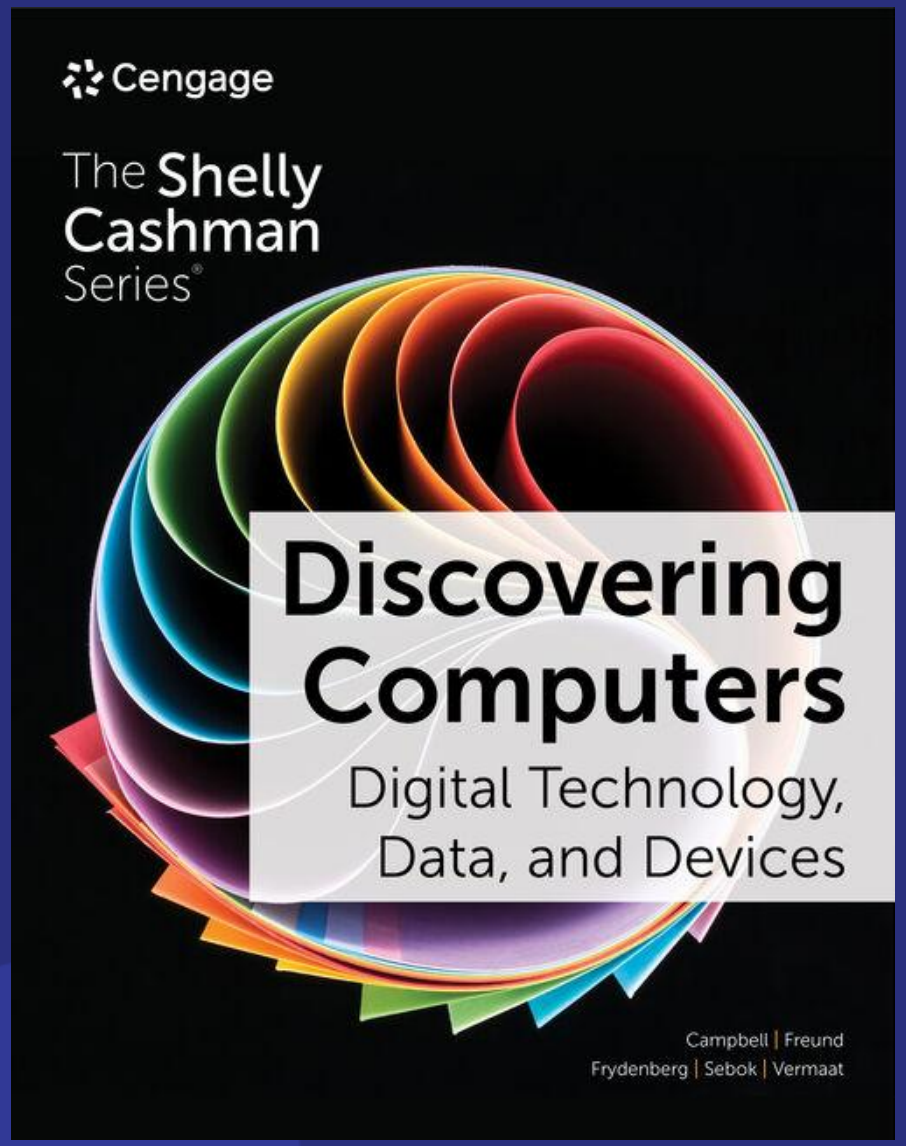


Discovering Computers: Digital Technology, Data, and Devices, 17e

Unit 8: Programs and Apps: Using Apps for Productivity, Graphics, and Security

Module Objectives (1 of 1)

By the end of the module, you should be able to:

- Identify the general categories of programs and apps
- Differentiate among the ways you can acquire programs and apps
- Identify the key features of productivity applications
- Identify the key features of graphics and media applications
- Explain how digital media is used online
- Identify the key features of file, disk, and system management tools
- Describe augmented reality, virtual reality, and artificial intelligence
- Identify the uses of personal-interest applications
- Identify the key features of security tools

How Do You Use Programs and Apps? (1 of 11)

- All smartphones, computers, or tablets require a program or app to run.
- Businesses and home users use productivity apps to manage documents, spreadsheets, presentations, and databases.
- The terms "software," "program," and "app"are used interchangeably.
- Apps are categorized according to productivity, graphics and media, personal interest, and communications.

