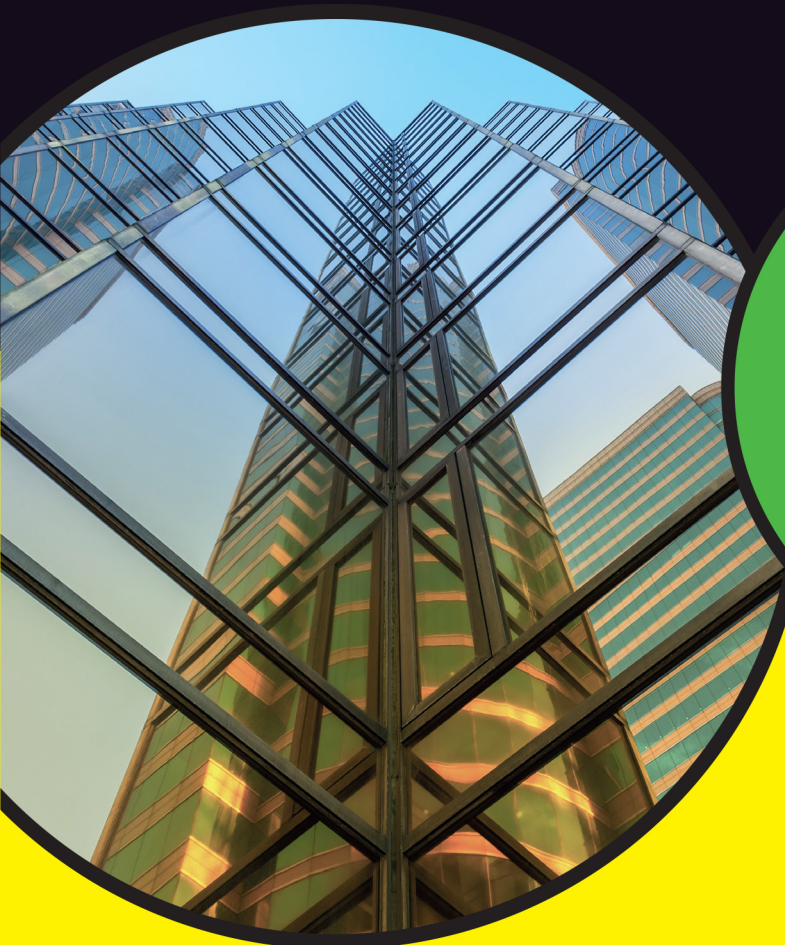2nd Edition

Windows 10
ALL-IN-ONE

For dummies

10 Books in one!

Woody Leonhard

Windows 10

ALL-IN-ONE

for

dummies®

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Windows 10

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by Woody Leonhard

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Windows 10 All-in-One For Dummies®, 2nd Edition

Contents at a Glance

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Introduction

Think of Windows 8/8.1 as an extended, really bad, no good, horrible nightmare. Microsoft's woken up now. They fired almost everybody who ran the Win8 operation, cleaned out the house, and brought in some truly gifted engineers. Windows 10's a brand new day. Whether it's *your* brand new day is another story.

Windows 10 looks a little bit like Windows 7 and a little bit like Windows 8.1. It doesn't work like either of them, but for the billion-and-a-half Windows users out there, at least it's recognizable as Windows.

If you haven't yet taken the plunge with Windows 10, I advise you to go slowly. Microsoft is furiously working on extending the product and shoring up problems. The Windows 10 you know today will change in a few months, and you may like the new one better. Before installing Windows 10, I would simply . . . count to ten.

For most Windows 8 and 8.1 users, Win10 is a no-brainer. You can kvetch about some problems — the disappearance of Windows Media Center, for example — and Microsoft cloud storage OneDrive users are going to have a hard time adapting to the now-you-see-it-now-you-don't interface (see Book 6, Chapter 1) until Microsoft figures out how to fix it. There are dozens of additional details, but by and large, Windows 10 is what Windows 8.1 should've been.

Windows 7 users, though, don't have as much incentive to move to Windows 10, but there are some good changes. Microsoft effectively ditched Internet Explorer and built a much lighter and more capable browser, called Microsoft Edge. Instead of desktop gadgets, which in Win7 were held together with baling wire and chewing gum, Win10 sports an entire infrastructure for tiled Universal apps. Win10 works with all the new hardware, touch, and pens. There's an improved Task Manager, File Explorer, and a dozen other system utilities.

Is that enough to convince Win7 users to abandon ship in droves? Probably not. The single biggest allure of Windows 10 for the Win7 battle-hardened is that it's clearly the way of the future.

If you want a better Windows, for whatever reason, you'll have to go through Windows 10.

Here's what you should ask yourself before you move from Windows 7 to Windows 10:

>> Are you willing to learn a new operating system, with a number of new features that may or may not appeal to you?

>> Are you willing to let Microsoft snoop on your actions, more than they do with Windows 7? We don't know exactly what's being snooped, but it appears to be roughly on par with Google snooping and arguably less intrusive than Apple snooping.

>> Are you willing to let Microsoft take control of your machine? MS has already shown that it can take Win7 and 8.1 machines to town, with the Get Windows 10 campaign. But in Win10, it's considerably more difficult to keep patches at bay.

This isn't the manual Microsoft forgot. This is the manual Microsoft wouldn't dare print. I won't feed you the Microsoft party line or make excuses for pieces of Windows 10 that just don't work: Some of it's junk, some of it's evolving, and some of it's devolving. My job is to take you through the most important parts of Windows, give you tips that may or may not involve Microsoft products, point out the rough spots, and guide you around the disasters. Frankly, there are some biggies.

I also look at using non-Microsoft products in a Windows way: iPads, Androids, Kindles, Gmail and Google apps, Facebook, Twitter, Dropbox, Firefox, Google Chrome, iCloud, and many more. Even though Microsoft competes with just about every one of those products, each has a place in your computing arsenal and ties into Windows in important ways.

I'll save you more than enough money to pay for the book several times over, keep you from pulling out a whole shock of hair, lead you to dozens if not hundreds of "Aha!" moments, and keep you awake in the process. Guaranteed.

About This Book

Windows 10 All-in-One For Dummies takes you through the Land of the Dummies — with introductory material and stuff your grandmother can (and should!) understand — and then continues the journey into more advanced areas, where you can truly put Windows to work every day.

I start with the new Start menu, and for many of you, that's all you'll ever need. The Start menu coverage here is the best you'll find anywhere because I don't assume that you know Windows and I step you through everything you need to know both with a touchscreen and a mouse.

Then I dig in to the desktop and take you through all the important pieces.

I don't dwell on technical mumbo jumbo, and I keep the baffling jargon to a minimum. At the same time, though, I tackle the tough problems you're likely to encounter, show you the major road signs, and give you lots of help where you need it the most.

Whether you want to get two or more email accounts set up to work simultaneously, turn your tiles a lighter shade of pale, or share photos of your Boykin Spaniel in OneDrive, this is your book. Er, I should say ten books. I've broken out the topics into ten minibooks, so you'll find it easy to hop around to a topic — and a level of coverage — that feels comfortable.

I didn't design this book to be read from front to back. It's a reference. Each chapter and each of its sections are meant to focus on solving a particular problem or describing a specific technique.

Windows 10 All-in-One For Dummies should be your reference of first resort, even before you consult Windows Help and Support. There's a big reason why: Windows Help was written by hundreds of people over the course of many, many years. Some of the material was written ages ago, and it's confusing as all get-out, but it's still in Windows Help for folks who are tackling tough legacy problems. Some of the Help file terminology is inconsistent and downright misleading, largely because the technology has changed so much since some of the articles were written. Finding help in Help frequently boggles my mind: If I don't already know the answer to a question, it's hard to figure out how to coax Help to help. Besides, if you're looking for help on connecting your iPad to your PC or downloading pictures from your Galaxy phone, Microsoft would rather sell you something different. The proverbial bottom line: I don't duplicate the material in Windows 10 Help and Support, but I point to it if I figure it can help you.

A word about Windows 10 versions: Microsoft is trying to sell the world on the idea that Windows 10 runs on everything — desktops, laptops, tablets, phones, assisted reality headsets, huge banks of servers, giant conference room displays, refrigerators, and toasters. While that's literally true — Microsoft can call anything Windows 10 if it wants — for those of us who work on desktops and laptops,

Windows 10 is Windows 10. If you're getting Windows 10 on a tablet, you need to check to see if it's the version that runs on phones. Windows 10 Mobile has some small resemblance to what's presented here, but this book won't take you through the tough times.

Foolish Assumptions

I don't make many assumptions about you, dear reader, except to acknowledge that you're obviously intelligent, well-informed, discerning, and of impeccable taste. That's why you chose this book, eh?

Okay, okay. The least I can do is butter you up a bit. Here's the straight scoop: If you've never used Windows, bribe your neighbor (or, better, your neighbor's kids) to teach you how to do four things:

>> Play a game with your fingers (if you have a touchscreen) or with a mouse (if you're finger-challenged). Any of the games that ship with Windows 10, or free games in the Windows Store, will do. If your neighbor's kids don't have a different recommendation, try the new Microsoft Solitaire Collection.

>> Start File Explorer.

>> Get on the web.

>> Turn Windows off. (Click or tap the Start icon in the lower left of the screen, click the universal on/off button thingy, and then click Shut down.)

That covers it. If you can play a game, you know how to turn on your computer, log in if need be, touch and drag, and tap and hold down. If you run File Explorer, you know how to click a taskbar icon. After you're on the web, well, it's a great starting point for almost anything. And if you know that you need to use the Start menu, you're well on your way to achieving Windows 10 Enlightenment.

And that begins with Book 1, Chapter 1.

Icons Used in This Book

Some of the points in *Windows 10 All-in-One For Dummies* merit your special attention. I set off those points with icons.

When I'm jumping up and down on one foot with an idea so absolutely cool that I can't stand it anymore, I stick a tip icon in the margin. You can browse any chapter and hit its highest points by jumping from tip to tip.

When you see this icon, you get the real story about Windows 10 — not the stuff that the Microsoft marketing droids want you to hear — and my take on the best way to get Windows 10 to work for you. You find the same take on Microsoft, Windows, and more at my eponymous website, `www.AskWoody.com`.

You don't need to memorize the information marked with this icon, but you should try to remember that something special is lurking.

Achtung! Cuidado! Thar be tygers here! Anywhere that you see a warning icon, you can be sure that I've been burnt — badly. Mind your fingers. These are really, really mean suckers.

Okay, so I'm a geek. I admit it. Sure, I love to poke fun at geeks. But I'm a modern, New Age, sensitive guy, in touch with my inner geekiness. Sometimes, I just can't help but let it out, ya know? That's where the technical stuff icon comes in. If you get all tied up in knots about techie-type stuff, pass these paragraphs by. (For the record, I managed to write this entire book without telling you that an IPv4 address consists of a unique 32-bit combination of network ID and host ID, expressed as a set of four decimal numbers with each octet separated by periods. See? I can restrain myself sometimes.)

Beyond the Book

At the time I wrote this book, I covered Windows 10 Anniversary Update, version 1607. Microsoft promises to keep Windows 10 continuously updated, but it isn't clear exactly when or how much. For details about significant updates or changes that occur between editions of this book, go to `www.dummies.com`, search for *Windows 10 All-in-One For Dummies,* and open the Download tab on this book's dedicated page.

In addition, the cheat sheet for this book has handy Windows shortcuts and tips on other cool features worth checking out. To get to the cheat sheet, go to `www.dummies.com`, and then type *Windows 10 All-in-One For Dummies* Cheat Sheet in the search box.

Where to Go from Here

That's about it. It's time for you to crack this book open and have at it.

If you haven't yet told Windows 10 to show you filename extensions, flip to Book 3, Chapter 1. If you haven't yet set up the File History feature, go to Book 8, Chapter 1. If you're worried about Microsoft keeping a list of all the searches that you conduct *on your own computer,* check out Book 2, Chapter 5.

Don't forget to bookmark my website: www.AskWoody.com. It keeps you up to date on all the Windows 10 news you need to know — including notes about this book, the latest Windows bugs and gaffes, patches that are worse than the problems they're supposed to fix, and much more — and you can submit your most pressing questions for free consultation from The Woodmeister himself.

See ya! Shoot me mail at woody@AskWoody.com.

Sometimes, it's worth reading the Intro, eh?

1

Starting Windows 10

Contents at a Glance

Chapter 1

Windows 10 4 N00bs

Don't sweat it. We all started out as n00bs (newbies).

If you've never used an earlier version of Windows, you're in luck — you don't have to force your fingers to forget so much of what you've learned. Windows 10 is completely different from any Windows that has come before. It's a melding of Windows 7 and Windows 8 and 8.1, tossed into a blender, speed turned up full, poured out on your screen.

If you heard that Windows 8 was a dog, you heard only the printable part of the story. By clumsily forcing a touchscreen approach down the throats of mouse-lovers everywhere, Windows 8 alienated the touch-first people, drove the mousers nuts, and left everybody — aside from a few diehards — screaming in pain.

Windows 10 brings a kinder, gentler approach for the 1.7 billion or so people who have seen the Windows desktop and know a bit about struggling with it. Yes, Win10 will expose you to those tappy phone-style tiles, but they aren't nearly as intrusive, or as scary, as you think.

Some of you are reading this book because you specifically chose to run Windows 10. Some of you are here because Windows 10 came preinstalled on a new computer. Some of you are here because your work forced you to upgrade to Win10. Some of you are here because you fell victim to Microsoft's much-maligned "Get Windows 10" campaign or you figured you better get on Win10 while the gettin's good. Whatever the reason, you've ended up on a pretty good operating system and — as long as you understand and respect its limitations — it should serve you well.

So you're sitting in front of your computer, and this thing called Windows 10 is staring at you. Except the screen (see Figure 1-1), which Microsoft calls the lock screen, doesn't say *Windows,* much less *Windows 10.* In fact, the screen doesn't say much of anything except the current date and time, with maybe a tiny icon or two that shows you whether your Internet connection is working, how many unopened emails await, or whether you should just take the day off because your holdings in AAPL stock soared again.

9:11
Wednesday, May 25
47
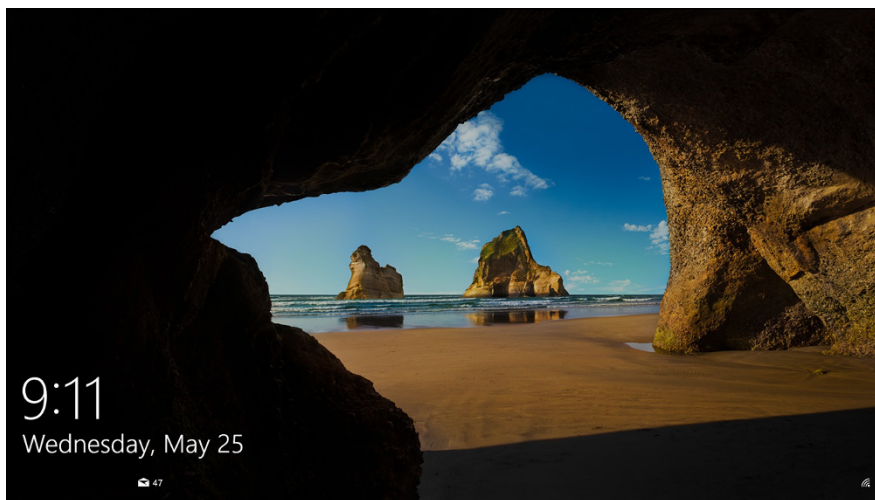
You may be tempted to just sit and admire the gorgeous picture, whatever it may be, but if you use your finger or mouse to swipe up from the bottom, or press any key on an attached keyboard, you see the login screen, possibly resembling the one in Figure 1-2. If more than one person is set up to use your computer, you'll see more than one name.

That's the login screen, but it doesn't say *Login* or *Welcome to Win10 Land* or *Howdy* or even *Sit down and get to work, Bucko.* It has names and pictures for only the people who can use the computer. Why do you have to click your name? What if

your name isn't there? And why in the %$#@! can't you bypass all this garbage, log in, and get your email?
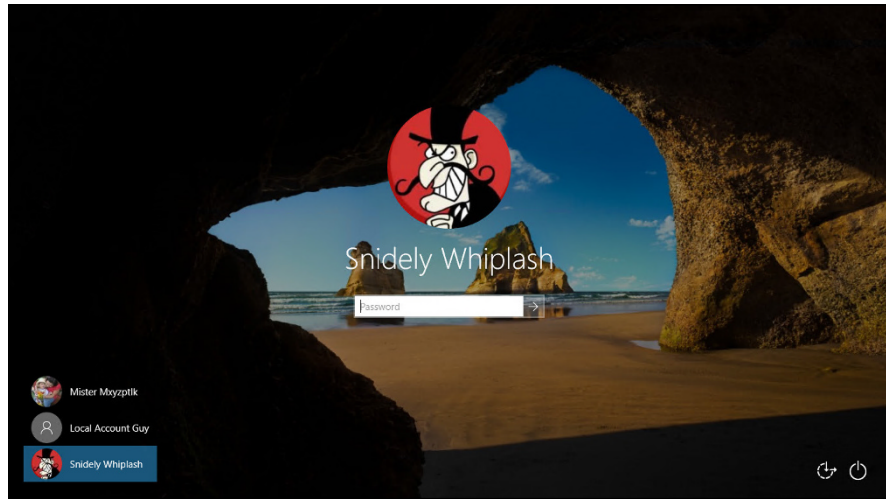
FIGURE 1-2:
The Windows 10
login screen.

Good for you. That's the right attitude.

Windows 10 ranks as the most sophisticated computer program ever made. It cost more money to develop and took more people to build than any previous computer program — ever. So why is it so blasted hard to use? Why doesn't it do what you want it to do the first time? For that matter, why do you need it at all?

Someday, I swear, you'll be able to pull a PC out of the box, plug it into the wall, turn it on, and then get your email, look at the news, or connect to Facebook — bang, bang, bang, just like that, in ten seconds flat. In the meantime, those stuck in the early 21st century have to make do with PCs that grow obsolete before you can unpack them, software so ornery that you find yourself arguing with it, and Internet connections that surely involve turtles carrying bits on their backs.

If you aren't comfortable working with Windows and you still worry that you may break something if you click the wrong button, welcome to the club! In this chapter, I present a concise, school-of-hard-knocks overview of how all this hangs together and what to look for when buying a Windows computer. It may help you understand why and how Windows has limitations. It also may help you communicate with the geeky rescue team that tries to bail you out, whether you rely on the store that sold you the PC, the smelly guy in the apartment downstairs, or your 8-year-old daughter's nerdy classmate.

Hardware and Software

At the most fundamental level, all computer stuff comes in one of two flavors: hardware or software. *Hardware* is anything you can touch — a computer screen, a mouse, a hard drive, a DVD drive (remember those coasters with shiny sides?). *Software* is everything else: email messages, that letter to your Aunt Martha, digital pictures of your last vacation, programs such as Microsoft Office. If you shoot a bunch of pictures, the pictures themselves are just bits — software. But they're probably sitting on some sort of memory card inside your phone or camera. That card's hardware. Get the difference?

