

# Chapter 1

## It's a Digital World

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### *In This Chapter*

- ▶ Reviewing the types of personal computers
  - ▶ Discovering about powerful multi-user computer systems
  - ▶ Finding out about different types of software
  - ▶ Seeing how it's all connected
  - ▶ Finding out what's out there online
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**T**he world has changed dramatically in the last few decades, thanks to computer technology. Every second of every day, billions of bits of electronic data are whizzing around the globe and bouncing off satellites to deliver data to businesses and individuals.

This chapter provides a look at the most popular computing devices in use today and how they fit together to make up the digital world in which we live. You'll learn about the types of computers and software, the networks used to enable them to connect, and what you can accomplish by using them.

### *PCs: Discovering the Personal Computing Connection*

When most people think about computers, they picture a *personal computer*, or *PC*. It's designed for only one person to use at a time. Most of the computers you and your friends and family have are probably personal computers.

The term *PC* has different meanings in popular culture. On one hand, it means any computer designed for personal use. That's the meaning it has in this chapter. On the other hand, it is also sometimes used to refer specifically to a computer that runs Microsoft Windows, as in "Which is better: Macs or PCs?"

Personal computers fall into several categories, differentiated mainly by their sizes:

- ✔ **Desktop:** A *desktop computer*, shown in Figure 1-1, is designed to be used at a desk and seldom moved. It consists of a large box called the *system unit* that contains most of the essential components. The monitor, keyboard, and mouse all plug into it using cables (or in some cases, using a wireless technology). Desktops offer a lot of computing power and performance for the price, and they're flexible because you can connect whatever monitor, keyboard, and mouse you want to it, as well as install additional storage drives, memory, and expansion cards that add new capabilities.



**Figure 1-1:**  
A desktop  
computer.

- ✔ **Notebook:** A notebook, as its name implies, is a portable computer designed to fold up like a notebook for carrying and storage. As shown in Figure 1-2, its cover opens up to reveal a built-in screen, keyboard, and pointing device, which substitutes for a mouse. A notebook can run most of the same software as a desktop, and is similar to it in performance. Some people call it a laptop. Notebooks allow you to take your computer with you almost anywhere. They're more expensive than desktops of the same level of performance, however, and not very customizable or upgradable.



**Figure 1-2:**  
A notebook  
computer or  
laptop.

- ✓ **Netbook:** Short for *Internet notebook*, a *netbook* is a smaller and less powerful notebook computer designed primarily for accessing the Internet. A netbook is usually cheaper than a notebook or desktop, and is lighter and more convenient to carry around, but may not have enough memory and a powerful enough processor to run all desktop applications.
- ✓ **Tablet:** A tablet is a portable computer that consists of a touch-sensitive screen mounted on a tablet-size plastic frame with a small computer inside. There is no keyboard or pointing device; a software-based keyboard pops up onscreen when needed, and your finger sliding on the screen serves as a pointing device (see Figure 1-3). Tablets are extremely portable and convenient, but usually do not run desktop computer applications and have limited memory and storage capabilities.
- ✓ **Smart phone:** A smart phone, like the one shown in Figure 1-4, is a mobile phone that can run applications and has Internet capability. Smart phones usually have touch-sensitive screens. Many have a variety of location-aware applications, such as global positioning system (GPS) and mapping programs and local business guides. Smart phones have a lot in common with computers, but they lack the power and flexibility of larger computing devices.