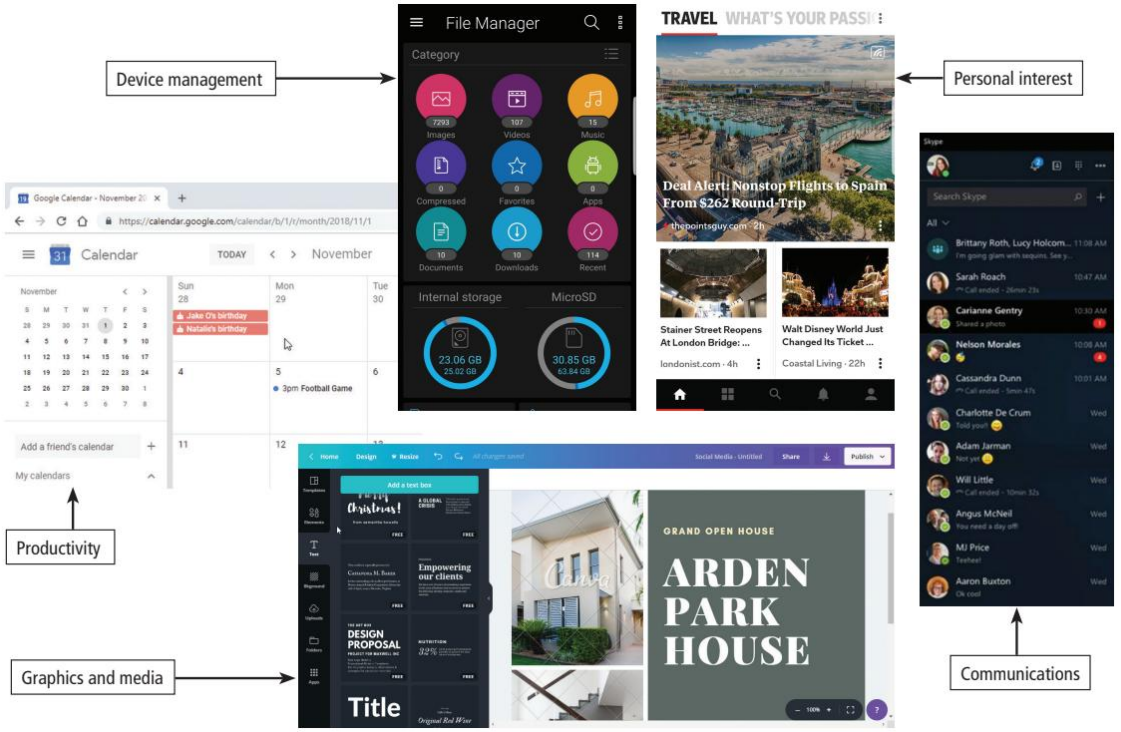


Figure 4-1 People use a variety of apps.

How Do You Use Programs and Apps? (2 of 11)

Table 4-1 Programs and apps by category.

Category	Types of Programs and Apps	
Productivity (business and personal)	Word processing • Presentation • Spreadsheet • Database • Note taking • Calendar and contact management • Project management	Accounting • Personal finance • Legal • Tax preparation • Document management • Support services • Enterprise computing
Graphics and media	Computer-Aided Design (CAD) • Desktop publishing • Paint/Image editing • Photo editing and photo management • Clip Art/Image gallery	Video and audio editing • Multimedia and website authoring • Media player • Augmented and virtual reality
Personal interest	• Lifestyle • Mapping • Medical	Entertainment • Convenience • Education

How Do You Use Programs and Apps? (3 of 11)

Table 4-1 Programs and apps by category (continued).

Category	Types of Programs and Apps	
Communications	• Blog • Browser • Chat room • Online discussion • Email	• File transfer • Internet phone • Internet messaging • Mobile messaging • Videoconference
Security	• Personal firewall • Antivirus	• Malware removers • Internet filters
File, disk, and system management •	• File manager • Search • Image viewer • Uninstaller • Disk clean-up	• Screen saver • File compression • PC maintenance • Backup and Restore • Power management

How Do You Use Programs and Apps? (4 of 11)

- **Local apps** are apps that you install on your computer's hard drive.
- **Portable apps** run from a removable storage device such as an external hard drive, flash drive or the cloud.
- **A native app** is an app written for a specific operating system and installed on a computer or mobile device.
- **Web apps** are programs that you access via the Internet using a browser on a computer or mobile device.
- Apps that you access on a smartphone or tablet are called **mobile apps.**

How Do You Use Programs and Apps? (5 of 11)

- Using mobile apps, you can check email, maintain an online calendar and contact lists, and obtain maps and travel directions on your mobile device without having to use a desktop or laptop computer.
- Mobile apps usually focus on a single task, such as checking email, searching the web, or sending a text message.

Figure 4-2 Mobile and web apps

How Do You Use Programs and Apps? (6 of 11)

Some apps are available as both native and web apps.

- The native app allows you to search for an item to purchase by taking a photo of a product or its bar code with your device's camera or tapping the microphone to speak the names of items to add to your shopping cart.
- The mobile web app runs in a browser, as shown by the web address in the search bar.