Windows 10 is software. You can't touch it. Your PC, on the other hand, is hardware. Kick the computer screen, and your toe hurts. Drop the big box on the floor, and it smashes into a gazillion pieces. That's hardware.

Chances are very good that one of the major PC manufacturers — Lenovo, HP, Dell, Acer, ASUS, or Toshiba, for example — or maybe even Microsoft, with its Surface line, or even Apple, made your hardware. Microsoft, and Microsoft alone, makes Windows 10.

When you bought your computer, you paid for a license to use one copy of Windows on the PC you bought. The PC manufacturer paid Microsoft a royalty so it could sell you Windows along with your PC. (That royalty may have been, in fact, zero dollars, but it's a royalty nonetheless.) You may think that you got Windows from, say, Dell — indeed, you may have to contact Dell for technical support on Windows questions — but, in fact, Windows came from Microsoft.

If you upgraded from Windows 7 or 8.1 to Windows 10, you may have received a free upgrade license — but it's still a license, whether you paid for it or not. You can't give it away to someone else.

REMEMBER These days, most software, including Windows 10, asks you to agree to an End User License Agreement (EULA). When you first set up your PC, Windows asked you to click the Accept button to accept a licensing agreement that's long enough to reach the top of the Empire State Building. If you're curious about what agreement you accepted, take a look at the official EULA repository, `www.microsoft.com/en-us/ Useterms/Retail/Windows/10/UseTerms_Retail_Windows_10_English.htm`.

Why Do PCs Have to Run Windows?

Here's the short answer: You don't have to run Windows on your PC.

The PC you have is a dumb box. (You needed me to tell you that, eh?) To get the dumb box to do anything worthwhile, you need a computer program that takes control of the PC and makes it do things, such as show web pages on the screen, respond to mouse clicks or taps, or print résumés. An *operating system* controls the dumb box and makes it do worthwhile things, in ways that mere humans can understand.

Without an operating system, the computer can sit in a corner and count to itself or put profound messages on the screen, such as *Non-system disk or disk error* or maybe *Insert system disk and press any key when ready.* If you want your computer to do more than that, though, you need an operating system.

Windows is not the only operating system in town. The other big contenders in the PC and PC-like operating system game are Chrome OS, Mac OS, and Linux:

» **Chrome OS:** Cheap Chromebooks have long dominated the best-seller lists at many computer retailers, and for good reason. If you want to surf the web, work on email, compose simple documents, or do anything in a browser — which covers a whole lot of ground these days — Chrome OS is all you need. Chromebooks, which by definition run Google's Chrome OS, can't run Windows programs such as Office or Photoshop (although they *can* run web-based versions of those programs, such as Office Online or the Photoshop Express Editor). In spite of the limitations, they don't get infected and have very few maintenance problems. You can't say the same about Windows: That's why you need a thousand-page book to keep Windows going. Yes, you do need a reliable Internet connection to get the most out of Chrome OS. But some parts of Chrome OS and Google's apps, including Gmail, can work even if you don't have an active Internet connection.

Chrome OS, built on Linux, looks and feels much like the Google Chrome web browser. There are a few minor differences, but in general you feel like you're working in the Chrome browser.

For friends and family who don't have big-time computer needs, I find myself recommending a Chromebook more often than not. It's easier for them, and it's easier for me to support.

» **Mac OS:** Apple has made great strides running on Intel hardware, and if you don't already know how to use Windows or own a Windows computer, it makes a great deal of sense to consider buying an Apple computer and/or running Mac OS. Yes, you can build your own computer and run the Mac OS on it: Check out `www.hackintosh.com`. But, no, it isn't legal — the Mac OS End User License Agreement specifically forbids installation on a non-Apple-branded computer — and it's certainly not for the faint of heart.

That said, if you buy a Mac — say, a MacBook Air or Pro — it's very easy to run Windows 10 on it. Some people feel that the highest quality Windows environment today comes from running Windows on a MacBook, and for years I've run Windows on my MacBook Pro and Air. All you need is a program called BootCamp, and that's already installed, free, on the MacBook.

» **Linux:** The big up-and-coming operating system, which has been up and coming for a couple of decades now, is Linux, which is pronounced "LIN-uchs." It's a viable contender for netbooks (covered in more depth at the end of this chapter). If you expect to use your PC only to get on the Internet — to surf the web and send email from the likes of your Gmail or Hotmail account — Linux can handle all that, with few of the headaches that remain as the hallmark of Windows. By using free programs such as LibreOffice (`www.libreoffice.org`) and online programs such as Google Apps and Google Drive (`www.drive.google.com`), you can even cover the basics in word processing, spreadsheets, presentations, contact managers, calendars, and more. Linux may not support the huge array of hardware that Windows offers — but more than a few wags will tell you, with a wink, that Windows doesn't support that huge of an array, either.

WINDOWS RT, RIP

Back in the early days of Windows 8, Microsoft developed a different branch of Windows that was christened *Windows RT.* New Windows RT computers at the time were generally small, light, and inexpensive, and had a long battery life and touch-sensitive displays.

Several manufacturers made Windows RT machines, but in the end the only company that sold more than a dumpster full of them was Microsoft. Microsoft's original Surface (later renamed Surface RT) and Surface 2 ran Windows RT — and even they didn't sell worth beans.

The fundamental flaw with Windows RT? It wasn't Windows. You couldn't (and can't) run Windows programs on it. You can't upgrade the machine to real Windows. But try explaining that to a garden-variety customer. Microsoft really blew it when they gave the new, odd operating system the name *Windows RT.*

Microsoft has essentially orphaned Windows RT. If you own a Windows RT device (most likely a Microsoft Surface or Surface 2), the folks in Redmond provided one last update, called Windows RT 8.1 Update 3, which plugs what little they could muster. See `www.microsoft.com/surface/en-us/support/install-update-activate/windows-8-1-rt-update-3`.

In the tablet sphere, iOS and Android rule, with iOS for iPhones and iPads — all from Apple — and Android for phones and tablets from a bewildering number of manufacturers. Windows 10 doesn't exactly compete with any of them, although Microsoft tried to take on iPad with the now-defunct Windows RT (see the sidebar "Windows RT, RIP").

There's yet another branch of Windows, which is geared toward phones and tablets, especially 8-inch and smaller tablets. Windows 10 Mobile (see the sidebar) owes its pedigree to Windows Phone 8 and Windows RT. At least conceptually (and, in fact, under the hood in no small part), Microsoft has grown Windows Phone up and Windows RT down to meet somewhere in the middle.

ASK WOODY.COM

While some of the nostrums in this tome apply to Windows 10 Mobile, most do not. The mobile layout's different, the approach is different, the way you interact with things is different, and most of the details are different. There is, however, some overlap in the Universal apps that can run on both Windows 10 and Windows 10 Mobile, and the tiles in many cases look the same.

What do other people choose? It's hard to measure the percentage of PCs running Windows versus Mac versus Linux. One company, Net Applications, specializes in inspecting the online records of big-name websites and tallying how many Windows computers hit those sites, compared to Apple and Linux.

WINDOWS 10 MOBILE

Generally, devices with screens smaller than 9 inches run the other kind of Windows, known (at least unofficially) as Windows 10 Mobile. Yes, there are devices larger than 9 inches that run Windows 10 Mobile and devices 8 inches and smaller with the "real" Windows 10. The general argument goes like this: If you don't need to use the traditional Windows 7–style desktop, why pay for it? Windows 10 centers on the mouse-friendly desktop. Windows 10 Mobile sticks to the tiled world, and it's much more finger-friendly.

Believe me, running the Windows desktop on a 7-inch tablet takes a tiny stylus, or a pencil sharpener for your fingertips.

This book talks about Windows 10. Although some of the topics also apply to Windows 10 Mobile, there's quite a bit of difference. Since Microsoft gave up and sold its Nokia business in May 2016, the few Windows 10 phone fans have largely given up hope.

I hesitate to mention Net Applications (www.netapplications.com), because there's a great deal of controversy surrounding its sampling and error correction methods, but it's still (arguably) the best source of information on operating system penetration.

If you look at only desktop operating systems — Windows (on desktops, laptops, 2-in-1s) and Mac OS X and Linux — the numbers in mid 2016 broke as shown in Figure 1-3.

FIGURE 1-3: Web access by desktop operating system, May 2016, worldwide.
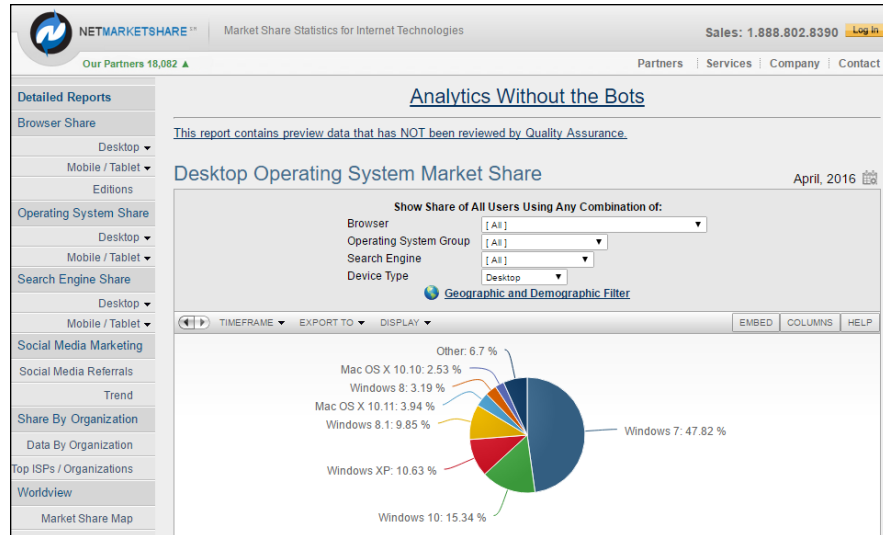
Yes, you read the graph correctly: As of mid 2016, when Windows 10 had been out for almost a year, Win10 ran only a 15 percent market share (that is, 15 percent of the browser hits recorded by Net Applications came from Win10). Windows 8 and 8.1 together got almost as much, at 13 percent, and even old WinXP hit nearly 11 percent. Win7 was the reigning champ, with a 48 percent market share. That share is declining rapidly, though, as Microsoft pushes and shoves more Win7 customers onto Windows 10.

If you look at the bigger picture, including tablets and phones, the numbers change completely. As of May 2016, Google says that more than half of the searches it handles in the US, Japan, and ten other countries come from tablets and phones, as opposed to desktops or laptops. Back in July 2015, Andreesen Horowitz reported that the number of iOS devices (iPhones, iPads) sold per month zoomed ahead of the number of Windows PCs. Traditionally, Android phones and tablets show twice the usage rate of iOS devices. Mobile operating systems are swallowing the world — and the trend's been in mobile's favor, not Windows.

ASK
WOODY.COM

Windows was once king of the computing hill. Not so any more. Which is good news for you, the Windows customer. Microsoft's branching out to make software for phones and tablets of all stripes, and Windows itself works better with whatever phones and tablets you may like.

It's a brave new Windows world.

A Terminology Survival Kit

Some terms pop up so frequently that you'll find it worthwhile to memorize them, or at least understand where they come from. That way, you won't be caught flat-footed when your first-grader comes home and asks whether he can install a Universal app on your computer.

TIP

If you want to drive your techie friends nuts the next time you have a problem with your computer, tell them that the hassles occur when you're "running Microsoft." They won't have any idea whether you mean Windows, Word, Outlook, Hotmail, Messenger, Search, Defender, or any of a gazillion other programs — and they won't know if you're talking about a Microsoft program on Windows, the Mac, iPad, iPhone, or Android.

Windows, the *operating system* (see the preceding section), is a program. So are computer games, Microsoft Office, Microsoft Word (the word processor part of Office), Google Chrome (the web browser made by Google), Xbox Video, those nasty viruses you've heard about, that screen saver with the oh-too-perfect fish bubbling and bumbling about, and others.

An *app* or a *program* is *software* (see the earlier "Hardware and Software" section in this chapter) that works on a computer. *App* is modern and cool; *program* is old and boring, *application* manages to hit both gongs, but they all mean the same thing.

A *Universal Windows* app is a program that, at least in theory, runs on any version of Windows 10. By design, Universal apps (also called Universal Windows Platform, or UWP, apps) should run on Windows 10 on a desktop, a laptop, a tablet, a phone — and even on an Xbox game console, a giant wall-mounted Surface Hub, a HoloLens augmented reality headset, and possibly Internet of Things tiny computers.

WARNING

For most people, "Universal" does not mean what they might think it means. Universal Windows apps *don't* work on Windows 8.1 or Windows 7. They don't even run on Windows RT tablets (see the "Windows RT, RIP" sidebar). They're universal only in the sense that they'll run on Windows 10. In theory.

REMEMBER

A special kind of program called a *driver* makes specific pieces of hardware work with the operating system. For example, your computer's printer has a driver, your monitor has a driver, your mouse has a driver, and Tiger Woods has a driver (several, actually, and he makes a living with them). Wish that everyone were so talented.

Many drivers ship with Windows, even though Microsoft doesn't make them. The hardware manufacturer's responsible for making its hardware work with your Windows PC, and that includes building and fixing the drivers. (Yes, if Microsoft makes your computer, Microsoft's responsible for the drivers, too.) Sometimes you can get a driver from the manufacturer that works better than the one that ships with Windows.

When you stick an app or program on your computer — and set it up so it works — you *install* the app or program (or driver).

When you crank up a program — that is, get it going on your computer — you can say you *started* it, *launched* it, *ran* it, or *executed* it. They all mean the same thing.

If the program quits the way it's supposed to, you can say it *stopped, finished, ended, exited,* or *terminated.* Again, all these terms mean the same thing. If the program stops with some sort of weird error message, you can say it *crashed, died, cratered, croaked, went belly up, jumped in the bit bucket,* or *GPFed* (techspeak for "generated a General Protection Fault" — don't ask), or employ any of a dozen colorful but unprintable epithets. If the program just sits there and you can't get it to do anything, no matter how you click your mouse or poke the screen, you can say the program *froze, hung, stopped responding,* or *went into a loop.*

A *bug* is something that doesn't work right. (A bug is not a virus! Viruses work as intended far too often.) US Navy Rear Admiral Grace Hopper — the intellectual guiding force behind the COBOL programming language and one of the pioneers in the history of computing — often repeated the story of a moth being found in a relay of an ancient Mark II computer. The moth was taped into the technician's logbook on September 9, 1947. (See Figure 1-4.)

The people who invented all this terminology think of the Internet as being some great blob in the sky — it's *up,* as in "up in the sky." So if you send something from your computer to the Internet, you're *uploading.* If you take something off the Internet and put it on your computer, you're *downloading.*

The *cloud* is just a marketing term for the Internet. Saying that you put your data "in the cloud" sounds so much cooler than saying you copied it to storage on the Internet. Programs can run in the cloud — which is to say, they run on the Internet. Just about everything that has anything to do with computers can now be done in the cloud. Just watch your pocketbook.

Photo # NH 96566-KN (Color) First Computer "Bug", 1947
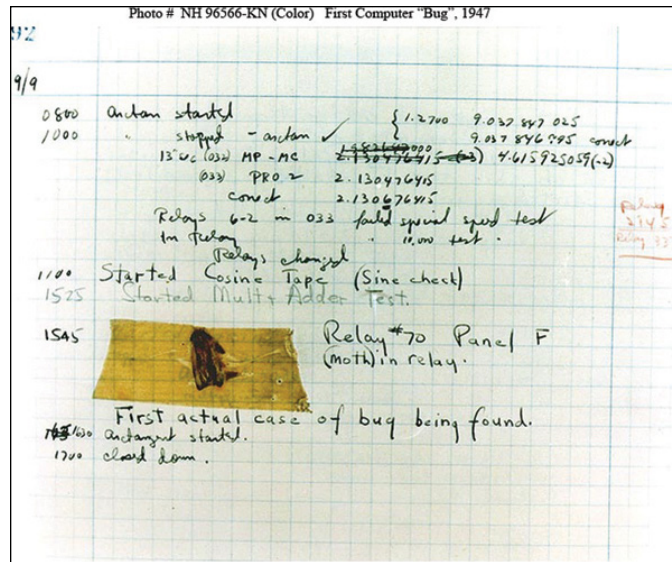
FIGURE 1-4:
Admiral Grace
Hopper's log of
the first actual
case of a bug
being found.

Source: US Navy

REMEMBER

If you use *cloud storage*, you're just sticking your data on some company's computer. Put a file in Microsoft OneDrive, and it actually goes onto one of Microsoft's computers. Put it in Google Drive, and it goes to Google's storage in the sky. Move it to Dropbox, and it's sitting on a Dropbox computer.

When you put computers together, you *network* them, and if your network doesn't use wires, it's commonly called a *Wi-Fi network.* At the heart of a network sits a box, commonly called a *hub,* or a *router,* that computers can plug in to. If the hub has rabbit ears on top for wireless connections, it's usually called a *Wi-Fi router.* (Some Wi-Fi routers may not have antennae outside.) Yes, there are fine lines of distinction among all these terms. No, you don't need to worry about them.

There are two basic ways to hook up to the Internet: *wired* and *wireless.* Wired is easy: You plug it into a router or some other box that connects to the Internet. Wireless falls into two categories: Wi-Fi connections, as you'll find in many homes, coffee shops, airports, and some exceptionally enlightened cities' common areas; and cellular (mobile phone–style) wireless connections.

Cellular Wireless Internet connections are usually identified with one of the G levels: 2G, 3G, 4G, or maybe even 5G. Each G level should be faster than its predecessor.

This part gets a little tricky. If your phone can connect to a 3G or 4G network, it may be possible to set your phone up to behave like a Wi-Fi router: Your computer talks to the phone, the phone talks to the Internet over its 3G or 4G connection.

That's called *tethering* — your laptop is tethered to your phone. Not all phones can tether, and not all phone companies allow it.

Special boxes called *Mobile Hotspot* units work much the same way: The Mobile Hotspot connects to the 3G or 4G connection, and your laptop gets tethered to the Mobile Hotspot box.

If you plug your Internet connection into the wall, you have *broadband,* which may run via *fiber* (a cable that uses light waves), *DSL* or *ADSL* (which uses regular old phone lines), *cable* (as in cable TV), or *satellite.* The fiber, DSL, cable, or satellite box is commonly called a *modem,* although it's really a *router.* Although fiber optic lines are inherently much faster than DSL or cable, individual results can be all over the lot. Ask your neighbors what they're using and then pick the best. If you don't like your current service, vote with your wallet.

ASK
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Turning to the dark side of the force, Luke, the distinctions among *viruses, worms,* and *Trojans* grow blurrier every day. In general, they're programs that replicate and can be harmful, and the worst ones blend different approaches. *Spyware* gathers information about you and then phones home with all the juicy details. *Adware* gets in your face, all too frequently installing itself on your computer without your knowledge or consent. *Ransomware* scrambles (or threatens to scramble) your data and demands a payment to keep the data intact. I tend to lump the three together and call them *scumware* or *crapware* or something a bit more descriptive and less printable.

