser display any UI that allows entry of a time.
url	Meant to let the browser display any UI that allows entry of a URL.

Note that the list in Table 2-1 is incomplete and limited to input types that you can really find supported today on some web browsers. Other input types (for example, week) are part of the current HTML5 draft but are not implemented anywhere. You might want to refer to *http://www.w3schools.com/html5* for more details.

What you can really expect from browsers

What you have read in Table 2-1 represents the HTML5 standard that browsers are expected to comply with by the time the standard is officially approved and promulgated. At this time, Opera and Chrome are likely the browsers that offer the best support for the current draft of HTML5. In general, the support for HTML5 you can currently get from all browsers is not uniform.

The point is that HTML5 is not yet an approved standard and won't be definitive for a few more years. At the same time, companies are eager to use HTML5 goodies in real websites and applications. Websites and applications, however, require compliant browsers. As you can imagine, this situation determines a sort of catch-me game between browser vendors. Each new release of browsers improves support for the HTML5 standard or makes it more adherent to the actual standard, removing possible features resulting from misinterpretation of older drafts.

HTML5 is not going to be something unambiguously defined for a few more years. Internet Explorer 10—the browser you find integrated in Windows 8—improves significantly the support for HTML5 over Internet Explorer 9. Note that in Windows 8 you find two flavors of the Internet Explorer browser—the classic version, which builds on top of Internet Explorer 9, and the version with the native Windows 8 look-and-feel. This version, in particular, lacks the ability to run plug-ins (specifically, Flash and Silverlight) and organize favorites in folders.

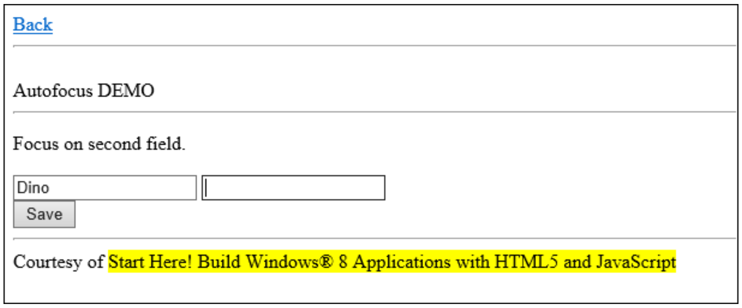
Making input fields auto-focusable

HTML5 provides the definitive solution to a couple of common problems that developers faced for years and solved using a bit of JavaScript code. The first of these problems relates to giving the input focus to an input field.

Using JavaScript, you can tell the browser to assign the input focus to a particular input field upon display of the page. In HTML5, you can use a new attribute for the *<input>* element—the *autofocus* attribute. Try placing the following code in the body of a new HTML page named *autofocus.html*.

```
<form>
      <input type="text" value="Dino" />
      <input type="text" autofocus />
      <br />
      <input type="submit" value="Save" />
</form>
```

Save the page and display it in Internet Explorer. As Figure 2-7 shows, the cursor that indicates input focus is on the second field.


Back

Autofocus DEMO

Focus on second field.

Dino

Save

Courtesy of Start Here! Build Windows® 8 Applications with HTML5 and JavaScript

FIGURE 2-7 The *autofocus* attribute in action.

Giving hints to users

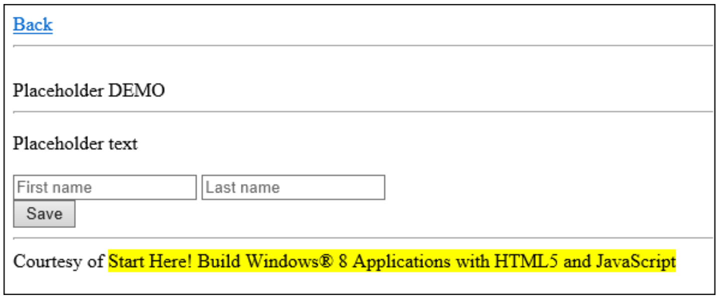
Looking at Figure 2-7, it is quite hard to figure out which content goes in which field. Probably in a real-world page, one would use labels and a more sophisticated layout to make it easier for users to understand the expected content for each field. This is *just* the second problem I referred to a moment ago.

