Mobile Devices

"I am Loki, of Asgard. And I am burdened with glorious purpose."

—LOKI, *THE AVENGERS*

In this chapter, you will learn how to

- **Explain the features and capabilities of smartphones and tablets**
- **Explain how to configure mobile devices**
- **Describe how to secure mobile devices**

Mobile devices have revolutionized the way we work and play in recent years. Devices such as smartphones and tablets enable people to access the Internet from just about anywhere and accomplish essential tasks on the go.

This chapter explores mobile devices in detail. We'll first look at the features and capabilities of devices that are common in the mobile market. The chapter then jumps into the details of configuring the devices for personal use, doing such things as setting up e-mail and adding productivity devices. The chapter wraps with a discussion on securing mobile devices. I'm eager to jump into a topic new to this version of the CompTIA A+ certification, so let's get started.

■ Features and Capabilities

Modern mobile devices fall into two categories, smartphones and tablets, and both types of device have similar features and capabilities. The primary distinction between the types is that a **smartphone** is a cell phone enhanced to do things formerly reserved for fully grown PCs; a **tablet** embodies those enhanced computing features and capabilities on an expanded format and screen. Tablets generally do *not* have cellular phone capability. This section explores the common features among the devices and highlights major differences as well. We'll first look at the mobile experience, and then look at ways to add programs to and enhance the capabilities of the devices. The section finishes with ways to enhance the hardware of mobile devices, or at least the hardware's capabilities.

Mobile Experience

Mobile devices might seem, at first description, like PCs scaled down to fit in a backpack, purse, or pocket, but they bring a unique experience to users that differs substantially from the standard PC experience. Mobile devices have a default screen—like the desktop in Windows—called the **home screen** and have icons for applications (*apps*) for accomplishing specific tasks. But the first thing that will strike you when you handle one of these devices is that it's *not* the same thing as a small PC (see Figure 27.1). The most obvious difference is the interface, so we'll start there.

• Figure 27.1   Small PC and tablet—cousins at best

• **Figure 27.2**   Mobile devices have a touch interface.

Touch Interface

Mobile devices use a **touch interface**, meaning that to interact with them you touch the screen (see Figure 27.2). They don't come with a physical keyboard for typing or a mouse for clicking. (In fact, you can't add a mouse at all to most mobile devices.)

Different gestures with your fingers accomplish different tasks. To start a program, or app as they're called, you **tap** its icon, which means to poke it with your finger. If you've opened an app with multiple screens, you hold your finger on the screen and slide it across the screen, either right to left or top to bottom, depending on the type of application (see Figure 27.3). This is called a **swipe**.

Holding a finger on the home screen or on an open app screen in many devices brings up a context menu for accomplishing things like changing the background picture (the *wallpaper*), bookmarking a page, or editing. Touching different parts of the screen when in an app can offer other options, such as closing the app or pushing the app to the background (see Figure 27.4).

Many mobile devices enable you to use multiple fingers to do tasks such as expand or shrink an image on the screen (see Figure 27.5). An open long document, such as a word processing document, for example, might give you two different responses when you scroll with one or two fingers. Using one finger might select text to edit, but two-fingered scrolling might move the document up or down. Different vendors call this feature different things, but the common term is **multitouch**.

This multitouch interface enables you to expand or contract some content on the screen. You can **pinch** an image, for example, between two fingers and make that picture bigger or smaller according to the way your fingers move.

• **Figure 27.3**   Swiping to move to the next screen

• **Figure 27.4**   Getting a context menu by touching and holding

Mike Meyer's CompTIA A+ Guide to Managing and Troubleshooting PCs

Screen Technology Current **capacitive** touchscreens use electrical current in your body to determine movement of your fingers across the screen. They measure the difference between the electrical charge in your body and the static charge on the screen, which is quite cool when you think about it. Capacitive touchscreens require physical contact, so gloved fingers won't work. Older technologies used **resistive** touchscreens that responded to the pressure applied to the screen. Fingers worked, but best results came from using a special pointing stick called a *stylus* (see Figure 27.6).

Mobile devices use a variety of screen types. Most tablets use some type of LCD panel, just like portable PCs and desktop monitors. The less expensive ones use twisted nematic (TN); the better ones, like the Apple iPad, use an In-Plane Switching (IPS) panel for richer colors and better viewing angles.

Some smaller devices, like the better smartphones, use a related but different technology called **organic light-emitting diode (OLED)** screens where an organic compound provides the light for the screen. Applying an electric current causes the organic layer to glow in the precise spots desired. Displaying a checkerboard pattern of black and white, in other words, only lights up the white squares. OLEDs don't use backlights at all, which means they can display true black, they're lighter, and they use less electricity than LCDs of any sort. Screens larger than half a dozen inches, as of this writing, are too expensive to make for mainstream consumer devices.

The resistive touchscreen devices required periodic *screen calibration*, which resets the touch screen for improved accuracy. Capacitive touchscreens don't require calibration.

OLED screens use an organic compound exposed to electrical current for lighting; they don't have a traditional backlight.

• **Figure 27.5**   Resizing and rotating an image using two fingers

• **Figure 27.6**   Older mobile device with stylus

• Figure 27.7   Switching orientation

Orientation Mobile devices feature rectangular screens, just like desktop displays, but all of them rotate easily. Plus, the orientation of the screen rotates right along with the display, so by default, up is always up. The underlying technology, called an **accelerometer**, enables you to switch easily from portrait view to landscape view. If you want to switch from reading a book to watching a movie, just turn the device on its side (see Figure 27.7). Figure 27.8 shows a wonderful use of the accelerometer in an iPhone, turning the device into an electronic level.

Some devices feature a **gyroscope** that can detect the position of the tablet or phone in 3-D space. This enables more intuitive control over onscreen devices, such as a plane's joystick. Tilting the device forward, for example, would have the effect of pushing the plane's nose down; tilting backward "pulls back" on the stick, easing the plane's nose up. Few applications (and those primarily games) use the gyroscope as of this writing.

Mobile Operating Systems

Two operating systems power the vast majority of mobile devices. Apple **iOS** runs on all Apple devices, such as the iPhone smartphone and the iPad tablet. Google **Android** runs almost every non-Apple product. Microsoft has a very small presence in the mobile devices market, but you'll only find Windows Phone 7 on a few smartphones.

• Figure 27.8   Hanging a picture properly

Apps

An **app** enables you to accomplish a specific task on a mobile device, such as check e-mail, surf the Web, play games, and so on. (Apps are the same thing as applications. For some reason, it's more hip to use the short term when discussing mobile devices.) Programmers write apps for specific mobile platforms and sometimes for specific devices. So an app written for a Windows Phone 7 phone, for example, won't work on an Apple iPhone, even though both are smartphones. This applies somewhat to apps written for a specific operating system as well. Apps written for an Apple iPhone can run on an Apple iPad, because both devices use Apple iOS for an operating system, but the same app optimized for the iPad will look and run better than a scaled-up iPhone app.