If a bad guy (and they're almost always guys) manages to take over your computer without your knowledge, turning it into a zombie that spews spam by remote control, you're in a *botnet.* (And yes, the term *spam* comes from the immortal *Monty Python* routine that's set in a cafe serving Hormel's SPAM luncheon meat, the chorus bellowing "lovely Spam, wonderful Spam.") Check out Book 9 for details about preventing scumware and the like from messing with you.

The most successful botnets employ *rootkits* — programs that run underneath Windows, evading detection because normal programs can't see them. The number of Windows 10 computers running rootkits is probably two or three or four orders of magnitudes less than the number of zombified XP computers. But as long as Windows XP computers are out there, botnets will continue to be a major threat to everyone.

ASK
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This section covers about 90 percent of the buzzwords you hear in common parlance. If you get stuck at a party where the bafflegab is flowing freely, don't hesitate to invent your own words. Nobody will ever know the difference.

What, Exactly, Is the Web?

Five years from now (although it may take ten), the operating system you use will be largely irrelevant, as will be the speed of your computer, the amount of memory you have, and the number of terabytes of storage that hum in the background. Microsoft will keep milking its cash cow, but the industry will move on. Individuals and businesses will stop shelling out big bucks for Windows and the iron to run it. Instead, the major push will be online. Rather than spend money on PCs that become obsolete the week after you purchase them, folks will spend money on big data pipes: It'll be less about me and more about us. Why? Because so much more is "out there" than "in here." Count on it.

But what is the Internet? This section answers this burning question (if you've asked it). If you don't necessarily wonder about the Internet's place in space and time just yet, you will . . . you will.

You know those stories about computer jocks who come up with great ideas, develop the ideas in their basements (or garages or dorm rooms), release their products to the public, change the world, and make a gazillion bucks?

This isn't one of them.

The Internet started in the mid-1960s as an academic exercise — primarily with the RAND Corporation, the Massachusetts Institute of Technology (MIT), and the National Physical Laboratory in England — and rapidly evolved into a military project, under the US Department of Defense Advanced Research Project Agency (ARPA), designed to connect research groups working on ARPA projects.

By the end of the 1960s, ARPA had four computers hooked together — at UCLA, SRI (Stanford), UC Santa Barbara, and the University of Utah — using systems developed by BBN Technologies (then named Bolt Beranek and Newman, Inc.). By 1971, it had 18. I started using ARPANET in 1975. According to the website `www.internetworldstats.com`, by the end of June 2014, the Internet had more than 3 billion users worldwide.

Today, so many computers are connected directly to the Internet that the Internet's addressing system is running out of numbers, just as your local phone company is running out of telephone numbers. The current numbering system — named *IPv4* — can handle about 4 billion addresses. The next version, named *IPv6*, can handle this number of addresses:

340,000,000,000,000,000,000,000,000,000,000,000,000

That should last for a while, don'tcha think?

Ever wonder why you rarely see hard statistics about the Internet? I've found two big reasons:

>> Defining terms related to the Internet is devilishly difficult these days. (What do you mean when you say "*X* number of computers are connected to the Internet"? Is that the number of computers up and running at any given moment? The number of different addresses that are active? The number that could be connected if everybody dialed up at the same time? The number of different computers that are connected in a typical day, or week, or month?)

>> The other reason is that the Internet is growing so fast that any number you publish today will be meaningless tomorrow.

Getting inside the Internet

Some observers claim that the Internet works so well because it was designed to survive a nuclear attack. Not so. The people who built the Internet insist that they weren't nearly as concerned about nukes as they were about making communica-tion among researchers reliable, even when a backhoe severed an underground phone line or one of the key computers ground to a halt.

As far as I'm concerned, the Internet works so well because the engineers who laid the groundwork were utter geniuses. Their original ideas from 50 years ago have been through the wringer a few times, but they're still pretty much intact. Here's what the engineers decided:

>> **No single computer should be in charge.** All the big computers connected directly to the Internet are equal (although, admittedly, some are more equal than others). By and large, computers on the Internet move data around like kids playing hot potato — catch it, figure out where you're going to throw it, and let it fly quickly. They don't need to check with some übercomputer before doing their work; they just catch, look, and throw.

>> **Break the data into fixed-size packets.** No matter how much data you're moving — an email message that just says "Hi" or a full-color, life-size photo-graph of the Andromeda galaxy — the data is broken into packets. Each packet is routed to the appropriate computer. The receiving computer assembles all the packets and notifies the sending computer that everything came through okay.

>> **Deliver each packet quickly.** If you want to send data from Computer A to Computer B, break the data into packets and route each packet to Computer B by using the fastest connection possible — even if that means some packets go through Bangor and others go through Bangkok.

Taken together, those three rules ensure that the Internet can take a lickin' and keep on tickin'. If a chipmunk eats through a telephone line, any big computer that's using the gnawed line can start rerouting packets over a different telephone line. If the Cumbersome Computer Company in Cupertino, California, loses power, computers that were sending packets through Cumbersome can switch to other connected computers. It usually works quickly and reliably, although the techniques used internally by the Internet computers get a bit hairy at times.

Big computers are hooked together by high-speed communication lines: the *Internet backbone.* If you want to use the Internet from your business or your house, you have to connect to one of the big computers first. Companies that own the big computers — Internet service providers (ISPs) — get to charge you for the privilege of getting on the Internet through their big computers. The ISPs, in turn, pay the companies that own the cables (and satellites) that comprise the Internet backbone for a slice of the backbone.

If all this sounds like a big-fish-eats-smaller-fish-eats-smaller-fish arrangement, that's quite a good analogy.

It's backbone-breaking work, but somebody's gotta do it.

What is the World Wide Web?

People tend to confuse the World Wide Web with the Internet, which is much like confusing the dessert table with the buffet line. I'd be the first to admit that desserts are mighty darn important — life-critical, in fact, if the truth be told. But they aren't the same as the buffet line.

To get to the dessert table, you have to stand in the buffet line. To get to the web, you have to be running on the Internet. Make sense?

The World Wide Web owes its existence to Tim Berners-Lee and a few co-conspirators at a research institute named CERN in Geneva, Switzerland. In 1990, Berners-Lee demonstrated a way to store and link information on the Internet so that all you had to do was click to jump from one place — one web page — to another. Nowadays, nobody in his right mind can give a definitive count of the number of pages available, but Google has indexed more than 50 billion of them. By some estimates, there are trillions of individual web pages.

Like the Internet itself, the World Wide Web owes much of its success to the brilliance of the people who brought it to life. The following list describes the ground rules:

>> Web pages, stored on the Internet, are identified by an address, such as
   `www.dummies.com`. The main part of the web page address — dummies.com,

for example — is a *domain name.* With rare exceptions, you can open a web page by simply typing its domain name and pressing Enter. Spelling counts, and underscores (_) are treated differently from hyphens (-). Being close isn't good enough — there are just too many websites. As of this writing, DomainTools (`www.domaintools.com`) reports that about 300 million domain names end in .com, .net, .org, .info, .biz, or .us. That's just for the United States. Other countries have different naming conventions: .co.uk, for example, is the UK equivalent of .com.

» Web pages are written in the funny language HyperText Markup Language (HTML). HTML is sort of a programming language, sort of a formatting language, and sort of a floor wax, all rolled into one. Many products claim to make it easy for novices to create powerful, efficient HTML. Some of those products are getting close.

» To read a web page, you have to use a web browser. A *web browser* is a program that runs on your computer and is responsible for converting HTML into text that you can read and use. The majority of people who view web pages use Google's Chrome web browser, although Firefox, Microsoft's Internet Explorer, and the new Edge browser in Win10 are all contenders. IE is still inside Windows 10, but you have to dig deep to find it. (Hint: Click the Start icon, All Apps, Windows Accessories.) For almost all people, almost all the time, Chrome works better than Internet Explorer: It's much more secure, faster, and not as dependent on things that can go bump in the night.

» More and more people (including me!) prefer Firefox (see `www.mozilla.org`) or Chrome, from Google (`www.chrome.google.com`). You may not know that Firefox and Chrome can run right alongside Internet Explorer and Edge, with absolutely no confusion between the two. Er, four. In fact, they don't even interact — Edge, Firefox, and Chrome were designed to operate completely independently, and they do very well playing all by themselves.

One unwritten rule for the World Wide Web: All web acronyms must be completely, utterly inscrutable. For example, a web address is a *Uniform Resource Locator,* or *URL.* (The techies I know pronounce URL "earl." Those who don't wear white lab coats tend to say "you are ell.") I describe the HTML acronym in the preceding list. On the web, a gorgeous, sunny, palm-lined beach with the scent of frangipani wafting through the air would no doubt be called SHS — Smelly Hot Sand. Sheeesh.

The best part of the web is how easily you can jump from one place to another — and how easily you can create web pages with *hot links* (also called *hyperlinks* or just *links)* that transport the viewer wherever the author intends. That's the *H* in HTML and the original reason for creating the web so many years ago.

Who pays for all this stuff?

That's the 64-billion-dollar question, isn't it? The Internet is one of the true bargains of the 21st century. When you're online — for which you probably have to pay EarthLink, Comcast, Verizon, NetZero, Juno, Netscape, Qwest, some other cable company, or another ISP a monthly fee — the Internet itself is free.

REMEMBER

Edge and Internet Explorer are free, sorta, because they come with Windows 10, no matter which version you buy. Firefox is free as a breeze — in fact, it's the poster child for open-source programs: Everything about the program, even the program code itself, is free. Google Chrome is free, too. Both Microsoft, with IE and Edge, and Google, with Chrome, keep tabs on where you go and what you do online — all the better to convince you to click an ad. Firefox collects some data, but its uses are limited.

Others involved in your security may be selling your personal information. AVG, of antivirus fame, announced in September 2015 that it would start selling browsing history data to advertisers. Your ISP may be selling your data, too.

Most websites don't charge a cent. They pay for themselves in any of these ways:

» **Reduce a company's operating costs:** Banks and brokerage firms, for example, have websites that routinely handle customer inquiries at a fraction of the cost of H2H (er, human-to-human) interactions.

» **Increase a company's visibility:** The website gives you a good excuse to buy more of the company's products. That's why architectural firms show you pictures of their buildings and food companies post recipes.

» **Draw in new business:** Ask any real estate agent.

» **Contract advertising:** Google has made a fortune. A thousand thousand fortunes.

» **Use bounty advertising:** Smaller sites run ads, most commonly from Google, but in some cases, selected from a pool of advertisers. The advertiser pays a bounty for each person who clicks the ad and views its website — a *click-through.*

» **Use affiliate programs:** Smaller sites may also participate in a retailer's affiliate program. If a customer clicks through and orders something, the website that originated the transaction receives a percentage of the amount ordered. Amazon is well known for its affiliate program, but many others exist.

Some websites have an entrance fee. For example, if you want to read more than a few articles on *The New York Times* website, you have to part with some substantial coin — about $15 per month for the most basic option, the last time I looked. Guess that beats schlepping around a whole lotta paper.

Buying a Windows 10 Computer

Here's how it usually goes: You figure that you need to buy a new PC, so you spend a couple weeks brushing up on the details — bits and bytes and kilobytes and megabytes and gigabytes — and comparison shopping. You end up at your local Computers Are Us shop, and the guy behind the counter convinces you that the absolutely best bargain you'll ever see is sitting right here, right now, and you'd better take it quick before somebody else nabs it.

YOU MAY NOT NEED TO PAY MORE TO GET A CLEAN PC

I hate it when the computer I want comes loaded with all that nice, "free" crapware. I'd seriously consider paying more to get a clean computer.

You don't need an antivirus and Internet security program preinstalled on your new PC. It'll just open and beg for money next month. Windows 10 comes with Windows Defender, and it works great — for free.

Browser toolbars? Puh-lease.

You can choose your own Internet service provider. AOL? EarthLink? Who needs ya?

And trialware? Whether it's Quicken or any of a zillion other programs, if you have to pay for a preinstalled program in three months or six months, you don't want it.

If you're looking for a new computer but can't find an option to buy a PC without all the "extras," look elsewhere. The big PC companies are slowly getting a clue, but until they clean up their act, you may be better served buying from a smaller retailer, who hasn't yet presold every bit that isn't nailed down. Or you can buy direct from Microsoft: Its Surface tablets are as clean as the driven snow. Pricey, perhaps. But blissfully clean.

Microsoft Stores, both online and the physical kind, sell new, clean computers from major manufacturers as part of Microsoft's Signature PC program. Before you spend money on a computer, check to see whether it's available dreck-free (usually at the same price) from the Microsoft Store. Go to `www.microsoftstore.com` and choose any PC. The ones on offer ship without any of the junk.

Your eyes glaze over as you look at yet another spec sheet and try to figure out one last time whether a RAM is a ROM, whether a hybrid drive is worth the effort, and whether you need a SATA 3 Gbps, SATA 6 Gbps, or eSATA, or USB 2 or 3 or C. In the end, you figure that the guy behind the counter must know what he's doing, so you plunk down your plastic and pray you got a good deal.

The next Sunday morning, you look at the ads on Newegg (`www.Newegg.com`) or Best Buy (`www.BestBuy.com`) or Amazon (`www.Amazon.com`) or Tiger Direct (`www.TigerDirect.com`) and discover you could've bought twice as much machine for half as much money. The only thing you know for sure is that your PC is hope–lessly out of date, and the next time you'll be smarter about the whole process.

If that describes your experiences, relax. It happens to everybody. Take solace in the fact that you bought twice as much machine for the same amount of money as the poor schmuck who went through the same process last month.

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Here's everything you need to know about buying a Windows 10 PC:

>> **Decide if you're going to use a touchscreen.** If you know that you won't be using the tiled part of Windows very much, a touchscreen won't hurt, but it probably isn't worth the additional expense. Experienced, mouse-savvy Windows users often find that using a mouse and a touchscreen at the same time is an ergonomic pain in the a . . . rm.

Unless you have fingertips the size of pinheads — or you always use a stylus — using some programs on a touchscreen is an excruciating experi-ence. Best to leave the touching to programs that are demonstrably touch-friendly.

>> **If you're going to use the old-fashioned, Windows 7–style desktop, get a high-quality monitor, a solid keyboard, and a mouse that feels comfort-able.** Corollary: Don't buy a computer online unless you know for a fact that your fingers will like the keyboard, your wrist will tolerate the mouse, and your eyes will fall in love with the monitor.

>> **Get a screen that's at least 1920 x 1080 pixels — the minimum size to play back high-definition (1080p) movies.** Although a touch-sensitive screen isn't a prerequisite for using tiled Universal apps on Windows 10, you'll probably find it easier to use tiled apps with your fingers than with your mouse. Swiping with a finger is easy; swiping with a trackpad works reason-ably well, depending on the trackpad; swiping with a mouse is a disaster.

There's no substitute for physically trying the hardware on a touch-sensitive Windows 10 computer. Hands come in all shapes and sizes, and fingers, too. What works for size XXL hands with ten thumbs (present company included) may not cut the mustard for svelte hands and fingers experienced at taking cotton balls out of medicine bottles.

See the section "Inside a touch-sensitive tablet" later in this chapter.

» **Go overboard with hard drives.** In the best of all possible worlds, get a computer with a solid-state drive (SSD) for the system drive (the `C:` drive) plus a large hard drive for storage, perhaps attached via a USB cable. For the low-down on SSDs, hard drives, backups, and putting them all together, see the upcoming section "Managing disks and drives."

How much hard drive space do you need? How long is a string? Unless you have an enormous collection of videos, movies, or songs, 1TB (=1,024GB = 1,048,576MB = 1,073,741,824KB = 1,099,511,627,776 bytes, or characters of storage) should suffice. That's big enough to handle about 1,000 broadcast-quality movies. Consider that the printed collection of the US Library of Congress runs about 10TB.

If you're getting a laptop or Ultrabook with an SSD, consider buying an external 1TB or larger drive at the same time. You'll use it. External hard drives are cheap and plug-in easy to use.

Or you can just stick all that extra data in the cloud, with OneDrive, Dropbox, Google Drive, or some competitor. See Book 6, Chapter 1 to get started. For what it's worth, I used Dropbox in every phase of writing this book.

» **Everything else they try to sell ya pales in comparison.**

If you want to spend more money, go for a faster Internet connection and a better chair. You need both items much more than you need a marginally faster, or bigger, computer.

Inside the big box

In this section, I give you just enough information about the inner workings of a desktop or laptop PC that you can figure out what you have to do with Windows. In the next section, I talk about touch-enabled tablets, the PCs that respond to touch. Details can change from week to week, but these are the basics.

The big box that your desktop computer lives in is sometimes called a *CPU*, or *central processing unit* (see Figure 1-5). Right off the bat, you're bound to get confused, unless somebody clues you in on one important detail: The main computer chip inside that big box is also called a CPU. I prefer to call the big box "the PC" because of the naming ambiguity, but you've probably thought of a few better names.

FIGURE 1-5:
The enduring,
traditional
big box.

Courtesy of Dell Inc.

The big box contains many parts and pieces (and no small amount of dust and dirt), but the crucial, central element inside every PC is the motherboard. (You can see a picture of a motherboard here: `www.asus.com/Motherboards/M5A99X_EVO/`).

You find the following items attached to the motherboard:

>> **The processor, or CPU:** This gizmo does the main computing. It's probably from Intel or AMD. Different manufacturers rate their CPUs in different ways, and it's impossible to compare performance by just looking at the part number. Yes, i7 CPUs usually run faster than i5s, and i3s are the slowest of the three, but there are many nuances. Unless you tackle very intensive video games, build your own audio or video files, or recalculate spreadsheets with the national debt, the CPU doesn't really count for much. In particular, if you're streaming audio and video (say, with YouTube or Netflix) you don't need a fancy processor. If in doubt, check out the reviews at `www.tomshardware.com` and `www.anandtech.com`.

>> **Memory chips and places to put them:** Memory is measured in megabytes (1MB = 1,024KB = 1,048,576 characters), gigabytes (1GB = 1,024MB), and terabytes (1TB = 1,024GB). Microsoft recommends a minimum of 2GB main memory. Unless you have an exciting cornfield to watch grow while Windows 10 saunters along, aim for 4GB or more. Most computers allow you to add more memory to them, and boosting your computer's memory to 4GB from 2GB makes the machine much snappier, especially if you run memory hogs such as Office, InDesign, or Photoshop. If you leave Outlook open and work with it all day and run almost any other major program at the same time, 8GB isn't overkill. If you're going to make your own videos, you probably need more. But for most people, 4GB is plenty and 8GB will run everything well.

>> **Video chipset:** Most motherboards include remarkably good built-in video. If you want more video oomph, you have to buy a video card and put it in a card slot. Advanced motherboards have multiple PCI card slots, to allow you to strap together two video cards and speed up video even more. If you want to run a VR or AR headset, such as an Oculus Rift, you're going to need a much more capable video setup. For more information, see the "Screening" section in this chapter.