**Figure 1-3:**  
A tablet  
computer.



**Figure 1-4:**  
A smart  
phone.

## The Business End: Multi-User Computer Systems

Multi-user computers are designed to serve groups of people all at a time, from a small office to a huge international enterprise. Here are some types of multi-user computers to be aware of:

- ✔ **Server:** A *server* is a computer that is dedicated to serving and supporting a group of network users and their information needs. There are different kinds of servers, varying greatly in size and power and performing different functions. For example, a *file server* stores files in a central location where multiple people can access them. A *database server* stores a database, such as a product inventory, and allows users to look up information in the database from their own computers. A *print server* manages a group of shared printers, controlling and prioritizing print jobs. Servers can be various sizes and designs. A *tower server* looks a lot like a regular desktop computer (Figure 1-1). *Rack servers* are stacked in multiples on storage racks, and accessed via a network interface rather than having their own keyboards and monitors.
- ✔ **Mainframe:** A *mainframe* is a large, powerful computer capable of processing and storing large amounts of business data. The main difference between a mainframe and a server is that the mainframe functions as the processing brain for multiple individual user terminals; it's not just a helper, but the primary processing device. For example, a mainframe might run several dozen cash registers in a large department store.
- ✔ **Supercomputer:** A *supercomputer* is the largest and most powerful type of computer. It can occupy a large room, or even an entire floor of a building. Supercomputers are used when a job requires a huge amount of processing power, such as molecular modeling, weather forecasting, or *cryptanalysis* (code-breaking). They are found in high-tech academic, government, and scientific research facilities.

## Computer Software

All the computer types you've learned about so far in this chapter have been *hardware* — that is, the physical computing devices you can see and touch. But it's actually the *software* — the instructions given to the hardware — that makes things happen. Without software, the hardware, no matter how grand and expensive it is, would be a useless lump of metal and plastic.

Here's a quick look at the software that makes a computer do what it does.

## BIOS

The hardware has a small amount of software permanently built into it on a chip, just enough to help it start up when you apply power to it. This basic startup software is called the *Basic Input Output System*, or *BIOS* (pronounced *buy-ohss*). Because this software is permanently installed, it occupies a somewhat gray area between hardware and software, so it is sometimes called *firmware*. You can mostly ignore it. However, sometimes if you are having problems with a device, the manufacturer will tell you that you can fix the problem by updating the firmware (or BIOS) and will provide you with a utility to do so.

## Operating system

The *operating system* manages all the computer's activities after the BIOS has finished its startup routine. It provides the user interface, runs applications, manages file storage, and communicates with the hardware on your behalf. Microsoft Windows, shown in Figure 1-5, is the most popular operating system, but there are also others, including Mac OS X and Linux for desktop computers, and iOS and Android for tablets and smart phones. You will learn more about operating systems in Chapter 3.



**Figure 1-5:**  
Microsoft  
Windows.

## Utilities

Utility programs work in partnership with the operating system to keep the computer healthy and running well. Some utilities come with the operating system, and others are purchased as add-ons. Utility programs assist with a wide range of maintenance and security functions, such as checking storage disks for errors, blocking security and privacy threats, and backing up important files.

## Applications

Last but not least, we get to the reason you own a computer: the applications. An *application* is software that is designed to help you do something productive or fun — something of interest to a human user.

Many computers come with some applications already installed, and you can buy more, either through an online store or on a CD or DVD in a retail store. You will learn more about applications in Chapter 9.

## It's All Connected

When computers were first developed, they were mostly standalone units; networking came later, and for years networking of all kinds remained cumbersome and slow, making it not-so-appealing for information sharing. Nowadays, though, connection is the norm. Many good networking technologies have been developed that transfer data from computer to computer quickly and easily, without a lot of complex setup and maintenance.

Here are some of the buzzwords you may hear about computer connectivity and what they mean. Many of these are discussed in much more detail in later chapters.

- ✓ **The Internet:** The Internet is the big, worldwide network of interconnected computers. When people talk about being “online,” they generally mean the Internet. The Internet is the network that enables the World Wide Web (also known as the web), which you’ll learn more about in Chapter 6, and email, covered in Chapter 7.
- ✓ **Ethernet:** *Ethernet* is a network type, but you’ll more likely hear the term when someone is referring to the port in your computer that you can plug a network cable into. Although technically most networks today

use Ethernet technology, the term Ethernet has lately come to informally mean the wired type of networking, where an Ethernet cable connects an Ethernet port on a computer to a router, switch, or some other type of networking equipment, as in Figure 1-6.