Different apps bring out different features of the mobile device. An electronic book reader, for example, shows an interface that appears like a book (see Figure 27.9). You swipe to change pages. A note-taking application, in contrast, will open a virtual keyboard that enables you to type as if you had a regular keyboard attached (see Figure 27.10). Finally, a racing game will turn the entire mobile device into a steering wheel, relying on the accelerometer to provide accurate turning (see Figure 27.11).

• Figure 27.9   Reading an eBook

Multimedia

Most mobile devices today come with one or two cameras for taking digital photos and movies and for video conferencing. Manufacturers initially offered low-resolution cameras and camcorders that produced poor-quality photos and grainy videos, but some current devices offer crystal-clear high-definition videos with flash photos and optical zoom.
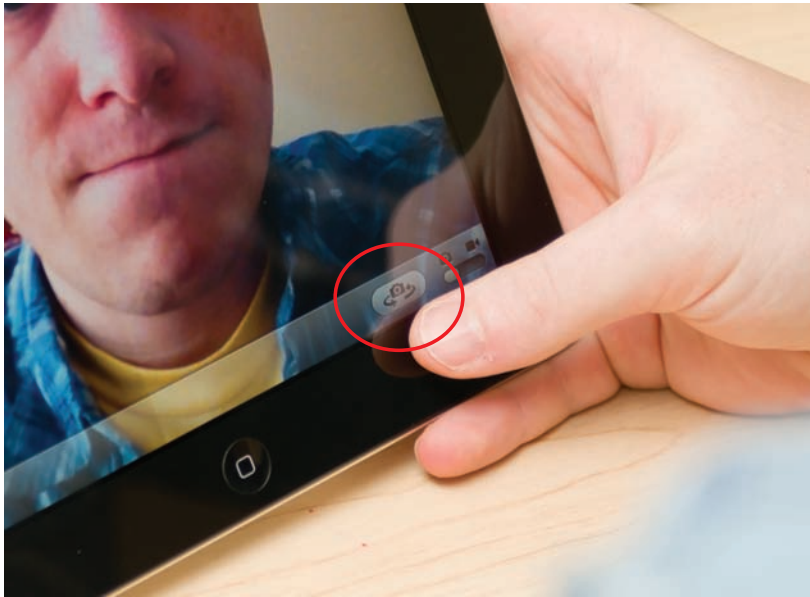

• Figure 27.10   Typing on a virtual keyboard

• Figure 27.11   Racing

• **Figure 27.12** Switching from the rear camera to the front camera

Devices with two cameras, one pointed away and one pointed at the user, have some kind of button to switch when picture taking. The tablet in Figure 27.12, for example, enables the user to swap the focus of the picture-taking software by tapping the double-arrow button in the lower-right corner.

Adding Apps

Mobile devices come from the manufacturer with a certain number of vital apps installed for accessing e-mail, surfing the Web, taking notes, making entries in a calendar, and so on. Almost all of them offer multimedia apps to enable you to listen to music, take pictures, watch You-Tube videos, and view photos. You'll find instant messaging tools and, in the case of smartphones, telephone capabilities.

With no exceptions I've encountered, though, you'll want to add capabilities to the mobile device, and that means adding apps. Games are incredibly popular to add, with *Angry Birds* accounting for billions of dollars of lost worker productivity in the United States alone (see Figure 27.13). (And if you haven't played *Angry Birds*, I highly suggest downloading it right now!)

Even when the prebundled tools offer great functionality, often other software developers will take an idea and run with it to create something

Tech Tip

iOS and Flash

The one big gotcha about Apple is that none of their mobile devices support Adobe Flash, making a surprising number of Web sites not available. You simply cannot add an app that makes Flash work on an Apple iPhone or iPad.

The GPS aspect of mobile devices goes both ways. Because mobile devices tap into the Internet or cellular phone networks, the devices have identifying numbers such as a MAC address. The cell phone companies and government agencies can use the ID or MAC address to pinpoint where you are at any given time. This feature, called **geotracking**, clearly has a lot of room for abuse of power, though nothing major has happened as of this writing.

• **Figure 27.13** *Angry Birds* on an ASUS table

wholly unexpectedly cool. All the smartphones and nearly every tablet, for example, include some sort map tool that also includes *positioning software*. This software taps into the **Global Positioning System (GPS)** network of satellites maintained by the U.S. government to pinpoint your current location on a map (see Figure 27.14). This helps you find how to get from where you are to where you want to be.

The Internet has turned the concept of map viewing into something much more powerful courtesy of tools like Google Earth. With Google Earth, you can zoom all over the world, seeing satellite images of cities, towns, and countryside. You can access embedded images of places (see Figure 27.15) and get information via Wikipedia. Adding Google Earth (or any other app) to a mobile device follows different patterns according to the operating system and manufacturer of a specific mobile device.

Apple and Closed Source

Apple makes the most popular mobile devices in the iPhone and the iPad (smartphone and tablet, respectively). Both devices use the iOS operating system. Unlike every other manufacturer, Apple tightly controls the user experience, insisting that all developers of apps for iOS follow the same guidelines.

Apple has created a **closed source** or **single source** system, meaning that if you want to get an app for your iPhone or iPad, you can only get it from the Apple App Store (see Figure 27.16). Apple must approve any app before it goes into the App Store, and Apple reserves the right to revoke permission on any app that fails to measure up.

To add an app, select the App Store icon from the home screen. You can select from featured apps or view by category. You can check out the top 25 paid or free apps or simply search for what you want (see Figure 27.17).
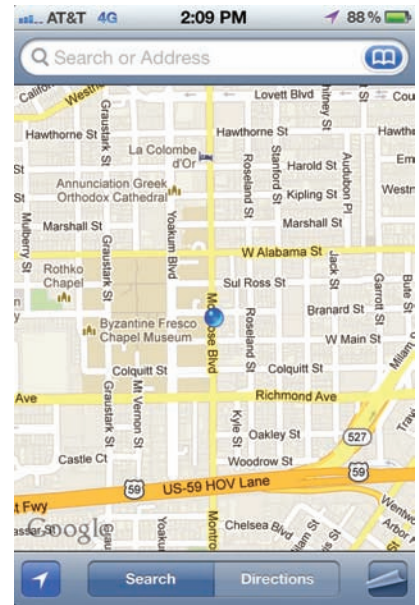
• Figure 27.14   GPS app showing current location (an excellent café in the Montrose neighborhood of Houston, Texas, in this example)
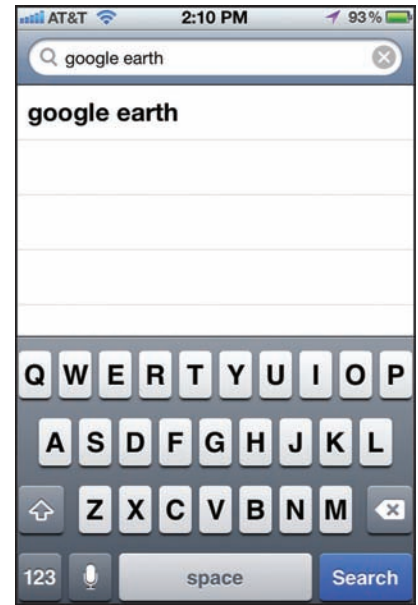
Don't like the idea of Big Brother knowing where you are all the time? Turn off Location Services in iOS or GPS Services on your Android. Keep in mind that turning this off will keep all applications that need this information from working.
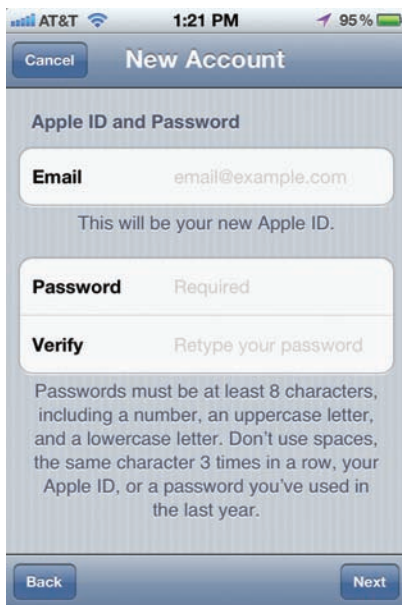