>> **Card slots (also known as expansion slots):** Laptops have very limited (if any) expansion slots on the motherboard. Desktops generally contain several expansion slots. Modern slots come in two flavors: PCI and PCI-Express (also known as PCIe or PCI-E). Most expansion cards use PCI, but very fast cards — including, notably, video cards — require PCIe. Of course, PCI cards don't fit in PCIe slots, and vice versa. To make things more confusing, PCIe comes in four sizes — literally, the size of the bracket and the number of bumps on the bottoms of the cards is different. The PCIe 1x is smallest, the relatively uncommon PCIe 4x is considerably larger, and PCIe 8x is a bit bigger still. PCIe 16x is just a little bit bigger than an old-fashioned PCI slot. Most video cards these days require a PCIe 16x slot. Or two.

If you're buying a monitor separately from the rest of the system, make sure the monitor takes video input in a form that your PC can produce. See the upcoming section "Screening" for details.

>> **USB (Universal Serial Bus) connections:** The USB cable has a flat connector that plugs in to your slots. USB 3 is considerably faster than USB 2, and any kind of USB device can plug in to a USB 3 slot, whether or not the device itself supports USB 3 level speeds.

USB Type-C (often called USB C) is a completely different kind of cable that takes its own kind of slot. It has two big advantages. The plug is reversible, so it's impossible to plug it in upside-down. And you can run a considerable amount of power through a USB-C, making it a good choice for power supplies.

Make sure you get plenty of USB slots — at least two, preferably four, or more. Pay extra for a USB C slot or two. More details are in the section "Managing disks and drives," later in this chapter.

>> **Lots of other stuff:** You never have to play with this other stuff, unless you're very unlucky.

Here are a few upgrade dos and don'ts:

>> **Don't** let a salesperson talk you into eviscerating your PC and upgrading the CPU: i7 isn't that much faster than i5; a 3.0-GHz PC doesn't run a whole lot faster than a 2.4-GHz PC, and a dual-quad-core ChipDuoTrioQuattroQuinto stuck in an old motherboard doesn't run much faster than your original slowpoke.

>> When you hit 4GB in main memory, **don't** expect big performance improvements by adding more memory, unless you're running Chrome all day with 25 open tabs, or putting together videos.

>> On the other hand, if you have an older video card, **do** consider upgrading it to a faster card, or to one with 1GB or more of on-board memory. They're cheap. Windows 10 takes good advantage of it.

>> Rather than nickel-and-dime yourself to death on little upgrades, **do** wait until you can afford a new PC, and give away your old one.

TIP

If you decide to add memory, have the company that sells you the memory install it. The process is simple, quick, and easy — if you know what you're doing. Having the dealer install the memory also puts the monkey on his back if a memory chip doesn't work or a bracket snaps.

Inside a touch-sensitive tablet

Although touch-sensitive tablets have been on the market for more than a decade, they didn't really take off until Apple introduced the iPad in 2010. Since the iPad went ballistic, every Windows hardware manufacturer has been clamoring to join the game. Even Microsoft has entered the computer-manufacturing fray with its line of innovative tablets known as Surface.

The old Windows 7–era tablets generally required a *stylus* (a special kind of pen), and they had very little software that took advantage of touch input. The iPad changed all that.

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The result is a real hodge-podge of Windows tablets, many kinds of 2-in-1s (which have a removable keyboard, as shown in Figure 1-6, and thus transform to a genuine tablet), and notebooks with all sorts of weird hinges, including some that flip around like an orangutan on a swing.

As sales of Windows machines plummets, the choice has never been broader. All major PC manufacturers now offer traditional clamshell notebooks, as well as some variant on the 2-in-1, many still have desktops, and more than a few even make Chromebooks!

I did most of the touch-sensitive work in this book on a Dell XPS-15 with a gorgeous 4K touchscreen (see Figure 1-7). The Infinity Edge screen makes the entire machine only slightly larger than most 13-inch laptops.

FIGURE 1-6:
Microsoft Surface
Pro tablets
typify the 2-in-1
combination of
removable slates
with tear-away
keyboards.

Courtesy of Microsoft

FIGURE 1-7:
The Dell XPS-15
that I used to
write this book.

Courtesy of Dell Inc.

With a 6th generation (Skylake class) i7-6700 chip, 16GB main memory and a 512GB solid-state drive, it's the fastest, most capable PC I've ever owned — much more powerful than my production desktop machines. The 4K screen simply blew me away. One USB-2 and two USB-3 ports, an HDMI output for high-definition monitors (or TVs!), and a separate SD card reader, which can hold up to 512GB, add up to an incomparable Win10 touch experience. It's 4.5 pounds, with all-day battery life, a rock solid keyboard, a responsive trackpad, and a separate GeForce video card with its own 2GB of storage. Those are all attributes you should seek when buying a Windows 10 tablet.

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Of course, that kind of oomph comes at a price. That's the other part — quite possibly the constraining part — of the equation. A couple thousand bucks for a desktop replacement is great, but if you just want a Windows 10 laptop, you can find respectable, traditional Windows 10 laptops (netbooks, whatever you want to call them), with or without touchscreens, for a few hundred.

Microsoft's Surface Pro 4 (Figure 1-6) lists for $1,000 or so, including the keyboard. The Surface Book, which doesn't suffer from the bouncy keyboard on the Pro, goes for $1,500 up, and it includes the keyboard. Microsoft's SB and SP4 went through a long shakeout period — it took more than six months to get the bugs ironed out of the hardware drivers — but they now work quite respectably.

That said, if a Chromebook or an iPad or an Android tablet will do everything you need to do, there's no reason to plunk down lots of money for a Windows 10 tablet. None at all.

If you're thinking about buying a Windows 10 tablet, keep these points in mind:

REMEMBER

- » **Focus on weight, heat, and battery life.** Touch-sensitive tablets are meant to be carried, not lugged around like a suitcase, and the last thing you need is a box so hot it burns a hole in your pants, or a fan so noisy you can't carry on a conversation.

- » **Make sure you get multi-touch.** Some manufacturers like to skimp and make tablets that respond only to one or two touch points. You need at least four, just to run Windows 10, and ten wouldn't hurt. Throw in some toes and ask for 20, if you want to be ornery about it.

- » **The screen should run at 1366x768 pixels or better.** Anything smaller will have you squinting to look at the desktop.

- » **Get a solid-state drive.** In addition to making the machine much, much faster, a solid-state drive (SSD) also saves on weight, heat, and battery life. Don't be overly concerned about the amount of storage on a tablet. Many people with Win10 tablets end up putting all their data in the cloud with, for example, OneDrive, Google Drive, Dropbox, or Box. See Book 6, Chapter 1.

- » **Try before you buy.** The screen has to be sensitive to your big fingers, and look good, too. Not an easy combination. I also have a problem with bouncy keyboards. Better to know about the limitations before you fork over the cash.

- » **Make sure you can return it.** If you have experience with a "real" keyboard and a mouse, you may find that you hate using a tablet to replicate the kinds of things you used to do with a laptop or desktop PC.

OLED VERSUS LED

OLED (organic light-emitting diode) screens are coming. You'll see them on TVs, computer monitors, laptop screens, tablets, and even phones, and the prices are headed down fast. Can or should they supplant LED screens, which have led the computer charge since the turn of the century? That's a tough question with no easy answer.

First, understand that an LED screen is actually an LCD screen — an older technology — augmented by backlighting or edge lighting, typically from LEDs or fluorescent lamps. A huge variety of LED screens are available, but most of the screens you see nowadays incorporate IPS (in-plane switching) technology, which boosts color fidelity and viewing angles.

OLED is a horse of a different color. IPS LED pixels (considered far superior to the older TN LED pixels) turn different colors, but they rely on the backlight or sidelight to push the color to your eyes. OLED (pronounced "oh-led") pixels make their own light. If you take an LED screen into a dark room and bring up a black screen, you can see variations in the screen brightness because the backlight intensity changes, if only a little bit. OLED blacks, by (er) contrast, are uniform and thus deeper.

All sorts of new techniques are being thrown at LED, and LED screens are getting better and better. HDR (high dynamic range) improvements, for example, make LED pictures stand out in ways they never could before. Quantum dots improve lighting and color. Many people feel that, at this point, OLEDs have blacker blacks, but the best LEDs produce better brights.

The huge difference is in price: OLED screens are still two to eight or more times more expensive than LED. The price of OLED is dropping rapidly, though. In addition, OLEDs don't last as long as LEDs — say, a decade with normal use. There's also some concern that OLEDs draw more power — and will burn through a laptop battery — faster than LCDs, but some contest that statement. Much depends on the particular LED and OLED you compare.

As the hardware market matures, you can expect to see many variations on the tablet theme. It ain't all cut and dried.

Screening

The computer monitor or screen — and LED, LCD, OLED, and plasma TVs — use technology that's quite different from old-fashioned television circuitry from your childhood. A traditional TV scans lines across the screen from left to right,

with hundreds of them stacked on top of each other. Colors on each individual line vary all over the place. The almost infinitely variable color on an old-fashioned TV combined with a comparatively small number of lines makes for pleasant, but fuzzy, pictures.

By contrast (pun absolutely intended, of course), computer monitors, touch-sensitive tablet screens, and plasma, LED, OLED, and LCD TVs work with dots of light called *pixels.* Each pixel can have a different color, created by tiny, col-ored gizmos sitting next to each other. As a result, the picture displayed on com-puter monitors (and plasma and LCD TVs) is much sharper than on conventional TV tubes.

REMEMBER

The more pixels you can cram on a screen — that is, the higher the screen resolution — the more information you can pack on the screen. That's impor-tant if you commonly have more than one word-processing document open at a time, for example. At a resolution of 800x600, two open Word documents placed side by side look big but fuzzy, like caterpillars viewed through a dirty magnify-ing glass. At 1280x1024, those same two documents look sharp, but the text may be so small that you have to squint to read it. If you move up to wide-screen territory — 1920x1080 (full HD), or even 2560x1440 — with a good monitor, two documents side-by-side look stunning. Run up to 4K technology, at 3840x2160 or better — the resolution on the XPS-15 — and you'll need a magnifying glass to see the pixels.

A special-purpose computer called a *graphics processing unit (GPU)*, stuck on your video card or possibly integrated into the CPU, creates everything that's shown on your computer's screen. The GPU has to juggle all the pixels and all the colors, so if you're a gaming fan, the speed of the GPU's chip (and, to a lesser extent, the speed of the monitor) can make the difference between a zapped alien and a lost energy shield. If you want to experience Windows 10 in all its glory, you need a fast GPU with at least 1GB (and preferably 2GB or more) of its own memory.

Computer monitors and tablets are sold by size, measured diagonally (glass only, not the bezel or frame), like TV sets. Just like with TV sets, the only way to pick a good computer screen over a run-of-the-mill one is to compare them side by side or to follow the recommendation of someone who has.

Managing disks and drives

Your PC's memory chips hold information only temporarily: Turn off the electric-ity, and the contents of main memory go bye-bye. If you want to reuse your work, keeping it around after the plug has been pulled, you have to save it, typically on a disk, or possibly in the *cloud* (which means you copy it to a location on the Internet).

The following list describes the most common types of disks and drives:

» **SD/xD/CF card memory:** Many smaller computers, and some tablets, have built-in SD card readers. (Apple and some Google tablets don't have SD — the companies would rather sell you more on-board memory, at inflated prices!) You probably know Secure Digital (SD) cards best as the kind of memory used in digital cameras, or possibly phones (see Figure 1-8). A microSD cards may slip into a hollowed-out card that is shaped like, and functions as, an SD card.
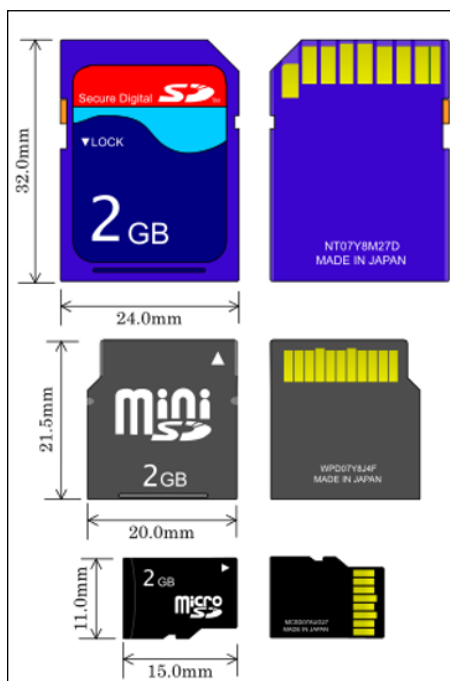
FIGURE 1-8:
Comparative sizes of an SD, a miniSD, and a microSD card.

TIP

Even now, long after the demise of floppy disks, many desktop computer cases have drive bays built for them. Why not use the open spot for a multifunction card reader? That way, you can slip a memory card out of your digital camera (or your Dick Tracy wristwatch, for that matter) and transfer files at will. SD card, miniSD, microSD card, xD card, CompactFlash, memory stick — whatever you have — the multifunction readers cost a pittance and read almost everything, including minds.

>> **Hard drive:** The technology's changing rapidly, with traditional hard disk drives (HDDs) now being rapidly replaced by *solid-state drives* (SSDs) with no moving parts, and to a lesser extent *hybrid drives* that bolt together a rotating drive with an SSD. Each technology has benefits and drawbacks. Yes, you can run a regular HDD drive as your `C:` drive, and it'll work fine. But SSD-goosed systems, on tablets, laptops, or desktops, run like greased lightning.

The SSD wins as speed king. After you use an SSD as your main system (`C:`) drive, you'll never go back to a spinning platter, I guarantee. SSDs are great for the main drive, but they're still expensive for storing pictures, movies, and photos. They may someday supplant the old whirling dervish drive, but price and technical considerations (see the sidebar "Solid-state drives have problems, too") assure that hard drives will be around for a long time. SSDs feature low power consumption and give off less heat. They have no moving parts, so they don't wear out like hard drives. And, if you drop a hard drive and a solid- state drive off the Leaning Tower of Pisa, one of them may survive. Or maybe not.

Hybrid drives combine the benefits and problems of both HDDs and SSDs. Although HDDs have long had *caches* — chunks of memory that hold data before being written to the drive, and after it's read from the drive — hybrid drives have a full SSD to act as a buffer.

If you can stretch the budget, start with an SSD for the system drive, a big hard drive (one that attaches with a USB cable) for storing photos, movies, and music, and get *another* drive (which can be inside your PC, outside attached with a USB cable, or even on a different PC on your network) to run File History (see Book 8, Chapter 1).

If you want full on-the-fly protection against dying hard drives, you can get three hard drives — one SSD, and two hard drives, either inside the box or outside attached with USB or eSATA cables — and run Storage Spaces (see Book 7, Chapter 4).

Ultimately, though, most people opt for a fast SSD for files needed immediately, coupled with cloud storage for the big stuff. Now that Google offers free unlimited photo storage — and with the rise of data streaming instead of purchased CDs — the need for giant hard drives has definitely hit the skids.

For the enthusiast, a three-tier system, with SSDs storing data you need all the time, intermediate backup in the cloud, and multi-terabyte data repositories hanging off your PC, seems to be the way to go. Privacy concerns (and the, uh, intervention of various governments) have people worried about cloud storage. Rightfully so.

>> **CD, DVD, or Blu-ray drive:** Of course, these types of drives work with CDs, DVDs, and the Sony Blu-ray discs, which can be filled with data or contain music or movies. CDs hold about 700MB of data; DVDs hold 4GB, or six times

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as much as a CD. Dual-layer DVDs (which use two separate layers on top of the disc) hold about 8GB, and Blu-ray discs hold 50GB, or six times as much as a dual-layer DVD.

Fewer and fewer machines these days come with built-in DVD drives: If you want to schlep data from one place to another, a USB drive works fine — and going through the cloud is even easier. For most storage requirements, though, big, cheap USB drives are hard to beat.

TIP

Unless you want to stick a high-definition movie on a single disc or play Blu-ray discs that you buy or rent in your local video store, 50GB of data on a single disc is overkill. Most Windows 10 users who still want a DVD will do quite well with a dual-layer DVD-RW drive, for the princely sum of $30 or so. You can always use a dual-layer drive to record regular (single-layer) DVDs or CDs.

>> **USB drive or key drive:** Treat it like it's a lollipop. Half the size of a pack of gum and able to hold an entire PowerPoint presentation or two or six, plus a half dozen full-length movies, flash memory (also known as a jump drive, thumb drive, or memory stick) should be your first choice for external storage space or for copying files between computers. (See Figure 1-9.) You can even use USB drives on many DVD players and TV set-top boxes.

Pop one of these guys in a USB slot, and suddenly Windows 10 knows it has another drive — except that this one's fast, portable, and incredibly easy to use. Go for the cheapest flash drives you can find: Most of the "features" on fancy key drives are just, uh, Windows dressing.
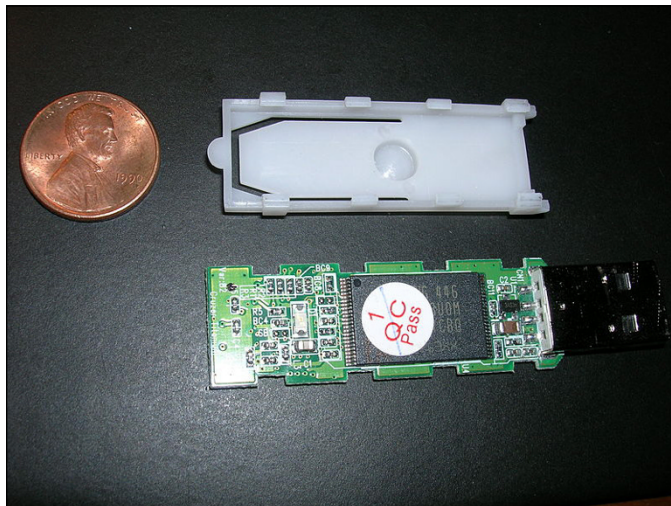
FIGURE 1-9:
The inside of a USB drive.

Source: Nrbelex, Wikimedia

SOLID-STATE DRIVES HAVE PROBLEMS, TOO

Although I love my SSD system drives and would never go back to rotating hard disk drives (HDDs), SSDs aren't perfect.

SSDs don't have any moving parts, and it looks like they're more reliable than HDDs. But when an HDD starts to go belly up, you can usually tell: whirring and gnashing, whining and groaning. Expiring SSDs don't give off any advanced warning signals. Or at least sounds.

When an HDD dies, you can frequently get the data back, although it can be expensive and time-consuming. When an SSD goes, you rarely get a second chance.

SSDs have to take care of lots of internal bookkeeping, both for trimming unused space and for load balancing to guarantee uniform wear patterns. SSDs actually slow down after you've used them for a few weeks, months, or years. The speed decrease is usually associated with the bookkeeping programs kicking in over time.

Finally, the SSD's own software has to be ultra-reliable. SSDs don't lay down tracks sequentially like HDDs. They hopscotch all over the place, and the firmware inside the SSD needs to keep up.

TIP

What about USB 3? If you have a hard drive that sits outside of your computer — an *external drive* — or a USB drive, it'll run faster if it's designed for USB 3 and attached to a USB 3 connector. Expect performance with USB 3 that's three to five times as fast as USB 2. For most other outside devices, USB 3 is overkill, and USB 2 works just as well.

This list is by no means definitive: New storage options come out every day.