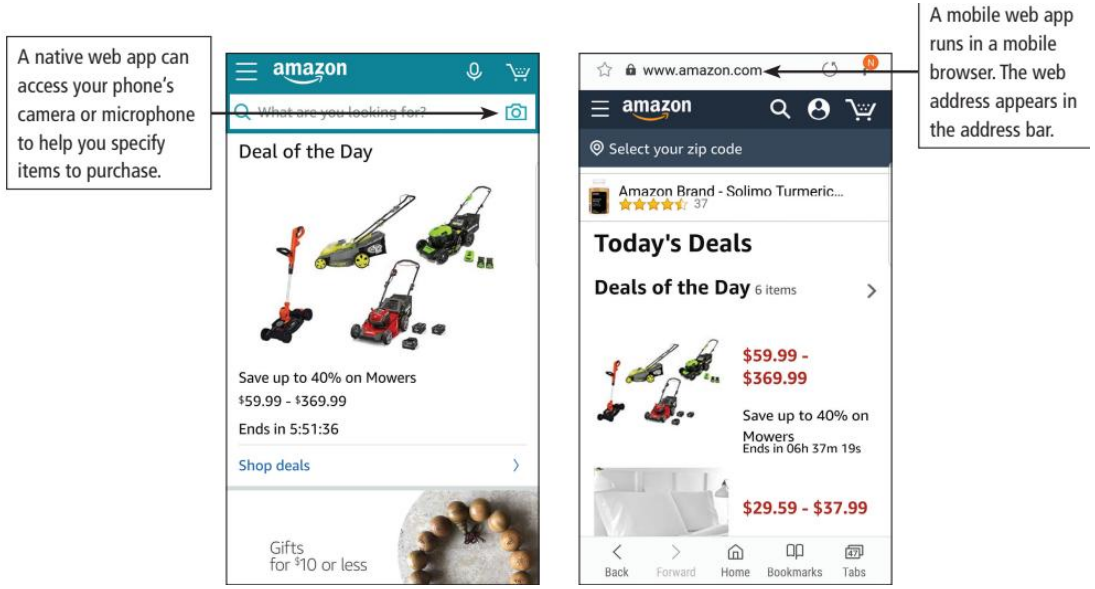


Figure 4-3 Amazon's native app (left) and web app (right).

How Do You Use Programs and Apps? (7 of 11)

- Some apps are available as both web apps and mobile apps.
- In this case, data and activity can be **synchronized** between the web app and the mobile app so that your actions, data, information, and settings will be consistent across all your devices.

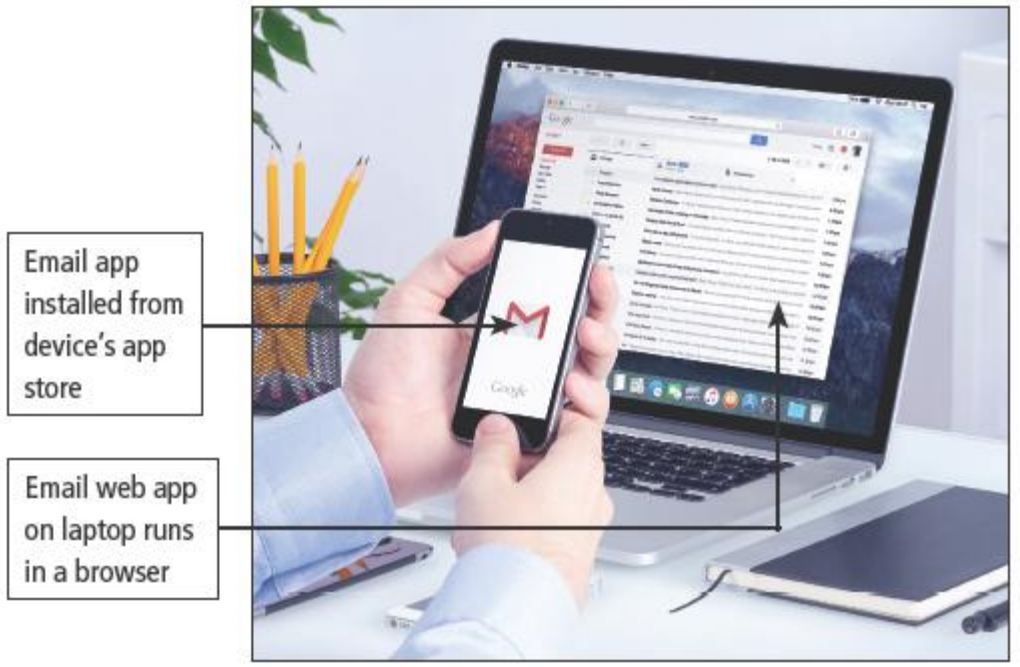


Figure 4-4 Mail apps synchronize data between mobile and web-based versions.