• Figure 27.15   Image in Google Earth

• Figure 27.16   App Store

• Figure 27.17   Searching for Google Earth

• Figure 27.18   Creating an iCloud account

The first time you try to purchase an app through the App Store, you'll be prompted to set up an account. You can use an account that you created previously through the Apple iTunes music and video store or create a new account using the Apple iCloud service. Creating a new iCloud account takes a few steps and a lot of typing in of passwords and such (see Figure 27.18), but eventually you'll get the account figured out. You'll need a valid credit card to set up the account.

Android Experience

Google Android powers a majority of smartphones and a solid percentage of tablets, but Android differs greatly from Apple iOS in that Google gives the OS away and developers create versions suited to their devices. That means in practice that when you have a smartphone or tablet that uses Google Android for an OS, you have to amend that description to include the manufacturer as well. A Samsung tablet, in other words, uses an OS that

Try This!

Checking Out Apps

You can see the kind of apps available through Google Apps Marketplace or Google Play, even if you don't have an Android tablet, so try this! Here are the two Web sites:

https://www.google.com/enterprise/marketplace/

https://play.google.com/store

What kinds of apps do they offer? What would you want that you don't see?

differs somewhat from the OS an ASUS tablet uses. HTC, for example, uses a custom interface for its Android devices called HTC Sense that changes the look and feel of Android.

When you want to get an app for an Android device, you have alternative sources for that app. Many vendors offer a store with apps developed or customized to work with their devices. These **vendor-specific** stores enable you to get apps that should work well with your Android smartphone or tablet.

You can also go to an **open source** market for apps developed "for Android" that probably will work with your device, but there's not a guarantee that they'll work on all Android devices. Google Play, for example, offers hundreds of thousands of apps. This Wild West approach to apps makes the Android experience vastly different from the iOS experience when it comes to smartphones and tablets.

Enhancing Hardware

A mobile device is a computer, just like your desktop PC or laptop, with the same basic components doing the same basic things. The construction centers around a primary circuit board, a *motherboard*, onto which every other component is attached. Each mobile device has a CPU and GPU, though not necessarily based on the same architecture as a portable PC. The Apple iPad uses an ARM processor, for example, rather than an Intel ×86 or ×64 processor. In contrast, the ASUS Transformer featured as the Android model in this chapter uses a processor called a Tegra from NVIDIA, billed as the first mobile super processor. It features two to four CPU cores with integrated GPU, Northbridge, Southbridge, and memory controller for awesome power and serious 3-D capabilities.

Mobile devices use storage, though usually not a traditional hard disk drive (HDD) with spinning platters. More commonly, mobile devices use a *solid state drive* (*SSD*) because SSDs use much less electricity than platter-based drives. Plus they're cooler in general, just like you.

Mobile devices vary from their larger brethren in two very significant areas of importance to techs. First, none of them offer any field-serviceable parts. If something breaks, you send the device back to the manufacturer. Second, you can't upgrade them at all. Even a laptop enables you to upgrade RAM or a hard drive, for example, but the mobile device you buy is exactly what you get. You want something better? Buy a new one.

That said, every mobile device enables you to attach some kind of peripheral or external storage device. But every device offers different expansion capabilities, so it's hard to generalize about them.

The one exception to the rule that you can't generalize about mobile devices relates to sound. Every mobile device has a single 3.5-mm audio jack for plugging in earbuds or speakers (see Figure 27.19). This applies to smartphones and tablets from all vendors.

The CompTIA A+ 220-802 objectives mention "touch flow" as if it were a standard feature of mobile operating systems. In fact, HTC's TouchFLO preceded HTC's Sense interface. TouchFLO is no longer used on HTC's Android phones.

Microsoft has a small but growing presence in the mobile devices market with Windows Phone 7 and Windows 8. Expect the market share to increase over the coming years. Microsoft embraces an app marketplace somewhere in between that of Apple and Google, with both Microsoft-created apps and those created by other developers available through the Windows Phone Marketplace and other venues.

Mobile devices have no field replaceable units (FRUs) and no upgradeability.

• **Figure 27.19**   Earbuds plugged into a smartphone

• **Figure 27.20**   Recharger dongle

Apple Expansion Options

Apple devices offer the least expansion capability of all the mobile devices, so even though they dominate the marketplace, there's not much to say about them. The iPhone and iPad use a single proprietary port that's used to recharge the device and to connect the few external devices available. Figure 27.20 shows the typical use for the port, a dongle that connects to a USB AC adapter for recharging.

Early iPhones and iPads had limited multimedia capabilities, but current devices enable you to mirror the screen to a multimedia device such as a projector. This enables seamless presentations, for example, through the excellent Apple Keynote program (see Figure 27.21). The multimedia connection requires another dongle adapter (see Figure 27.22).

Android Expansion Options

Devices that use Google Android come with a variety of connections and expansion capabilities. Many offer microSD slots for adding storage in the form of the tiny flash memory cards (see Figure 27.23). Some offer bigger slots, and a few feature Micro USB or even full-sized USB ports.

Many Android devices offer a proprietary socket that mimics the functions of Apple's dongle port, providing a way to recharge the tablet or smartphone and get data from a PC to the tablet and vice versa. Figure 27.24 shows a proprietary connector for power.

Finally, many tablets sport a connector for attaching the device to an external monitor, such as a big screen or projector. (Smartphones don't generally have this connector.) Figure 27.25 shows a Micro-HDMI port and connector.

• **Figure 27.21**   Apple Keynote on an iPad and a projector

• **Figure 27.22**   Apple Digital AV Adapter

• **Figure 27.23**   MicroSD card and slot

• **Figure 27.24**   ASUS proprietary power connector

Bluetooth

The last way that mobile devices expand their physical capabilities is wirelessly, most often using the Bluetooth standard for adding a keyboard (all) or mouse (not with Apple products). In theory, you could attach all sorts of Bluetooth devices to the mobile device, but the reality seems limited to keyboards, headphones, and headsets. Figure 27.26 shows a diminutive Apple keyboard for the iPad and the iPad resting in a stand to make typing this chapter a little easier than using the virtual keyboard.