Making PC connections

Your PC connects to the outside world by using a bewildering variety of cables and connectors. I describe the most common in this list:

» **USB (Universal Serial Bus) cable:** This cable has a flat connector that plugs in to your PC, known as *USB A* (see Figure 1-10). The other end is sometimes shaped like a D (called *USB B*), but smaller devices have tiny terminators (usually called *USB mini* and *USB micro,* each of which can have two different shapes).
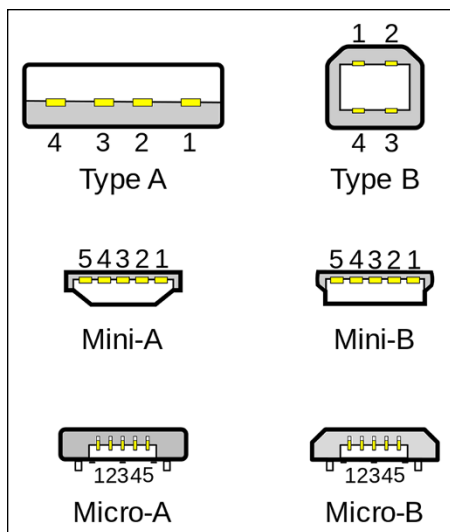
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USB 2 connectors will work with any device, but hardware — such as a hard drive — that uses USB 3 will run much faster if you use a USB 3 cable and plug it into the back of your computer in a USB 3 port. USB 2 works with USB 3 devices, but you won't get the speed. Note that not all PCs have USB 3 ports!

USB is the connector of choice for just about any kind of hardware — printer, scanner, phone, camera, portable hard drive, and even the mouse. Apple iPhones and iPads use a USB connector on one side — to plug in to your computers — but the other side is Thunderbolt (common on Apple devices, not so common on Windows PCs), and doesn't look or act like any other connector.

If you run out of USB connections on the back of your PC, get a USB hub with a separate power supply and plug away.

USB-C is a special kind of USB connection that supports very fast data transmission, and high levels of power. You know when you have USB-C because it's impossible to insert the plug upside-down — both sides work equally well. It's becoming the go-to choice for connecting peripherals and, in some cases, power supplies.

>> **LAN cable:** Also known as a CAT-5, CAT-6, or RJ-45 cable, it's the most common kind of network connector. It looks like an overweight telephone plug (see Figure 1-11). One end plugs in to your PC, typically into a network interface *card* (or *NIC,* pronounced "nick"), a network connector on the motherboard. The other end plugs in to your network's hub (see Figure 1-12) or switch or into a cable modem, DSL box, router, or other Internet connection-sharing device.
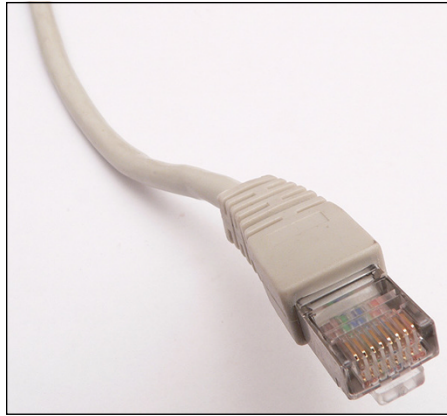
FIGURE 1-11:
RJ-45 Ethernet
LAN connector.

Source: David Monniaux, Wikimedia
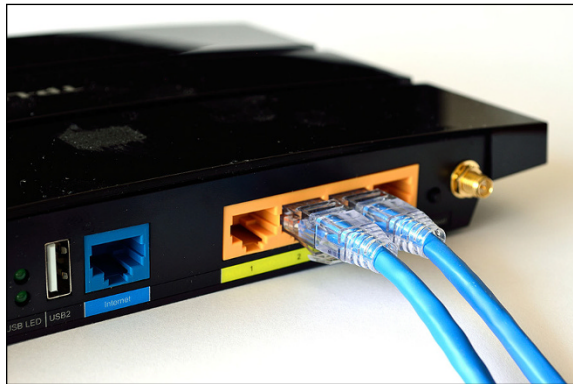
FIGURE 1-12:
The back of a
home router.

Source: Raysonho, Wikimedia

» **Keyboard and mouse cable:** Most mice and keyboards (even cordless mice and keyboards) come with USB connectors.

» **DVI-D and HDMI connectors:** Although older monitors still use legacy, 15-pin, HD15 VGA connectors, most monitors and video cards now use the small HDMI connector (see Figure 1-13), which transmits both audio and video over one cable. Some older monitors don't support HDMI, but do take a DVI-D digital cable (see Figure 1-14).

If you hope to hook up your new TV to your PC, make sure your PC can connect to the TV with the right kind of cable. Or use Chromecast from your Chrome browser and a Chromecast dongle stuck in your TV — see Book 10, Chapter 2.

FIGURE 1-13:
HDMI has largely
supplanted the
old VGA and
DVI-D video
adapters.

Source: D-Kuru, Wikimedia

DVI-D (Dual Link)

FIGURE 1-14:
Two different
kinds of DVI-D
cables — they
work well, but
don't carry audio.

DVI-D (Single Link)
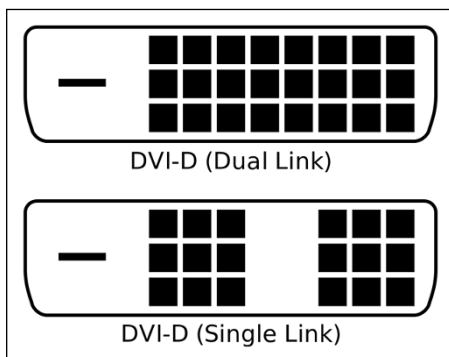
Source: Hungry Charlie, Wikimedia

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Some really old monitors still use the ancient 15-pin VGA connector, the one shaped like a *D.* Avoid VGA if you can. Old-fashioned serial (9-pin) and parallel (25-pin) cables and Centronics printer cables are growing as scarce as hen's teeth. Hey, the hen doesn't need them, either.

» **Bluetooth** is a short-distance wireless connection. Once upon a time, Bluetooth was very finicky and hard to set up. Since the recent adoption of solid standards, Bluetooth's become quite useful.

Futzing with video, sound, and multitudinous media

Unless you're using a tablet, chances are pretty good that you're running Windows 10 on a PC with at least a little oomph in the audio department. In the simplest case, you have to be concerned about four specific sound jacks (or groups of sound jacks) because each one does something different. Your machine may not have all four (are you feeling inadequate yet?), or it may look like a patch board at a Slayer concert, but the basics are still the same.

Here's how the four key jacks are usually marked, although sometimes you have to root around in the documentation to find the details:

» **Line In:** This stereo input jack is usually blue. It feeds a stereo audio signal — generally from an amplified source — into the PC. Use this jack to receive audio output into your computer from an iPad, cable box, TV set, radio, CD player, electric guitar, or other audio-generating box.

» **Mic In:** This jack is usually pink. It's for unamplified sources, like most microphones or some electric guitars. If you use a cheap microphone for Skype or another VoIP service that lets you talk long distance for free, and the mic doesn't have a USB connector, plug in the microphone here. In a pinch, you can plug any of the Line In devices into the Mic In jack — but you may hear only mono sound, not stereo, and you may have to turn the volume way down to avoid some ugly distortion when the amplifier inside your PC increases the strength of an already-amplified signal.

» **Line Out:** A stereo output jack, usually lime green, which in many cases can be used for headphones or patched into powered speakers. If you don't have fancy output jacks (such as the Sony-Philips SPDIF), this is the source for the highest-quality sound your computer can produce. If you go for a multi-speaker setup, this is for the front speaker.

» **Rear Surround Out:** Usually black, this jack isn't used often. It's intended to be used if you have independent, powered rear speakers. Most people with rear speakers use the Line Out connector and plug it into their home theater systems, which then drives the rear speakers; or they use the HDMI cable (see the preceding section) to hook up to their TVs. If your computer can produce full surround sound output, and you have the amplifier to handle it, you'll get much better results using the black jack.

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Many desktop computers have two more jacks: Orange is a direct feed for your subwoofer, and the gray (or brown) one is for your side speakers. Again, you have to put an amplifier between the jacks and your speakers.

Fortunately, PC-savvy 4-channel amplifiers can handle the lime (front speaker) and black (rear speaker) lines, 6-channel amps may be able to handle all but the gray, and 8-channel amps will take all four: lime (front speaker), orange (subwoofer, or center back), black (rear), and gray (side).

With a sufficiently bottomless budget, you can make your living room sound precisely like the 08R runway at Honolulu International.

Laptops typically have just two jacks, pink for Mic In and lime for Line Out. If you have a headphone with a mic, that's the right combination. It's also common to plug powered external speakers into the lime jack.

Tablets and phones usually have an earphone jack, which works just like a lime green Line Out jack.

High-end audio systems may support optical connections. Check both the computer end of the connection and the speaker/receiver end to make sure they'll line up.

TIP PC manufacturers love to extol the virtues of their advanced sound systems, but the simple fact is that you can hook up a rather plain-vanilla PC to a home stereo and get good-enough sound. Just connect the Line Out jack on the back of your PC to the Aux In jack on your home stereo or entertainment center. *Voilà!*

Netbooks and Ultrabooks

I really fell in love with an ASUS netbook while working with Windows 7. But then along came the iPad, and at least 80 percent of the reason for using a netbook disappeared. Sales of *netbooks* — small, light, inexpensive laptops — have not fared well, and I don't see a comeback any time soon. Tablets just blow the doors off netbooks, and 2-in-1s just mopped up the remains.

Ultrabooks are a slightly different story. Intel coined (and trademarked) the term *Ultrabook* and set the specs. For a manufacturer to call its piece of iron an Ultrabook, it has to be less than 21mm thick, run for five hours on a battery charge, and resume from hibernation in seven seconds or less. In other words, it must work a lot like an iPad.

Intel threw a $300 million marketing budget at Ultrabooks, but they fizzled. Now the specs seem positively ancient, and the term *Ultrabook* doesn't have the wow factor it once enjoyed.

Right now, I'm having a great time with all the new form factors: I mention the XPS-15, Surface Book, and Surface Pro 4 earlier in this chapter. I worked with a trapezelike machine for a bit, but always worried about snapping the carrier off. There's no one-size-fits-all solution. Now, depending on the situation, I'm just as likely to grab my iPad Pro as I head out the door, or curl back with a Chromebook to watch Netflix. I use Android phones and iPhones, too, all the time.

If you're in the market for a new machine, drop by your favorite hardware store and just take a look around. You might find something different that strikes your fancy. Or you may decide that you just want to stick with a boring desktop machine with a mechanical keyboard and three monitors the size of football fields.

Guess what I work on.

What's Wrong with Windows 10?

Microsoft made a lot of mistakes in Windows 10's first year of existence. Chief among them was the widely despised "Get Windows 10" campaign. Combining the worst of intrusive malware, forced updates, bad interface design, presumptive implementation, and a simple lack of respect for Windows 7 and 8.1 customers, Get Windows 10 (GWX), to me, represents the lowest point in the history of Windows. Microsoft just didn't give a hairy rat's patoutie who they stomped on, as they pushed and pushed and pushed to get everybody on Windows 10.

Which is a shame, really, because Windows 10 is a great operating system.

Many people who used to trust Microsoft, more or less, lost all trust in the wake of GWX, and it's hard to blame them. I've been writing books about Windows and Office for 25 years, and I think GWX is the most customer-antagonistic effort Microsoft has ever undertaken.

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Trust in Microsoft is at the core of what you need to understand about Windows 10.

Here's what I feel every Windows 10 customer should know:

» **Forced updates:** Most Windows 10 customers don't have any choice about updates; when Microsoft releases a patch, it gets applied, unless you go to near-Herculean lengths to block them (see `http://www.infoworld.com/article/3053701/microsoft-windows/block-windows-10-forced-updates-without-breaking-your-machine-part-2.html`). I've railed against automatic updating for more than a decade V — bad patches have driven many machines and their owners to the brink. The GWX debacle has shown that Microsoft has little respect for what you want to do with your computer. With Win10, you don't have much choice.

» **Privacy concerns:** Microsoft's following the same path blazed by Google and Facebook and, to a lesser extent, Apple and many other tech companies. They're all scraping information about you, snooping on what you're doing, in an attempt to sell you things. I don't think Microsoft is any worse than the others, but I don't think it's any better either. I talk about reducing the amount of data that Microsoft collects about you in Book 2, Chapter 6, but the simple fact is that nobody knows exactly what data is being collected, or how it's being used.

I think that data snooping will be the focus of extensive legislation over the next decade and one of the major battles of our time. The problem, of course, is that the people who control the laws also control the organizations that circumvent the laws.

>> **Massive dearth of apps:** Five years ago, apps were a nice part of using an iPhone or iPad. Now, many people rely on them to get their work done and to keep their lives sunny side up. Microsoft missed the ball with UWP apps — they never caught on, and with the demise of a viable Microsoft phone ecosystem, developers have little incentive to make UWP apps. That means we're all going to be using Win32 apps — the kind that were revolutionary 20 years ago — on our Windows machines for the foreseeable future.

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I've learned how to block Microsoft's forced updating — details are in my Info-World Woody on Windows blog, `http://www.infoworld.com/article/3053701/microsoft-windows/block-windows-10-forced-updates-without-breaking-your-machine-part-2.html`. I've come to peace with the fact that Microsoft's snooping on me. (Hey, I've used Google's Chrome browser for years, and it's been harvesting data the entire time.) And when I want the convenience of a specific app, I'll pick up my phone, tablet, or Chromebook.

But that's just me. You may have good reason to want to switch to another computing platform. Certainly, Windows will give you more headaches and heartaches than the alternatives. But it gives you more opportunities, too.

Welcome to my world.

Chapter 2

Windows 10 for the Experienced

f you're among the 1.7 billion or so souls on the planet who have been around the block with Windows 8/8.1, Windows 7, Windows Vista, or Windows XP, you're in for a shock.

Although Windows 10 will look vaguely familiar to long-time desktop users, the details are very different. And if you've conquered the Metro side of Windows 8.1 (which is the only side of Windows 8), you're going to be in for a pleasant surprise.

If You Just Upgraded from Win7 or 8.1 to Win10

Before we dig into an examination of the new nooks and crannies in Windows 10, I'd like to pause for a second and let you know about an option you may or may not have.

If you upgraded from Windows 7 or 8.1 to Windows 10 in the past 30 days, and you don't like Windows 10, you can roll back to your old version. This works for only 30 days because a scheduled program comes in and wipes out the backup after 30 days. But if you're in under the wire and want to roll back, here's how. Note that this technique is only for upgraders; it doesn't apply to new Windows 10 systems or computers in which you installed Windows 10 by wiping out the hard drive. If you love Win10 or don't qualify for the rollback, jump down to the next section.

The method for moving back is easy:

1. **Make sure you have your old password.**

   If your original Windows 7 or Windows 8.1 system had login IDs with passwords, you'll need those passwords to log in to the original accounts. If you changed the password while in Windows 10 (local account), you need your old password, not your new one. If you created a new account while in Windows 10, you have to delete it before reverting to the earlier version of Windows.

2. **Make a backup.**

   Before you change any operating system, it's a good idea to make a full system backup. Many people recommend Acronis for the job, but Windows 10 has a good system image program as well that is identical to the Windows 7 version. However, the program is hard to find. To get to the system image program, in the Win10 Cortana search box, type **Windows Backup**, press Enter, click Create a System Image (on the left), and follow the directions.

3. **Run the reset.**

   Choose the Start icon, the Settings icon, Update & Security, and then Recovery. You see an entry to Go Back to Windows 7 or Go Back to Windows 8.1, depending on the version of Windows from whence you came.

   If you don't see the Go Back option and are using an administrator account, you've likely fallen victim to one of the many gotchas that surround the upgrade. See the next part of this section, but don't get your hopes up.

4. **Choose to keep files or wipe them out.**

   If you chose Go Back to a Previous Windows, you're given a choice analogous to the choice you made when you upgraded to Windows 10, to either Keep My Files or Remove Everything. See Figure 2-1. The former keeps your files (as long as they're located in the usual places), so changes you made to them in Windows 10 will appear back in Windows 7 (or 8.1). The latter wipes out all your files, apps, and settings, as you would expect.

5. **Tell Microsoft why you don't like Win10.**

   The Windows rollback software wants to know why you're rolling back, offers to check for updates in a last-ditch attempt to keep you in the Windows 10 fold,

warns you that you'll have to reinstall some programs after going back (a problem I didn't encounter with my rather pedestrian test programs), thanks you for trying Windows 10, and then lets you go back.
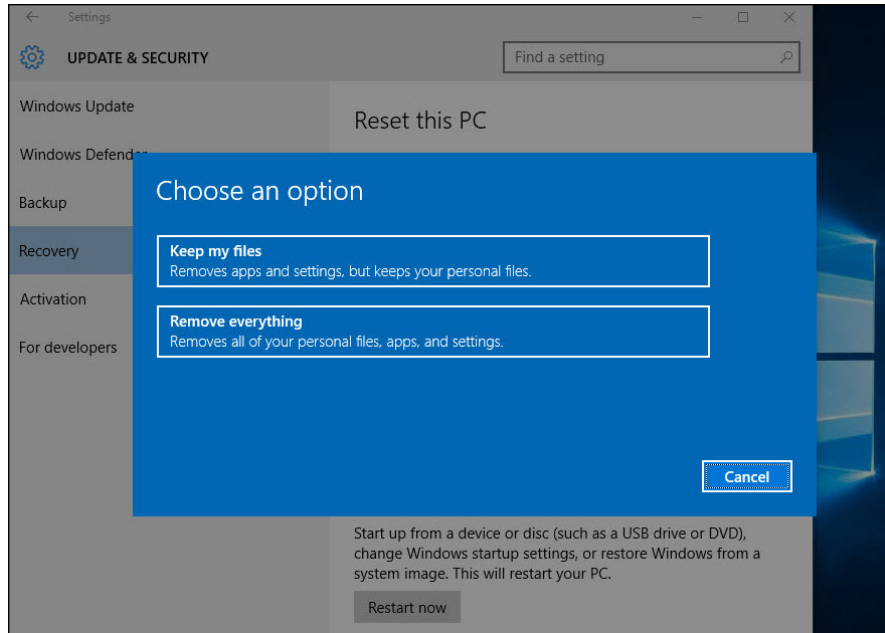
FIGURE 2-1:
When you roll back to Windows 7 or 8.1, you can choose to save your files or not.

6. **Click Next.**

   After a while (many minutes, sometimes hours), you arrive back at the Windows 7 (or 8.1) login screen.

7. **Click a login ID and provide a password.**

   You're ready to go with your old version.

I found, in extensive testing, that the Keep My Files option does, in spite of the warning, restore apps (programs) and settings to the original apps and settings (the ones that existed when you upgraded from Win7 to Win10). Any modifications made to those programs (for example, applying security updates to Office programs) while using Windows 10 will not be applied when you return to Win7; you have to apply them again.

