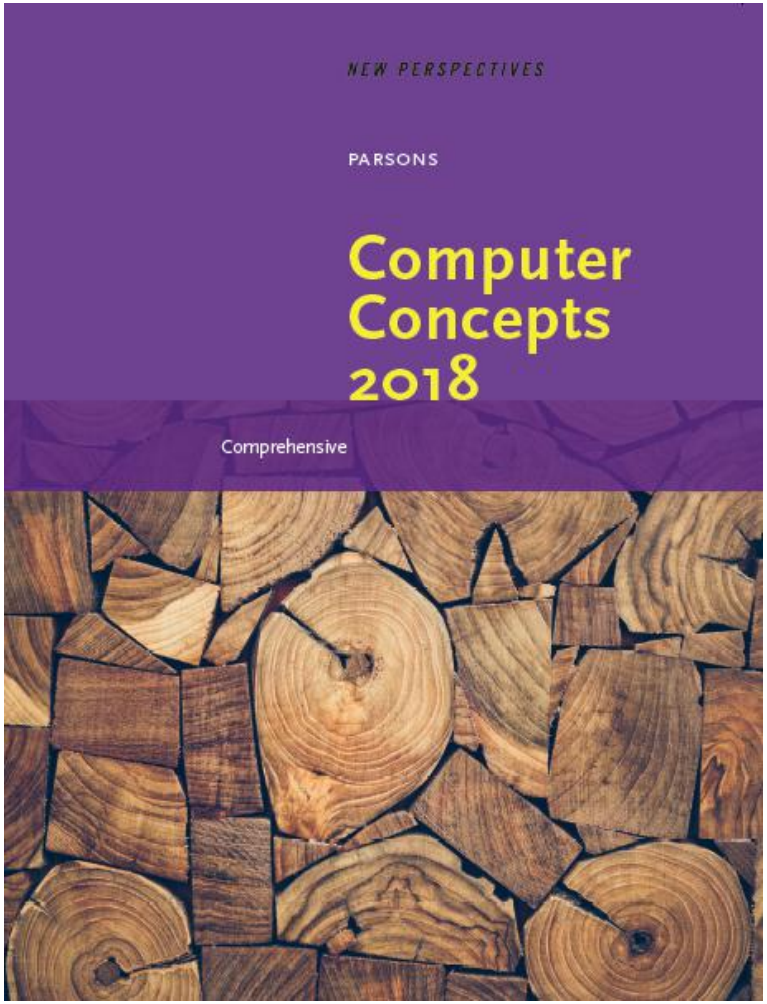
Computer Concepts 2018



Module 6
Software

Module Contents

- Section A: Software Basics
- Section B: Operating Systems
- Section C: Apps and Applications
- Section D: Productivity Software
- Section E: File Management Utilities

Section A: Software Basics

- Essentials
- Distribution
- Software Licenses
- Fake and Pirated Software

Section A: Objectives (1 of 2)

- Draw a hierarchical diagram that illustrates the three main categories of software and their subcategories
- State four best practices for obtaining software
- Distinguish between software updates and upgrades
- List four pricing models commonly used in the software industry
- Explain why most software is licensed
- Describe the difference between proprietary software and public domain software

Section A: Objectives (2 of 2)

- List and describe three types of commercial software licenses
- Create a chart comparing freeware, demoware, and shareware
- Name two popular open source software licenses
- List four ways to avoid fake mobile apps

Essentials (1 of 7)

- When searching for new software, it helps to have a framework of categories
- System Software
  - Operating Systems
    - For controlling a digital device's internal operations
    - Windows, macOS, iOS, Linux, Android, UNIX, and Chrome OS.
  - Device Drivers
    - For digital devices to communicate with each other .
    - Printer Drivers and Video Drivers
  - Utilities
    - For file management, security, communications, backup, network management, and system monitoring

Essentials (2 of 7)

- Development Software
  - Programming Languages
    - For writing programs C Basic, Java, Fortran, C++, C#, Scheme, and Objective-C
  - Scripting Languages
    - For writing scripts, creating Web pages, and querying databases
    - HTML, JavaScript, PHP, Python, Ruby, and SQL
  - Quality Assurance Tools
    - For testing software Debuggers, Load Testing, Security Testing

Essentials (3 of 7)

- Application Software
  - Professional Tools
    - For automating professional activities at work and in the home office
    - Desktop Publishing, Graphic Design, and Special Effects
  - Educational Software
    - For students and teachers engaged in the process of learning in classrooms and at a distance
    - Tutorials, Courseware, and Learning Management Systems
  - Personal Finance Software
    - For managing bank accounts, preparing taxes, retirement planning, and other financial matters
    - Tax Preparation, Banking Apps, and Loan Calculators

Essentials (4 of 7)

- Entertainment Software
  - For accessing media and playing games
  - Ebook Readers, Games, Media Players, and Media Editors
- Reference Software
  - For accessing information in specific topic areas
  - Travel, Sports, Medical, Hobbies, Lifestyle, Maps, News, Weather, and Shopping
- Social Media Software
  - For accessing and working with social media services, such as Facebook and WordPress
  - Social Analytics, Dashboards, and Marketing

Essentials (5 of 7)

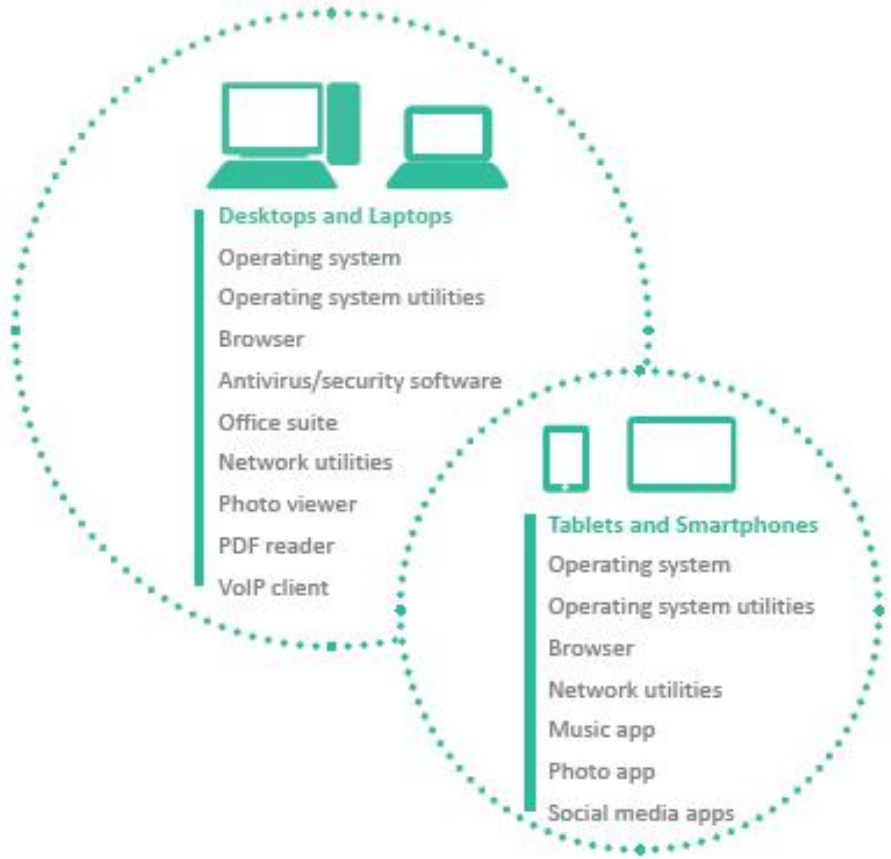
- Business Software
  - For automating core business functions
  - Accounting, Inventory Management, Billing Databases, Point of Sale, Sales force Management and Estimating
- Productivity Software
  - For automating tasks formerly carried out with legacy technologies, such as pen and paper, typewriters, calculators, and slide Projectors
  - Word Processors, Spreadsheets, Presentations, Calendars, and Contact Managers

Essentials (6 of 7)

- There is no universal standard for categorizing software, but various categorization schemes have many similarities

Essentials (7 of 7)

- Mobile devices are used differently from desktop and laptop computers, so the configuration of their software is slightly different
- Files tend to be stored and retrieved by each app, so users have little need for a utility that allows access to the file management system.

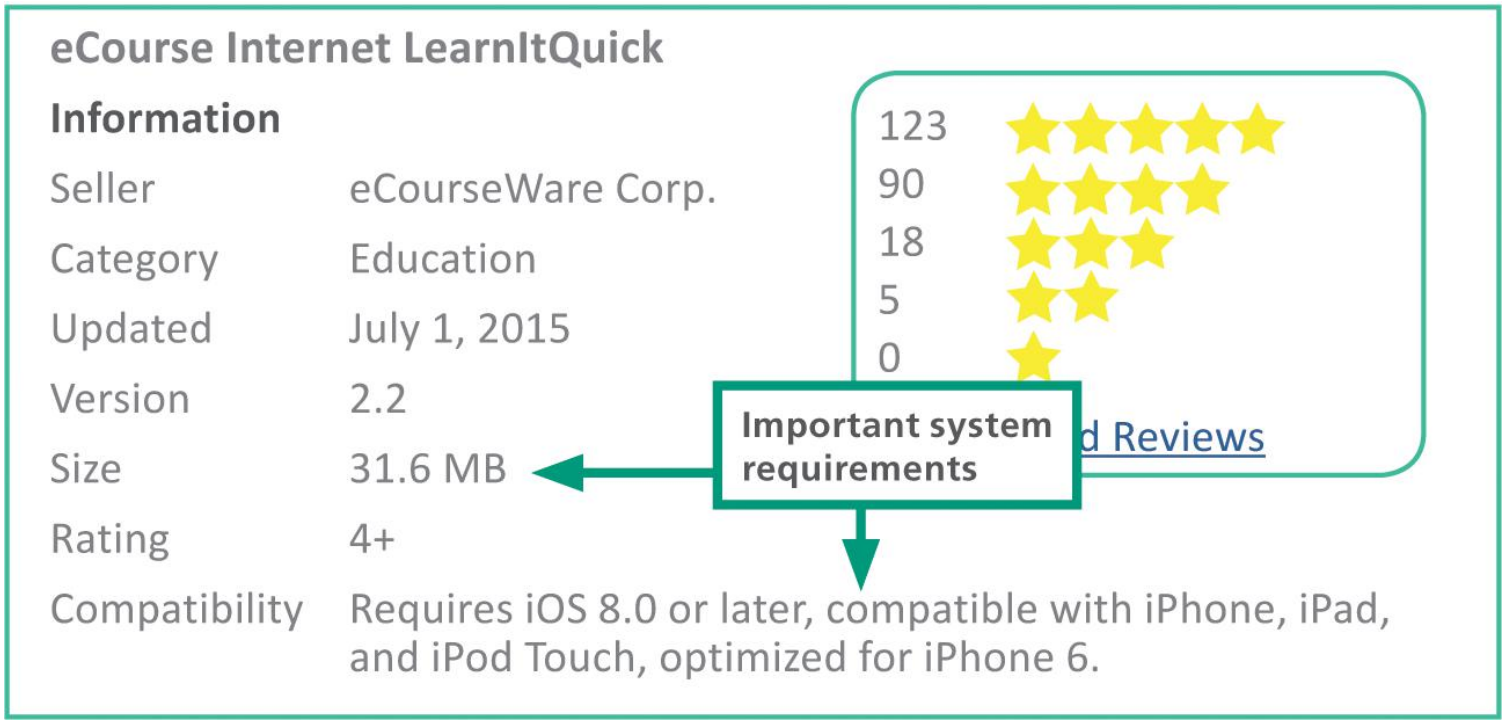


Distribution (1 of 5)

- Most consumers obtain software online, where it can be downloaded directly from the developer or from a software aggregator
- An **executable file** contains a computer program that is carried out step-by-step within the microprocessor
- Software can contain viruses and other malware, so consumers should download new applications only from trusted sources
- Software developers usually have a Web site for distributing software. Well-established developers tend to offer trustworthy products

Distribution (2 of 5)

- **System requirements** specify the operating system and minimum hardware capacities necessary for a software product to work correctly



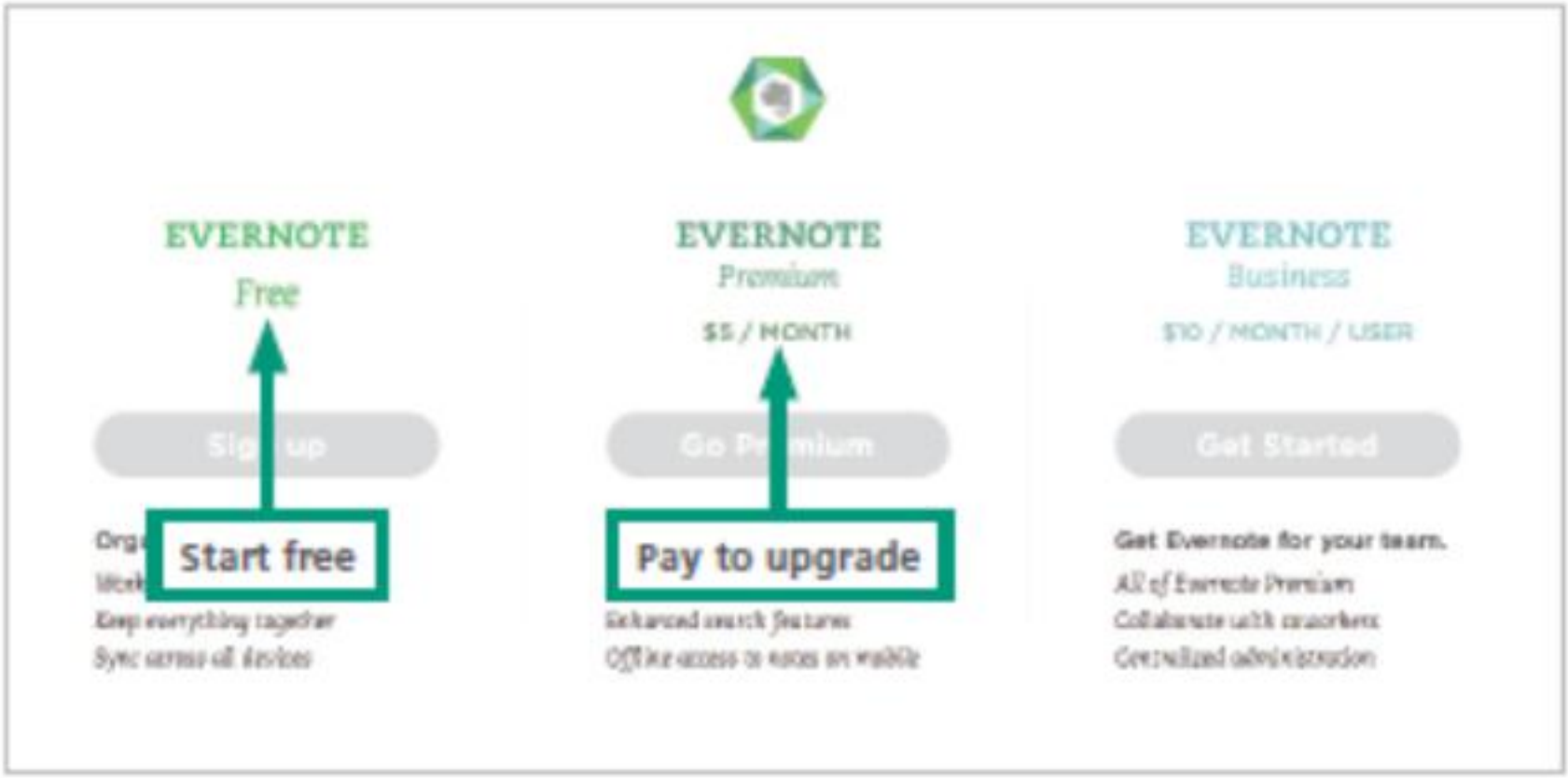
Distribution (3 of 5)

- When a new version or edition of a software product is released, it is referred to as a **software upgrade**
- A **software update** (sometimes called a software patch) is a small section of program code that replaces part of the software currently installed
- The term **service pack**, which usually applies to operating system updates, refers to a set of updates
- Updates and service packs are designed to correct problems and address security vulnerabilities

Distribution (4 of 5)

- Software can be obtained under a variety of pricing models
  - **One-time purchase** – the software remains basically the same as when it was purchased
  - **Subscription** – consumers pay a monthly or an annual fee to use software; updates and upgrades are usually included in the pricing
  - **Trial** – consumers use a software product during a free trial period
  - **Freemium** – provides free use of a stripped-down or basic version of the product but requires payment for upgraded features

Distribution (5 of 5)



Software Licenses (1 of 9)

- A **software license**, or license agreement, is a legal contract that defines the ways in which a computer program may be used
- These licenses are sometimes referred to as **EULAs** (End User License Agreements)

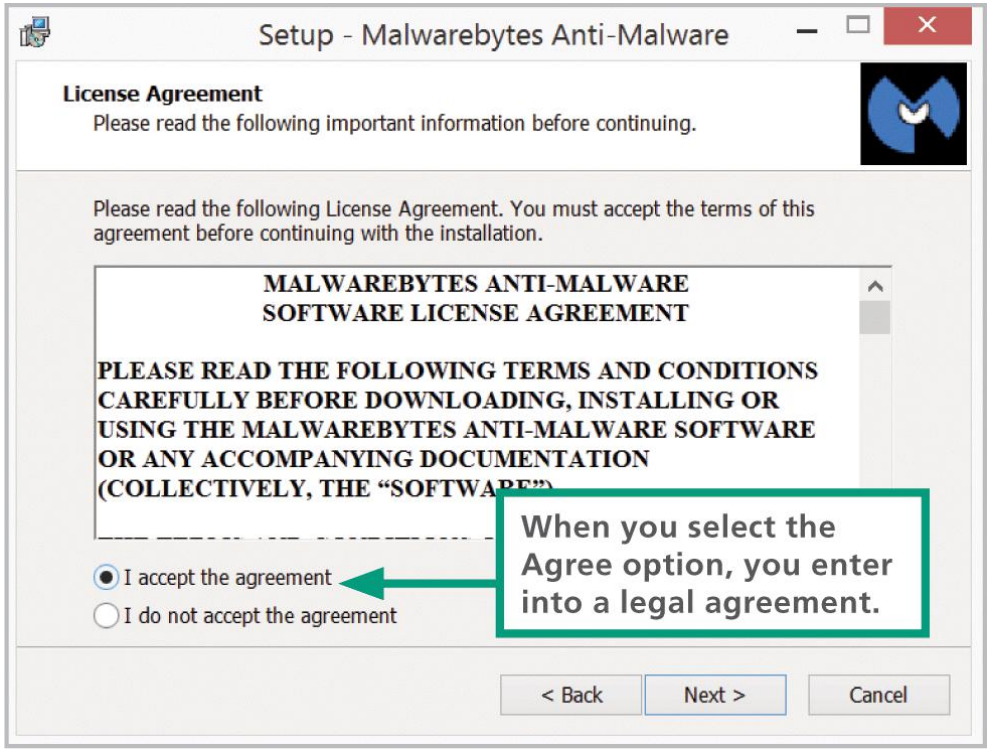
The purchaser has the right to copy software from distribution media or a Web site to a device's internal storage medium in order to install it.