• **Figure 27.25**   Micro-HDMI port and connector

> See the "Bluetooth" subsection of the "Configuration" section later in this chapter for the steps to set up a tablet with a Bluetooth keyboard.

• **Figure 27.26**   Keyboard associated with iPad

■ Configuration

Mobile devices require some setup and configuration to function seamlessly in your online life. That means you need to set up network connectivity, add Bluetooth devices, configure e-mail account(s), and enable the devices to synchronize with a PC. Let's look at all four options.

Network Connectivity

Mobile devices connect to the outside world through the cellular networks or through various 802.11 Wi-Fi standards. You learned specifics about the standards in Chapter 23, so I won't rehash them here. This section looks at standard configuration issues from the perspective of a mobile device.

When you want to connect to a Wi-Fi network, you need to turn Wi-Fi on and then actively connect to a network. If the network is properly configured with WPA or WPA2 encryption, then you also need to have the logon information to access the network. The most common way to connect is through the Settings app (see Figure 27.27). (This applies to all iOS and Android devices.)

Settings enables you to do the vast majority of configuration necessary to a mobile device. To join a network, for example, tap the Wi-Fi (or Networks) option to see available networks (see Figure 27.28). Simply select the one you want to join and type in the passphrase or passcode. Give the mobile device a moment to get IP and DNS information from the DHCP server, and you're on the network.

After you connect to a network successfully, all mobile devices store that network access information automatically, creating a *profile* of that network based on the SSID (the name of the network). This works just like with any other device that connects to a Wi-Fi network. If the SSID of a network
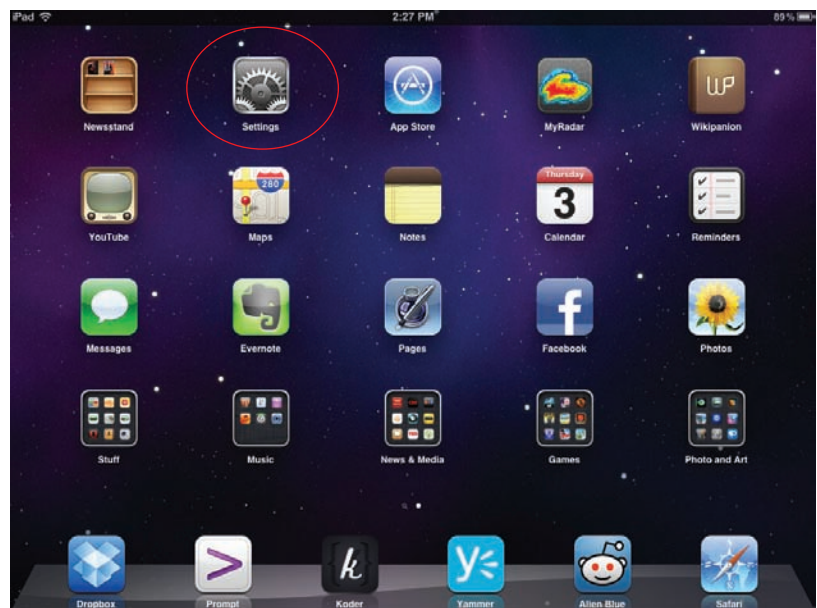
• Figure 27.27   Selecting the Settings icon
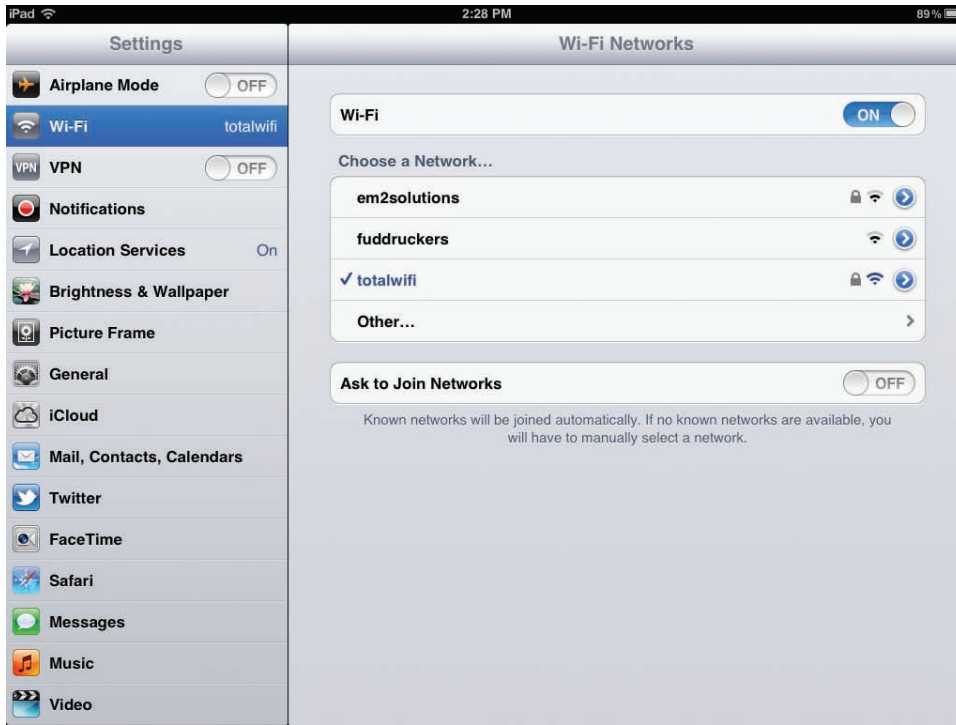
• Figure 27.28   Browsing available networks

changes after you've connected to that network, your mobile device will fail to connect to the rechristened network. You need to delete the profile and reconnect. You do this through the Settings app by selecting the Wi-Fi network and selecting *Forget this network*.

Data

Many mobile devices can use the cellular data services discussed in Chapter 24 to access the Internet. This way you can use your smartphone or tablet to get e-mail or browse the Web pretty much anywhere, even without a Wi-Fi hotspot.

By default, mobile devices that use cellular networks for Internet connectivity use **data roaming**, meaning they'll jump from cell tower to cell tower and from your provider to another provider without obvious notice. This is no big deal when you travel within your own country where competing providers have inexpensive roaming agreements.

Watch out for data roaming outside your country! If you travel outside of your country, your mobile device will also happily and seamlessly connect via some other available cell provider. This can lead to some shockingly huge bills from your cell phone company when you get back from that cruise or out-of-country trip. If you're going outside your cell provider's coverage area, get a plan that specifies that you're traveling. It'll still be more expensive than your regular plan, but not nearly as crazy as an accidental roaming charge.