**Figure 1-6:**  
An Ethernet  
port and  
cable.

- ✔ **Wi-Fi:** *Wi-Fi* is the technology used to connect your computers, tablets, and smart phones to wireless networking access points. It's an abbreviation of *Wireless Fidelity*, which is itself a play on the phrase "high fidelity" that used to be used to describe vinyl records. It refers to the wireless type of Ethernet networking, and is also known by its official standard: IEEE 802.11. There are various versions of it, like 802.11g or 802.11n, and you'll see those on the boxes if you buy networking hardware.
- ✔ **Private networks:** Besides the Internet, many companies and even homes also have private networks that allow their own computers to communicate with one another. Most of these private networks are Ethernet, and you use the same networking hardware to participate in the private network that you do to connect to the Internet.

- ✓ **3G and 4G:** These stand for 3rd Generation and 4th Generation, respectively, and are standards for cellular phone networking technology. A 3G or 4G network is a data network that operates through the same system of cell phone towers that carry your voice calls and text messages. Smart phones use these networks to gain Internet access (especially when a Wi-Fi network is not available). Most people don't use 3G/4G networks as their primary means of Internet connectivity because it uses up their phone's data plan quickly, and because the data speeds are not as high as with Wi-Fi or wired Ethernet connections.
- ✓ **Bluetooth:** *Bluetooth* is a short-range type of wireless networking used to connect computers to external devices such as microphone headsets, wireless mice and keyboards, and printers. If your computer has a Bluetooth adapter, you can pair it to a wireless Bluetooth device and they can communicate as long as they are in close proximity to one another (about 10 feet).

## *Discovering What's Out There*

If you're relatively new to being online (that is, on the Internet), you might be wondering what all the fuss is. What's out there to be discovered? Plenty! Here's a whirlwind tour of the joys that await a digitally literate person online.

### *Shopping*

Ecommerce (buying and selling online) is one of the main reasons the Internet is so popular — and so well-funded. Hundreds of thousands of online stores compete for your business on the web. Giant online retailers like Amazon.com (Figure 1-7) sell a wide variety of merchandise, but there's a place for small merchants too. Mom-and-pop stores in small towns all over the world can put their products up for sale globally. You can have your purchases delivered right to your home, saving you a trip to the mall, and if you catch the right deal, shipping might even be free.

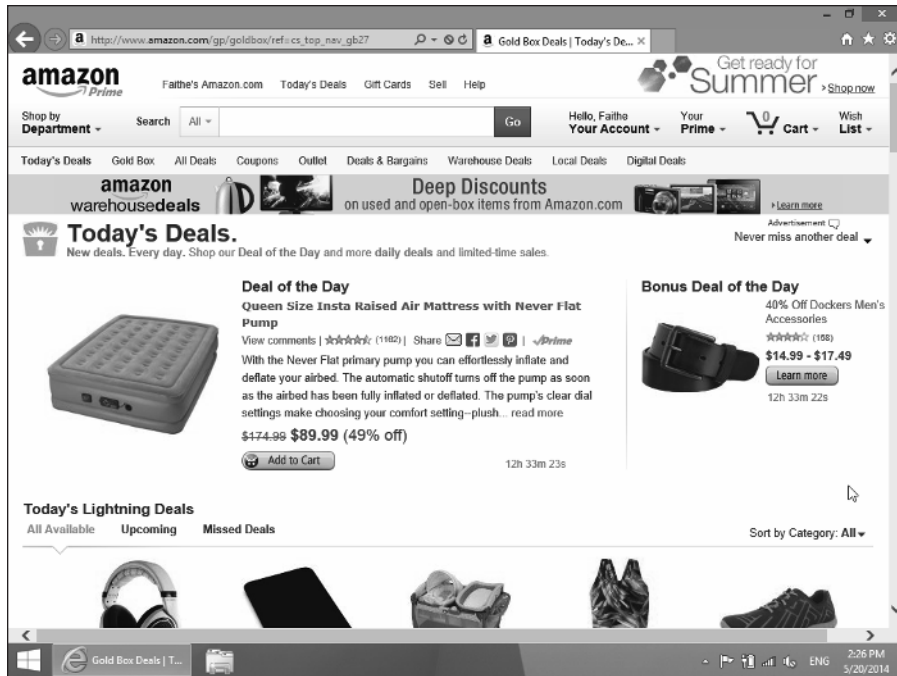


Figure 1-7:  
Amazon.  
com.