On the other hand, changes made to your regular files while working in Windows 10 — edits made to Office documents, for example, or to new files created while working with Windows 10 — may or may not make it back to Windows 7. I had no problems with files stored in My Documents; edits made to

those documents persisted when Windows 10 rolled back to Windows 7. But files stored in other locations (specifically, in the \Public\Documents folder or on the desktop) didn't make it back: Word docs created in Win10 simply disappeared when rolling back to Win7, even though they were on the desktop or in the Public Documents folder.

One oddity may prove useful: If you upgrade to Windows 10, create or edit documents in a strange location, and then roll back to Windows 7 (or 8.1), those documents may not make the transition. Amazingly, if you then upgrade again to Windows 10, the documents may reappear. You can retrieve the "lost" documents, stick them in a convenient place (such as on a USB drive or in the cloud), roll back to Windows 7, and pull the files back again.

Important lesson: Back up your data files before you revert to an earlier version of Windows. If you lose a file while going from Windows 7 to Windows 10, you can usually find it from inside Win10 in the hidden Windows.old folder. But when you go back from Win10 to Win7, there is no Windows.old folder.

If you can't get Windows to roll back and absolutely detest Windows 10, you're up against a tough choice. The only option I've found that works reliably is to reinstall the original version of Windows from scratch. On some machines, the old recovery partition still exists and you can bring back your old version of Windows by going through the standard recovery partition technique (which varies from manufacturer to manufacturer), commonly called a factory restore. More frequently, you get to start all over with a fresh install of Windows 7 or 8.1.

A Brief History of Windows 10

So you've decided to stick with Win10? Good.

Pardon me while I rant for a bit.

Microsoft darn near killed Windows — and most of the PC industry — with the abomination that was Windows 8. Granted, there were other forces at work — the ascendancy of mobile computing, touchscreens, faster cheaper and smaller hardware, better Apples, and other competition — but to my mind the number one factor in the demise of Windows was Windows 8.

We saw PC sales drop. After Windows XP owners replaced their machines in a big wave in late 2014 and early 2015, responding to the end of support for XP, we saw PC sales drop even more. Precipitously. Steve Ballmer confidently predicted that Microsoft would ship 400 million machines with Windows 8 preinstalled in the year that followed Windows 8's release. The actual number was closer to a quarter

of that. Normal people like you and me went to great lengths to avoid Windows 8, settling on Windows 7.

Windows 8.1, which arrived a nail-biting year after Windows 8, improved the situation a little bit, primarily by not forcing people to boot to the tiled Metro Start screen.

The team inside Microsoft that brought us the wonderful forced Windows 8 Metro experience were also responsible, earlier, for the Office ribbon. Many of us old-timers grumbled about the ribbon, saying Microsoft should at least present an alternative for using the older menu interface. It never happened. Office 2007 shipped with an early ribbon, and subsequent versions have been even more ribbon-ified since. Here's the key point: Office 2007 sold like hotcakes, in spite of the ribbon, and it's been selling in the multi-billion-dollar range ever since.

As a result, the Office interface team figured they knew what consumers wanted, and old-timers were just pounding their canes and waggling toothless gums.

The entire Office 2007 management team was transplanted, almost intact, to the Windows 8 effort. They saw an opportunity to transform the Windows interface, and they took it, over the strenuous objections of many of us in the peanut gallery. I'm convinced they figured it would play out like the Office ribbon. It didn't. Windows 8 is, arguably, the largest software disaster in Microsoft's history.

Essentially all the Windows 8 management team — including some very talented and experienced people — left Microsoft shortly after Win8 shipped. With a thud. Their boss, Steve Ballmer, left Microsoft too. Ballmer's still the largest individual shareholder in Microsoft, with 333,000,000 shares at last count, worth $17 billion and change.

In their place, we're seeing an entirely new generation of Windows managers, raised in the cloud, but more than willing to listen to reason. The current head of the Windows effort, Terry Myerson, was in charge of Windows Phone — and before that, Windows Exchange Server. Head honcho Satya Nadella not only knows cloud computing, he invented lots of the Microsoft pieces.

That said, Microsoft's traditional PC market has sunk into a funk, and it appears to be on a slow ride into the sunset. Or it may just turn belly up and sink, anchored with mounds of iPhones, iPads, MacBooks, Galaxy Tabs, and Chromebooks. Or maybe, just maybe, Windows 10 will breathe some life back into the 30-year-old veteran. Yes, Windows 1.0 shipped in November 1985.

However things play out, at least we have an (admittedly highly modified) Start menu to work with, as you can see in Figure 2-2.

FIGURE 2-2:
The new Start
menu should
look at least
vaguely familiar
to just about
all experienced
Windows users.
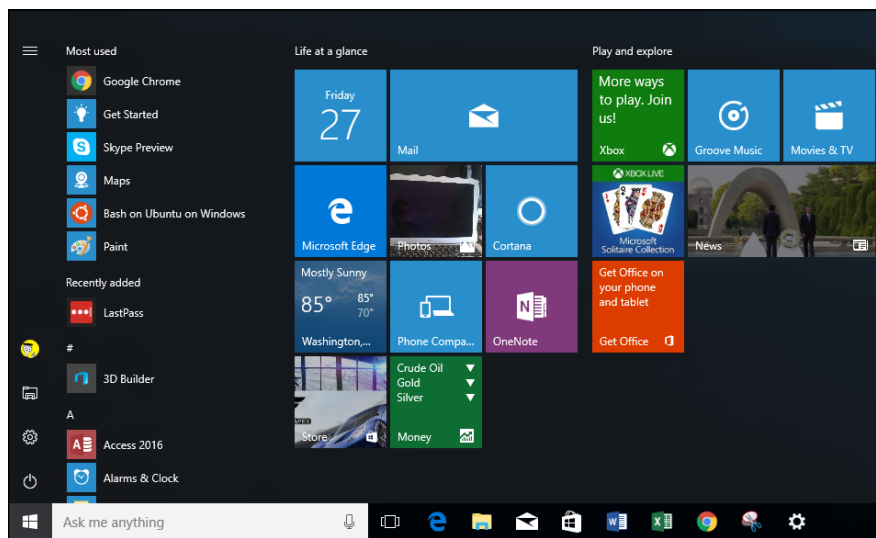
The first release of Windows 10, dubbed build 10240 (or just RTM by us old guys), came out on July 29, 2015. The second release, called version 1511 or the November update, arrived in November 2015. (1511 = November 2015, get it?) It had only a few improvements.

THE "GET WINDOWS 10" DEBACLE

No description of the recent history of Windows, however brief, can gloss over the fear and loathing that Microsoft induced with its Get Windows 10, or GWX, campaign.

The campaign started shortly after the RTM release in July 2015, with a little-noticed program known as KB 3035583. In October 2015, Microsoft started force-updating Windows 7 and 8.1 computers to Windows 10, without the owners' knowledge or consent. A loud scream arose and, a week after the forced upgrades started, they suddenly stopped. But the GWX campaign continued, showing increasingly persistent ads for Windows 10, all the symptoms of nagware and even malware. Microsoft proved that it could reach into your Windows 7 machine and start the upgrade to Windows 10, whether you wanted it or not.

The resultant clamor — from an unexpected appearance of a Win10 upgrade notification on a weather forecaster's live news show, to Windows experts fretting over their relatives and friends, to more than 1 million posts on a Chinese blog — should have convinced Microsoft to back off. It didn't. If you bump into people who don't trust Windows, or Microsoft, they have good reason.

The third release, known variously as the anniversary update and version 1607, came out in August 2016 (they missed the numbering system by a bit). I call it Win 10.2, but I'm old-fashioned that way. You can call it anything you like. Win 10.2 includes all sorts of improvements, such as the new Start menu layout, an improved Action/Notification Center, Hand-Off/Continuum features that almost nobody uses, Ink Workspace, which is great for Surface Books and Pros but not much else, along with big changes to Cortana and enough improvements to the Microsoft Edge browser that it's actually usable.

The Different Kinds of Windows Programs, Er, Apps

Windows 10 runs two very different kinds of programs. Permit me to go back to basics.

Computer programs (call them applications or apps if you want) that you and I know work by interacting with an operating system. Since the dawn of Windows time, give or take a bit, Windows apps have communicated with Windows through a specific set of routines (application program interfaces or APIs) known colloquially and collectively as Win32. With rare exceptions, Windows desktop apps — the kind you use every day — take advantage of Win32 APIs to work with Windows.

In early June 2011, at the All Things D D9 conference in California, Steve Sinofsky and Julie Larson-Green gave their first demo of Windows 8. As part of the demo, they showed off new immersive or Metro apps, which interact with Windows in a very different way. They use the newly minted (and still evolving) API set known as Windows Runtime or, more commonly, the WinRT API.

Microsoft started calling the WinRT based apps "immersive" and "full screen." Most of the world settled on Microsoft's internal code name, Metro. Microsoft, however, has since changed the name to Modern UI, then Windows 8, Windows Store App, New User Interface, Microsoft Design Language, Microsoft style design, and more recently Modern and Universal. The preferred terminology at the moment is *Universal Windows Platform (UWP) app,* although the tech support folks revert to *Universal app* all the time. I continue to use the term *Metro* in normal conversation, but in this book, to minimize confusion, I use the term Universal Windows app.

Don't be confused. (Ha!) They all mean the same thing: Those are the names for Universal Windows applications that run with the WinRT API.

Universal Windows (Modern, Metro) apps have many other characteristics: They're sandboxed — stuck inside a software cocoon that isolates the programs so that it's hard to spread infections through them. They can be easily interrupted, so their power consumption can be minimized; if a Universal Windows app hangs, it's almost impossible for the app to freeze the machine. But at their heart, Universal Windows apps are written to use the WinRT API.

Windows 8 and 8.1 (and Server 2012) support the WinRT API — Universal apps run on the Metro side of Windows 8, not on the desktop. ARM-based processors also run the WinRT API. You can find ARM architecture processors in many phones and tablets. In theory, Universal apps should run on any Windows 10 computer — a desktop, a laptop, a tablet, a phone, a wall-mounted Surface Hub, an Xbox, and even a HoloLens headset. In practice, however, it ain't quite so simple. For example, only the simplest Universal app that works in Windows 10 will run in Windows 8. So "Universal" is something of an aspiration, not a definition.

REMEMBER

In Windows 10, Universal Windows (Modern/Metro/Tiled) apps run in their own boxes, right there on the desktop. Look at the Weather app — a Universal Windows app — shown in Figure 2-3.

FIGURE 2-3: The Windows 10 Weather app is a Universal Windows app because it's based on the WinRT API. See the distinctive design?
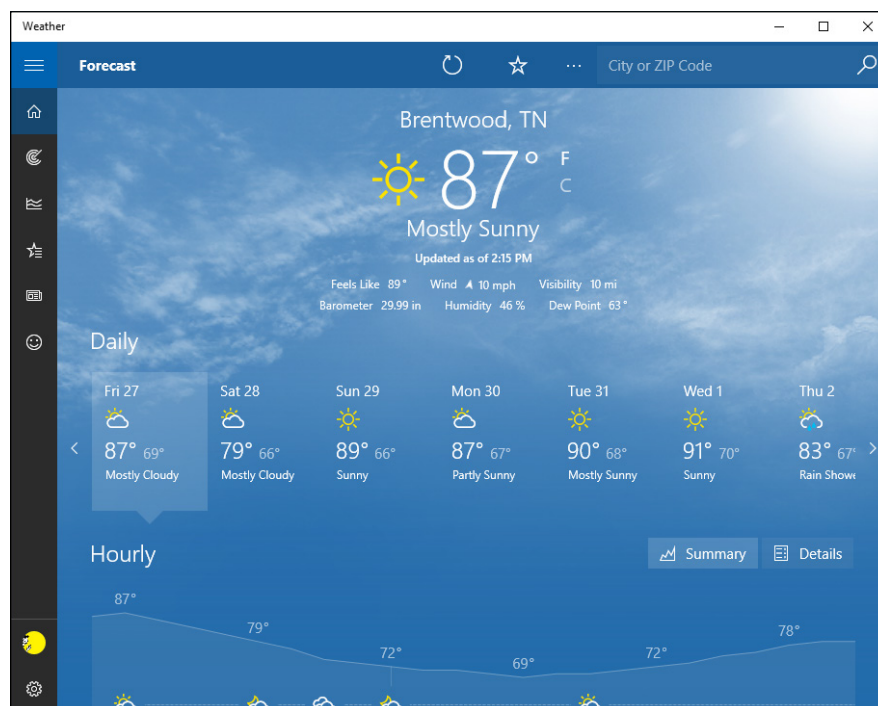
All the other Windows programs — the ones you've known since you were still wet behind the WinEars — are now called Windows Desktop apps. Three years ago, you would've just called them programs, but now they have a new name. After all, if Apple can call its programs *apps*, Microsoft can, too. Technically, old-fashioned Windows programs (Windows Desktop apps) are built to use the Win32 API.

HOW DID WE GET INTO THIS NICE MESS

Microsoft's been making tablet software for more than 10 years, and it never put a dent in the market. Never did get it. Apple started selling tablet software in 2010, and selling tons of it. Boy howdy. Now Microsoft's diving in to get a piece of the touch-enabled action.

There's a big difference in approaches. Apple started with a telephone operating system, iOS, and grew it to become the world's best-selling tablet operating system. There's very little difference between iOS 9 on an iPhone and iOS 9 on an iPad: Applications written for one device usually work on the other, with a few obvious changes, such as screen size. On the other hand, Apple's computer operating system, OS X (say "oh ess ten"), is completely different. It's built and optimized for use with a Mac computer. Apple is slowly changing the programs, er, apps on both iOS and OS X so they resemble each other and work together. But the operating systems are fundamentally quite different (even though, yes, iOS did originally start with the Mac OS Darwin foundation).

When Windows 7 was finished, Steve Sinofsky and crew decided to take a fundamentally different tack. Instead of the good people at Microsoft growing their phone software up, they decided to grow their computer operating system down. (The fact that the phone software at that point drew nearly universal scorn could've been part of the reason.) Windows 8 grew out of that decision: There's a touch-friendly part and a mouse- and keyboard-friendly part. The two aren't mutually exclusive: You can use your mouse on the Metro Start screen and in the tiled full-screen apps; you can use your greasy thumb on an old-fashioned Windows desktop app. But the approach is different, the design is different, and the intent is different.

Windows 10 goes back to Windows Start menu roots and tries to grow the same concept down even further, to Windows Phone. Microsoft will be able to say that Windows covers all the bases, from lowly smartphones to gigantic workstations (and server farms, for that matter). The fact that the "Windows" running in each of the device classes is quite different kinda gets swept under the rug.

Unfortunately, there's a huge difference between Universal Windows apps and Windows Desktop apps. For starters:

» **Windows Desktop apps are on the way out.** Microsoft won't abandon them or the Win32 API anytime soon, but with the exception of a few big money-milking programs and utilities and niche programs from small developers, Windows Desktop apps are starting to be viewed as legacy apps, ones ultimately headed to the bone farm.

» **Universal Windows apps — the ones that run on the WinRT API — are the future.** Microsoft rebuilt the aging Windows Desktop app Internet Explorer and turned it into the Universal Windows app called Microsoft Edge. Microsoft is trying hard to replace Windows Desktop app versions of Office with snappier, analogous (and finger-friendly) Universal Windows apps. Of course, the Universal version of Office doesn't have anywhere near as many features as the Desktop version.

» **Windows Desktop apps and Universal Windows apps are starting to look the same.** Developers want you to look at their programs and think, "Oh, hey, this is a snappy new version."

» **Universal Windows apps really are better.** Don't shoot me. I'm just the messenger. Now that we can run those newfangled tiled Universal Metro whoozamajiggers in their own resizable windows on the Windows desktop, the underlying new WinRT plumbing beats the pants off Win32. WinRT apps don't bump into each other as much, they (generally) play nice in their own sandboxes, they won't take Windows down with them, and they don't have all the overhead of those buggy Win32 calls.

If you're going to stay with Windows, it's time to get with the system and learn about this new tiled stuff.

Here's a quick guide to what's new — and what's still the same — with some down-and-dirty help for deciding whether you truly need Windows 10.

What's New for the XP Crowd

Time to fess up. You can tell me. I won't rat you out.

If you're an experienced Windows XP user and you're looking at Windows 10, one of two things happened: Either your trusty old XP machine died and you *had* to get Win10 with a new PC, or a friend or family member conned you into looking into Win10 to provide tech support.

Am I right, or am I right? Hey, as of this writing, something like 10 percent of all Windows online use comes from Windows XP. Yeah, you read that number right. Win7 may dominate, but XP is still alive and well even though Microsoft doesn't support it.

If you're thinking of making the jump from XP to Win10, and you're going to stick with a keyboard (as opposed to going touch-only, or touch-mostly, heaven help ya), you have two big hurdles:

>> Learning the ways of tiled Universal Windows apps (which I outline in the next section, "What's New for Windows 7 and Vista Victims")

>> Making the transition from XP to Windows 7 because the Win10 desktop works much like Windows 7

Are you sure you want to tackle the learning curve? Er, curves? See the nearby sidebar about switching to a Mac.

That said, if you didn't plunge into the Windows 7 or Vista madness, or the Windows 8/8.1 diversion, and instead sat back and waited for something better to come along, many improvements indeed await in Windows 10.

WOULDN'T IT BE SMARTER TO GET A MAC?

Knowledgeable Windows XP users may find it easier — or at least more rewarding — to jump to a Mac, rather than upgrading to Windows 10. I know that's heretical. Microsoft will never speak to me again. But there's much to be said for making the switch.

Why? XP cognoscenti face a double whammy: learning Windows 7 (for the Win10 desktop) and learning how to deal with Metro/Modern Universal Windows apps. If you don't mind paying the higher price — and, yes, Macs are marginally more expensive than PCs, feature-for-feature — Macs have a distinct advantage in being able to work easily in the Apple ecosystem: iPads, iPhones, the App Store, iTunes, iCloud, and Apple TV all work together remarkably well. That's a big advantage held by Apple, where the software, hardware, cloud support, and content all come from the same company. "It just works" may be overblown, but there's more than a nugget of truth in it. Give or take a buggy iOS update.

Yes, Macs have a variant of the Blue Screen of Death. Yes, Macs do get viruses. Yes, Macs have all sorts of problems. Yes, you may have to stand in line at an Apple Store to get help — I guess there's a reason why Microsoft Stores seem so empty.

If you're thinking about switching sides, I bet you'll be surprised at the similarities between Mac OS X and Windows XP.

Improved performance

Windows 10 (and Windows 8 and 7 before it) actually places fewer demands on your PC's hardware. I know that's hard to believe, but as long as you have a fairly powerful video card, and 2GB or more of main memory, moving from XP to Win10 will make your PC run faster.

If you don't have a powerful video card, and you're running a desktop system, you can get one for less than $100, and extra memory costs a pittance. I've upgraded dozens of PCs from XP to Win10, and the performance improvement is quite noticeable. You laptop users aren't so lucky because laptop video is usually soldered in.

Better video

Windows 10 doesn't sport the Aero interface made popular in Vista and Win7, but some of the Aero improvements persist.

The *Snap Assist* feature in Windows 10 lets you drag a window to an edge of the screen and have it automatically resize to half-screen size — a boon to anyone with a wide screen. Sounds like a parlor trick, but it's a capability I use many times every day. You can even snap to the four corners of the screen, and the desktop shows you which open programs can be clicked to fill in the open spot (see Figure 2-4).