The purchaser can make an extra, or backup, copy of the software in case the original copy becomes erased or damaged—unless the process of making the backup requires the purchaser to defeat a copy protection mechanism designed to prohibit copying.

The purchaser is allowed to copy and distribute sections of a software program for use in critical reviews and teaching.

Software Licenses (2 of 9)

- License agreements are displayed during the installation process. By clicking the I Agree button, you consent to the terms of the license agreement



Software Licenses (3 of 9)

- **Public domain software** is not protected by copyright because the copyright has expired or the author has placed the program in the public domain, making it available without restriction
- **Proprietary software** has restrictions on its use that are delineated by copyright, patents, or license agreements
- **Commercial software** is usually sold in retail stores or on Web sites. Most commercial software is distributed under a **single-user license** that limits use to one person at a time

Software Licenses (4 of 9)

- A **site license** is generally priced at a flat rate and allows software to be used on all computers at a specific location
- A **multiple-user license** is priced per copy and allows the allocated number of copies to be used simultaneously

Software Licenses (5 of 9)

- **Freeware** is copyrighted software that—as you might expect—is available for free. It is fully functional and requires no payment for its use
- **Demoware** is proprietary software made available as a trial version. It is distributed for free and often comes preinstalled on new devices
- **Product activation** is a means of protecting software from illegal copying by requiring users to enter a product key or an activation code

Software Licenses (6 of 9)

- A **hash value** is a unique number derived from encoding one or more data sets, such as names, serial numbers, and validation codes
- **Shareware** is copyrighted software marketed under a try-before-you-buy policy. It was conceived as a low-cost marketing and distribution channel for independent programmers

Software Licenses (7 of 9)

- **Open source software** makes uncompiled program instructions—the source code—available to programmers who want to modify and improve the software. Linux is an example of open source software
- Two of the most common open source and free software licenses are BSD and GPL

Software Licenses (8 of 9)

- The **BSD license** originated as the Berkeley Software Distribution license for a server operating system
- The **GPL** (General Public License) was developed for a free operating system called GNU. It is slightly more restrictive than the BSD license because it requires derivative works to be licensed

Software Licenses (9 of 9)

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Pirated Software (1 of 2)

- Software that is illegally copied and sold is referred to as **pirated software.**
- Some unsuspecting consumers have inadvertently obtained pirated software, even when paying full price from a reputable source.
- Pirated software may not update properly and is not eligible for authenticated upgrades.

Pirated Software (2 of 2)

The following characteristics could be signs of pirated software:

- Software sold at Web sites for prices well below retail
- Commercial software offered as a free download from a third-party Web site or Tor server
- Software sold in a clear CD-ROM jewel case with no accompanying documentation, license, registration card, or Certificate of Authenticity
- Software marked as “Academic” that requires no proof of eligibility
- Software marked as “OEM” or “For Distribution Only with New PC Hardware”

Section B: Operating Systems

- Operating System Basics
- Microsoft Windows
- macOS
- iOS
- Android
- Chrome OS
- Linux
- Virtual Machines

Section B: Objectives (1 of 2)

- List and describe four categories of operating systems
- Explain the purpose of an operating system kernel and name the operating system kernels that were used to develop Windows and MacOS
- List five digital device resources that are managed by the operating system
- Define the terms *multitasking, multiprocessing,* and *multithreading*
- Explain how memory leaks develop and why they are a problem
- Give an example of a buffer that is managed by the operating system

Section B: Objectives (2 of 2)

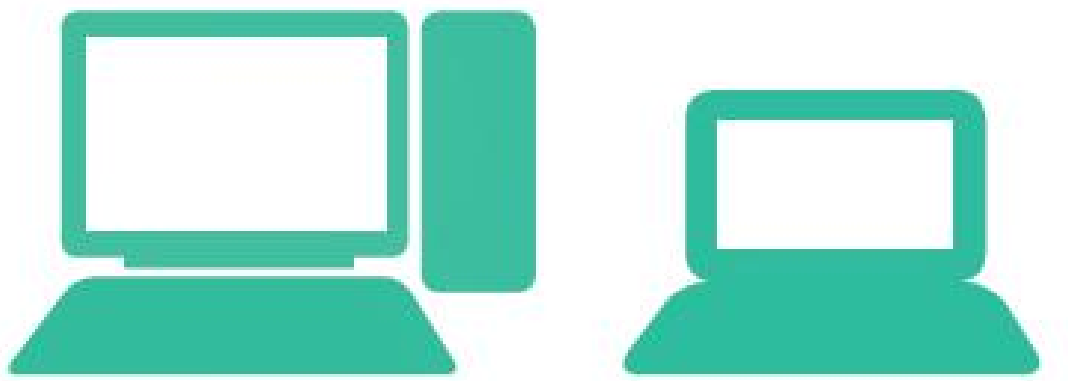
- Summarize the strengths and weaknesses of the Windows operating system
- Summarize the strengths and weaknesses of macOS
- List three ways in which iOS and Android are the same and two ways in which they differ
- Explain why Chrome OS is considered a thin client
- Provide an example of a situation that would benefit from the use of a virtual machine

Operating System Basics (1 of 13)

- An operating system gives your digital device a personality. It controls key elements of the **user interface**, which includes the visual experience as well as the keyboard, mouse, microphone, or touchscreen that collects user commands
- Behind the scenes, the OS is busy supervising critical operations that take place within a device

Operating System Basics (2 of 13)

- A **desktop operating system** is designed for a desktop or laptop computer.
- The computer you use at home, at school, or at work is most likely configured with a desktop operating system, such as Microsoft Windows, macOS, or Chrome OS.



Operating System Basics (3 of 13)

- Key characteristics of desktop operating systems include the following:
  - Accommodate one user at a time, but allow multiple accounts
  - Provide local area networking capability
  - Include file management tools
  - Run more than one application at a time
  - Offer a graphical user interface designed for keyboard and mouse input

Operating System Basics (4 of 13)

- Operating systems such as iOS and Android are classified as **mobile operating systems** because they are designed for use on smartphones, tablet computers, and ebook readers.
- Key characteristics of mobile operating systems include the following:

Operating System Basics (5 of 13)

- Accommodate one user at a time
- Provide connectivity to wireless local area networks
- Offer a graphical user interface designed for touchscreen input
- Include integrated cellular communications

Operating System Basics (6 of 13)

- Computers that are deployed as Web servers, or as servers for files, applications, databases, or email, generally use a **server operating system** designed for distributed networks accessed by many simultaneous users.
- Linux, UNIX, Windows Server, and macOS Server are examples of popular server operating systems with the following characteristics:

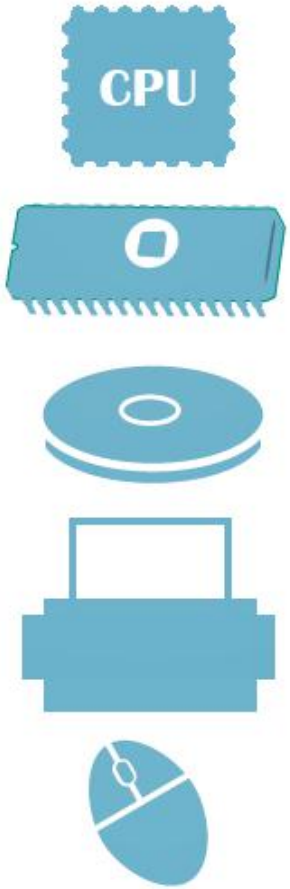
Operating System Basics (7 of 13)

- Accommodate multiple simultaneous users
- Include sophisticated network management and security tools
- Provide a utilitarian user interface

Operating System Basics (8 of 13)

- During the boot process, the OS kernel is loaded into RAM. A **kernel** provides essential operating system services, such as memory management and file access
- In the context of digital devices, the term **resource** refers to any component that is required to perform work

Operating System Basics (9 of 13)



Manage processor resources to handle simultaneous input, output, and processing tasks

Manage memory by allocating space for all the programs and data that are in use during a computing session

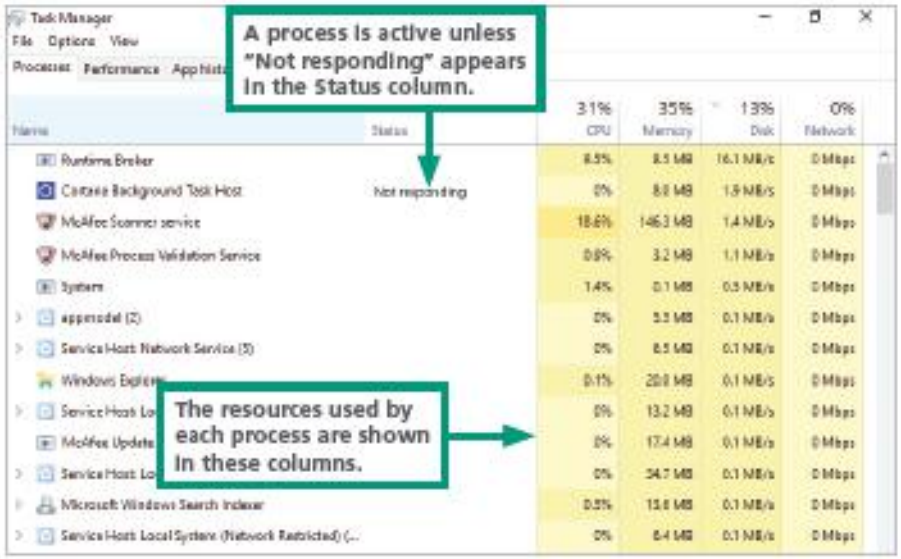
Keep track of storage resources so that files and programs can be found and manipulated

Ensure that input and output proceed in an orderly manner by communicating with peripheral devices

Establish basic elements of the user interface such as the appearance of the desktop, menus, and toolbars

Operating System Basics (10 of 13)

- Many activities—called **processes**—compete for the attention of a device's microprocessor
- To manage all these competing processes, an operating system must ensure that each process receives its share of attention from the microprocessor

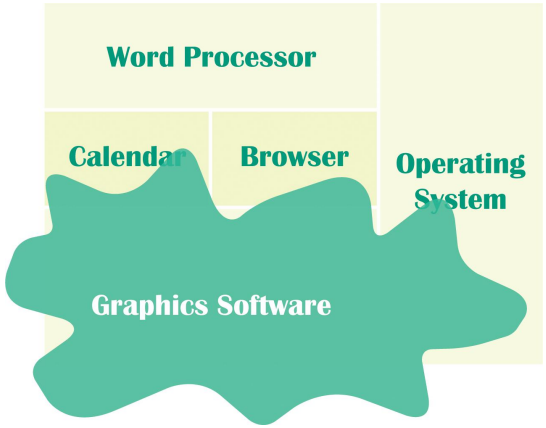


Operating System Basics (11 of 13)

- Depending on the capabilities of the operating system and computer hardware, processes can be managed by multitasking, multithreading, and multiprocessing
  - **Multitasking** – provides process and memory management services that allow two or more tasks, jobs, or programs to run simultaneously
  - **Multithreading** – allows multiple commands, or threads to run simultaneously
  - **Multiprocessing** – a capability that supports a division of labor among all the processing units

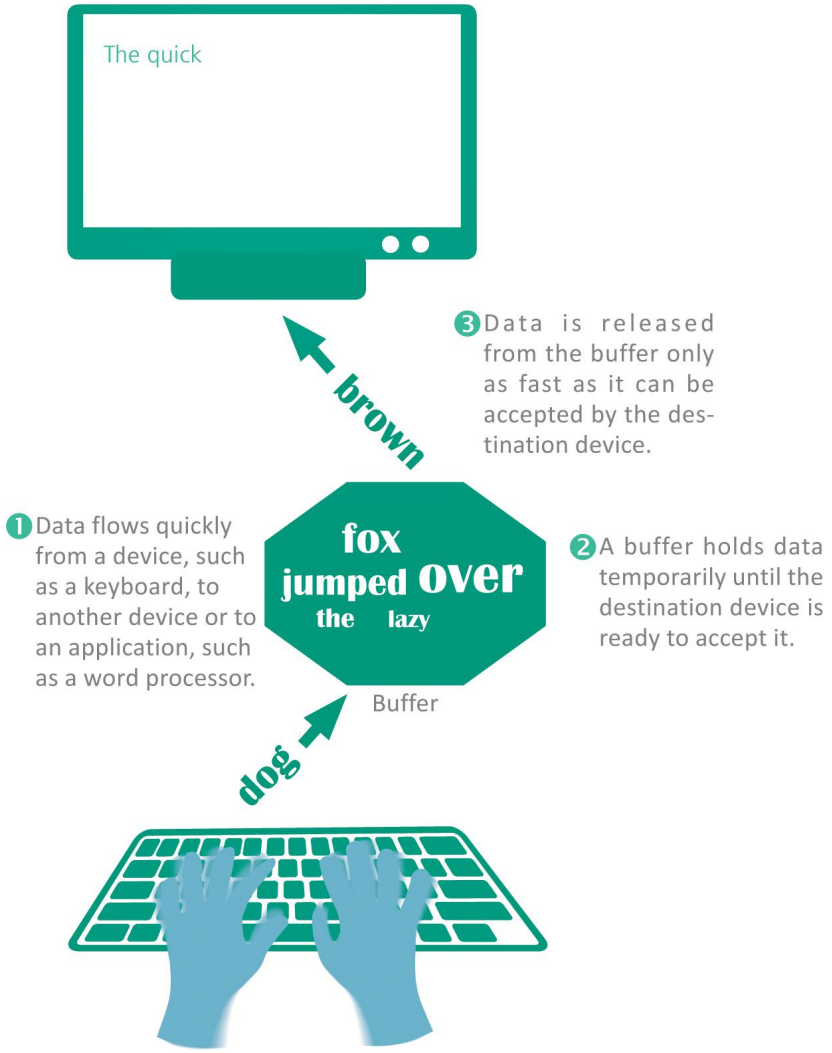
Operating System Basics (12 of 13)

- When you want to run more than one application at a time, the OS has to allocate specific areas of memory for each. Sometimes application requests memory but never releases it—a condition called a **memory leak**
- Memory "leaks" away into this application's reserved area, eventually preventing other applications from accessing enough memory to function properly



Operating System Basics (13 of 13)

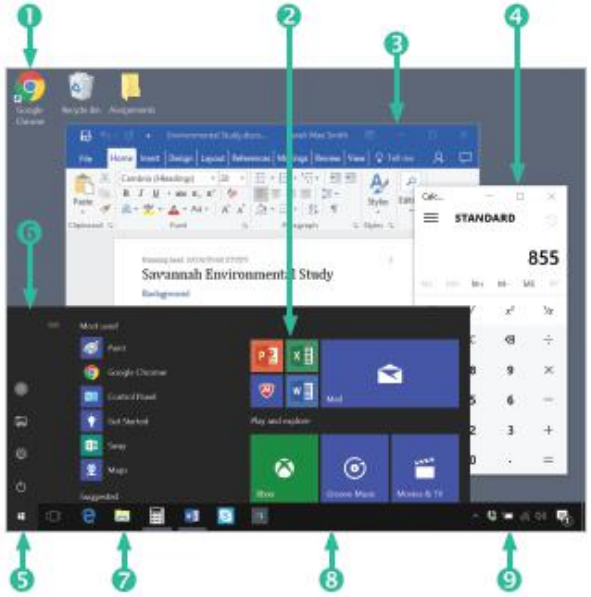
- An OS ensures that input and output proceed in an orderly manner, using **buffers** to collect and hold data while the device is busy with other tasks



Microsoft Windows (1 of 7)

- **Microsoft Windows** is installed on more than 80% of the world's personal computers
- The Windows OS got its name from the rectangular work areas displayed on its screen-based desktop
- Windows evolved from a Microsoft OS called **DOS** (Disk Operating System) that was designed to run on early PCs with Intel or Intel-compatible microprocessors
- The most recent versions of Windows are Windows 7, Windows 8, and Windows 10

Microsoft Windows (2 of 7)

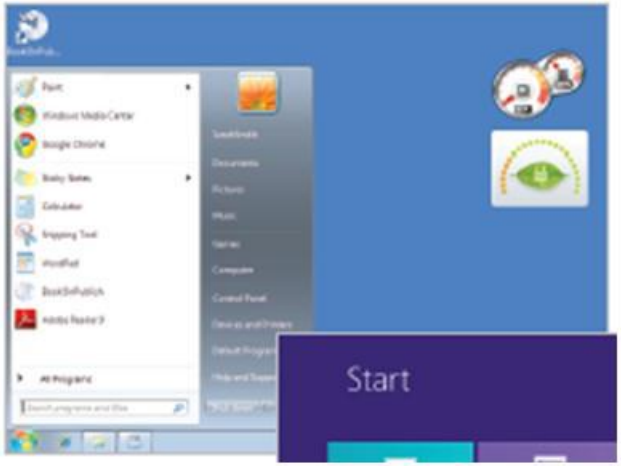


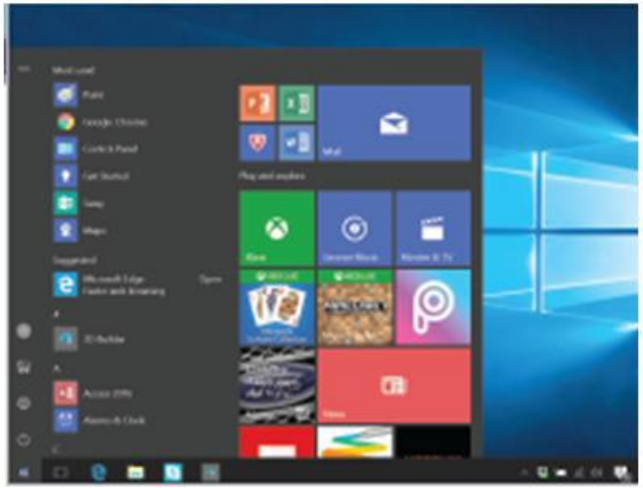
- Desktop **icons** represent programs, folders, and data files
- **Tiles** provide quick access to apps.
- An **application window** displays a program