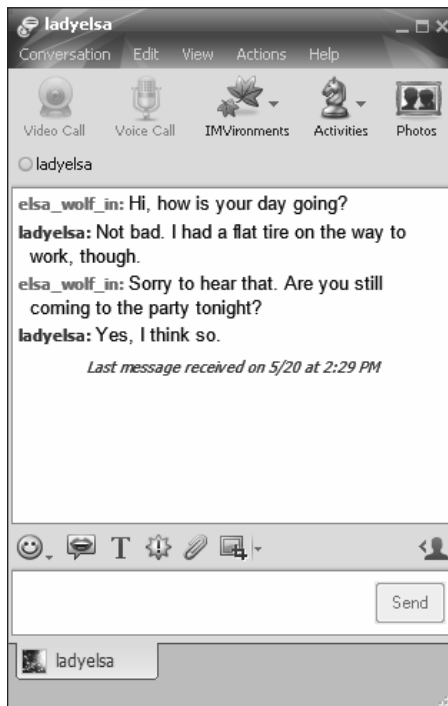
## *Fun and games*

Most people will tell you they use computers to be more productive and efficient, but most of people also use computers to play games, from simple Solitaire games to the fanciest 3D shoot-em-up action adventures. You can buy games online and download them to your computer, or buy them on CDs or DVDs in stores. Some games are for individual use, whereas others have a collaborative component that lets you use the Internet to play with (or against) other players all over the world.

## *Communicating online*

Keeping in touch with your friends, family, and co-workers has never been easier. Here are some of the ways you can communicate online:

- ✔ **Email:** With electronic mail, you can exchange private messages with individuals. Email is a store-and-forward type of communication; your email is sent to a mail server, where it waits for the recipient to pick it up. In other words, it's not instant communication; it's more like an electronic post office system. You'll learn more about email in Chapter 7.
- ✔ **Instant Messaging:** You can have private text conversations in real-time with individuals via an instant messaging (IM) service such as Yahoo! Messenger (shown in Figure 1-8) or AOL Instant Messenger (AIM). Some of these services also offer voice and video chat through the same interface, blurring the lines between those offerings.



**Figure 1-8:**  
Yahoo!  
Messenger.

- ✔ **Video chat:** Services like Skype enable you to have voice and video person-to-person conversations. All you need is a computer with a webcam (an attached or built-in video camera) and a microphone.
- ✔ **Video conferencing:** For business use, multi-person and multi-point video conferencing takes video chat to the next level. Not only can multiple people participate in the call, as shown in Figure 1-9, but you can share computer screens, notes, documents, and whiteboards in a single interface.