Recently, developers got into the groove of displaying a short text message in an input text field to instruct users. Before HTML5, this could only be accomplished by using a bit of JavaScript code. In HTML5, the new *placeholder* attribute makes it a lot easier and even more natural.

Create a new HTML page and save it as *placeholder.html*. Now edit the content of the body, as shown below:

```
<form>
      <input type="text" placeholder="First name" />
      <input type="text" placeholder="Last name" />
      <br />
      <input type="submit" value="Save" />
</form>
```

As Figure 2-8 shows, both empty fields now provide a hint to users about the expected content.


Back

Placeholder DEMO

Placeholder text

First name

Last name

Save

Courtesy of Start Here! Build Windows® 8 Applications with HTML5 and JavaScript

FIGURE 2-8 The *placeholder* attribute in action.

Form submission

Sometimes developers have no other option besides writing the same boilerplate code over and over again, no matter how annoying it is. A good example of boilerplate code that it would be great to stop writing is validation of input forms in HTML pages. Any data collected from an HTML input form should be carefully validated on the server before being used for some business tasks. However, some basic validation tasks can be easily delegated to the browser and commanded by the developers using markup instead of JavaScript code.

HTML5 helps reduce the amount of boilerplate code requested to build effective input forms. I've already mentioned the newest attributes of the HTML5 *<input>* element; the next step is to take a look at other attributes you can leverage to control the whole process of form submission, including ways to ensure that the user has not left required fields blank, and that the user input matches expected patterns. For example, if you ask for a phone number, the user shouldn't be allowed to enter something that couldn't possibly be a valid phone number.

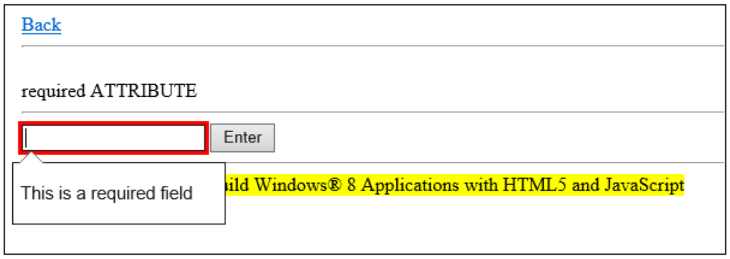
Detecting required fields

By adding the *required* attribute to a *<input>* element, you tell the browser that the input field cannot be blank when the form that contains the *input* element is submitted. You use the required attribute only if the field is not considered optional.

Consider the following content of an HTML page named *required.html*:

```
<body>
<form>
      <input type="text" placeholder="Your PIN" required />
      <br />
      <input type="submit" value="Enter" />
</form>
</body>
```

When the user pushes the submit button and the text field is empty, the browser automatically denies the post and displays an error message. The specific content, form, and shape of the error message may change according to the browser; the overall behavior, though, is similar on all HTML5-compliant browsers. Figure 2-9 shows how Internet Explorer 10 deals with required fields left empty.


Back

required ATTRIBUTE

Enter

This is a required field

ild Windows® 8 Applications with HTML5 and JavaScript

FIGURE 2-9 The *required* attribute in action.

HTML5 browsers allow you to customize the error message by using the *oninvalid* attribute, as shown below:

```
<form>
      <input type="text" placeholder="Your PIN" required
             oninvalid="this.setCustomValidity('PIN is mandatory')" />
      <br />
      <input type="submit" value="Enter" />
</form>
```

Note In general, you use the *oninvalid* attribute to specify any JavaScript code that should run when the content of an input field is invalid, either when that field value was required and left blank or when its content failed validation.