Microsoft Windows (3 of 7)

- Another application window displays a calculator
- The Windows **Start button** opens the Start menu
- The **Start menu** provides access to frequently used applications and utilities
- Application icons are “pinned” to the taskbar
- The desktop **taskbar** contains the Start button, pinned icons, and the notification area
- The **notification area** displays status icons

Microsoft Windows (4 of 7)





Microsoft Windows (5 of 7)

- **Windows 7** was released in 2009. It features a round Start button that produces a Search box and a Start menu for launching applications and utilities. Desktop icons provide an alternative way to access applications
- **Windows 8** was released in 2012. It has no Start button. Instead, colorful tiles provide access to programs and utilities. A Search box appears when any key is pressed
- **Windows 10** was released in 2015 after Microsoft decided to skip Windows 9. The Start button is again a prominent element of the taskbar. The desktop includes a Search box, a list of frequently used applications, and a set of tiles for accessing applications

Microsoft Windows (6 of 7)

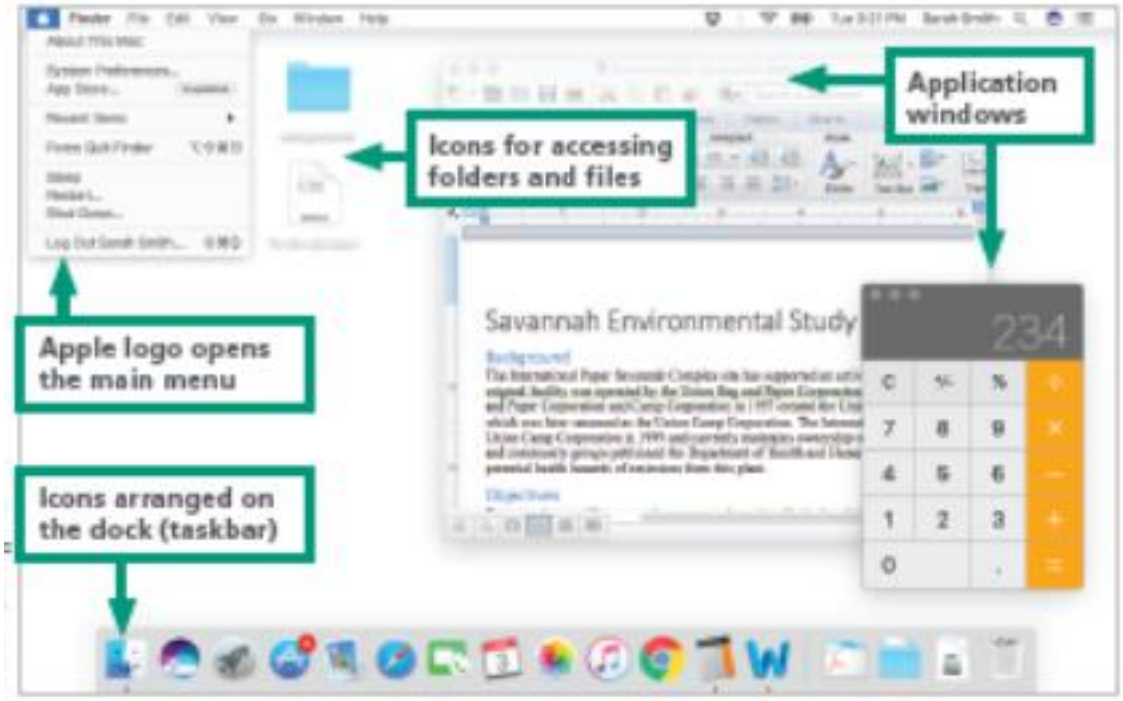
- Microsoft offers several editions of Windows designed for desktop and laptop computers
- All editions of Windows 10 include a Tablet Mode designed to work on tablets and laptops with touchscreens. For smartphones with ARM processors, Microsoft offers Windows 10 Mobile

Microsoft Windows (7 of 7)

- The number and variety of programs that run on Windows are unmatched by any other operating system
- Microsoft's official site, *www.microsoft.com*, includes thousands of pages of easily searchable information
- Windows tends to become unstable with more frequency than other operating systems
- Of the major desktop operating systems, Windows has the reputation for being the most vulnerable to viruses, worms, and other attacks
- One reason for Windows' vulnerability is its huge user base, which makes it the biggest target for hackers

macOS (1 of 4)

- As a desktop operating system, **macOS** features beautifully designed icons and multiple rectangular work areas to reflect multitasking capabilities.



macOS (2 of 4)

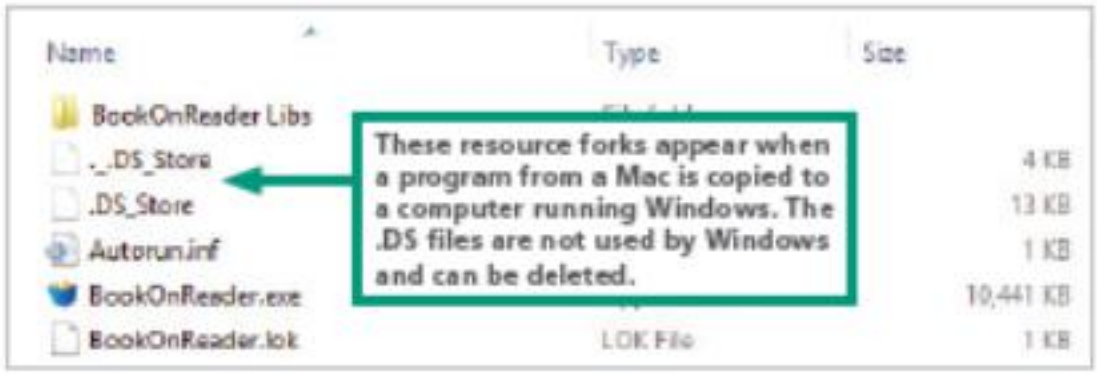
- In 2012, Apple released OS X 10.8 and officially dropped “Mac” from the operating system’s name
- With the release of Sierra in 2016, the operating system was renamed macOS

macOS (3 of 4)

- MacOS has a reputation for being an easy-to-use, reliable, and secure operating system
- MacOS uses a kernel based on UNIX, a server operating system that includes industrial-strength memory protection features that contribute to a low incidence of errors and glitches

macOS (4 of 4)

- Files maintained by OS X have two parts, called forks:
  - The **data fork** is similar to files in other operating systems. It contains data, such as text for a document or the commands for a program
  - The **resource fork** is a companion file that stores information about the data in the data fork, such as the file type and the application that created it



iOS (1 of 2)

- **iOS** is a mobile operating system derived from the same UNIX code that is the basis for macOS
- iOS displays a home screen containing application icons
- iOS was the first operating system to offer routines to manage touchscreen gesture inputs, such as using your fingers to “squeeze” an on-screen graphic into a smaller size

iOS (2 of 2)

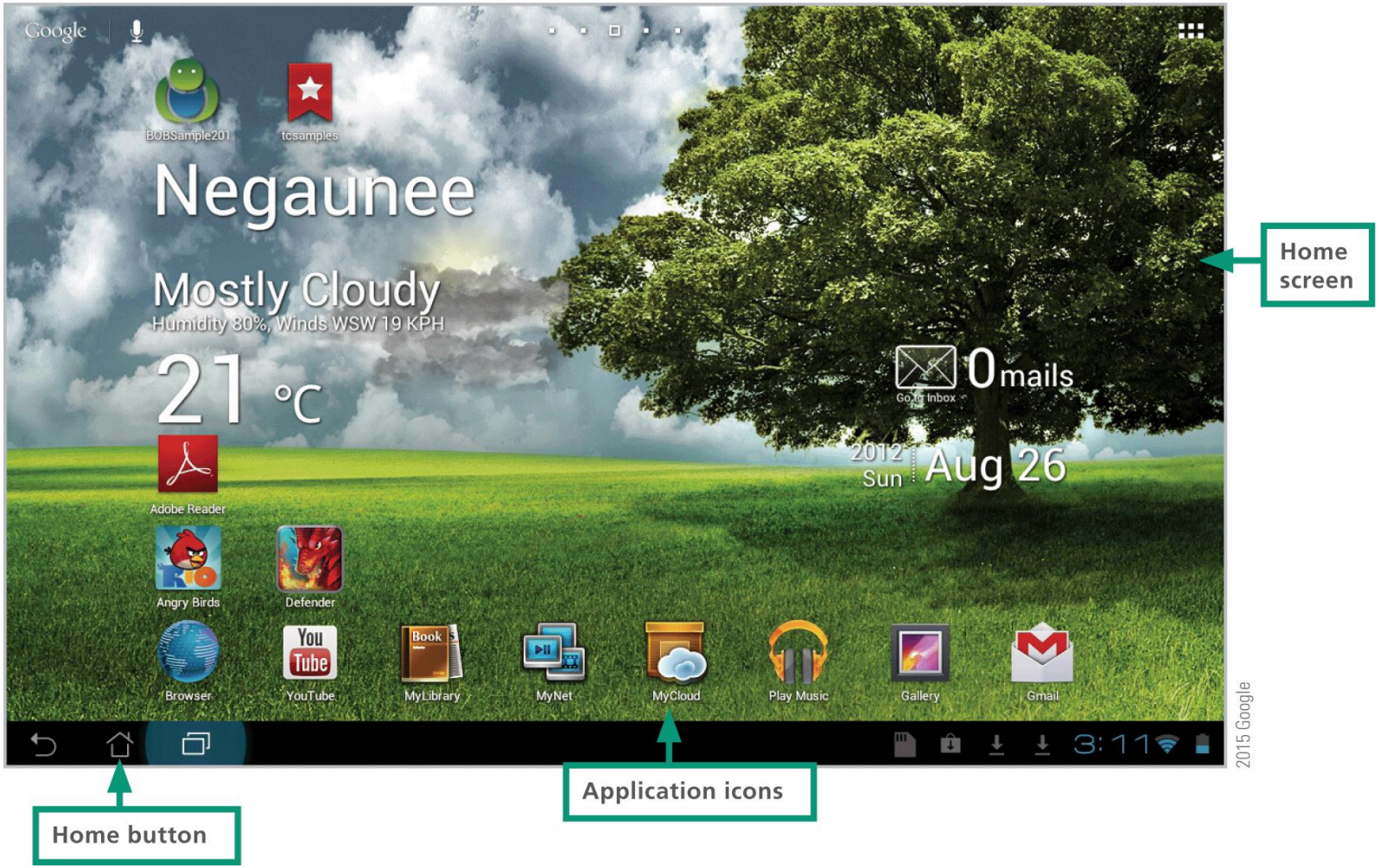
Limitations to iOS:

- iOS limits your selection of apps to those provided by the online Apple App Store, unless you make unauthorized modifications to “jailbreak” the phone
- Background processes, such as music, voice calls, and notifications, provide very limited multitasking capabilities

Android (1 of 2)

- Developed in 2007, **Android** is a mobile operating system that is a popular platform for tablet computers, smartphones, and ebook readers
- Android devices have a screen-based home button rather than a physical button
- In addition to touchscreen input, the Android OS supports voice input for Google searching, voice dialing, navigation, and other applications

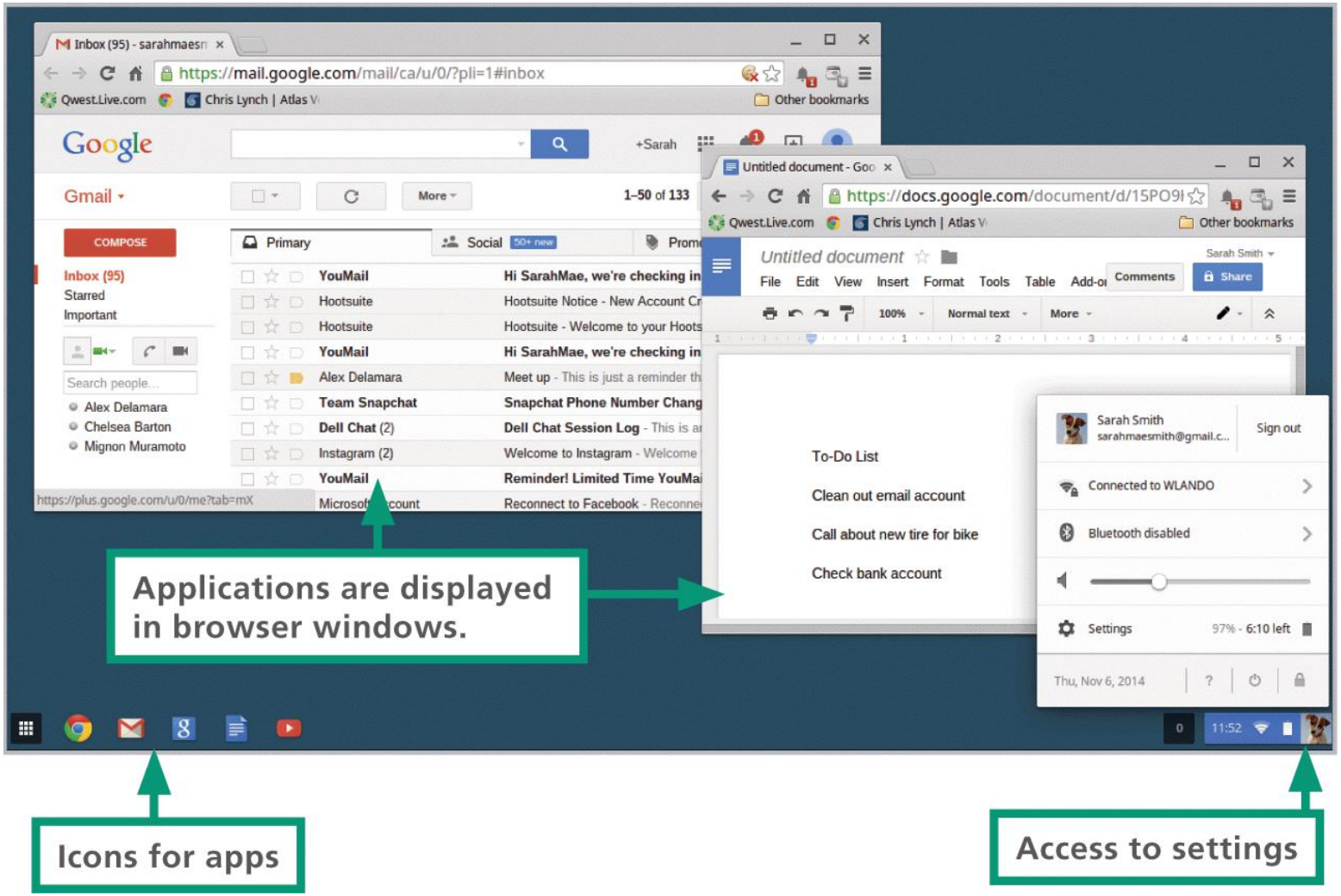
Android (2 of 2)



Chrome OS (1 of 2)

- Google launched an OS called Chrome OS in 2009 with a kernel based on an open source OS called Linux
- Chrome OS is an example of a **thin client** because it depends substantially on processing and storage provided by a remote computer—in this case, cloud-based servers
- Unlike iPads, Chromebooks support multiple users, but provide limited storage space
- Chromebooks boot very quickly to a simple desktop where apps are displayed in the Chrome browser

Chrome OS (2 of 2)



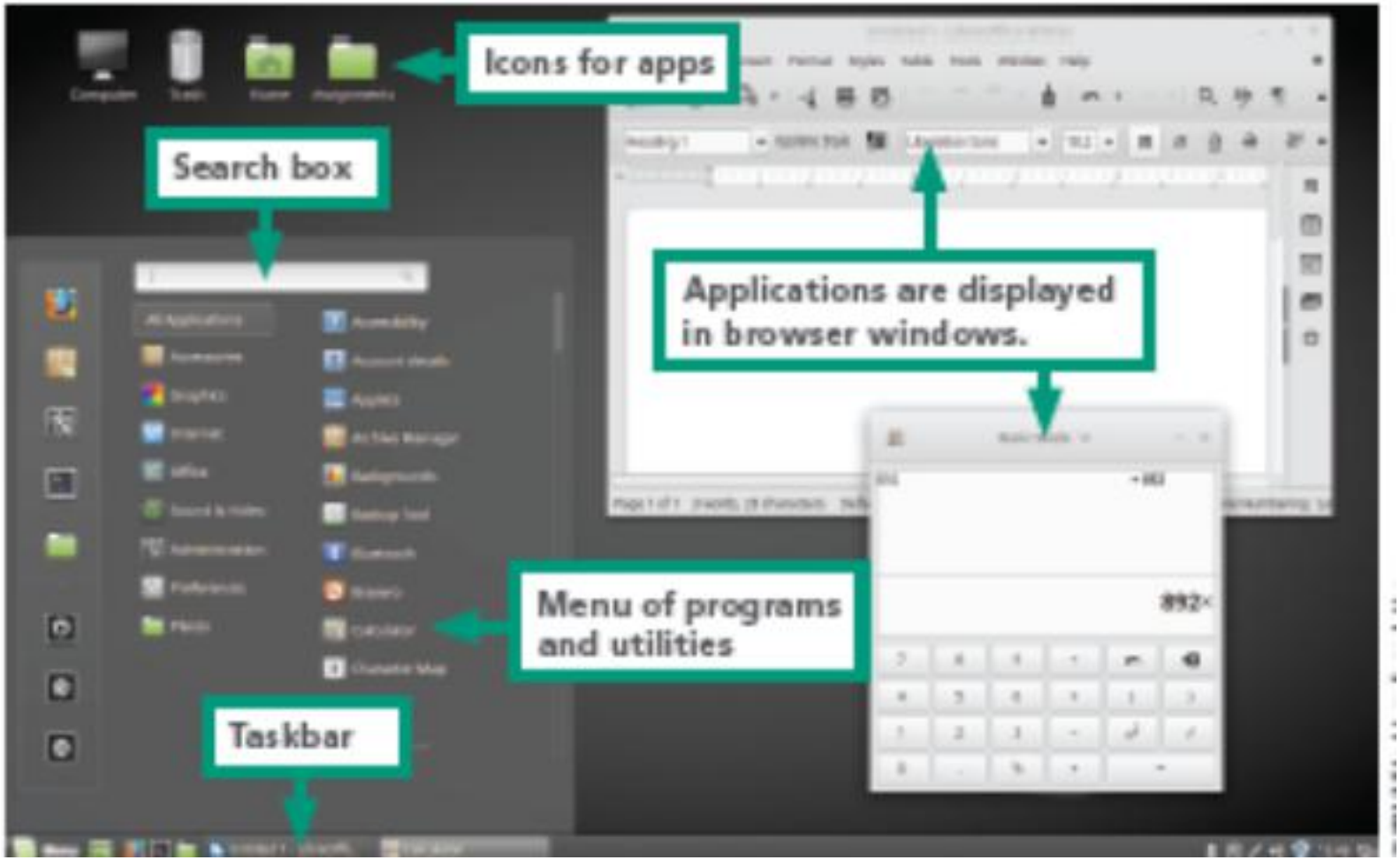
LINUX (1 of 3)