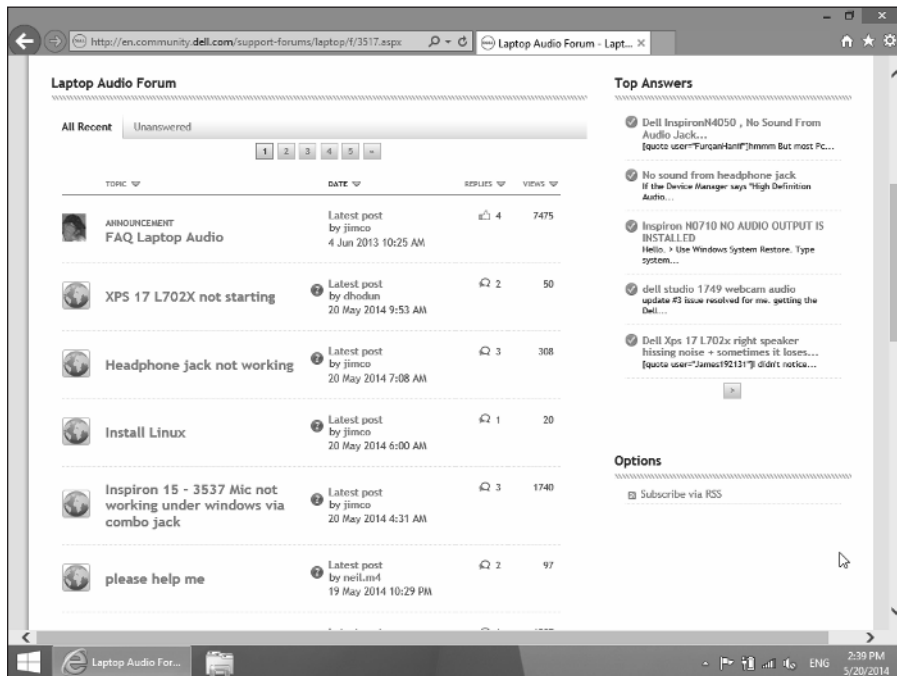
**Figure 1-9:**  
A video  
conference.

## *Social networking*

With the Internet, you'll never be lonely unless you want to be. Millions of people are reaching out to others in every conceivable way online. Social networking is covered in Chapter 8 in more detail, but here are some starting points for finding like-minded people:

- ✔ **Social networking websites:** Sites like Facebook and Pinterest provide users to create their own pages and spaces to share their hobbies and interests with others. On some social networking sites, you can also play online games.
- ✔ **Twitter:** Although Twitter has a web interface ([www.twitter.com](http://www.twitter.com)), it's probably best known for being a smart phone app. With Twitter, you can post very short status updates, and anyone who subscribes to your feed will immediately receive them on their computer or phone. You can follow your family and friends, celebrities, and companies. Beware, though, that if you have some friends who post a lot of *tweets* (Twitter posts), it can get exhausting to read.

- ✔ **Dating sites:** If you're looking for a date (or possibly a lifetime partner), there are many dating websites that want to help you find one. You can create a profile on one of these sites and describe yourself there, and others can browse you, decide you are the best thing since sliced bread, and send you a message. Where you go from there is up to you.
- ✔ **Forums:** A *forum* (sometimes called a *community*) is a web-based message board, usually open to the public. On a forum you can post questions and comments and other people can reply with answers. Forums are usually narrowly focused on a particular topic. For example, a computer manufacturer may host a support forum on their website to handle customer questions, as shown in Figure 1-10.



**Figure 1-10:**  
An Internet  
forum.

- ✔ **Internet Relay Chat (IRC):** This is a somewhat older technology, but still very popular. You use IRC software to log into a group of servers that host chat rooms, which are like text-based instant message services except they are public. Anyone may jump into a chat room and start participating by typing text. Chat rooms are not only for socializing; organizations have their meetings in chat rooms too. For example, there are hundreds of chat rooms that focus on addiction recovery.