Validating against regular expressions

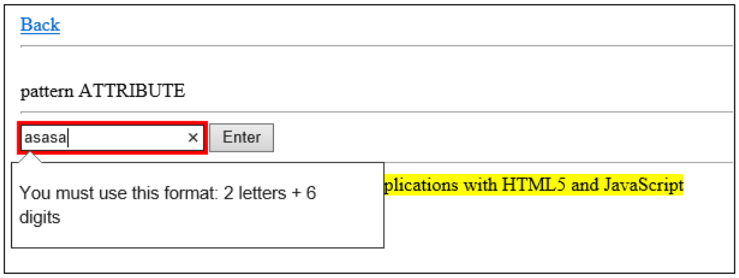
Table 2-1 lists popular new types of input fields supported by HTML5-compliant browsers. If your page is expected to collect a date, then you can use an input date field; likewise, you can use a numeric input field if you need to collect a number and so forth. But what if you intend to collect data formatted in a specific way that none of the predefined input types can guarantee? For example, what if you need users to enter a string with two letters followed by exactly six digits?

In HTML5, you can use the *pattern* attribute, as shown in the example below:

```
<form>
      <input type="text"
             placeholder="Your PIN"
             title="2 letters + 6 digits"
             pattern="[a-zA-Z]{2}\d{6}" />
      <br />
      <input type="submit" value="Enter" />
</form>
```

When you use the *pattern* attribute, Internet Explorer 10 requires that you also indicate the *title* attribute—usually used to add a tooltip to most HTML elements. The text of the *title* attribute is combined with a default static message to produce some feedback to the user when the content of the field is invalid.

Figure 2-10 shows how Internet Explorer 10 deals with patterns when the submitted content is invalid.



You must use this format: 2 letters + 6 digits

FIGURE 2-10 The *pattern* attribute in action.

The value of the *pattern* attribute has to be a *regular expression*. Regular expressions can get very complex; in fact, they're a topic worthy of a complete book, but learning the basics of regular expression use isn't too difficult. For more information on regular expressions, you can check out *http://www.regular-expressions.info*.

Forms and input validation

Each HTML form should contain a submit button; when the submit button is pushed the browser collects the content of the input fields and prepares to post it to the specified URL. Up until HTML5, the browser was not responsible for validating the content of the form. Developers, though, could hook up validation to the process using a bit of JavaScript code.

Validating a form entails checking that each input field in the form contains valid content. Although the HTML5 standard doesn't mandate browsers to validate the content of a form, this is indeed what happens by default with most browsers. HTML5 browsers give you a chance to disable validation on the entire form, but not on individual fields. You can disable form validation by using the *novalidate* attribute, as shown below in the file *novalidate.htm*:

```
<form novalidate>
      <input type="text" placeholder="Your PIN"
             title="2 letters + 6 digits"
             pattern="[a-zA-Z]{2}\d{6}" />
      <br />
      <input type="submit" value="Enter" />
</form>
```

In this case, the content of the form is submitted to the server regardless of the data held by input fields.

If the form contains multiple submit buttons, you can enable or disable validation on a per-button basis so that validation occurs if users, say, click the first button but not the second. To disable validation when the form is submitted via a particular submit button, you add the *formnovalidate* attribute as follows:

```
<input type="submit" value="..." formnovalidate />
```

Note The *formnovalidate* attribute overrides the form's *novalidate* attribute if both are set.

Multimedia elements

HTML5 offers two new markup elements that developers can use to play audio and video files from within webpages without resorting to external plug-ins such as Flash and Silverlight. The entire infrastructure to play audio and video (including graphical feedback to users) now is provided natively by the browser.

The *audio* element

To embed audio content into HTML documents, you use the <*audio*> element. The syntax is trivial, as the example below shows:

```
<audio src="/hello.mp3">
   <p>Your browser does not support the audio element.</p>
</audio>
```

Optionally, you can incorporate some markup in the body of the <*audio*> element to be used in case the browser can't deal successfully with the <*audio*> element. Next, you'll explore a bit more about how to embed audio in HTML5 pages.

Using the <*audio*> element

The <*audio*> element supports a variety of attributes, as listed in Table 2-2. Of these, the most important is *src*, which you use to point to the location of the actual audio stream.

TABLE 2-2 Attributes of the <*audio*> element

Attribute	Description
autoplay	Indicates that the audio will start playing as soon as the content is available to the browser.
controls	Instructs the browser to display audio controls, such as the play and pause buttons.
loop	Indicates that the audio will automatically restart after it is finished.
preload Note that the preload attribute is ignored if the autoplay attribute is also present.	Instructs the browser on how to load the audio content when the page loads. Allowed values are none, meaning that no content should be preloaded; auto, meaning that the entire content should be downloaded when the page loads; and metadata, meaning that only content metadata should be preloaded on page display.
src	Indicates the URL of the audio file, whether local or remote.