- In 1991, a young Finnish student named Linus Torvalds developed the **Linux** (pronounced “LIH nucks”) operating system
- Linux was inspired by and loosely based on a UNIX derivative called MINIX, created by Andrew Tanenbaum
- As an operating system, Linux is unique because it is distributed along with its source code under the terms of a GPL (General Public License), which allows everyone to make copies for their own use, to give to others, or to sell

LINUX (2 of 3)

- Linux users can select from a long list of system utilities for file management, packaged to meet the needs of various businesses and industries
- Linux requires more tinkering than the Windows and Mac operating systems
- A **Linux distribution** is a download that contains the Linux kernel, system utilities, desktop user interface, applications, and an installation routine. Beginner-friendly Linux distributions include Arch, Fedora, Ubuntu, Debian, openSUSE, and Mint

LINUX (3 of 3)



Virtual Machines (1 of 2)

- It's possible to run Windows on a Mac using a virtual machine
- A **virtual machine** (VM) allows one computer to simulate the hardware and software of another
- Each VM has its own simulated processor, RAM, video card, input and output ports, and OS
- Popular VM software such as Vmware workstation and Parallels Desktop can run on most computers with Intel microprocessors, including Intel Macs, PCs, and generic Linux computers

Virtual Machines (2 of 2)

Section C: Apps and Applications

- Web Apps
- Mobile Apps
- Local Applications
- Uninstalling Software

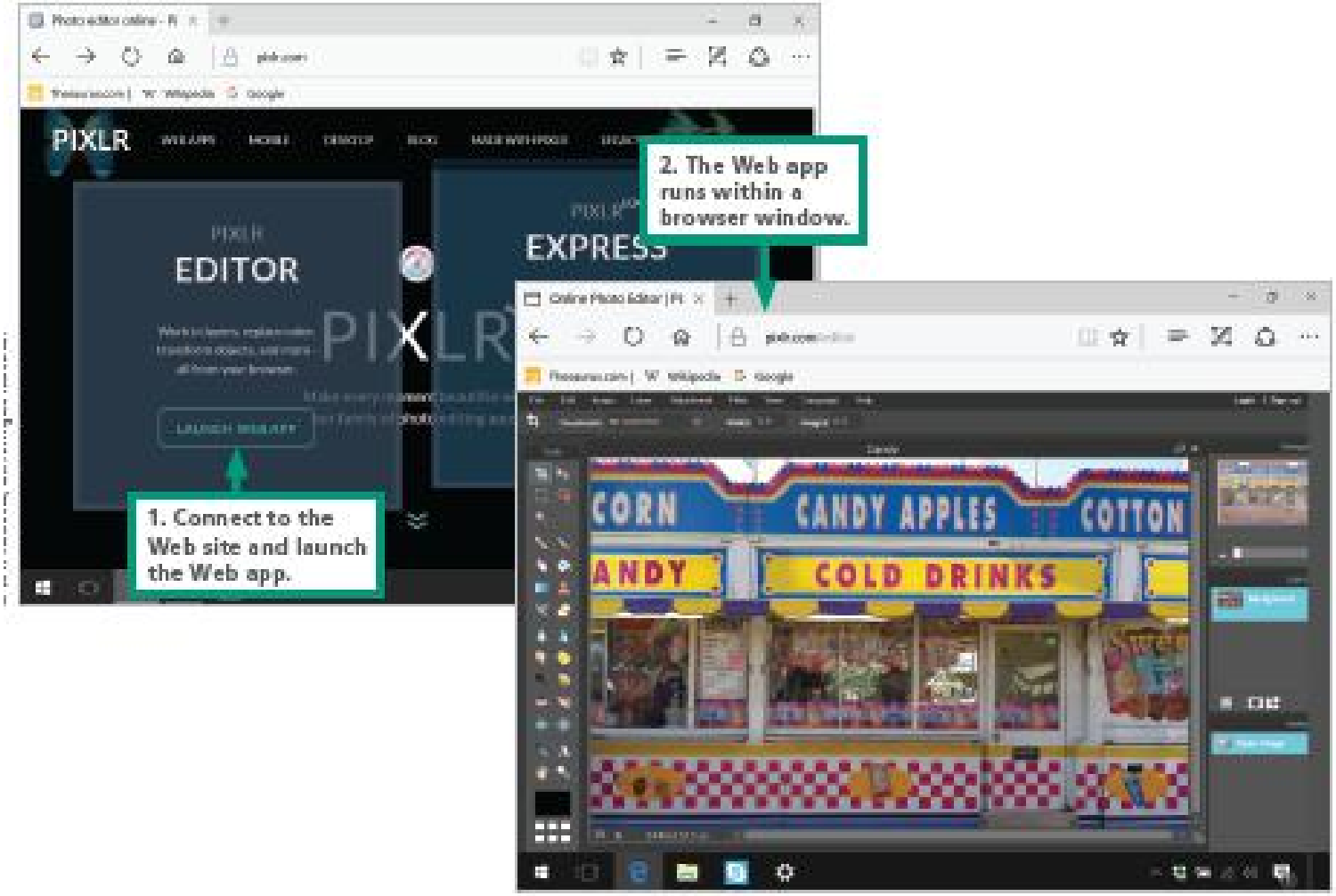
Section C: Objectives

- Describe two ways in which Web apps differ from mobile apps.
- List four advantages and three disadvantages of Web apps
- Describe the installation process for mobile apps
- Explain why iPhone owners might want to jailbreak their devices
- State whether the following file extensions are associated with PCs or Macs: .exe, .app, .dll, .dmg
- List the seven activities that take place during the installation process for PC software
- Describe the process for installing software on Macs
- Summarize the different procedures necessary to uninstall software on PCs and Macs

Web Apps (1 of 3)

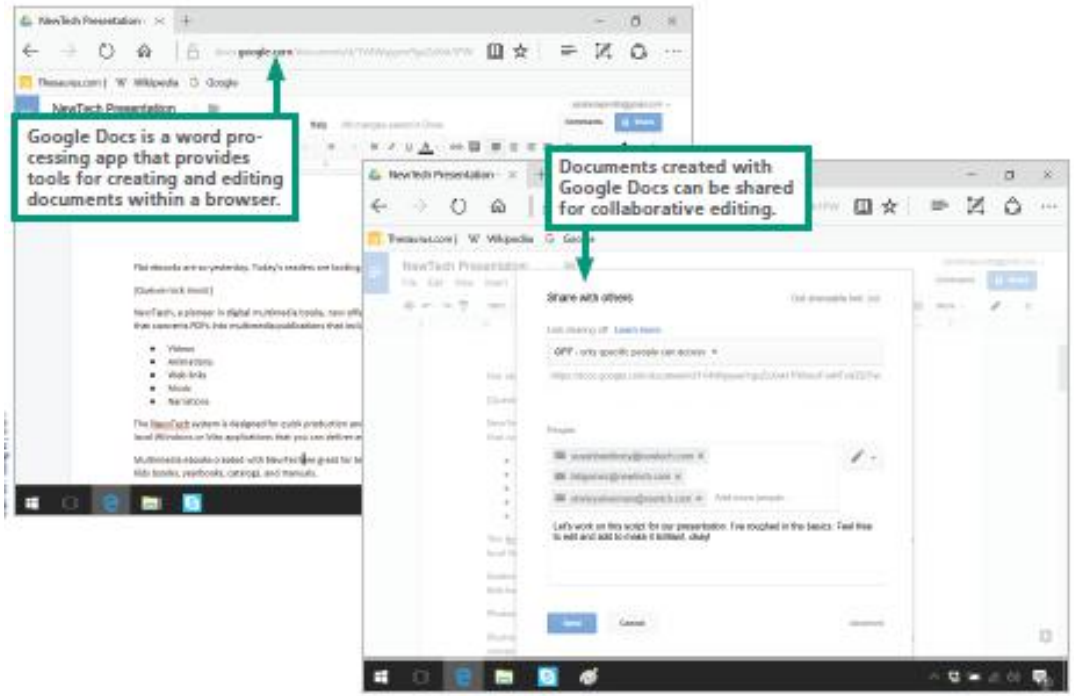
- A **Web application** (or Web app) is software that is accessed with a Web browser
- Web apps are an example of cloud computing
- Some popular Web apps include: Gmail, Google Docs, and Turnitin
- Most Web apps require no installation at all on your local computer or handheld device

Web Apps (2 of 3)



Web Apps (3 of 3)

- Web apps allow several people to collaborate on projects because the project files are stored on the Web and can be easily shared



Web Apps - Advantages

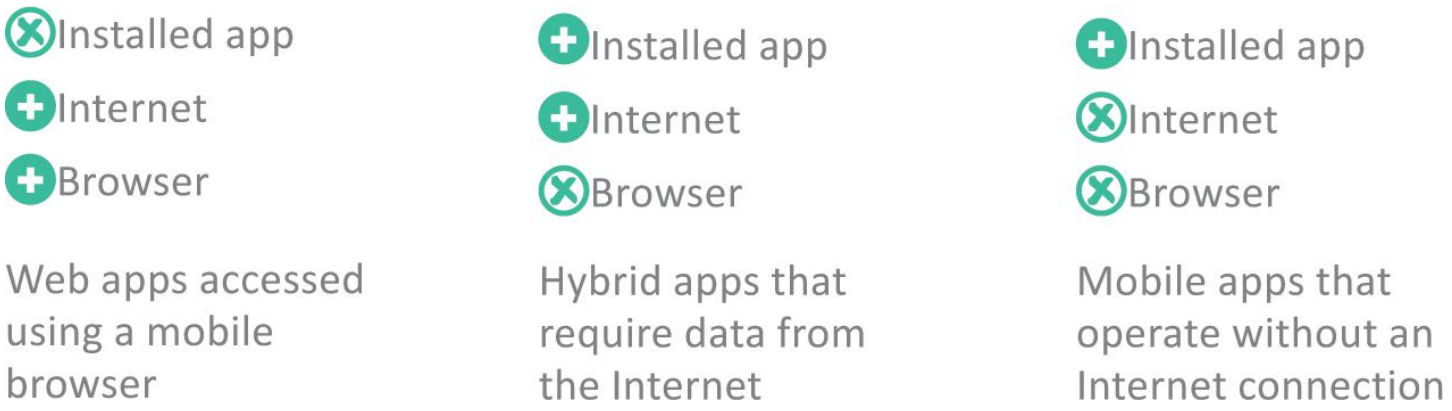
- You can access Web apps from any device that has a browser and an Internet connection, including full-size computers, smartphones, tablet computers, and enhanced media players
- Your data is usually stored on the app's web site, so you can access data even when you are away from your main computer
- Web apps are always up to date; you don't have to install updates because the latest version is the one posted at the Web site where you access the app
- Web apps don't require local storage space, so you don't have to worry about them accumulating on your hard disk or SSD

Web Apps - Disadvantages

- Web apps tend to have fewer features than applications that require installation
- If the site hosting the app shuts down, you will not be able to access the application or your data
- Your data might be more vulnerable to exposure or loss because it is out of your control. If possible, back up data to a local device or to an auxiliary cloud storage site

Mobile Apps (1 of 3)

- A mobile app is designed for a handheld device, such as a smartphone, tablet computer, or enhanced media player
- Most handheld devices can use both Web apps and mobile apps
- Some apps, such as Yelp and Pandora, are hybrids; a thin client is downloaded from an app store, but during use, data is accessed from the Web

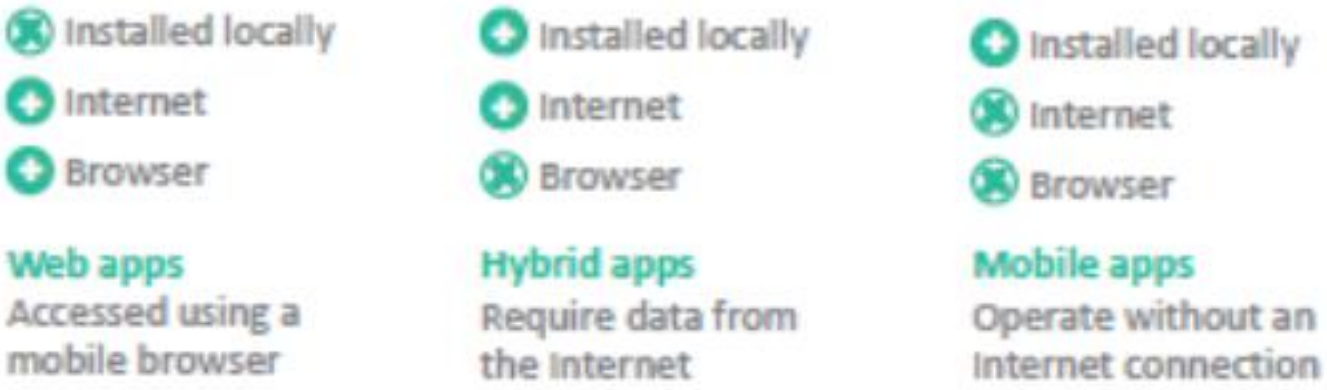


Mobile Apps (2 of 3)

- A **mobile app** is designed for a handheld device, such as a smartphone, tablet computer, or enhanced media player
- iPads, iPhones, and iPods are only allowed to download apps from the official iTunes App Store
- Apps are available from other sources, but using them requires an unauthorized change to the device's software called a **jailbreak**

Mobile Apps (3 of 3)

- After downloading and installing the jailbreak software, your device will be able to install apps from a variety of sources other than the iTunes App Store
- The process of making unauthorized modifications to any mobile device is called **rooting**

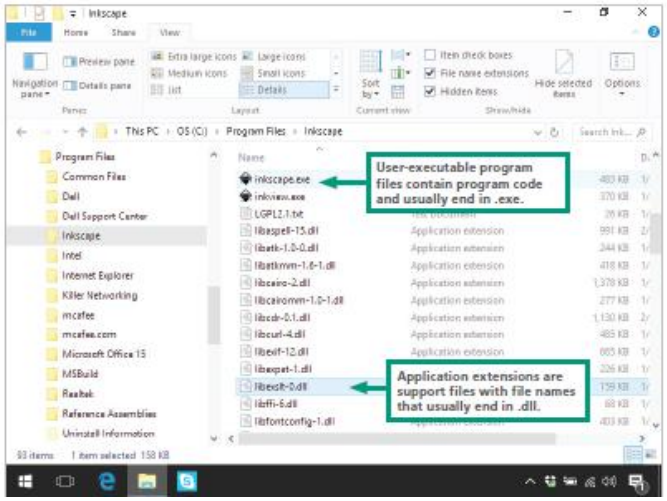


Local Applications (1 of 9)

- A **local application** is installed on a computer's hard disk
- Office suites, games, and professional software tools are common examples of local applications for desktop and laptop computers

Local Applications (2 of 9)

- Software designed for computers that run Microsoft Windows is commonly composed of multiple files. The main executable file has an .exe extension—for example, *Inkscape.exe*
- Additional files required for Windows application software contain support modules called **application extensions** with file names that end in .dll



Local Applications (3 of 9)

- Software for PCs contains a **setup program** that guides you through the installation process
- During the installation process, the setup program usually performs the following activities:

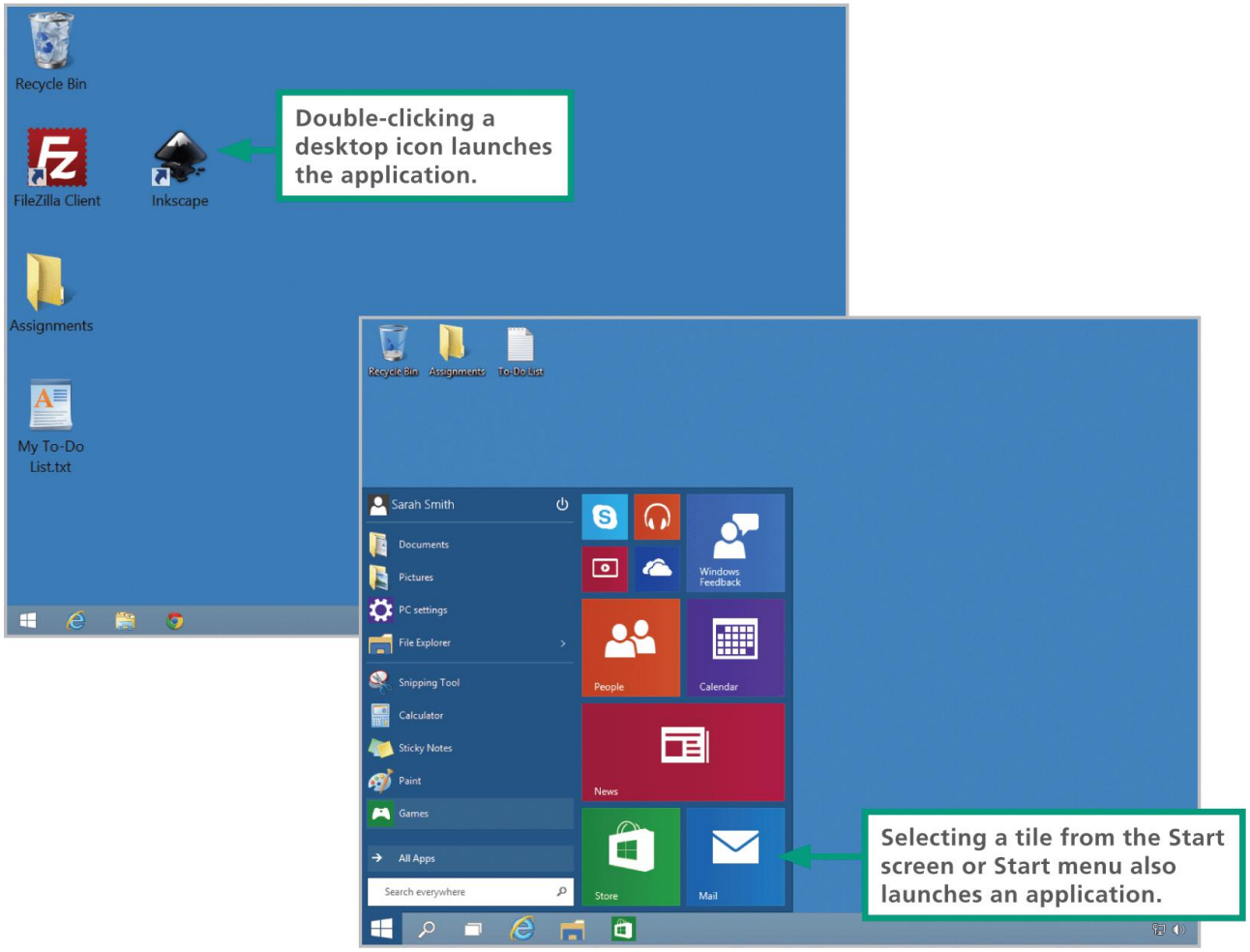
Local Applications (4 of 9)

- **Copy files** – Copies application files from distribution media (CDs or DVDs) or downloads files to specified folders on the hard disk
- **Unzip files** – Reconstitutes files that have been distributed in compressed format
- **Check resources** – Analyzes the computer's resources, such as processor speed, RAM capacity, and hard disk capacity, to verify that they meet or exceed the minimum system requirements
- **Select device drivers** – Analyzes hardware components and peripheral devices to select appropriate device drivers

Local Applications (5 of 9)

- **Find players** – Looks for any system files and players, such as Microsoft Edge or Windows Media Player, that are required to run the program but are not supplied on the distribution media or download
- **Update the Registry** – Updates necessary system files, such as the Windows Registry and the Start menu, with information about the new software
- **Update the desktop** – Places an icon or tile for the new software on the Windows desktop, Start screen, or Start menu

Local Applications (6 of 9)



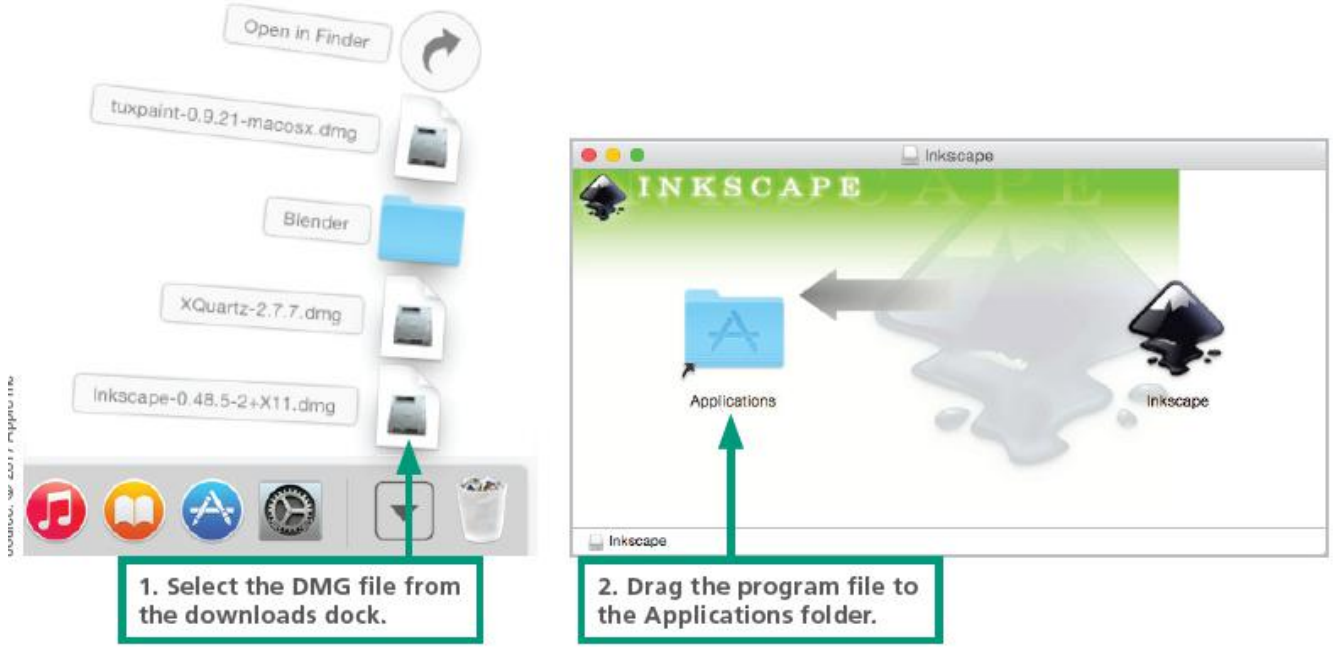
Local Applications (7 of 9)

- The EXE and DLL files for Windows application software are zipped to consolidate them into one large file, which is compressed to decrease its size and reduce the download time
- Downloaded files are generally stored in the Downloads folder
- If your computer's hard drive malfunctions, you can use these files to rebuild your software collection without having to download all of it again

Local Applications (8 of 9)

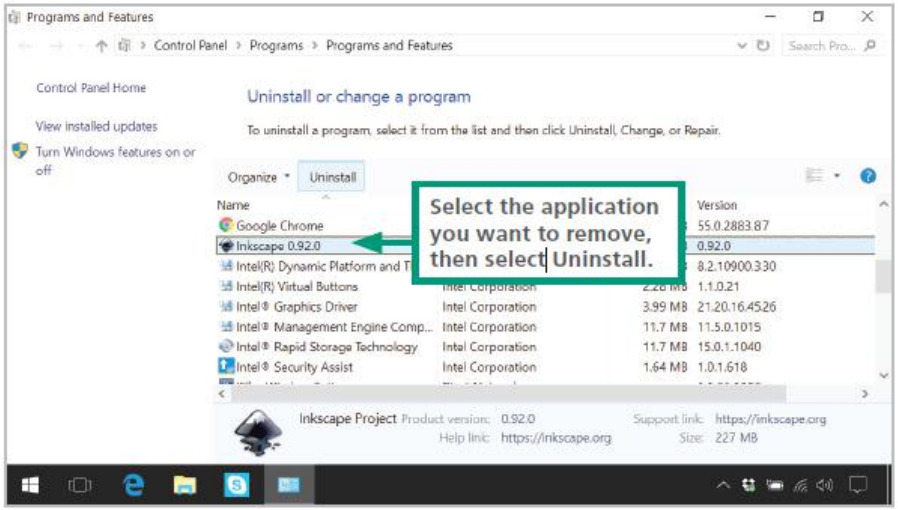
Local Applications (9 of 9)

- Downloads are ordinarily supplied as a **DMG** package commonly referred to as a “disk image”
- The DMG package has a .dmg extension



Uninstalling Software

- The process of removing software differs for PCs and Macs
- Most Mac users simply use Finder to locate the program's APP file or folder and move it to the trash
- The Windows OS includes an **uninstall utility**, which deletes the software's files from various folders on your computer's hard disk



Section D: Productivity Software (1 of 2)

- Office Suite Basics
- Word Processing
- Spreadsheets
- Databases
- Presentations

Section D: Productivity Software (2 of 2)

- List three applications that are the core of an office suite
- Describe three features of word processing software that help improve the quality of writing and three features that improve the format of documents
- Provide an example of a what-if analysis
- Give an example of a spreadsheet formula that uses mathematical operators and cell references
- Describe a formula that requires an absolute reference
- Identify fields and records in a database table
- Provide an example of a database that would have two or more related tables
- List five commonly used features of presentation software

Office Suite Basics (1 of 2)

- Office suites, such as Microsoft Office and Google Docs, are sometimes referred to as **productivity software**
- An **office suite** is a collection of programs that typically include word processing, spreadsheet, and presentation modules
- In the context of office suites, the term *module* refers to a component, such as a word processing module

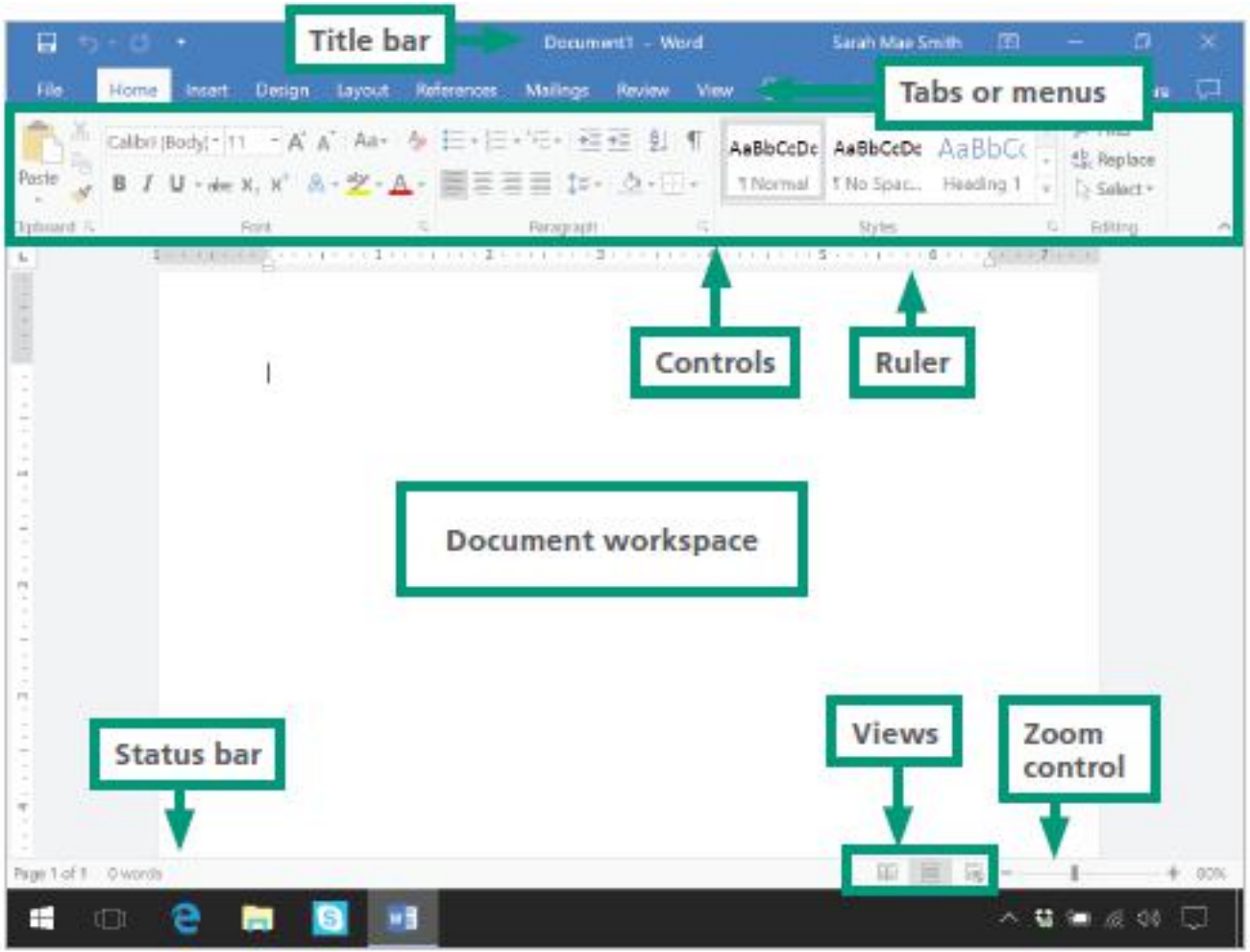
Office Suite Basics (2 of 2)

NAME	MODULES	PLATFORM
Google Docs	Word processing, spreadsheet, presentation	Online(free)
iWork	Word processing, spreadsheet, presentation	macOS($$)
LibreOffice	Word processing, spreadsheet, presentation, database, drawing	Windows, macOS, Linux(Free)
Microsoft Office	Word processing, spreadsheet, presentation, database, mail/calendar	Windows, macOS, Linux, iOS, Android($$)
Zoho Office Suite	Word processing, spreadsheet, presentation,calender,and more	Online(free)

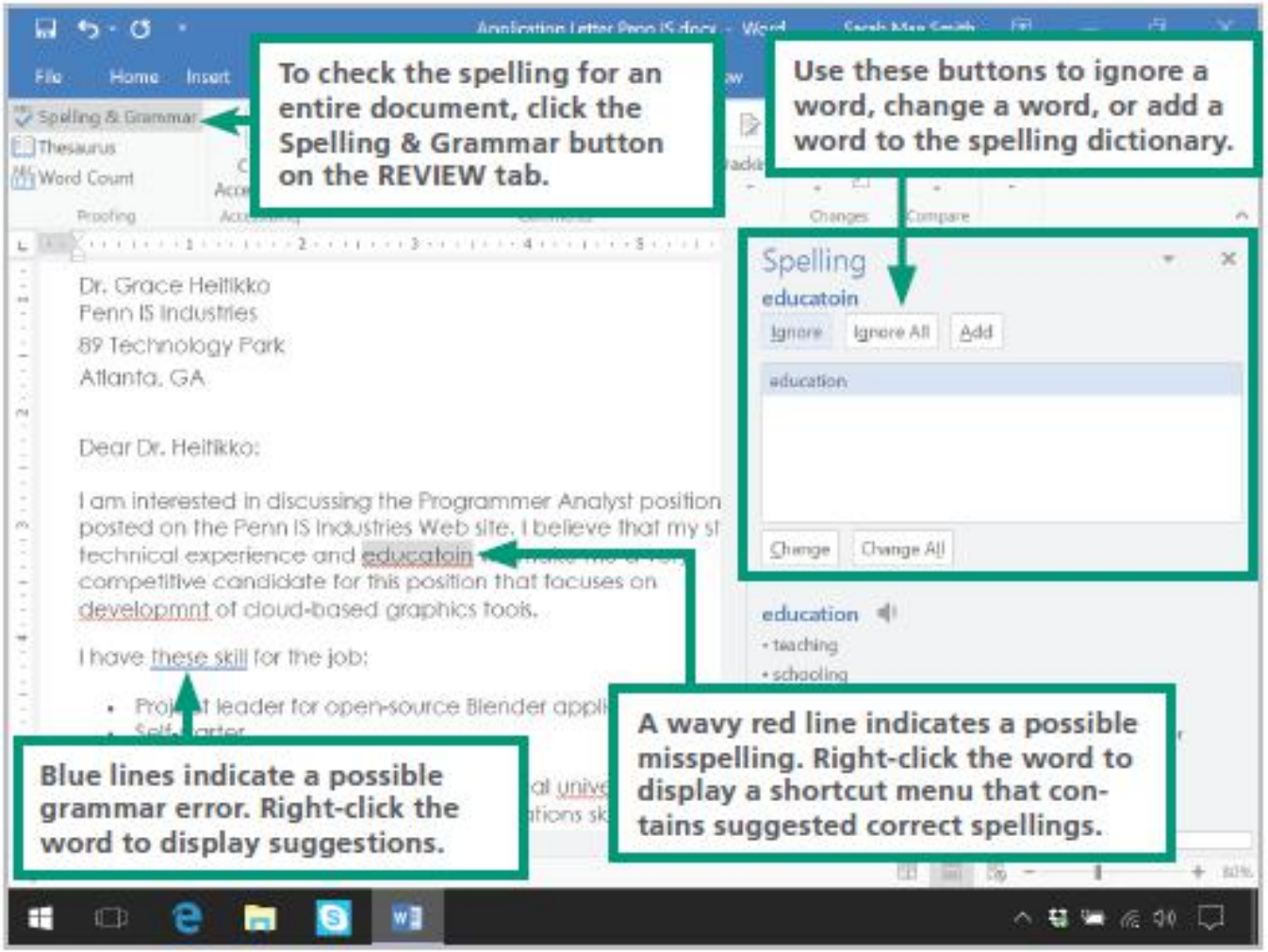
Word Processing (1 of 4)

- Word processing software has replaced typewriters for producing many types of documents, including reports, letters, memos, papers, and book manuscripts
- A typical word processor window displays a work area, called a workspace, that represents a blank piece of paper; the window also includes controls for viewing and formatting the document