If you don't need to connect when out of the country, turn data roaming off. You'll find the feature in the Settings app, as you might expect. You can also turn off cellular data entirely or only turn off cellular services

You can use the Settings app to turn Wi-Fi off or to go into Airplane Mode to stop the device from sending any signals out.

selectively if your device can do more than one type. (You would want to turn off cellular data, for example, if you don't have an unlimited data plan and are getting near your limits.)

Bluetooth

Pairing a Bluetooth device with a mobile device follows a similar, simple pattern through the Settings icon. You turn on Bluetooth on the smartphone or tablet, then power on the Bluetooth device. Return to the mobile device to select to pair with the Bluetooth device, and then enter the appropriate personal identification number (PIN) code. For a keyboard, for example, the smartphone or tablet will display a set of characters for you to type on the keyboard (see Figure 27.29). Once you type in the PIN code, the devices connect.

Always test the connectivity between a mobile device and a newly added Bluetooth accessory. If you've added a keyboard, for example, open up a note-taking app and start typing to make sure it works.

Most mobile devices have Bluetooth discovery disabled by default to conserve battery life. Actively seeking pairing uses electricity, as does completed pairing, so use Bluetooth when you need to use it and be prepared for the battery hit.
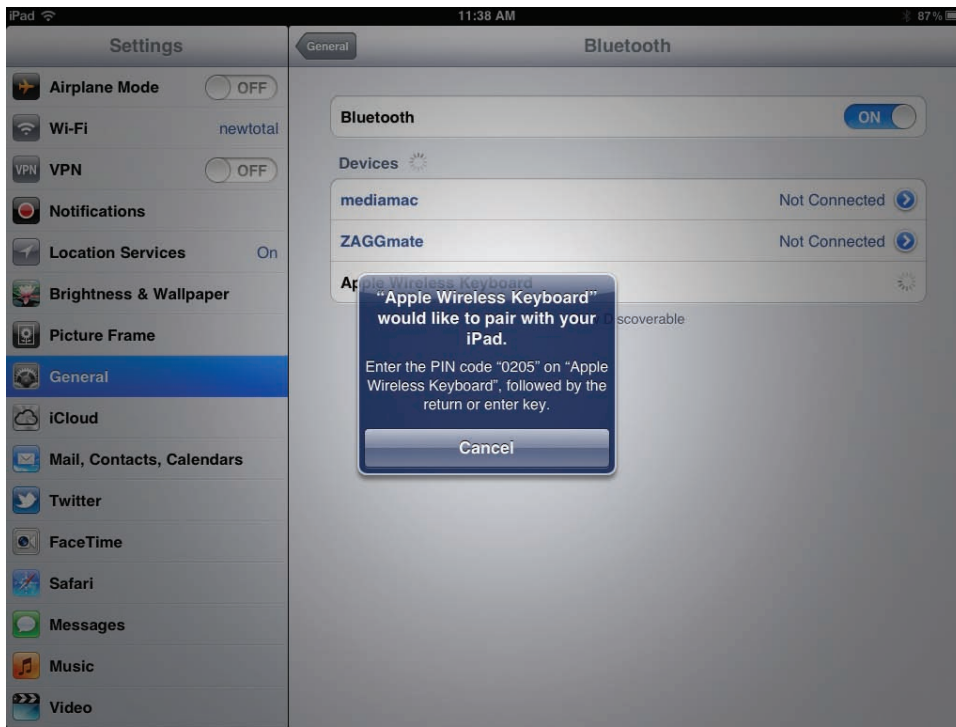

• Figure 27.29   Prompting for PIN

E-Mail

Setting up e-mail offers many levels of complexity with mobile devices, primarily because of the many different types of e-mail servers out there. The process is similar to that of setting up e-mail accounts that you learned about in Chapter 24. Apple devices go through the Settings app, then the Mail, Contacts, Calendars option (see Figure 27.30). Tap the Add Account option to bring up the default e-mail options (see Figure 27.31). If you want to connect to a Microsoft Exchange Server–based e-mail account, tap the appropriate option here and type in your e-mail address, domain, username, password, and description.

If you want a more common POP3 or IMAP account set up, that's not one of Apple's default options, so you'd have to go through the Other option on the initial Add Account screen. Eventually you'll get prompted
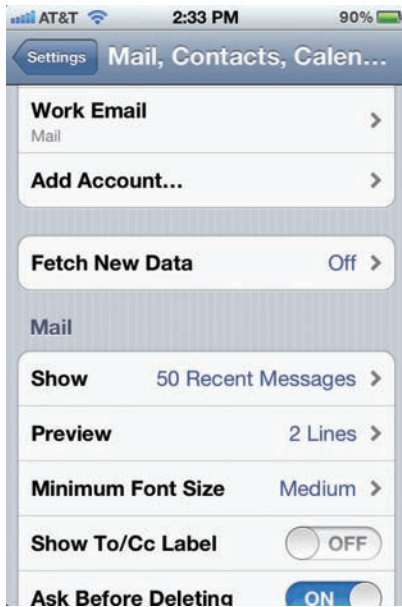
• Figure 27.30   Mail, Contacts, Calendars screen on iPhone
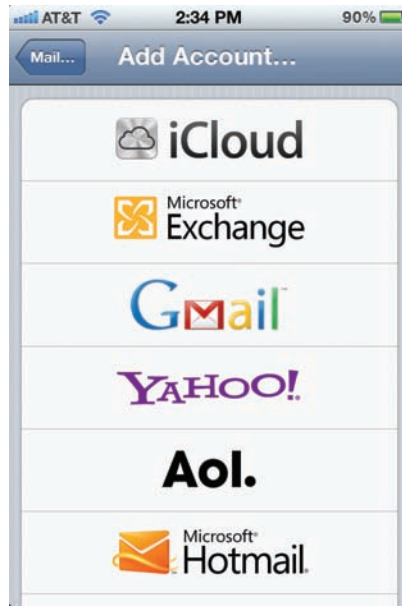
• Figure 27.31   Default e-mail types on iPhone

as you would expect to choose POP3 or IMAP and type in addresses for the sending and receiving servers.

Android-based tablets assume you'll have a Gmail account as your primary account, so that option is offered as a distinctive icon on the home screen (see Figure 27.32). You'll also have an Email icon for setting up Exchange, POP3, or IMAP accounts. You configure them the same way as you would a desktop e-mail application, including putting in the port setting and security type, such as SSL or TLS (see Figure 27.33).