Windows 10's desktop shows you thumbnails of running programs when you hover your mouse cursor over a program on the taskbar (see Figure 2-4).

Video efficiency is also substantially improved: If you have a video that drips and drops in XP, the same video running on the same hardware may go straight through in Windows 10.

A genuinely better browser is emerging

Internet Explorer lives in Windows 10, but it's buried deep. If you're lucky, you'll never see it when you use Win10. IE is an old, buggy, bloated slug with incredibly stupid and infection-prone "features": ActiveX, COM extensions, custom crap-filled toolbars, and don't get me started on Silverlight. IE deserves to die, if only in retaliation for all the infections it's brought to millions of machines.

In its place, the new, light, standards-happy, fast Microsoft Edge is everything IE should be, without the legacy garbage. Microsoft built Edge from the ground up as a Universal Windows app — a new WinRT API-based tiled app that runs on the desktop in its own resizable window.
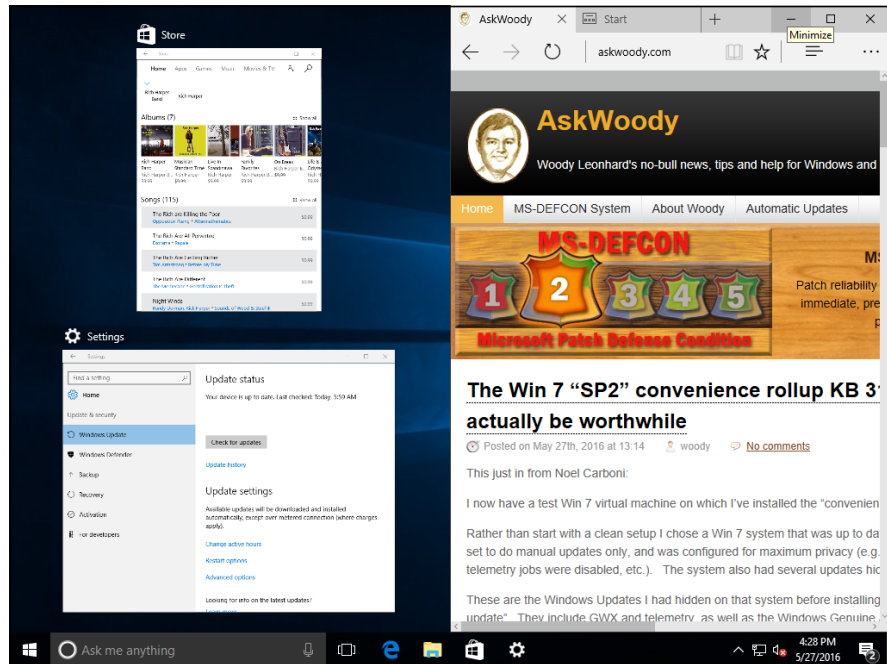
It's a poster boy for the new apps that are coming down the pike. It took Microsoft forever to build, but the final result is well worth the effort.

Unfortunately, Edge is still an unfinished work. Few people use it because it lacks many important browser features. The situation's slowly improving, though, and Edge may well be ready for prime time at some point.

If you live in fear of IE getting you infected and/or hate the massive IE patches now appearing every month, Microsoft Edge will be a refreshing change.

Cortana

Apple has Siri. Google has Google Now. Amazon has Alexa. Microsoft has Cortana, the Redmond version of an AI-based personal assistant, shown in Figure 2-5. Unlike Siri and Now, though, Cortana has taken over the Windows search function, so it has a larger potential footprint than its AI cousins, which comes with a double edge. At the same time, Cortana really, really wants to scan everything on your computer, coming and going — all the better to help you with, my dear.

FIGURE 2-5:
Cortana sits,
listening and
watching, waiting
to help you. That
should either
make you skepti-
cal or scared —
or a little of both.
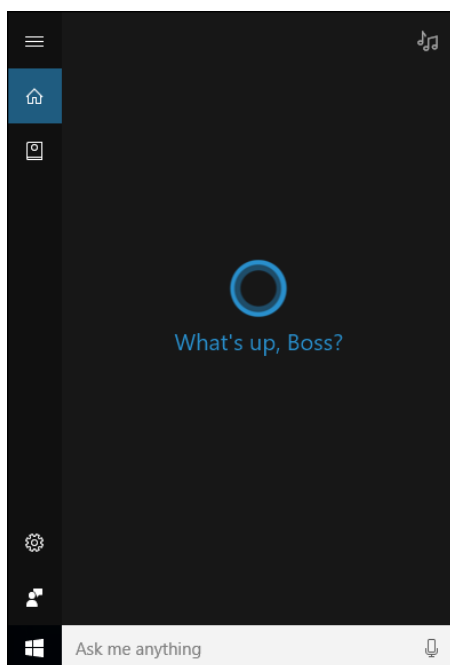
I tell you much more about Cortana in this book — she has a chapter all to herself, Book 3, Chapter 6 — but I'll drop a little tidbit here, tailored for those Windows XP fans among you who may just be a bit intimidated by a talking helper-droid.

You see, Cortana has a history.

Back in 2001, Microsoft released a game called Halo: Combat Evolved. In Halo: CE, you, the player, take the role of the Master Chief, a kinda-human kinda-cyber soldier known as Master Chief Petty Officer John-117. Cortana is part of you, an artificial intelligence that's built into a neural implant in your body armor. After saving Captain Keyes, Cortana and the Master Chief go into a map room called the Silent Cartographer, and . . . well, you get the idea. Cortana is smooth and creepy and omniscient, just like the Windows 10 character.

Right now, depending on how you measure, Cortana is likely the least intelligent of the assistants, with Google on top, and Siri and Alexa vying for second place. That may change over time. In fact, some day Cortana may scan this paragraph and call me to task for my impertinence — bad blot on my record, served up to our robotic overlords.

Other improvements

Many other features — not as sexy as Cortana but every bit as useful — put Windows 10 head and shoulders above XP. The standout features include:

REMEMBER

» **The taskbar:** I know many XP users swear by the old Quick Launch toolbar, but the taskbar, after you get to know it, runs rings around its predecessor. Just one example is shown in Figure 2-3 earlier in this chapter.

» **A backup worthy of the name:** Backup was a cruel joke in Windows XP. Windows 7 did it better, but Windows 10 makes backup truly easy, particularly with File History (see Book 8, Chapter 1).

» **A less-infested notification area:** XP let any program and its brother put an icon in the notification area, near the system clock. Windows 10 severely limits the number of icons that appear and gives you a spot to click if you really want to see them all. Besides, notifications are supposed to go in the Action pane, on the right. See Book 2, Chapter 3.

» **Second monitor support:** Although some video card manufacturers managed to jury-rig multiple monitor support into the Windows XP drivers, Windows 10 makes using multiple monitors one-click easy.

» **Homegroups:** Windows 10, like Windows 7, lets you put together all the PCs in a trusted environment and share among them quite easily.

» **Easy wireless networking:** All sorts of traps and gotchas live in the Windows XP wireless programs. Windows 10 does it much, much better.

» **Search:** In Windows XP, searching for anything other than a filename involved an enormous kludge of an add-on that sucked up computer cycles and overwhelmed your machine. In Windows 10, search is part of Windows itself, and it works quickly.

On the security front, Windows 10 is light years ahead of XP. From protection against rootkits to browser hardening, and a million points in between, XP is a security disaster — Microsoft no longer supports it — while Windows 10 is relatively (not completely) impenetrable.

Although Windows 10 isn't the XP of your dreams, it's remarkably easy to use and has all sorts of compelling new features.

What's New for Windows 7 and Vista Victims

Anything that works with Windows 7, 8, or 8.1 — and almost everything from Vista — will work in Windows 10. Programs, hardware, drivers, utilities — just about anything.

That's a remarkable achievement, particularly because your Windows Desktop apps/Legacy programs (there's that *L* word again) have to peacefully coexist with the WinRT API–based Windows/Universal/Modern/Metro apps.

Windows 10 does have lots going for it. Let me skip lightly through the major changes between Windows 7 and Windows 10.

Getting the hang of the new Start menu

By now, you've no doubt seen the tiles on the right of the Start menu (refer to Figure 2-6).
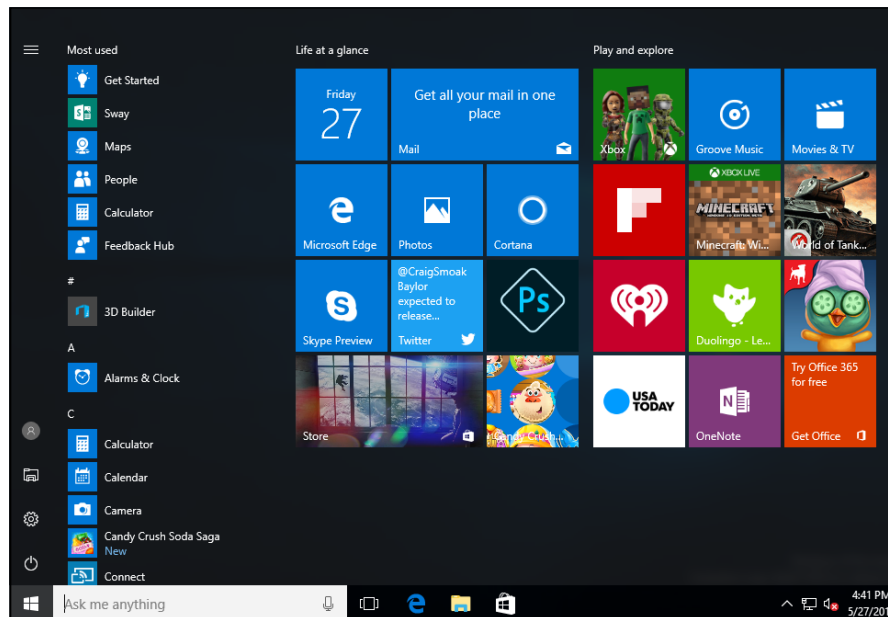
FIGURE 2-6: The Windows 10 desktop.

If you're coming to Windows 10 from Windows 7 — without taking a detour through Windows 8 — those tiles are likely to represent your greatest conceptual hurdle. They're different, but in many ways they're familiar.

Do you remember gadgets in Win7? See Figure 2-7. They actually started in Vista. Many people (who finally found them) put tiles for clocks on their desktops. I also used to use the CPU gadget and on some machines the Weather gadget.

FIGURE 2-7:
Windows 7
gadgets — at
least from the
interface point
of view — work
much like the
new Universal
Windows
app tiles.

In Windows 10, you have a layout that's more or less similar to Windows 7, but it has fantastically good gadgets. Microsoft rebuilt all the plumbing in Windows to support these really good gadgets. Those updated, enormously powerful gadgets are now called Universal Windows apps.

The new gadgets/Universal Windows apps run in resizable windows on the desktop. They can do phenomenal things. In fact, Microsoft Edge is quite superior to Internet Explorer, even if it doesn't yet have all the bells and whistles. Internet Explorer gets the heave-ho. Edge, which runs as a gadget/Universal Windows app, becomes the new default browser.

Tiles for these gadgets/Universal Windows apps appear to the right of the list of programs in the Win10 Start menu.

REMEMBER

Here's the big picture, from the Win7 perspective: Windows 10 has a desktop, and it's more or less analogous to the desktop in Windows 7. It doesn't have a Windows 8/8.1–style Metro view. Doesn't need a Metro view: The gadgets (or Metro apps or Universal Windows apps) now behave themselves and run in resizable windows on the desktop.

In Windows 10, you can switch from a finger-friendly view of the desktop to a mouse-friendly view and back. The finger-friendly view — called tablet mode — has larger gadget tiles, opens the gadgets at full-screen, and hides most of the text. It takes three clicks to change modes. Or you can plug or unplug your keyboard, and Windows will ask if you want to switch modes.

Here's the ace in the hole: Programmers who write programs for these new gadgets can have their gadgets run, with a varying amount of modification, on Windows 10 for PCs, Windows 10 for tablets without a keyboard, Windows 10 phones, and even Xbox. At least, that's the theory. Remains to be seen how it works in practice.

The only way you can get these new gadgets/Universal Windows apps is through the Windows Store, so — again, at least in theory — they should be well vetted, checked for malware, and generally in good shape, before you can install them.

Exploring new stuff in the old-fashioned desktop

You'll notice many improvements to long-neglected portions of the Windows 7–style desktop. For example, if you copy more than one file at a time, Windows actually keeps you on top of all the copying in one window. Imagine that.

A new and much better *Task Manager* rolls in all the usage reporting that's been scattered in different corners of Windows (see Figure 2-8). The new Task Manager even gives you hooks to look at programs that start automatically, and to stop them if you like. Some serious chops. See Book 8, Chapter 4.

ASK WOODY.COM

File Explorer (formerly known as Windows Explorer) takes on a new face and loses some of its annoying bad habits. You may or may not like the new Explorer, but at least Windows 10 brings back the up arrow to move up one folder — a feature that last appeared in Windows XP. That one feature, all by itself, makes me feel good about the new File Explorer. Explorer also now offers native support for ISO files. About time.

Taking a cue from iPad . . . er, other tablets, Windows 10 also offers a one-stop system restore capability. Actually, it offers three capabilities: *PC Reset* wipes everything off the machine and then reinstalls Windows 10. *PC Refresh* goes through the same motions but retains your data, apps from the Windows Store, and settings. And Start Fresh pulls in a brand-spanking-new version of Windows 10. Note that PC Refresh zaps out your legacy Windows Desktop apps and doesn't put them back. See Book 8, Chapter 2.

FIGURE 2-8:
The new and greatly improved Task Manager.
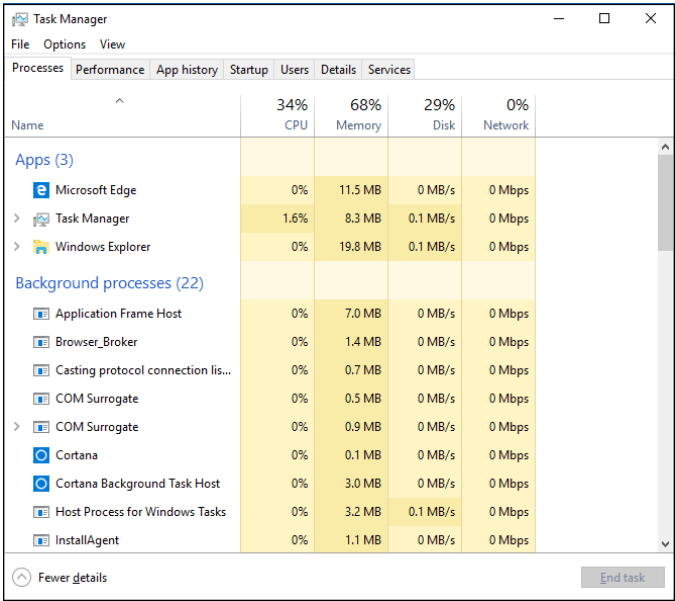
TIP

Storage Spaces requires at least two available hard drives — not including the one you use to boot the PC. If you can afford the disk space, Windows 10 can give you a fully redundant, hot backup of everything, all the time. If a hard drive dies, you disconnect the dead one, slip in a new one, grab a cup of coffee, and you're up and running as if nothing happened. If you run out of disk space, stick another drive in the PC or attach it with a USB cable, and Windows figures it all out. It's a magical capability that debuted in Windows Home Server, now made more robust. See Book 7, Chapter 4 for more on Storage Spaces.

Backup gets a major boost with an Apple Time Machine work–alike called *File History.* You may not realize it, but Windows 7 had the capability to restore previous versions of your data files. Windows 10 offers the same functionality, but in a much nicer package — so you're more likely to discover that it's there. See Book 8, Chapter 1. Unfortunately, Windows 10 drops the capability to create whole–disk ghost backups — you need to buy a third–party program such as Acronis if a full backup is in your future.

Power options have changed significantly. Again. The new options allow Windows to restart itself much faster than ever before. See Book 7, Chapter 1.

TECHNICAL STUFF

If you ever wanted to run a Virtual Machine inside Windows, Microsoft has made *Hyper–V* available, free. It's a rather esoteric capability that can come in very handy if you need to run two different copies of an operating system on one machine. You must be running a 64–bit version of Windows 10 Pro (or Enterprise), with at least 4GB of RAM. See Book 8, Chapter 4.

What's New for Windows 8 and 8.1 Users

You're joking, right?

Windows 10 is a no-brainer if you already have Windows 8 or 8.1. If you're still running Windows 8, drop everything right now, and follow the instructions in Book 1, Chapter 4 to install Windows 10.

Okay, I'll backtrack a bit. If you're a big fan of the tiled Metro side of Windows 8 or 8.1, you probably won't be happy with Windows 10, at least at first. There's no Charms bar, the taskbar always takes up part of the screen, Metro apps aren't completely immersive because they have title bars, and the full-screen tablet mode in Windows 10 isn't exactly comparable to the Metro side of Windows 8.

But if you use a mouse, even a little bit, or the desktop side of Windows 8/8.1, there's absolutely no question in my mind that you'll be happier with Windows 10.

Here's what you'll find when shifting from Win8 to Win10:

>> The Start menu — need I say more?

>> Big new features (detailed in the next section), along with a bunch of small tweaks really make life easier. Even in tablet mode, you'll find all sorts of things to love about Windows 10.

>> Universal Windows apps are updated and greatly improved.

>> OneDrive is built-in. You don't need to install a separate app.

WARNING

On the downside, OneDrive in Windows 10 works differently from how it does in Windows 8.1. The placeholders that many Windows 8.1 customers have come to know and love disappear in Windows 10. In Windows 8.1, files in OneDrive, in the cloud, aren't automatically synced and stuck on the Win 8.1 machine. Instead, small file previews called placeholders live on the Win 8.1 machine and act much like the whole file. When you bring up Explorer, for example, you riffle through placeholders. If you click a file that's only a placeholder, OneDrive runs out and quickly downloads the file, feeding it to you or your program.

A problem arises if you're disconnected from the cloud when you want to open a file. By all appearances, the file's on your computer — but it isn't.

There are other problems. If you have a gazillion photos in OneDrive, and you crank up OneDrive on a Windows 8.1 machine with a tiny hard drive, just the placeholders can take up all the space on the hard drive.

Windows 10 changes all that, making the sync process much more convoluted, eliminating the old placeholders. Many people — rightfully — don't like that change. But, in my experience, it's the only significant feature that's getting the axe in moving from Windows 8.1 to Windows 10.

Windows 10 is, in many ways, what Windows 8 should've been. If Microsoft had been listening to its experienced Windows customers, Win8 never would've seen light of day.

What's New for All of Windows

Permit me to take you on a whirlwind tour of the most important new features in Windows 10 — of which there are many.

The Start menu

Unless you've been living on an alternate Windows desktop, you know that Win10 sports a new Start menu, with shortcuts on the left, a list of all your programs in the middle, and Windows 8–style tiles on the right.