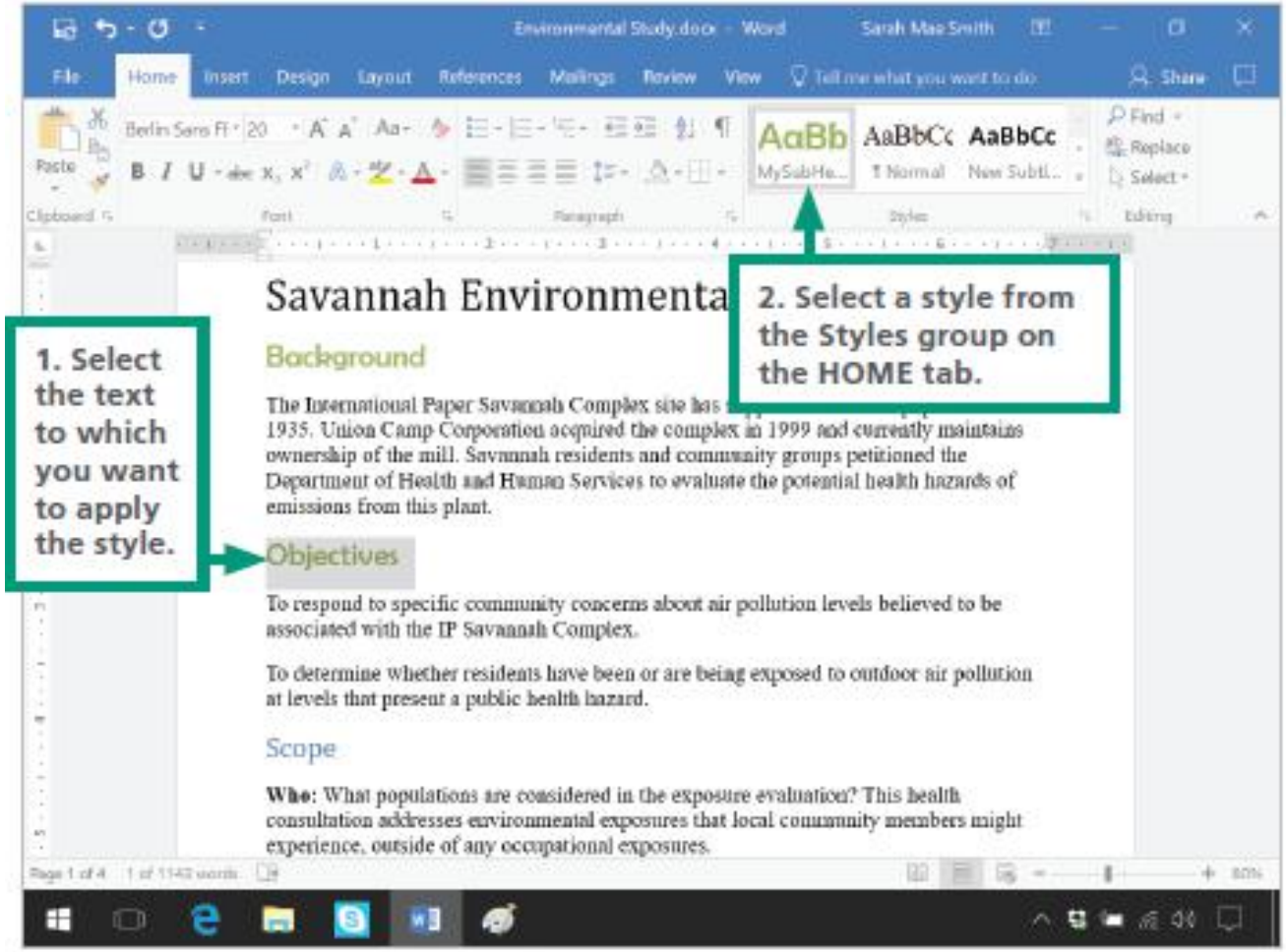
Word Processing (2 of 4)



Word Processing (3 of 4)



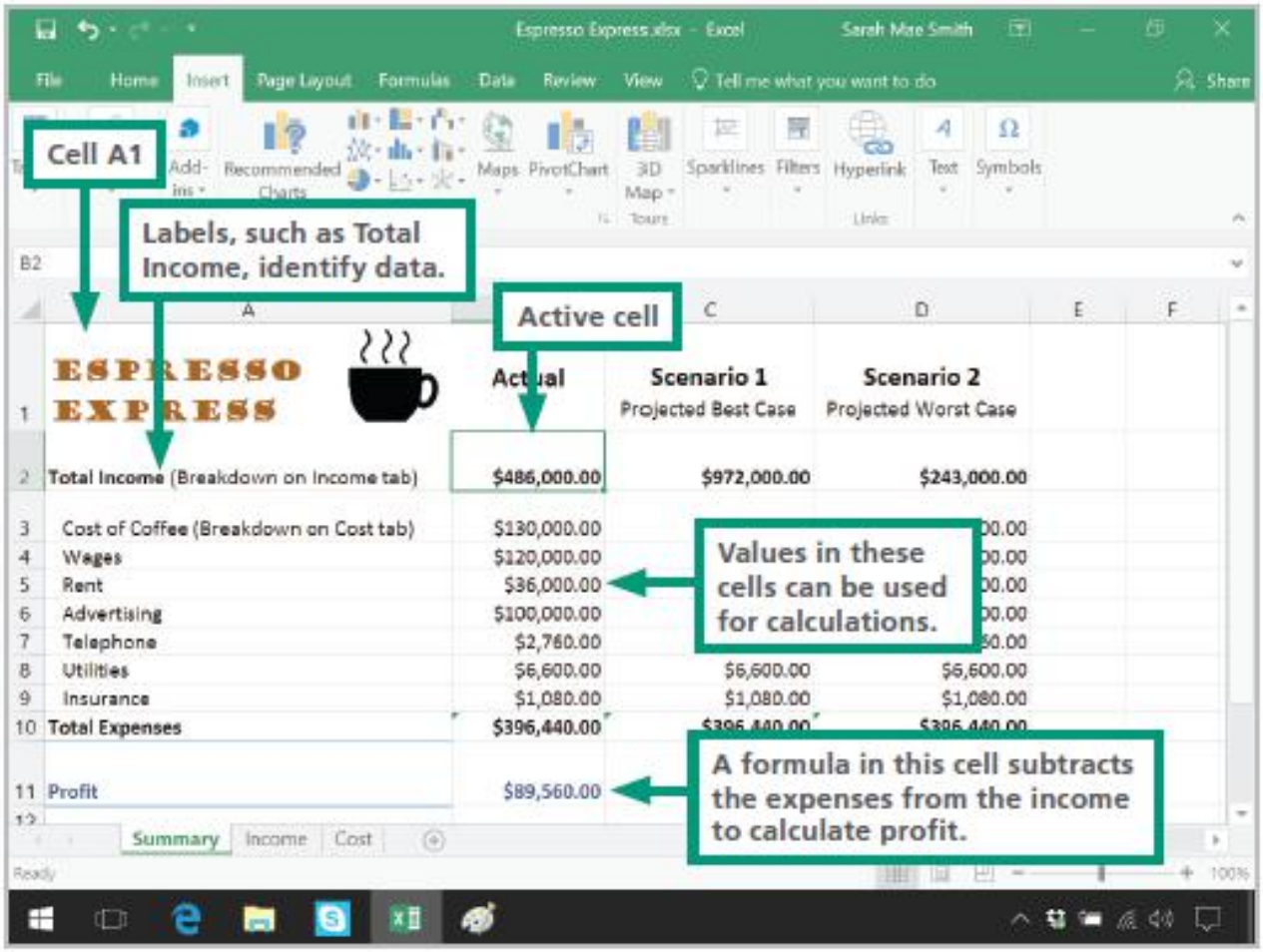
Word Processing (4 of 4)



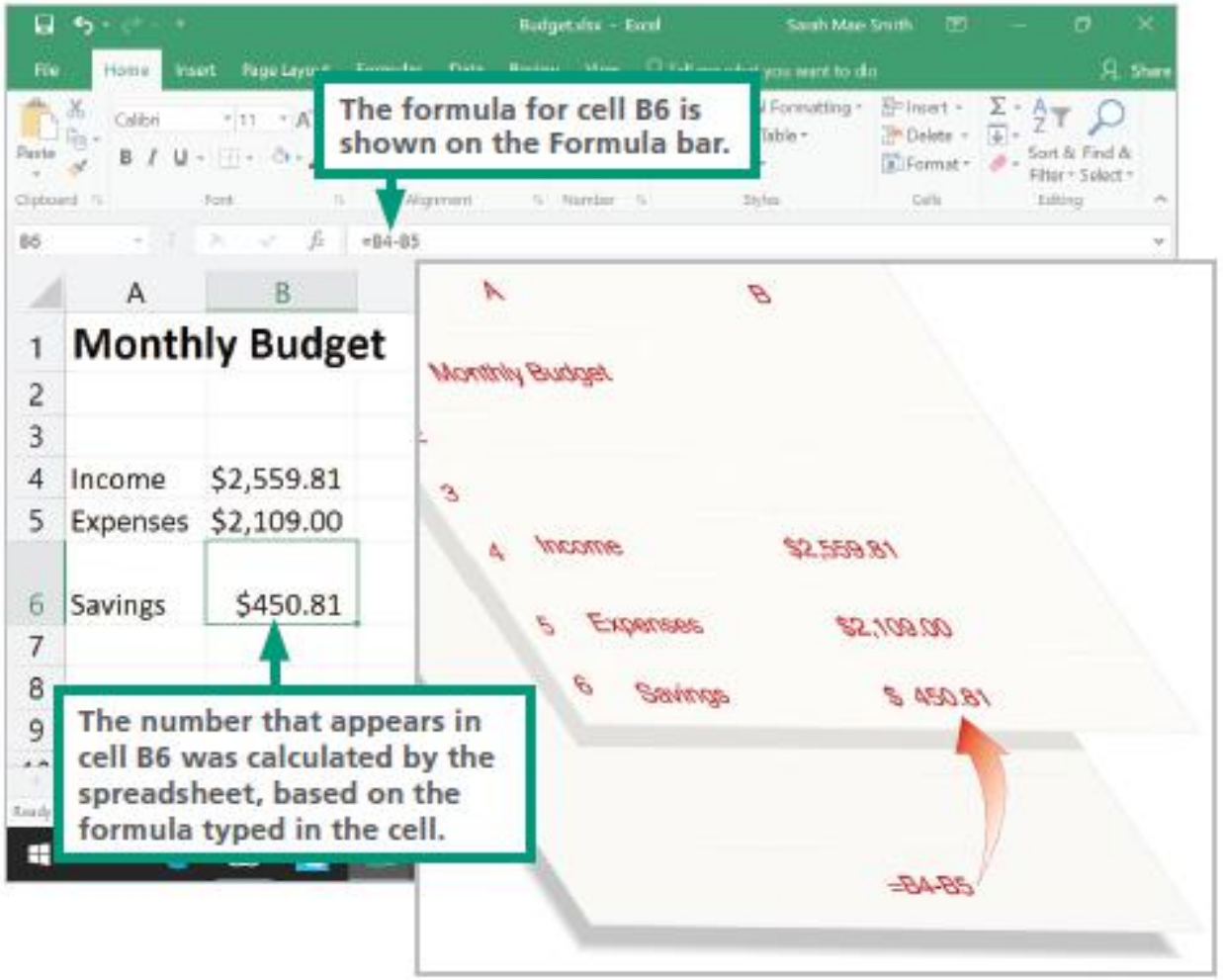
Spreadsheets (1 of 6)

- A **spreadsheet** uses rows and columns of numbers to create a model or representation of a real situation
- **Spreadsheet software**, such as Microsoft Excel and Google Docs Sheets, provides tools to create electronic spreadsheets
- Because it is so easy to experiment with different numbers, spreadsheet software is particularly useful for **what-if analysis**

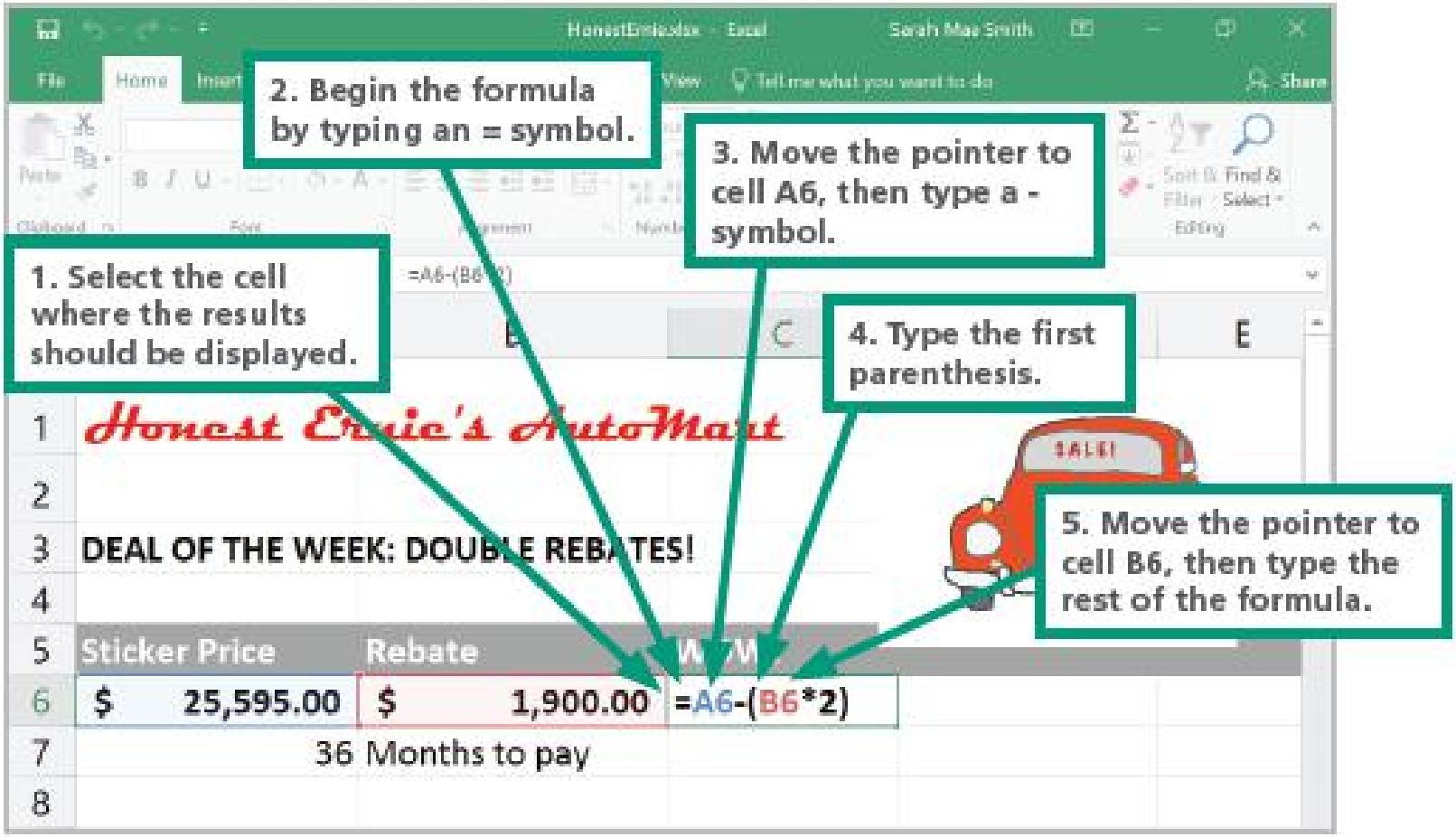
Spreadsheets (2 of 6)



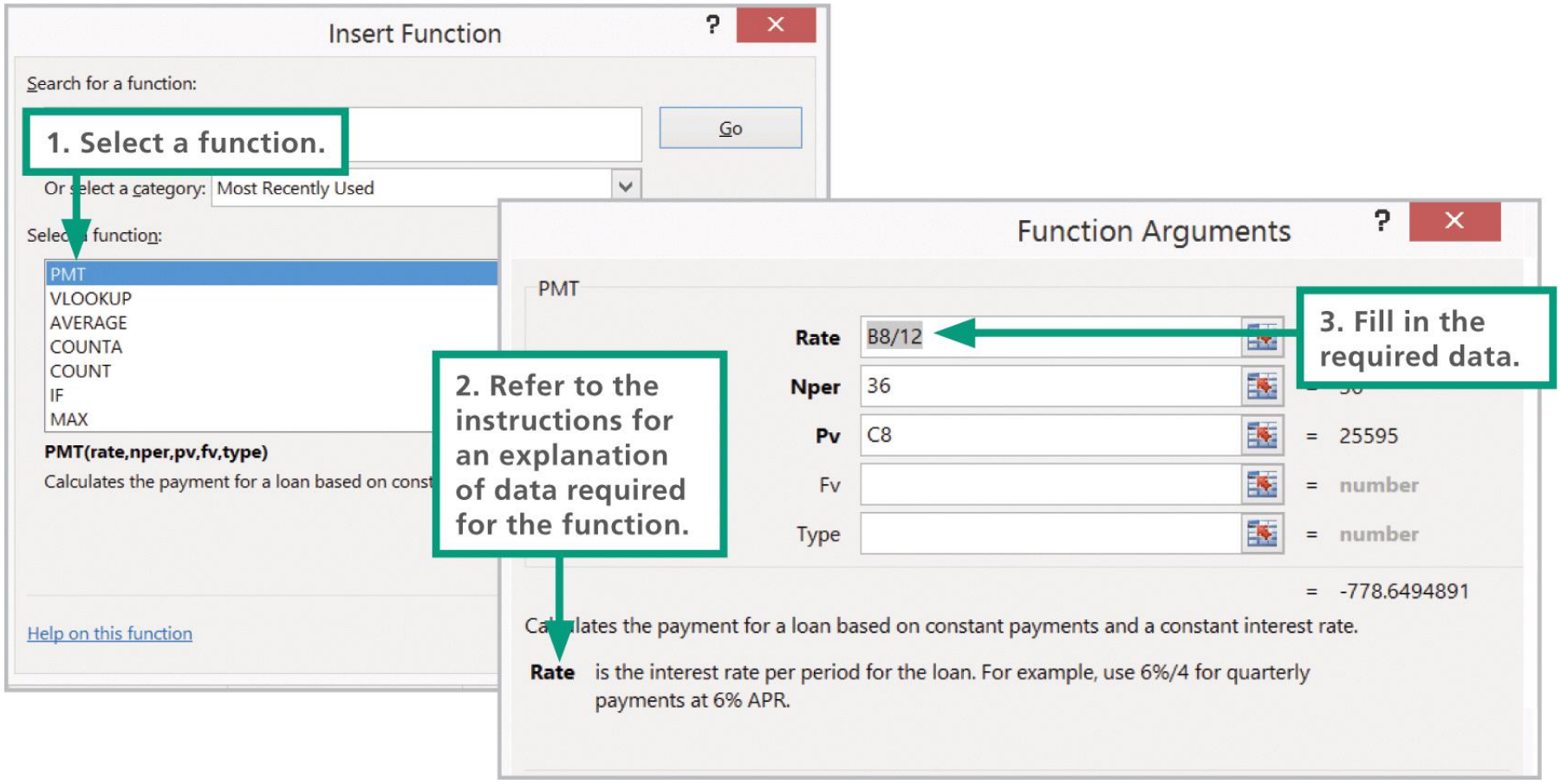
Spreadsheets (3 of 6)