So far, I have referred to audio content in a rather generic way, without mentioning specific audio formats such as MP3 or WAV. This is a major problem with HTML5-compliant browsers: Not all browsers support the same set of audio formats by default (without resorting to external components).

The problem of codecs

An audio file is a sequence of bytes that codec software decodes for playing. An audio file, therefore, can be encoded in a variety of formats, each requiring an ad hoc codec—MP3, WAV, OGG, and more. More often than not, a codec is a piece of software that implements patented algorithms, so embedding a codec directly in the browser may pose copyright issues.

The current HTML5 standard doesn't make an official ruling about codecs, so deciding on the format to support will remain up to the browser vendors for now.

From a developer's perspective, this is not great news. Different browsers support different audio formats, leaving developers with the problem of working out the most effective way to play audio from the same page on different browsers.

Supported codecs

The simplest way of approaching the problem of multiple codecs is to provide multiple files so the browser can choose the most appropriate for its capabilities. In other words, instead of linking the *<audio>* element to just one audio file and codec, you link it to multiple sources. You no longer use the *src* attribute; instead, you resort to a set of *<source>* elements inside the *<audio>* element. Here's an example of playing an audio file using *<source>* elements:

```
<audio controls autoplay>
      <source src="hello.ogg" type="audio/ogg" />
      <source src="hello.mp3" type="audio/mp3" />
      <p>Your browser does not support the audio element.</p>
</audio>
```

The *<source>* elements link to different audio files. The browser will use the first format it knows how to support. While simple to implement, this approach is not free of issues—in the sense that it requires you to have each audio file available converted into multiple formats and stored on the server in multiple copies.

A basic guideline is that the OGG format is not subject to software patents. OGG will work in Firefox, Opera, and Chrome. To target Safari and Internet Explorer, you need to use MP3 encoding instead.

The *video* element

To embed video content into HTML documents, you use the *<video>* element. The syntax is just as trivial as what you have seen for the *<audio>* element:

```
<video src="/hello.mp4">
   <p>Your browser does not support the video element.</p>
</video>
```

Similarly, you can optionally incorporate some markup in the body of the *<video>* element to be used in case the browser can't deal with video successfully.

Using the *<video>* element

Table 2-3 presents the list of attributes you can use to customize the aspect and behavior of the *<video>* element in HTML5-compliant browsers.

TABLE 2-3 Attributes of the *<video>* element

Attribute	Description
autoplay	Indicates that the video will start playing as soon as the content is available to the browser.
controls	Instructs the browser to display video controls such as the play and pause buttons.
height	Indicates the desired height of the video player in the HTML document.
loop	Indicates that the video will automatically restart after it is finished.
muted	Indicates that the video sound should be muted off.
poster	Instructs the browser to display a specified image while the video content is downloading, or until the user chooses to play the video.
preload Note that the preload attribute is ignored if the autoplay attribute is also present.	Instructs the browser on how to load the video content when the page loads. Allowed values are *none*, meaning that no content should be preloaded; *auto*, meaning that the entire content should be downloaded when the page loads; and *metadata*, meaning that only content metadata should be preloaded on page display.
src	Indicates the URL of the video file to play, whether local or remote.
width	Indicates the desired width of the video player in the HTML document.

It is highly recommended that you always set both width and height in a *<video>* element. This helps the browser to reserve enough space while rendering the page. In addition, you should always set width and height to the real size of the video clip you plan to incorporate. If you downsize the video player, you force the browser to do even more work. Keep in mind that downsizing a video won't save the user any download time. If you have a video that is too large for the page, you should resize it with an ad hoc program first, and then link it using its new size.

Figure 2-11 shows how Internet Explorer 10 renders a *video* element.