• Figure 27.32   Gmail account option
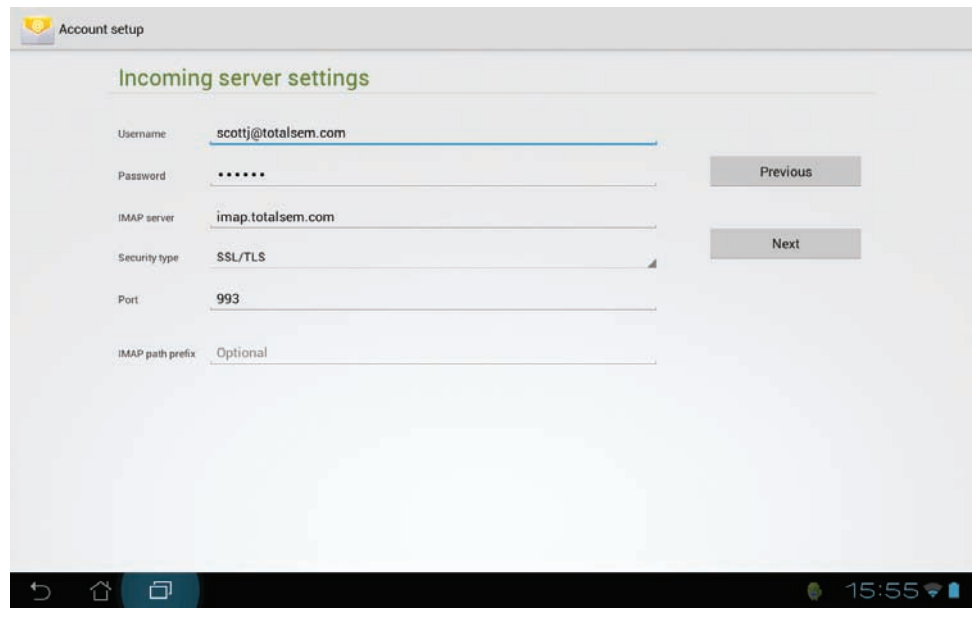
• **Figure 27.33**   Setting up a secure IMAP account

Synchronization

Smartphones and tablets can **synchronize**, or **sync**, with local machines or over the Internet with cloud-based servers to keep files and data up-to-date. Older devices, such as BlackBerrys and Palm Pilots, had a specialized sync program that installed onto your PC that you could use to sync contacts, calendars, and so on. Today's devices either use a dedicated program or sync through the cloud.

Most tablets and many smartphones use a proprietary dongle for syncing through a USB port on the computer. This is the same dongle used to recharge the battery. Some devices can sync through Wi-Fi connections. Many smartphones use a micro USB to regular USB cable to connect to the PC.

iTunes and iCloud

Apple iPhones and iPads sync through Apple iTunes installed on a Mac or PC, a free program that you download from Apple. Everything, such as music, videos, contacts, pictures, and so on, can be stored locally. You can choose to back up all the apps on your iPhone or iPad to iTunes as well. This single source for backup makes it easy to recover from something catastrophic happening to your Apple device. If you replace an Apple device, for example, you can simply sync that new device and all your files, contact information, and apps copy to the new device.

In late 2011, Apple introduced a cloud-based storage solution called iCloud. With iCloud, you can have all your iPhone or iPad data backed up and thus accessible from anywhere. This includes any media purchased through iTunes and calendars, contacts, reminders, and so forth.

Apple iTunes will run on just about any Mac OS X machine. On Windows at the time of this writing, you need to be running Windows XP with Service Pack 2 or better or any later Windows OS.

The CompTIA A+ 802 competencies don't discuss hardware requirements. The only thing that's relevant to a tech is that hardware needs to scale up to play more complex media. You can play music with a 1-GHz CPU, for example, but need a 2.4-GHz CPU with two or more cores to play an HD video.

Android and Gmail

Android-based mobile devices don't have a central desktop application like Apple devices. Rather, they sync over the Internet—but only some data. Contacts, calendars, and e-mail (through Gmail) are all that sync by default. For every other type of data or media, you treat the Android device like a fat thumb drive—you drag and drop files into the appropriate folder on the smartphone or tablet.

Sync In, Sync Out

One of the radical differences between an Apple device and an Android device is in the direction of syncing (or even copying, for that matter). With Apple, you can sync files—especially media files—to the iPhone or iPad. You cannot take that Apple device, connect it to another computer, and copy files *from* it to the PC. It's a one-way street.

Android devices, in contrast, happily share like a thumb drive. You can drag and drop from an Android smartphone or tablet to any PC.

■ Security

Mobile devices almost long to roam freely, so you need to take active steps to secure them against damage, loss, or theft. Let's look at all three issues.

Preventing Damage

Mobile devices cost a fair amount of money and thus aren't disposable media for most people. That means you need to take steps to prevent damage, both physical and software-based.

For physical damage, the first step you must take is to get a protective cover or sleeve for the mobile device. It doesn't help the HD camcorder in your new iPad if you get a scratch across the lens! You'll get a scratched, blurry movie even though the camcorder is capable of much, much more. Apple makes very nice covers for iPhones and iPads, plus you can get many third-party covers and sleeves (see Figure 27.34).

Depending on the amount of money you're willing to spend, you can get covers that help protect your screen from scratches, impacts, and small amounts of water. Like to scuba with your Android device? There are waterproof cases (as opposed to a cover) that enable you to check your Facebook account from 40 feet underwater. (These are specialty devices and not very typical.)

Do the obvious to protect your devices. Don't get them anywhere near liquids. Don't run your smartphone through the wash in your trousers.

• **Figure 27.34**   Putting an Apple Smart cover on an iPad

• Figure 27.35 Screen lock option in Settings

Don't even think about placing heavy objects on that ~$600 tablet! Use common sense.

Your options for software-based issues depend on your mobile platform. Android devices support a large number of antivirus applications, while iOS devices have no antivirus software. (Apple contends that such software is unnecessary on iOS.) You can also protect your mobile device with periodic *patching*, automatic updates and operating system patches from the device manufacturers.

Dealing with Loss

Losing a mobile device creates a series of issues that you need to address. First, protect your data from access by putting a good **passcode lock** on the device, which requires you to type in a series of letters, numbers, or motion patterns to unlock the mobile device each time you press the power button. Don't assume that you'll never set the phone down in the lavatory at an airport and forget about it or lose it to a thief. Most mobile devices enable you to set a passcode lock or screen lock from the Settings icon (see Figure 27.35). Do it right now! Some devices enable you to encrypt the contents of the SSD, so even if a "finder" dismantles the device to access the drive, he or she will not get your documents.