## Information, please

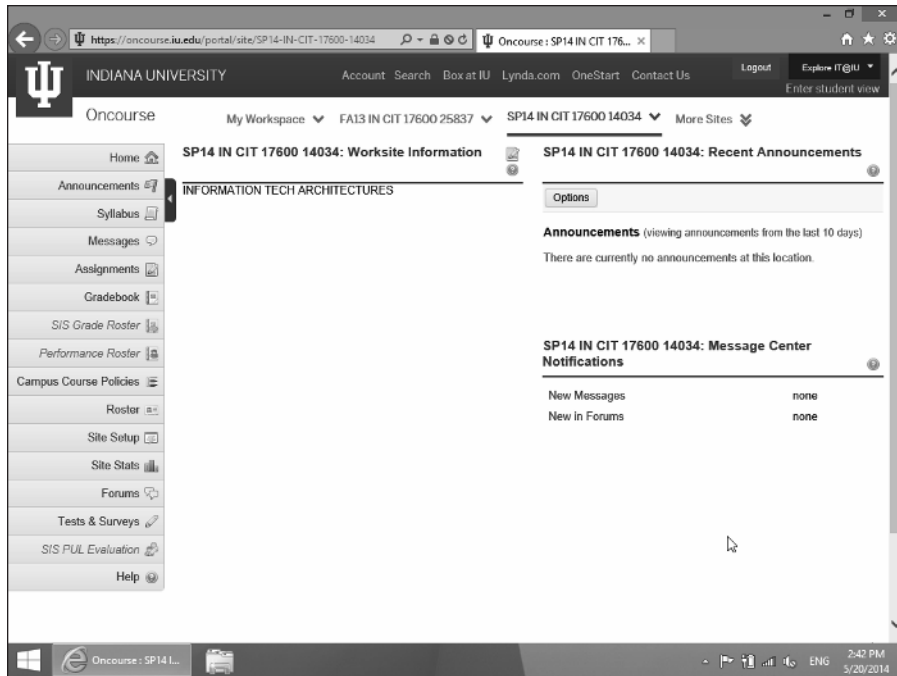
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- ✔ **Encyclopedia Britannica ([www.britannica.com](http://www.britannica.com)):** The encyclopedia that your school probably had in its library is now available online (in expanded and updated form, of course).
- ✔ **Wikipedia ([www.wikipedia.org](http://www.wikipedia.org)):** This is a wiki, which means it's publicly updated. Therefore the information in it isn't authoritative. It's a great place to start for basic facts, though, and the breadth of topic coverage is staggering.
- ✔ **Dictionary.com ([www.dictionary.com](http://www.dictionary.com)):** Your one-stop shop for settling arguments over a word's definition.
- ✔ **Oxford English Dictionary ([www.oed.com](http://www.oed.com)):** If the dictionary argument ends with one person saying "Yeah, well that's not what it *used* to mean," you can settle *that* argument with the OED, which provides historical meanings for the last thousand years for more than 600,000 words.
- ✔ **Project Gutenberg ([www.gutenberg.org](http://www.gutenberg.org)):** When books go out of copyright, they become public domain, and many of them become available here, in this library of over 45,000 ebooks, available in plain text, EPUB, or Kindle format.

## Education

You say you want an education? You could spend the rest of your life doing nothing but learning online, both at free sites and at formal educational institutions. Here are some basic categories:

- ✔ **Online universities:** Most bricks-and-mortar institutions now have an online segment where you can take college classes online and earn real credits toward a degree. The enrollment process for online classes is probably similar to that of the school's regular classes — and the tuition may also be similar as well. Some universities are even offered entirely online, with no offline classrooms. Figure 1-11 shows a college course at Indiana University that runs through a proprietary web interface.



**Figure 1-11:**  
An online  
course at  
Indiana  
University.

- ✔ **Free education:** If you aren't ready to commit to spending the money on real college classes, that doesn't mean you can't learn. Hundreds of sites offer free classes that are more informal in nature. You won't get a degree, but you can get much the same education as you would get by pursuing a degree. For example, check out Open Yale (<http://oyc.yale.edu>), which offers free and open access to a selection of introductory courses taught by teachers at Yale University.
- ✔ **Educational videos:** Want to pick and choose what lectures to hear and what subjects to learn about? Try a site such as FreeVideoLectures ([www.freevidelectures.com](http://www.freevidelectures.com)), which is full of online courses and lectures on every academic subject you could study at a real university. You can also find interesting educational and how-to videos at general video sites like YouTube ([www.youtube.com](http://www.youtube.com)).
- ✔ **Test preparation:** If you are getting ready to take an important test, such as a college entry exam like the SAT, you can find study help online. Practice tests and sample questions are widely available, as well as online tutoring and peer-to-peer advice and help.