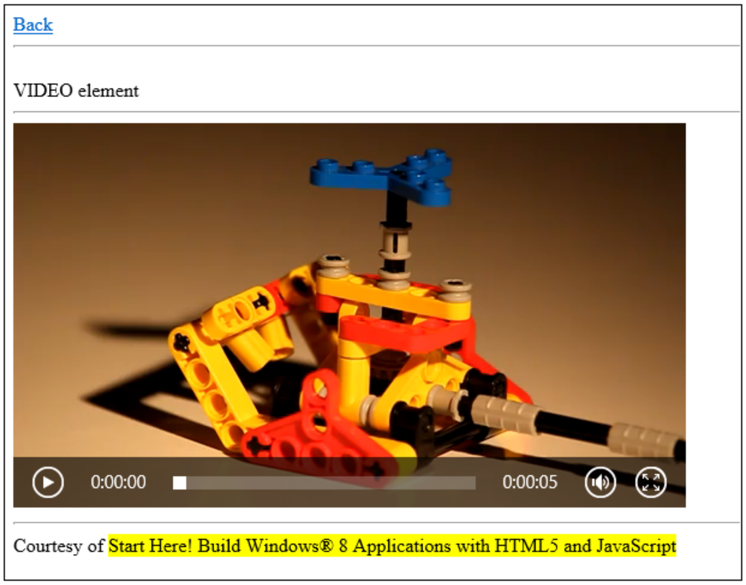

Back
VIDEO element
0:00:00
0:00:05
Courtesy of Start Here! Build Windows® 8 Applications with HTML5 and JavaScript

FIGURE 2-11 The *video* element in action.

Supported codecs

When it comes to codecs, video suffers from the same issues that audio does. Therefore, it requires the same workaround.

You should not use the *src* attribute unless you are well aware of the concrete risk that the video may not be playable on some browsers. To gain the widest support from HTML5-compliant browsers, you should use the <*source*> element. Here's the rewritten content of the sample *video.html* file:

```
<video controls width="320" height="240">
      <source src="/sample.ogg" type="video/ogg" />
      <source src="/sample.mp4" type="video/mp4" />
      <p>Your browser does not support the video element.</p>
</video>
```

Just as for audio, the <*source*> elements link to different video clips and the browser will use the first format it knows how to support. As a guideline, you should plan to have an MP4-encoded video for Internet Explorer and Safari, and OGG for all other browsers.

Summary

HTML has been around for a couple of decades, but it only recently underwent significant syntax changes. The new HTML5 specification clears out some obsolete elements and adds new markup elements for specific (and common) tasks. New elements have stronger semantics that make it obvious what they are for—such as *header*, *footer*, *menu*, *section*, and more.

These new elements, however, live side by side with older and, semantically speaking, more generic elements such as *DIV*. The result is that sometimes you have two or more ways to achieve the same rendering—using direct HTML5 elements or a combination of more generic elements. If you plan to target HTML5 browsers, using new elements keeps your markup easier to read and understand—in a word, simpler.

The purpose of this book is to build Windows 8 applications, as opposed to classic websites, which makes the differences between older HTML and HTML5 unimportant: this book uses HTML5 all the way through. However, if your goal is to build a website for the general public, then integrating HTML5 in the markup of the pages is much more difficult. For web applications, you will need to deal with browser differences and ensure that the behavior is uniform across major browsers.

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About the authors

Dino Esposito, a long-time trainer and top-notch consultant, is the author of many popular books for Microsoft Press that have helped the professional growth of thousands of .NET developers and architects. Dino is the CTO of a fast-growing company that provides software and mobile services to professional sports, and currently is also a technical evangelist for JetBrains, where he focuses on Android and Kotlin development, and is a member of the team that manages WURFL—the database of mobile devices used by organizations such as Google and Facebook. Follow Dino on Twitter at @despos and on *http://software2cents.wordpress.com*.

Even though he's still a teenager (he's only 15), **Francesco Esposito** has accumulated significant experience with mobile application development for a variety of platforms, including iOS with Objective C and MonoTouch, Android via Java, Windows Phone, and even BlackBerry. He wrote most of the code for IBI12—the official multi-platform app for the Rome ATP Masters 1000 tennis tournament.

When not writing apps, hanging out with friends, or practicing water polo, he likes going to school, where his secret goal is to achieve the highest marks ever so he can get a scholarship to Harvard or just buy his own Surface tablet.