Spreadsheets (4 of 6)



Spreadsheets (5 of 6)



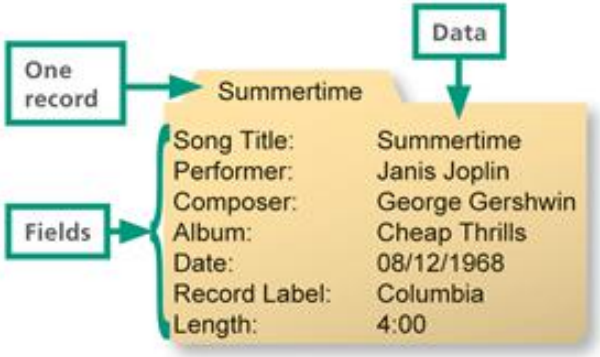
Spreadsheets (6 of 6)

- When you change the contents of any cell in a worksheet, all the formulas are recalculated; this **automatic recalculation** feature ensures that the results in every cell are accurate for the information currently entered in the worksheet
- Unless you specify otherwise, a cell reference is a **relative reference**—that is, a reference that can change
- An **absolute reference** never changes when you insert rows, or copy and move formulas

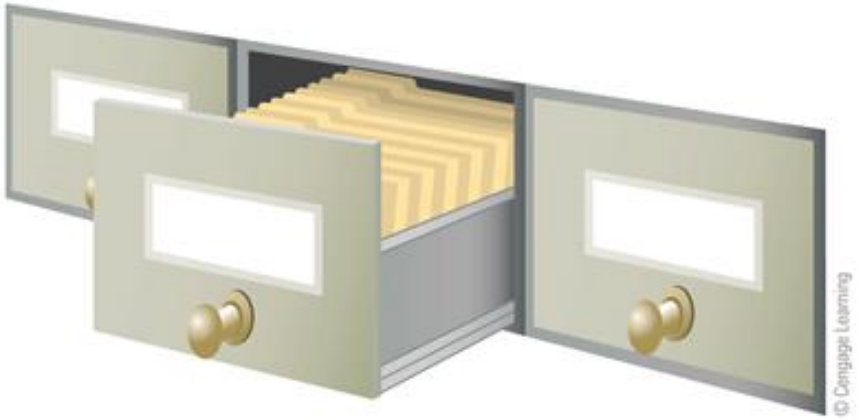
Databases (1 of 4)

- The term *database* has evolved from a specialized technical term into a part of our everyday vocabulary
- In the context of modern usage, a **database** is simply a collection of data that may be stored on one or more digital devices
- **Database software** helps you enter, find, organize, update, and report information stored in a database
- Database software stores data as a series of records, which are composed of fields that hold data
  - A **record** holds data for a single entity—a person, place, thing, or event
  - A **field** holds one item of data relevant to a record

Databases (2 of 4)



A single database record is similar to a Rolodex card or an index card. A series of records is usually depicted in table format.

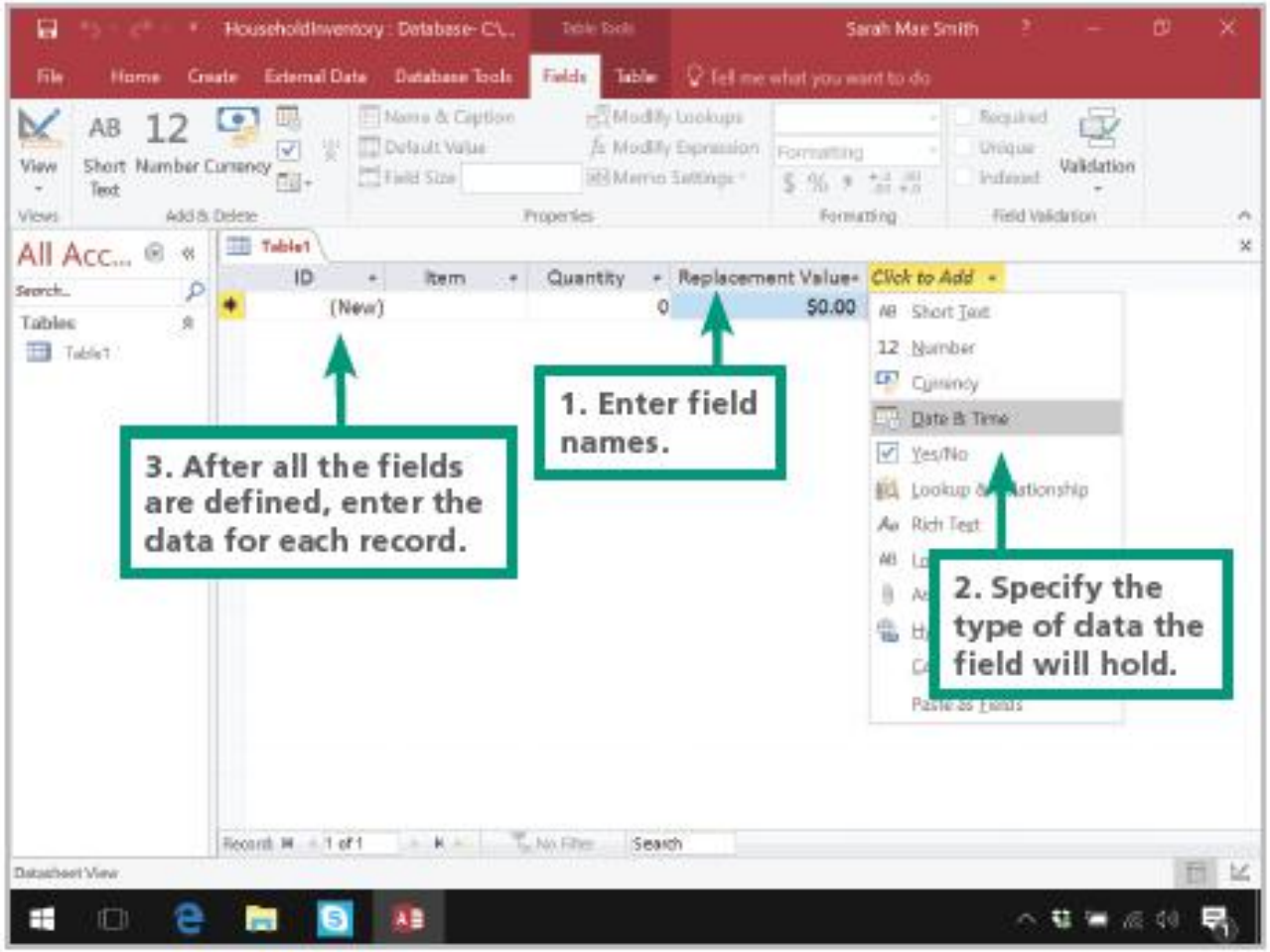


Databases (3 of 4)

A Series of records in table format

SONG TITLE	PERFORMER	COMPOSER	ALBUM	DATE	LABEL	LENGTH
Take it Back	Norah Jones	Jones	Little Broken Hearts	05/01/2012	Blue Note	4:05
Even Though	Norah Jones	Jones and Harris	The Fall	11/07/2009	Blue Note	3:52
Summertime	Janis Joplin	Gershwin	Cheap Thrills	08/12/1968	Columbia	4:00
Summertime	Sarah Vaughan	Gershwin	Compact Jazz	06/22/1987	PolyGram	4:34

Databases (4 of 4)



Presentations (1 of 3)

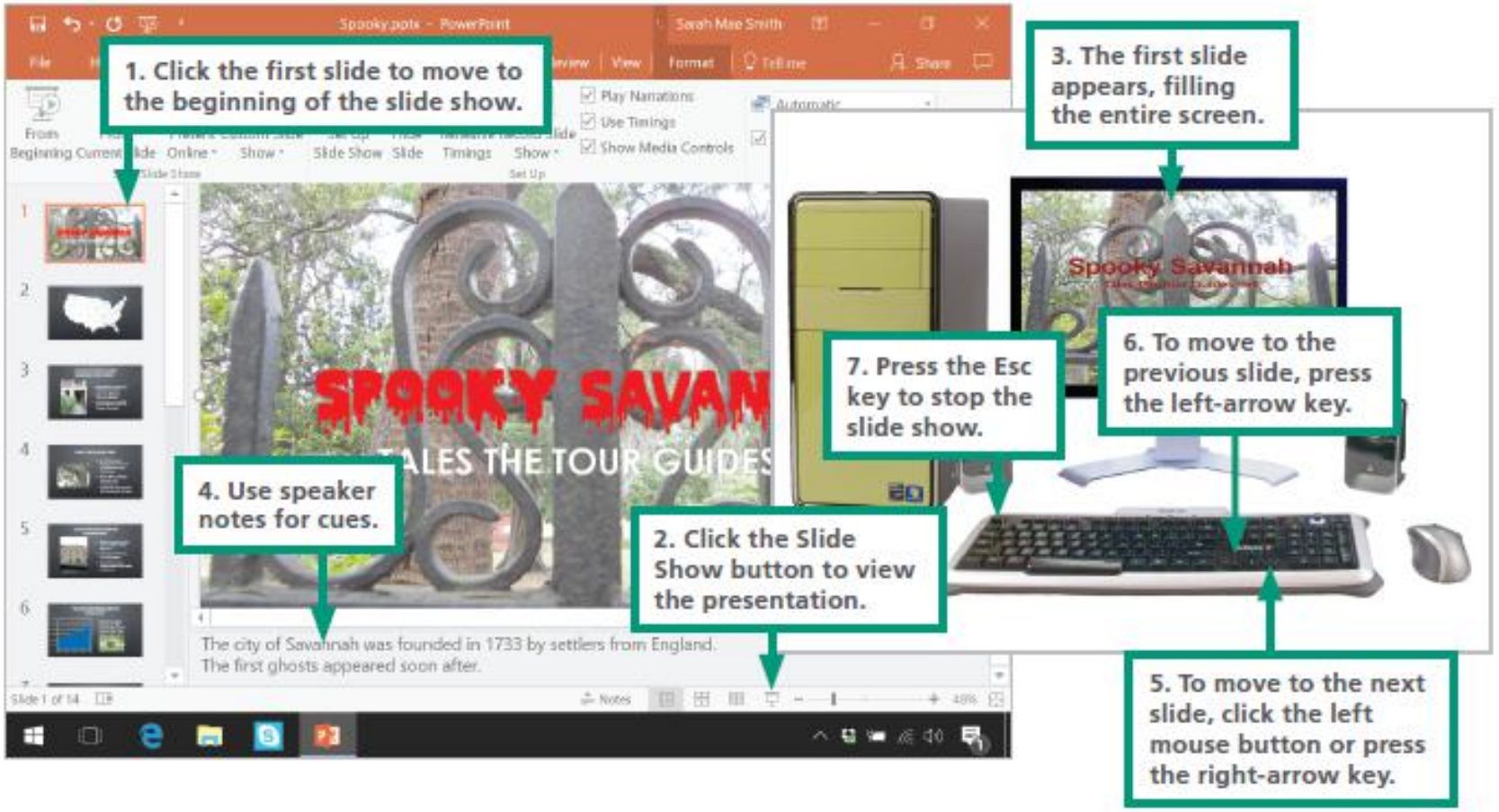
- **Presentation software** supplies the tools for combining text, photos, clip art, graphs, animations, and sound into a series of electronic slides that can be shown on a screen or projector
- Popular presentation software products include Microsoft PowerPoint, iWork Keynote, LibreOffice Impress, and Google Docs Slides

Presentations (2 of 3)

Presentation software highlights include:

- Bulleted lists to summarize the points in your presentation
- Graphics to make your presentation visually interesting
- Transitions between slides to keep your audience's attention
- Speaker notes to help you remember what to say
- Themes and templates to give your slides a professional appearance
- Conversion routines to package presentations as PDF files and YouTube videos

Presentations (3 of 3)



Section E: File Management Utilities

- File Basics
- File Management Tools
- Application-Based File Management
- Physical File Storage

Section E: Objectives (1 of 2)

- List five file-naming conventions
- Explain how storage devices on PCs are named or designated by device letters
- Identify disk partitions
- Write out the complete file path for any file that exists on a digital storage device
- Identify the basic elements of Windows File Explorer and macOS Finder
- Explain how operating systems use default applications

Section E: Objectives (2 of 2)

- State the difference between a physical storage model and a logical storage model
- Describe why an operating system uses an index file
- Explain what the operating system does when you move a file to the Recycle Bin and when you permanently delete a file

File Basics (1 of 6)

- As you learned in Unit 1, a computer file—or simply a file—is defined as a named collection of data that exists on a storage medium, such as a hard disk, cloud drive, or USB flash drive
- When saving a file, you must provide a valid file name that adheres to specific rules, referred to as **file-naming conventions**, which include:
  - Maximum length is 256 characters
  - Symbols are not allowed
  - No reserved words, such as Aux, Com1, and Nul
  - Case is disregarded
  - Spaces are allowed

File Basics (2 of 6)

Maximum length is 255 characters. Current versions of Windows and macOS support file names up to 255 characters long. In practice, some of the 255 characters are used for the file's drive letter, folder designation, and extension, so the name you assign to a file should be much shorter. A file name limitation of 255 characters gives you the flexibility to use descriptive file names, such as *Job Search Cover Letter Pixar*, so that you can easily identify what a file contains.

Avoid using symbols. If an operating system attaches special significance to a symbol, you cannot use it in a file name. For example, Windows uses the colon (:) character to separate the device letter from a file name or folder, as in C:Music. A file name that contains a colon, such as *Report:Summary*, is not valid because the operating system would become confused about how to interpret the colon. Avoid using the symbols * \ < > | “ / : and ? in file names.

Do not use reserved words. Some operating systems also contain a list of reserved words that are used as commands or special identifiers. You cannot use these words alone as a file name. You can, however, use these words as part of a longer file name. For example, in Windows, the file name *Nul* would not be valid, but you could name a file something like *Null Set.exe*. The following words should not be used as file names: Aux, Com1, Com2, Com3, Com4, Con, Lpt1, Lpt2, Lpt3, Prn, and Nul.

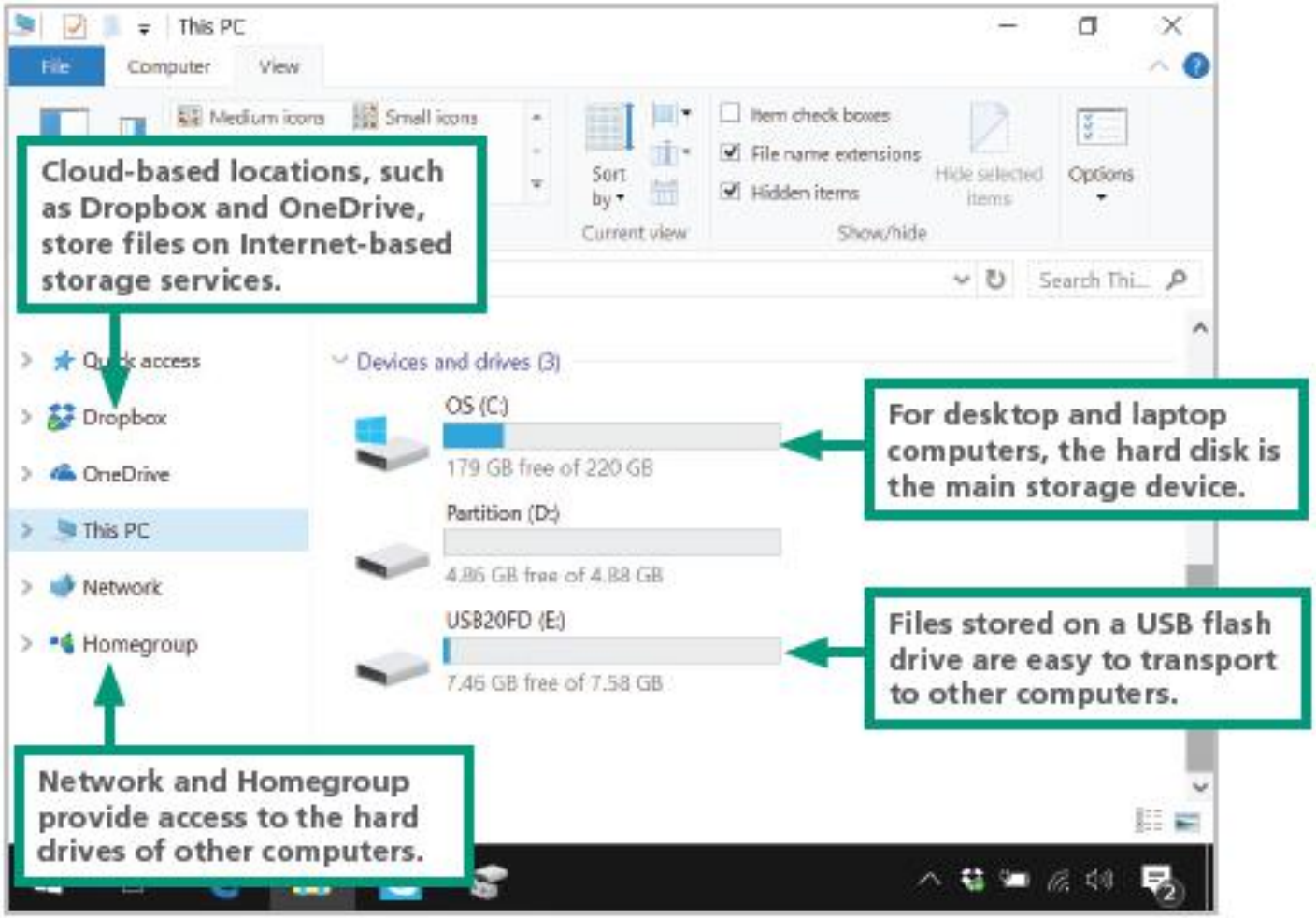
Case is disregarded. Some operating systems are case sensitive, but those that you regularly work with on personal computers are not. A file named *Final Report* is the same as *FINAL REPORT* or *final report*.

Spaces are allowed. You can use spaces in file names. That's a different rule than for email addresses, where spaces are not allowed. You've probably noticed that people often use underscores or periods instead of spaces in email addresses such as Madi_Jones@msu.edu. That convention is not necessary in file names, so a file name such as *Letter to Edison Jones* is valid.