Mobile devices also have a preset number of failed login attempt restrictions that, when exceeded, lock up the mobile device. This slows down someone trying to hack into a found mobile device while you use locator services or applications to try to recover it.
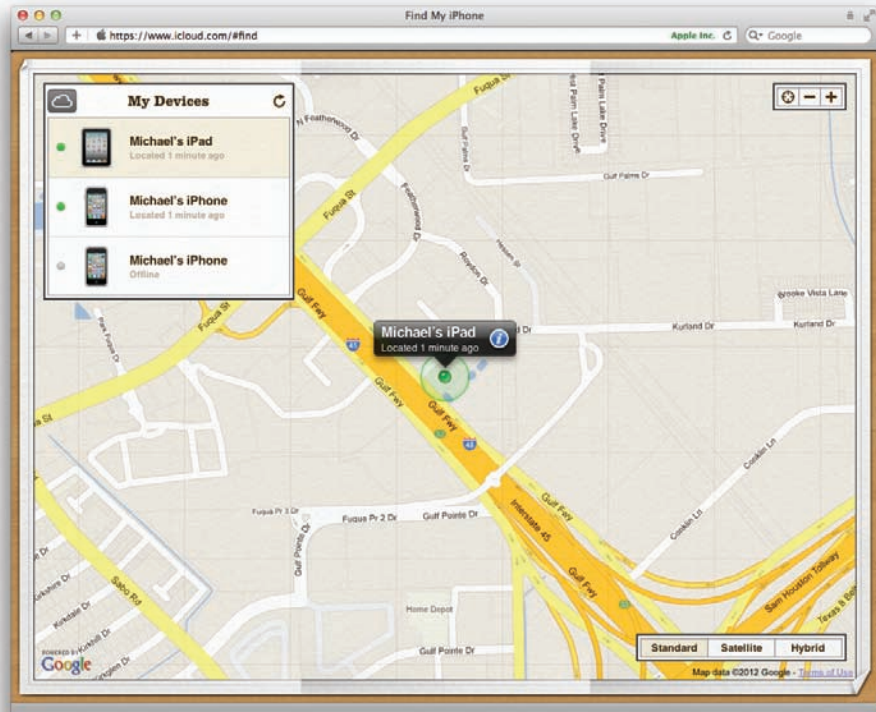
• Figure 27.36 Locating a device in iCloud

Both Apple and Google offer locator services for discovering the whereabouts of a misplaced mobile device. Google's service is okay, while Apple does a much better job with iCloud. Log in to your iCloud account and click the Find My iPhone button. (This works for both iPhones and iPads.) As soon as the device in question accesses the Internet (and thus receives an IP address and posts its MAC address), iCloud will pinpoint the location within a few yards (see Figure 27.36). Very slick!

Recovering from Theft

If your mobile device gets stolen and contains sensitive information, then you have a couple of options for dealing with it. Certainly the locator services help, but if you have credit card information or other very damaging information on your mobile device, you need to act quickly.

First, make sure you have your data backed up. You should have everything synced to a local machine and, if possible, backed up to one of the remote backup applications—like iCloud—to put your data beyond the reach of even a disaster that takes out your house. With iCloud, go into Settings and select iCloud. Tap the Storage & Backup option and turn iCloud Backup from OFF (the default) to ON (see Figure 27.37). Note that this will stop automatic backups to your local machine when you sync with iTunes.

Second, you can remotely wipe your mobile device. Apple makes it supremely easy through iCloud. Log in, locate, and nuke your device (see Figure 27.38). You may never get the device back, but at least the bad guys won't have your data.

• **Figure 27.37**   Turning on remote backup
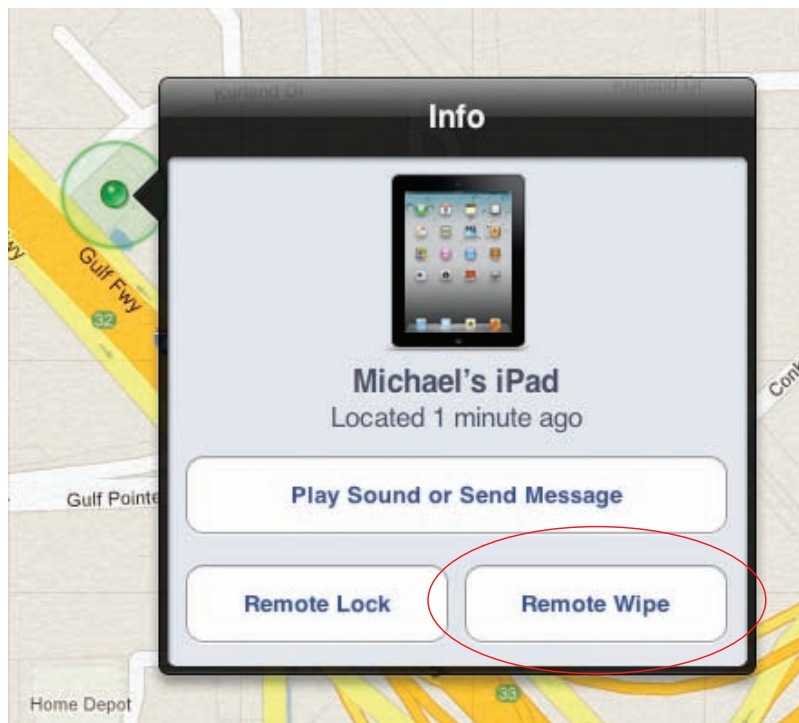
• **Figure 27.38**   Remote wipe

Chapter 27 Review

■ Chapter Summary

After reading this chapter and completing the exercises, you should understand the following about mobile devices.

Explain the features and capabilities of smartphones and tablets

- The primary distinction between the two mobile device types is that a smartphone is a cell phone enhanced to do things formerly reserved for fully grown PCs, whereas a tablet embodies those enhanced computing features and capabilities on an expanded format and screen.

- Mobile devices have a default home screen and have icons for apps for accomplishing specific tasks, just like portable computers, but they use a touch interface for interaction rather than a mouse and keyboard. You interact with mobile devices by using your fingers to tap, swipe, and pinch the LCD or OLED screen. The screens reorient automatically when rotated by using their accelerometer.

- Adding an app to increase the functionality of a mobile device differs somewhat between Apple and non-Apple devices. Apple uses a closed source or single source system, meaning that if you want to get an app for your iPhone or iPad, you can only get it from the Apple App Store. With Android devices, you get apps from vendor-specific stores or an open source market for apps developed "for Android" that probably will work with your device.

- Upgrading mobile devices means only adding a few external devices rather than updating internal components. You can attach a Bluetooth keyboard, for example, but not swap out the internal memory or SSD. Mobile devices offer no field-serviceable parts.

Explain how to configure mobile devices

- Mobile devices connect to the outside world through the cellular networks or through various 802.11 Wi-Fi standards. When you want to connect to a Wi-Fi network, you need to turn Wi-Fi on and then actively connect to a network using proper authentication.

- To pair a Bluetooth device with a mobile device, turn on Bluetooth on the smartphone or tablet, then power on the Bluetooth device. Return to the mobile device to select to pair with the Bluetooth device, and then enter the appropriate PIN code.

- The Settings icon enables you to set up all sorts of types of e-mail on both iOS and Android devices. You set up an Exchange, POP3, IMAP, Gmail, or other type of e-mail account the same way you would on a desktop, with addresses for sending and receiving servers, login information, port settings, and security type, such as SSL or TLS.

- You can sync smartphones and tablets with local machines or over the Internet with cloud-based servers to keep files and data up-to-date. Apple devices use iTunes or iCloud. Android devices sync primarily with Gmail for mail and contacts.

Describe how to secure mobile devices

- Start with securing hardware and software. For preventing physical damage, the first step you must take is to get a protective cover or sleeve for the mobile device. At the time of this writing, there is no antivirus software for smartphones or tablets. About the only software protection you get is periodic, automatic updates and operating system patches from the device manufacturers.