Figures 2-2 and 2-6 earlier in this chapter show the Start menu. In Figure 2-9, I show you the Start menu with the phone-dialer style index; you get to it by clicking the Start icon and then clicking one of the headings for the app groups (A, B, and so on).

You have very few customizing options for the Start menu — for example, you can't drag entries onto the Most Used list in the top left, or drag items from the list on the left and turn them into tiles on the right. Tiles on the right can be resized to small (one-quarter the size of a medium tile), medium, wide (two single-size slots, as with the Store and Mail tiles in the screen shot), and large (twice the size of wide). You can click and drag, group and ungroup tiles on the right, and give groups custom names.

TIP

You can resize the Start menu, within certain rigid limits. You can adjust it vertically in small increments, but trying to drag things the other way is limited to big swaths of tiles: Groups of tiles remain three wide, and you can add or remove only entire columns. You can drag tiles from the right side of the Start screen onto the desktop for easy access.

Although it's possible to manually remove all the tiles on the right (right-click each, Unpin from Start), the big area for tiles doesn't shrink beyond one column.
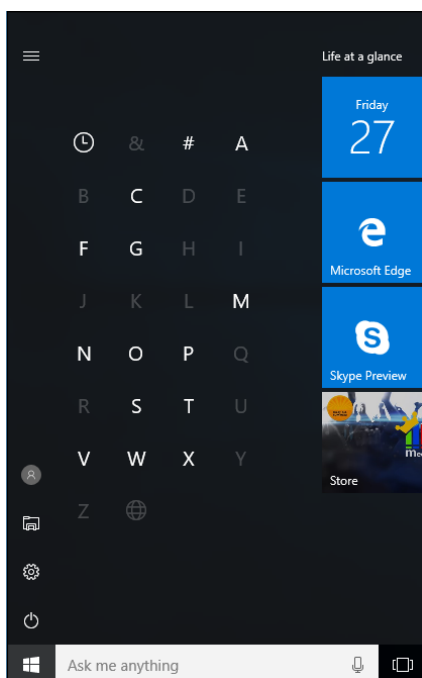
In tablet mode, Start looks quite different, although many of the options are the same. See Figure 2-10.

I talk about personalizing the Start menu in Book 3, Chapter 2, and working with tablet mode in Book 3, Chapter 3.

Microsoft Edge

Long overdue — and for many of us, a real surprise — Microsoft Edge (Figure 2-11) finally sheds the albatross that is Internet Explorer. Edge is a stripped-down, consciously standards-compliant, screamingly fast shell of a browser, ready to take on just about any website anywhere. Microsoft Edge may see Microsoft taking back the mindshare it's been steadily losing on the browser front for the past decade or so. As of this writing, though, Google's Chrome rules the roost.

Edge doesn't replace Internet Explorer — IE still lurks, but it's buried in the Start⇨Windows Accessories list. Microsoft Edge is, however, the default web browser, with its own tile on the right side of the Start menu and its own icon on the taskbar. IE continues to use the old Trident rendering engine, while Edge has the newer Edge. That makes it faster, lighter, and much more capable of playing nicely with websites designed for Firefox and Chrome.
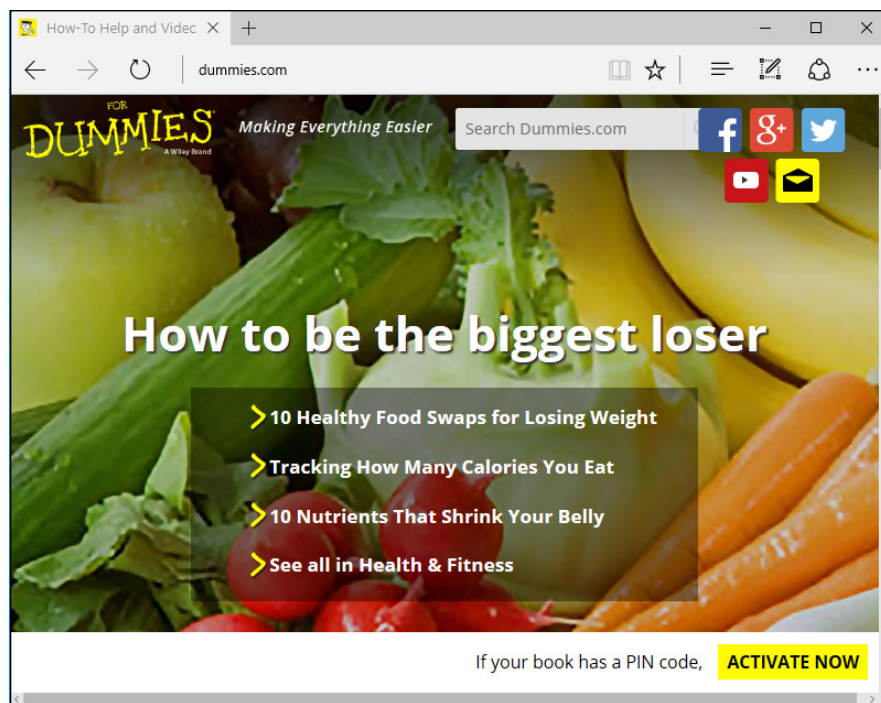
Edge is a Universal Windows app (formerly Universal app, formerly Metro app) that runs inside its own window on the desktop, like every other WinRT API-based Universal Windows app. IE is an old-fashioned Windows Desktop app, and the difference is like a Tesla III versus a 1958 Edsel.

Adobe Flash Player can be turned on and off with a simple switch in Settings. There's a reading view as well, which helps on smaller screens. Click the OneNote icon in the upper right, and all the OneNote markup tools become available. And you can Print as PDF.

REMEMBER

Where IE was frequently infected by wayward Flash programs and bad PDF files, Edge is relatively immune. And all the flotsam that came along with IE — the ancient (and penetrable) COM extensions, wacko custom toolbars, even Silverlight — are suddenly legacy and rapidly headed to a well-deserved stint in the bit bucket.

On the other hand, Edge will eventually, we're told, support Google Chrome-like extensions, which play in their own sandboxes, staying isolated. Instead of the spaghetti mess with IE add-ons, we finally have some Microsoft-sponsored order. It's about time.

Edge uses Cortana for voice assistance and search capabilities.

I talk about Edge in Book 5, Chapter 1. I also talk about Internet Explorer, briefly, in Book 3, Chapter 5.

Cortana

Although Apple partisans will give you a zillion reasons why Siri rules, and Googlies swear the superiority of Google Now, Cortana partisans think Microsoft rules the AI roost, of course. Unlike Siri and Now, though, Cortana has taken over the Windows search function — which you can see in Figure 2-12 — so it has a larger potential footprint than its AI cousins, which comes with a double edge.

Cortana occupies the search box to the right of the Start button. She (forgive my anthropomorphism) also appears when you click or tap the Search tile, on the right side of the Start menu. Cortana works only when connected to the Internet, and it's severely limited unless you use a Windows account. You can control some aspects of Cortana's inquisitiveness by clicking the hamburger icon in the upper-left corner (and shown in the margin).
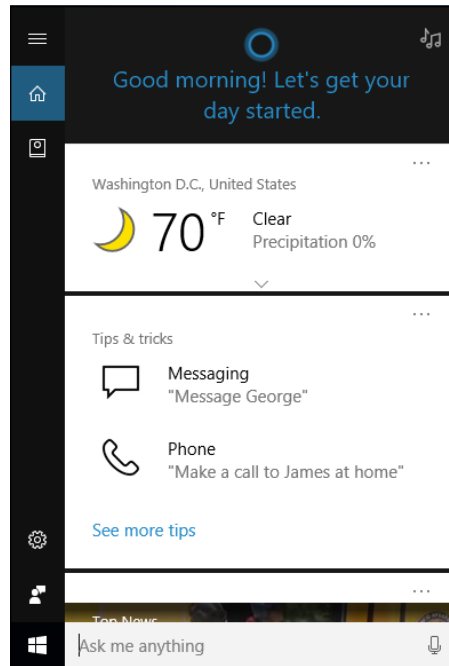
FIGURE 2-12:
Cortana knows
all, sees all, and
takes over your
search function.

REMEMBER

Frequently overlooked in Cortana discussions: everything — absolutely everything — that you search for on your computer gets sent, through Cortana, to Microsoft's giant database in the sky. Cortana's Notebook, as your personal repository is called, can be switched off, and entries can be manually deleted, but Microsoft's banking on you leaving it on.

Cortana improves as it gathers more information about you — yes, by snooping on what you do. But it also improves as Microsoft hones its artificial intelligence moxie, on the back end.

Microsoft has ported Cortana to both iOS (Apple phones and tablets) and Android, although the extent of its integration/usefulness remains to be seen. No, you won't be able to use Google Search with Cortana.

In actual use, there's no question that Google's AI is superior to all the others, with Siri and Alexa each occupying different niches. Cortana's well adapted to Windows 10, but she isn't all that smart. I talk about Cortana in Book 3, Chapter 6.

Virtual desktops and task view

Windows has had virtual (or multiple) desktops since Windows XP, but before Windows 10 you had to install a third-party app — or something like Sysinternals

desktop, from Microsoft — to get them to work. Windows 10 implements virtual desktops (Figure 2-13) so they're actually useful.
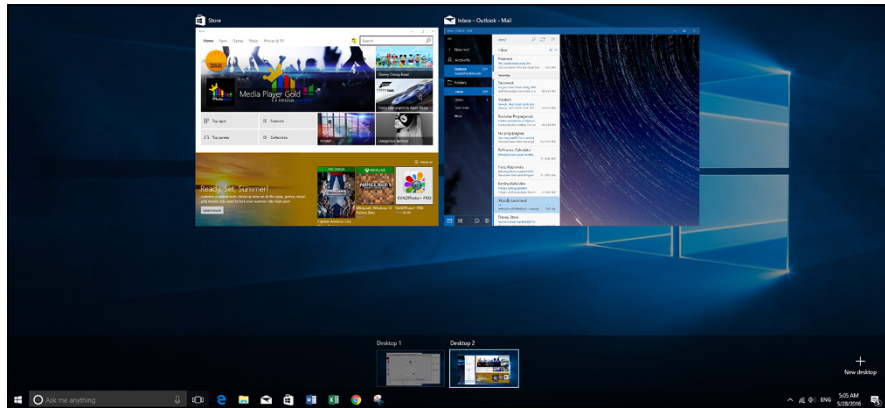
Don't let the terminology freak you out: Virtual desktops are just multiple desktops, and vice versa. If you want to sound cool, you can talk about optimizing your virtual desktops, but people in the know will realize you're just flipping between multiple desktops.

Multiple desktops are very handy if you tend to multitask. You can set up one desktop to handle your mail, calendar, and day-to-day stuff, and another desktop for your latest project or projects. Got a crunch project? Fire up a new desktop. It's a great way to put a meta-structure on the work you do every day.

To start a new desktop, press Win+Ctrl+D, or bring up the task view — the environment where you can work directly with multiple desktops — by clicking the Task View icon to the right of the Cortana Search bar (and shown in the margin) and then clicking or tapping the + sign in the lower-right corner. Windows can be moved between desktops by right-clicking and choosing Move To. Alt+Tab still rotates among all running windows. Clicking an icon in the taskbar brings up the associated program, regardless of which desktop it's on.

I talk about multiple desktops in Book 3, Chapter 4.

Security improvements

I'm told that Pliny the Elder once described the alarm system of ancient Rome by saying, "Even when the dogs sleep, the goose watches."

By that standard, Windows 10 has been goosed.

With Windows 8, Microsoft somehow found a new backbone — or decided that it can fend off antitrust actions — and baked full antivirus, antispyware, antiscumstuff protection into Windows itself. Windows 10 continues to use exactly the same protection as Windows 8/8.1.

Although the 'Softies resurrected an old name for the service — *Windows Defender* — the antivirus protection inside Windows 10 is second to none. And it's free.

Microsoft is also encouraging hardware manufacturers to use a boot-up process called *UEFI,* as a replacement to the decades-old BIOS. UEFI isn't exactly a Windows 10 feature, but it's a requirement for all PCs that carry the Windows 10 (or Windows 8) logo. UEFI can help protect you from rootkits by requiring digital signatures on any operating system that gets loaded. See Book 9, Chapter 3.

Other Universal Windows apps

Microsoft has given most of its built-in apps a much-needed makeover.

Mail and **Calendar,** unlike their Windows 8.1 analogs, actually work. You don't need to feel like the 90-pound weakling on the beach if you crank them up. I use Gmail and Google Calendar, but the new Windows Mail app is definitely a contendah. I talk about Mail and Calendar (which are really one app with two different viewpoints) in Book 4, Chapter 1.

People is a derivative of the Windows Phone People Sense app. It doesn't do much. I talk about it in Book 4, Chapter 2.

Groove Music and **Movies & TV** have replaced the useless Windows 8.1 Xbox Music and Xbox Video apps. They're surprisingly capable and tie into Microsoft's streaming service. (It took Microsoft only half a decade to put together a decent streaming service.) Look at Book 4, Chapter 5 for more.

The new **Photos** app is a dud. If you do anything at all with photos, other than file them and maybe remove some red-eye from time to time, you're far better off with a free online alternative — or do yourself a favor and try Google Photos, `www.photos.google.com`, which I talk about in Book 4, Chapter 3.

The **Weather** app shows more weather and less sappy background than its Windows 8.1 counterpart. I cover it along with the other Bing apps — News, Money, Sports, Extortion — in Book 5, Chapter 3.

Even the **Windows Store** is better than it used to be — damning with faint praise, for sure. Look for some actual improvements in Book 5, Chapter 4.

What you lose

OneDrive in Windows 10 doesn't work anything like it did in Windows 8 and 8.1, primarily because Microsoft is doing away with placeholder or smart file behavior — where thumbnails of files are stored on your machine and pulled down from OneDrive only as needed. I talk about that in the "What's New for Windows 8 and 8.1 Users" section, earlier in this chapter. If you're coming to Windows 10 from Windows 7, don't worry about it. You never knew what you're missing.

Although Microsoft hasn't talked much about it, the fact is that all the old Windows Live programs are disappearing. Windows Live is, in fact, dead. Windows 8 killed it, and Windows 10 drove a stake through its heart. If you use any of the Windows Live apps in Windows 7 (or Vista or XP, for that matter), your old Live apps are still available, but it doesn't look like Microsoft is going to do much with them. They certainly aren't getting any support.

Why? The Windows 10 Windows/Universal/Metro tiled apps cover many of the Live bases. Consider these:

>> **Windows Live ID** (formerly known as Microsoft Wallet, Microsoft Passport, .NET Passport, and Microsoft Passport Network), which now operates from the Windows Live Account site (confused yet?), is rebranded Microsoft Your Account and referred to informally as your *Microsoft Account.*

>> **Windows Live OneDrive** has already turned into just plain *OneDrive.* Parts of Ray Ozzie's Windows Live Mesh — formerly Live Mesh, Windows Live Sync, and Windows Live FolderShare — have been folded into OneDrive, although Microsoft has squashed PC-to-PC sync; the only way to synchronize files is through the OneDrive cloud. It appears as if Mesh has met its match.

>> **Windows Live Mail** has officially fallen out of favor, with Microsoft announcing that it won't support WLM with any Microsoft accounts. Expect Microsoft to push the new *Universal Windows Mail* as a core Windows communications app. Ditto for Windows Live Calendar.

>> **Windows Live Contacts** is now the *Universal Windows People app.*

>> **Windows Live Photo Gallery** morphed into the *Universal Windows Photos* app.

>> **Windows Live Messenger** is dead. It's been replaced by Skype — or Facebook, or any of a zillion competitors. I use Line, but that's a story for Book 5, Chapter 2.

It's not just the Live apps that are dying. Some of the old Windows programs — **Media Center** being a good example — are just dead.

Some people feel that losing **Adobe Reader** (and other browser add-ins) in Edge is a bad thing. I disagree strongly. Reader (and Flash, which is insulated in Edge) have brought on more pain and misery — and hijacked systems — than they're worth. Microsoft's own ActiveX technology, which won't run on Edge, is another malware magnet that deserves to die, as do browser helper objects, home page hijackers, custom toolbars, and much more. You can run all those add-ins in the Legacy desktop version of Internet Explorer, if you absolutely must.

Some other odd missing pieces include the following:

> » **ClearType** doesn't run on the Universal Windows apps' interface, at all. It's still on the old-fashioned desktop, but your Windows/Universal/Metro tiles apps can't use it.
>
> Note that this is different from Microsoft's ClearType HD technology, a marketing term for the monitors on Microsoft Surface tablets. I have no idea why Microsoft used the same term for both.
>
> » **Flip 3D** is gone. Little more than a parlor trick, and rarely used, the Windows Key+Tab used to show a 3D rendering of all running programs and flip among them. Stick a fork in it. Now it cycles among desktops.

WARNING

Do You Need Windows 10?

ASK WOODY.COM

With the drubbing I gave Windows 8 and Windows 8.1 in the press — and in my *For Dummies* books — you might think that I'd come down hard on Windows 10.

Nope.

I've been using Windows 10 in various stages for almost a year now, and I still love it. This is from a guy who works in front of a monitor about 16 hours a day, 7 days a week (at least during book-writing season). I use a mouse or trackpad, and I'm proud of it. Windows 10, to my mind, is a great operating system, and it's a big improvement over Windows 8. I know, damning with faint praise again.

If you use a keyboard and a mouse with Windows 8 or 8.1, you need Windows 10. It's that simple.

Switching over to touch computing isn't quite so clear-cut. I have a couple of touch tablets, and I review dozens more, and for simple demands — mail, web, media playing, TV casting — I still prefer Chrome OS. It's simpler, less prone to infuriating screw-ups, less prone to infection, and less demanding for patches.

On the other hand, if you need one of the (many!) Universal Windows apps or Windows Desktop apps that don't run on Chrome OS, and you have a touch-first environment, Windows 10 ain't a bad choice.

One thing's for sure. This isn't recycled old Windows 8 garbage. With Windows 10, Microsoft has taken a bold step in the right direction — one that accommodates both old desktop fogies like me and the more mobile newcomers (like me, too, I guess).

I haven't felt this good about a Microsoft product since the original release of Windows 7. I just wish Microsoft hadn't pushed so hard with the Get Windows 10 campaign. It still leaves a bad taste in my mouth.

Chapter 3
Which Version?

Permit me to dispel two rumors, right off the bat. Windows 10 isn't exactly free. And it isn't the last version of Windows.

You probably heard either or both of those rumors from well-regarded mainstream publications, and what you heard was wrong.

ASK WOODY.COM

Here are the facts:

>> From July 29, 2015 (when Win10 RTM was released) to July 29, 2016, you could upgrade from a genuine copy of Win7 or Win8.1 to Win10 for free. At the time this book went to press, you can't, although hope springs eternal. For the latest info on free or reduced-price upgrades, drop by www.AskWoody.com.

   If you're building a new PC, you have to buy Windows 10. And if you buy a new PC with Windows 10 preinstalled, the PC manufacturer (probably) paid for Windows 10.

>> Microsoft may drop the numbering system — so Windows 10 in the future will become, simply, Windows — but there will always be version numbers. I tell you how to find yours in this chapter. The number 10 is, was, and always will be a marketing fantasy.