File Basics (3 of 6)

- When working with Windows, storage devices—where files can be saved—can also be identified by a **device letter**
- A **disk partition** is a section of a hard disk drive that is treated as a separate storage unit. Most hard drives are configured with a single apartition that contains the OS, programs, and data

File Basics (4 of 6)



File Basics (5 of 6)

- Every storage device has a **directory** containing a list of its files
- The main directory is referred to as the **root directory**
- A root directory can be subdivided into smaller lists; each list is called a **subdirectory**
- Each subdirectory is depicted as a **folder**
- A computer file's location is defined by a **file path**, which on a PC includes the drive letter, folder(s), file name, and extension

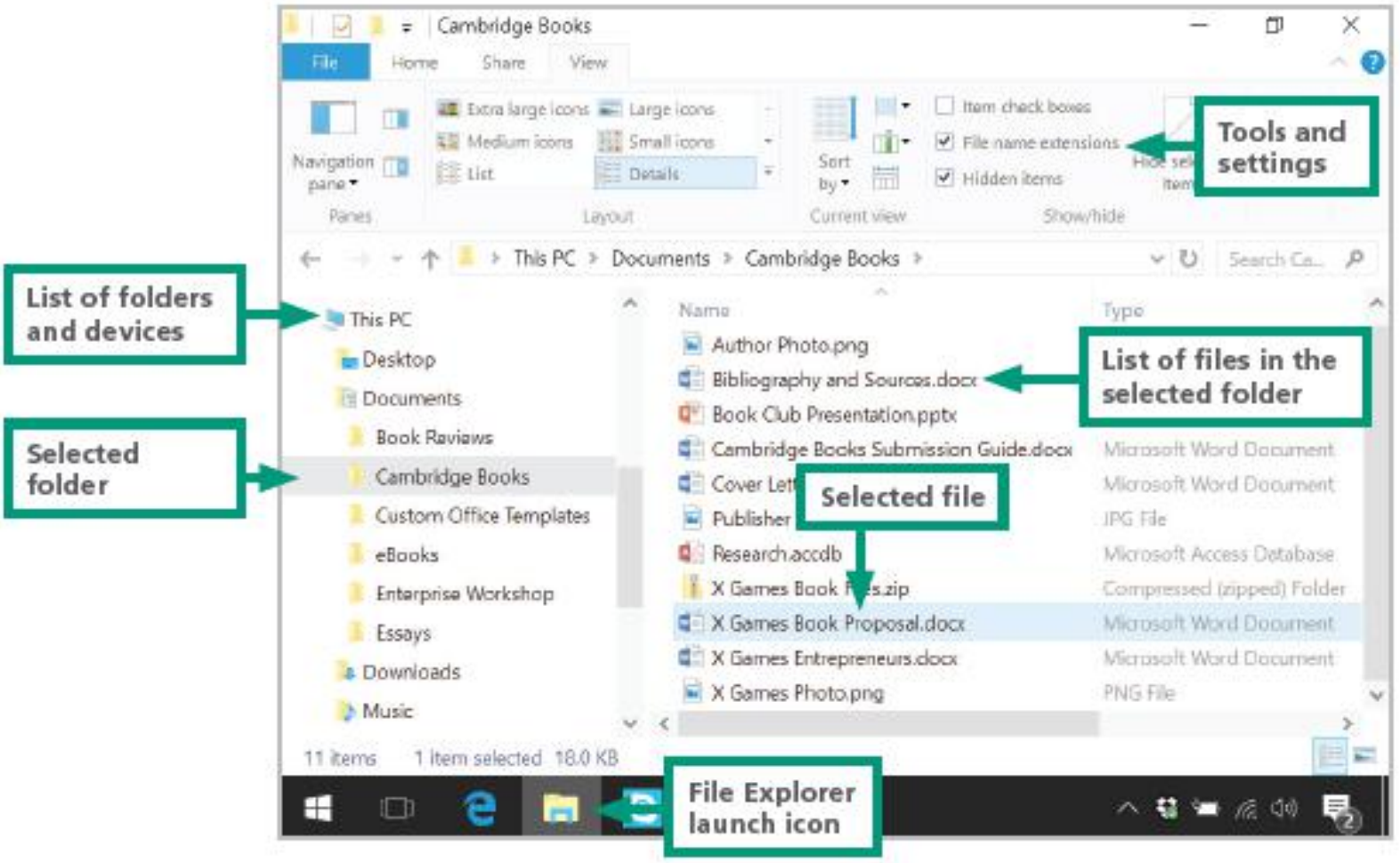
File Basics (6 of 6)

TYPE OF FILE	EXTENSIONS
Text	.txt .dat .rtf .docx(Microsoft Word) .doc(Microsoft Word 2003) .odt(OpenDocument text) .wpd(WordPerfect) .pages(iWork)
Sound	.wav .mid .mp3 .m4p .aac
Graphics	.bmp .tif .wmf .gif .jpg .png .eps .ai(Adobe Illustrator)
Animation/video	.flc .swf .avi .mpg .mp4 .mov(QuickTime) .wmv(Windows Media Player)
Web page	.htm .html .asp .vrml .php
Spreadsheet	.xlsx(Microsoft Excel) .xls(Microsoft Excel 2003) .ods(OpenDocument spreadsheet) .numbers(iWork)
Database	.accdb(Microsoft Access) .odb(OpenDocument database)
Miscellaneous	.pdf(Adobe Acrobat) .pptx(Microsoft Powerpoint) .qxp(QuarkXPress) .odp(OpenDocument presentations) .zip(WinZip) .pub(Microsoft Publisher)

File Management Tools (1 of 12)

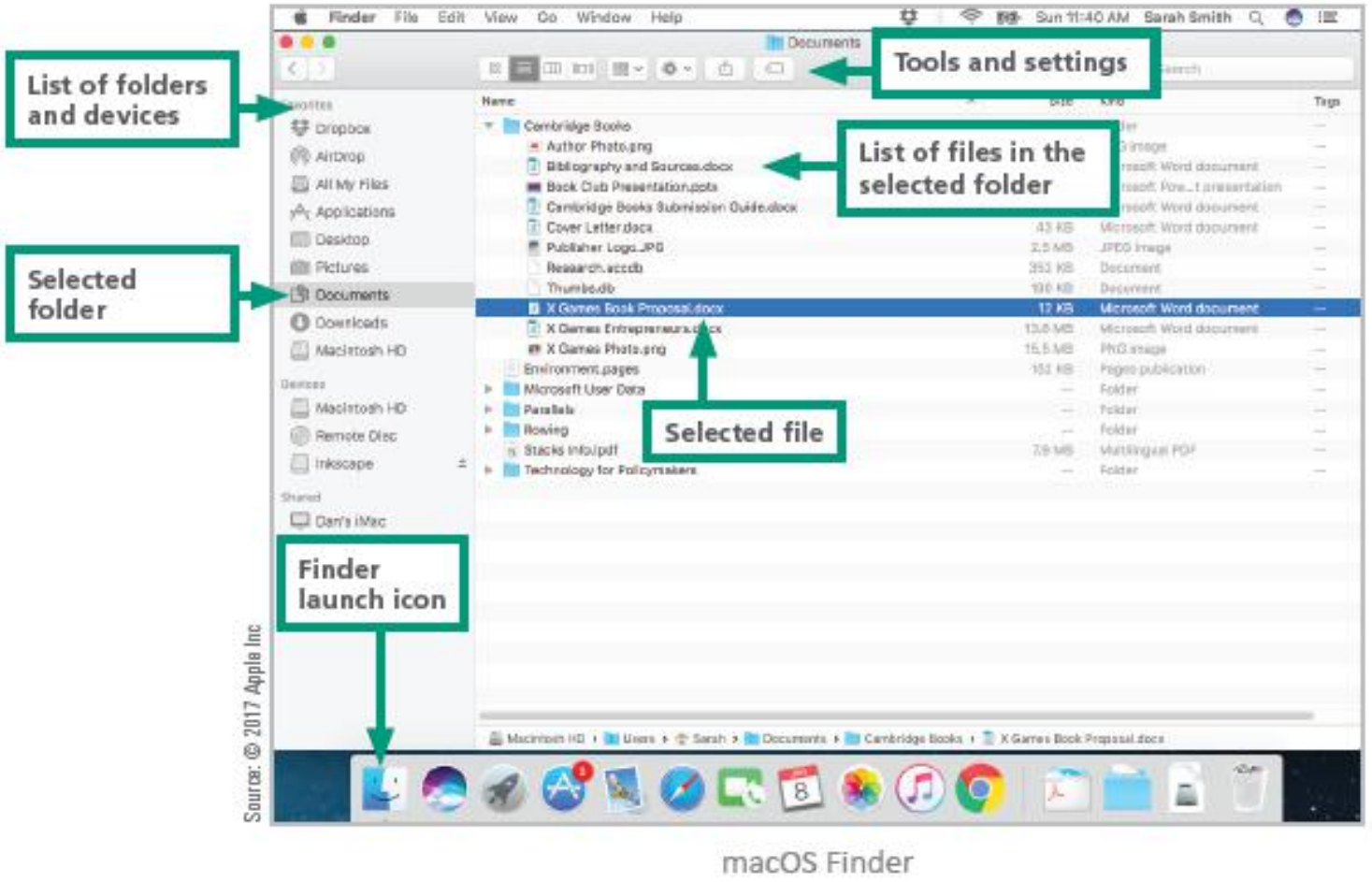
- Operating systems provide file organization tools called **file management utilities**
- Windows offers a utility called File Explorer, which is launched from the Folder icon on the taskbar
- MacOS offers a utility called Finder, which is launched from the Finder icon on the dock

File Management Tools (2 of 12)



Windows File Explorer

File Management Tools (3 of 12)



macOS Finder

File Management Tools (4 of 12)

- File management utilities are useful for locating files and for viewing their contents
- The software application associated with a specific file type is called a **default application**
- You can select the application that you want to use by right-clicking the file and selecting the application from a list

File Management Tools (5 of 12)

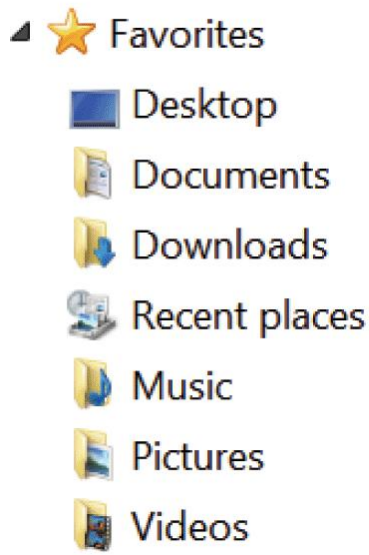
- In addition to locating files and folders, file management utilities help you manipulate files and folders in the following ways:
  - **Rename** — You can change the name of a file or folder to better describe its contents.
  - **Copy** — You can copy a file from one device to another-for example, from a USB drive to the hard disk drive. You can also make a copy of a document so that you can revise the copy and leave the original intact.

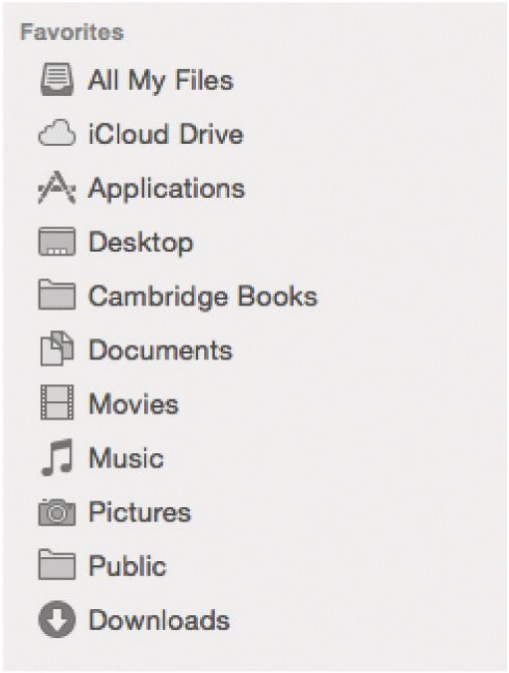
File Management Tools (6 of 12)

- **Move** — You can move a file from one folder to another or from one storage device to another. When you move a file, it is erased from its original location, so make sure you remember the new location of the file. You can also move an entire folder and its contents from one storage device to another storage device or to a different folder.
- **Delete** — You can delete a file when you no longer need it. You can also delete a folder. Be careful when you delete a folder because most file management utilities also delete all the files within a folder.

File Management Tools (7 of 12)

- Windows and OS X offer a set of preconfigured personal folders, such as Documents and Music, for storing your personal data files





File Management Tools (8 of 12)

- **Use descriptive names** — Give your files and folders descriptive names, and avoid using cryptic abbreviations
- **Maintain file extensions** — When renaming a file, keep the original file extension so that it can be opened with the correct application software
- **Group similar files** — Separate files into folders based on subject matter. For example, store your creative writing assignments in one folder and your MP3 music files in another folder

File Management Tools (9 of 12)

- **Organize your folders from the top down** — When devising a hierarchy of folders, consider how you want to access files and back them up. For example, it is easy to specify one folder and its subfolders for a backup. If your important data is scattered in a variety of folders, however, making backups is more time-consuming

File Management Tools (10 of 12)

- **Consider using default folders** — You should use preconfigured personal folders, such as Documents and Music, as your main data folders. Add subfolders to these personal folders as necessary to organize your files
- **Use public folders for files you want to share** — Use the public folders for files that you want to share with other network users

File Management Tools (11 of 12)

- **Don’t mix data files and program files** — Do not store data files in the folders that hold your software. Most software is stored in subfolders of the Program Files folder on Windows systems and in the Applications folder on Macs
- **Don’t store files in the root directory** — Although it is acceptable to create folders in the root directory, it’s not a good practice to store programs or data files in the root directory of your computer’s hard disk

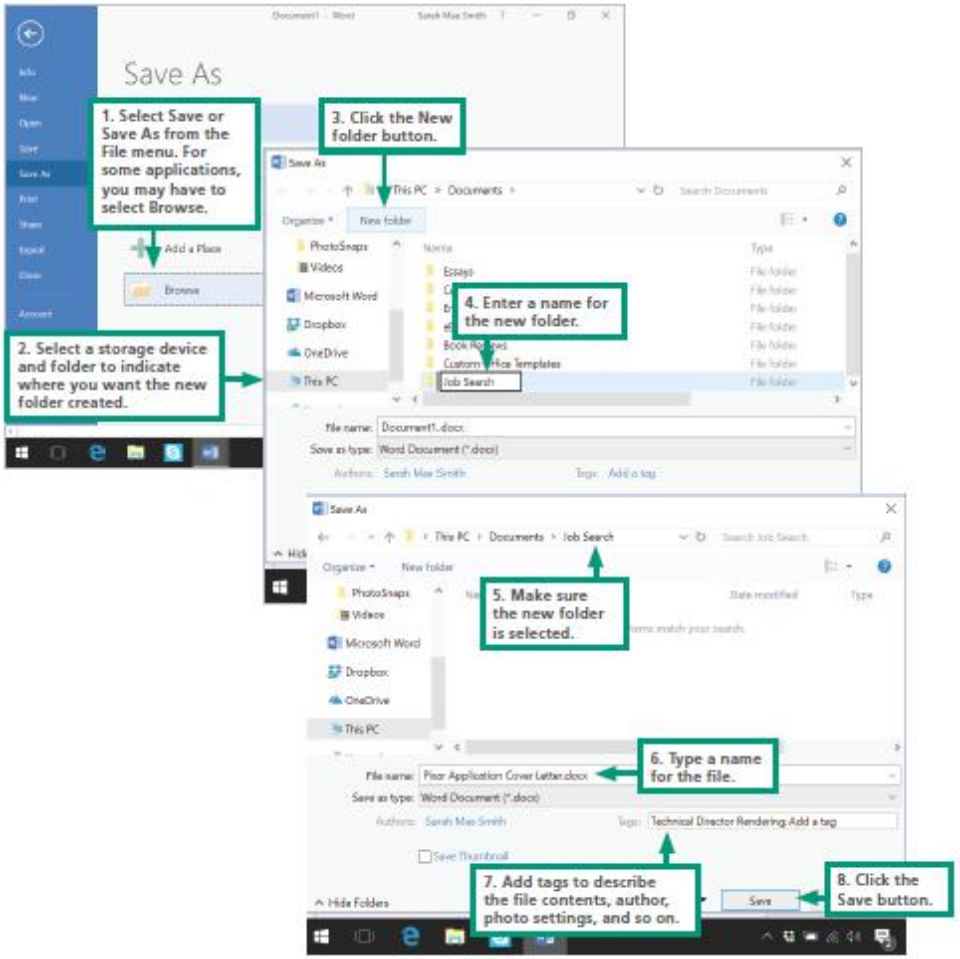
File Management Tools (12 of 12)

- **Access files from the hard disk.** For best performance, copy files from USB drives to your computer's hard disk before accessing them
- **Follow copyright rules.** When copying files, make sure you adhere to copyright and license restrictions
- **Delete or archive files you no longer need.** Deleting unneeded files and folders helps keep your list of files from growing to an unmanageable size
- **Be aware of storage locations.** When you save files, be sure to specify the correct storage device and folder
- **Back up!** Back up your folders and files regularly

Application-Based File Management (1 of 2)

- Applications, such as Word and Excel, generally provide a way to open files and save them in a specific folder on a designated storage device
- Saving files is easy; simply use the Save option provided by your application, specify a location for the file, and give it a name

Application-Based File Management (2 of 2)



Physical File Storage (1 of 2)

- The structure of files and folders displayed by File Explorer is called a **logical storage model** because it helps you create a mental picture of the way files are organized in a hierarchy of folders
- A **physical storage model** describes what actually happens on the disks and in the circuits
- The **formatting** process creates the equivalent of electronic storage bins
- Magnetic and optical media are divided into circular **tracks** and then further divided into pie-shaped **sectors**

Physical File Storage (2 of 2)

- The OS uses a **file system** to keep track of the names and locations of files that reside on a storage medium, such as a hard disk
- To speed up the process of storing and retrieving data, a disk drive usually works with a group of sectors called a **cluster** or a block
- To delete data from a disk in such a way that no one can ever read it, you can use a special **file shredder software** that overwrites supposedly empty sectors with random 1s and 0s; this is handy if you want to sell or donate your computer and want to make sure your personal data is no longer on the hard disk