- Use passcode locks and device finding services to protect and recover from losing your mobile device. Make sure you back up the device regularly. If the device is stolen and doesn't appear recoverable, you can wipe it from afar.

■ Key Terms

accelerometer *(1038)*
Android *(1038)*
app *(1039)*

capacitive *(1037)*
closed source *(1041)*
data roaming *(1047)*

geotracking *(1040)*
Global Positioning System (GPS) *(1041)*
gyroscope *(1038)*
home screen *(1035)*
iOS *(1038)*
multitouch *(1036)*
open source *(1043)*
organic light-emitting diode (OLED) *(1037)*
passcode lock *(1052)*
pinch *(1036)*

resistive *(1037)*
single source *(1041)*
smartphone *(1035)*
swipe *(1036)*
sync *(1050)*
synchronize *(1050)*
tablet *(1035)*
tap *(1036)*
touch interface *(1036)*
vendor-specific *(1043)*

■ Key Term Quiz

Use the Key Terms list to complete the sentences that follow. Not all terms will be used.

1. The default "desktop" of a mobile device is called the _____.

2. The feature that most differentiates smartphones and tablets from portable PCs is the _____.

3. The feature that enables a user to rotate a tablet and have the screen rotate with the device is called a(n) _____.

4. A program that enables you to accomplish a specific task, like play *Angry Birds*, on a tablet is called a(n) _____.

5. The _____ enables a mobile device to determine where you are on a map.

6. When you want to buy software for an Android device, you buy from the vendor or from the _____ market for Android devices.

7. Tablets respond differently when you use one or multiple fingers on the screen, a feature called _____.

8. Protect your data from access by putting a good _____ on the device, which requires you to type in a series of letters, numbers, or motion patterns to unlock the mobile device each time you press the power button.

9. A(n) _____ screen responds to pressure applied to the screen and needs to be calibrated periodically.

10. Moving your finger across the screen on a mobile device to switch the screen to the next item, such as the next page in an eBook, is called a(n) _____.

■ Multiple-Choice Quiz

1. Which operating system powers an Apple mobile device?
   A. Android
   B. iOS
   C. OS X
   D. Windows Mobile

2. Which type of display responds to the difference in electrical potential between you and the screen?
   A. Capacitive
   B. LCD
   C. IPS
   D. Resistive

3. John has a high-resolution image on his iPad of his 2-year-old son and the family dog. The image initially displays smaller than the screen, so he wants to zoom in to get the details of his son's expression. How can he accomplish this task? (Select two.)

   A. Click the mouse in the middle of the picture to select it, then use the scroll wheel on the mouse to zoom in.

   B. Tap the picture with his index finger on his son's face.

   C. Right-click the picture with his index finger on his son's face.

   D. Touch his son's face on the screen with his thumb and finger, then pinch outward to scroll in.

4. Which mobile device screen technology uses no backlight?

   A. CCFL

   B. LCD

   C. LED

   D. OLED

5. What can a government use to determine your location at a specific time as long as you're using your mobile device?

   A. *Angry Birds*

   B. Geotracking

   C. Google Earth

   D. Gyroscope

6. What are the steps involved in pairing a Bluetooth keyboard with a tablet?

   A. Enable Bluetooth on the tablet; turn on the Bluetooth device; find the device with the tablet; enter a PIN code or other pairing sequence.

   B. Turn on the Bluetooth device; find the device with the tablet; enter a PIN code or other pairing sequence.

   C. Search for a Bluetooth device from the tablet; select **pair** from the options to enable the device.

   D. Enable Bluetooth on the tablet; turn on the Bluetooth device; find the device with the tablet; select **pair** from the options to enable the device.

7. A client calls, wanting to copy his music from his iPhone to his new PC. How can he accomplish this task?

   A. Connect the iPhone to the new PC. When it shows up as a new device, right-click it and select Properties. In the Properties dialog box, select Export media files.

   B. Connect the iPhone to the new PC. Double-click it and go to the Media folder. Drag and drop the desired music to the Music library on his new PC.

   C. Access the iPhone wirelessly from the PC. Drag and drop the desired music to the Music library on his new PC.

   D. He can't.

8. A client calls and is upset that he's misplaced his iPad. The mobile device has literally thousands of client records, including business addresses, e-mail addresses, phone numbers, and, in some cases, credit card information. What is the first thing he should do?

   A. There's nothing he can do.

   B. He should call his ISP and have them track his iPad.

   C. He should access his iCloud account and wipe his iPad to erase all personal data.

   D. He should purchase another iPad and sync with his iTunes account. This automatically erases the information on the old tablet.

9. Name the primary feature that separates a smartphone from a tablet.

   A. iTunes

   B. OLED screen

   C. Capacitive touchscreen

   D. Capability to make telephone calls

10. What information do you need to connect an Android-based tablet to an IMAP account?

    A. POP3 server DNS name

    B. Username and password

    C. Username, password, sending and receiving server addresses

    D. Exchange server name, username, and password

11. Tim wants to listen to music on his iPad. Which of the following are connectivity options for his headset? (Select two.)

   A. Infrared

   B. 802.11

   C. Bluetooth

   D. 3.5-mm audio jack

12. John returned from a cruise to the Bahamas and got a bill from his cell phone company (Sprint) that was over $1000. What could have happened?

   A. John connected to the Internet with his smartphone using the cruise ship company's Wi-Fi.

   B. John's smartphone connected to the Internet in the Bahamas via a cell provider that wasn't Sprint.

   C. John used his smartphone to do Internet gambling and Sprint frowns on that activity.

   D. Bills after international trips are always reported in the currency of the country visited. When translated from Bahamian dollars to U.S. dollars, the amount is the same he normally pays.

13. Galina has an application that tracks her location for people she invites via the application to know her whereabouts. She's in another town and wants to prevent temporarily one user from knowing her location. Which of the following is the best answer?

   A. Turn off the GPS.

   B. Uninstall the application.

   C. Uninvite the person using the application.

   D. Leave her phone at home.

14. Placing your phone in a typical protective cover will *not* protect the phone from:

   A. Scratches

   B. Impact

   C. Small amounts of water

   D. Immersion in water

15. Benjamin is using his iPhone to access a Web page. When the page opens he notices that it says he needs to install Flash. Which of the following should he do?

   A. Install Flash.

   B. There's nothing he can do to access this site.

   C. Use a Flash converter.

   D. Install MacFlash.

■ Essay Quiz

1. The boss has decided that all employees should get a new tablet to increase company satisfaction. Write a short essay on why every employee should get an Apple iPad.

2. The boss has decided that all employees should get a new tablet to increase company satisfaction. Write a short essay on why every employee should get a Google Android-based tablet.

Lab Projects

• Lab Project 27.1

Explore the Apple or Android apps available (seeking reviews and such on the Internet) and come up with a list of ten apps that would enable you to turn a tablet into a work device. That work can be whatever you or your instructor defines it as, such as something that enables you to create content (text, images, and so on). How much would such apps cost? Would they make you more likely to benefit from a tablet?