How Do You Use Programs and Apps? (8 of 11)

- Many on-screen keyboards assist you by predicting words and phrases you might want to type based on context or by providing automatic corrections.
- Some on-screen keyboards include voice recognition capabilities so that you can speak the words to be typed.
- Users who need to type significant amounts of information may opt for a portable keyboard that they can connect to their smartphones using Bluetooth.

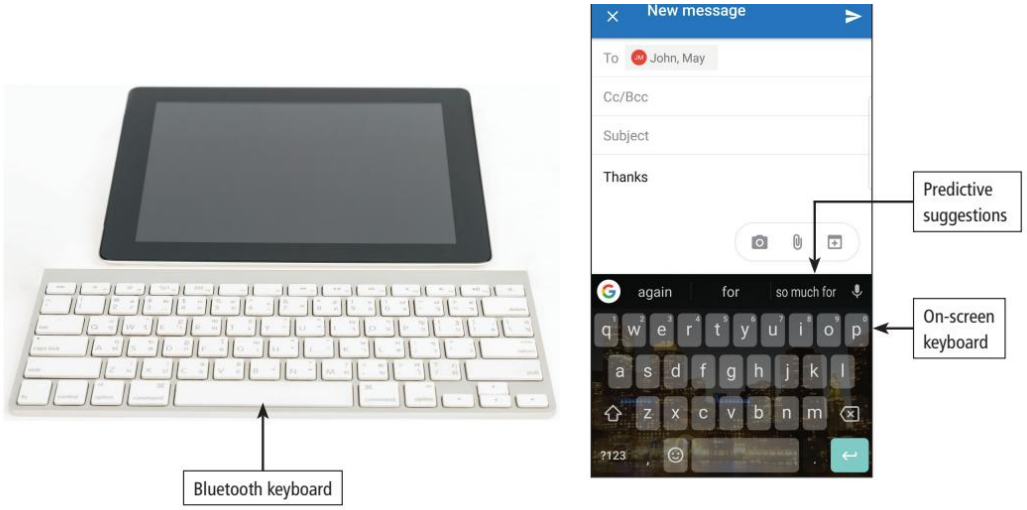


Figure 4-5 You can enter information in mobile apps using a Bluetooth keyboard or an on-screen keyboard.

How Do You Use Programs and Apps? (9 of 11)

Although mobile apps are popular and convenient, they have limitations.

Table 4-2 Pros and cons of mobile apps.

Pros	Cons
Mobile web apps can be created quickly compared to native apps.	Mobile web apps are not as fast and have fewer features than native web apps or desktop apps.
You can access your information on the go.	Poorly designed apps can turn people away.
Voice input and smart on-screen keyboard simplify interactions.	Typing using a small on-screen keyboard can be cumbersome.

How Do You Use Programs and Apps? (10 of 11)

- **Web apps** rely on HTML5 (**Hypertext Markup Language**) to display information, JavaScript to manage the app's performance, and CSS (**Cascading Style Sheets**) to format information.
- By using **cross-platform** development tools, developers can build apps that work on multiple platforms.
- **Fitness trackers** have sensors to track your heart rate.
- **Digital cameras** have sensors for remote controls.
- **Smart home devices** such as the Nest Thermostat have temperature sensors.
- Google Home or **Amazon Alexa** smart speakers have sensors that detect the sound of a voice.

How Do You Use Programs and Apps? (11 of 11)

- **Mobile commerce**, or **m-commerce**, apps let you use your mobile device to make online purchases of goods and services.
- Mobile payment capabilities are built into apps, such as Uber or Lyft for rides, and online retailers, such as Amazon or Walmart.

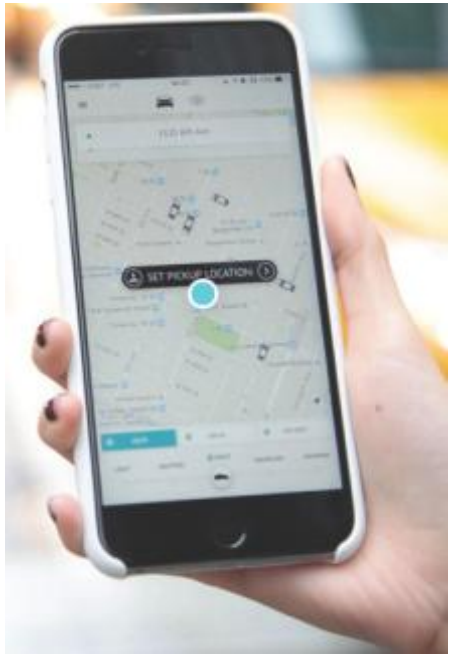


Figure 4-6 M-commerce allows apps such as Uber to provide payment methods for services.

Ethics and Issues: Acquire Programs and Apps Responsibly (1 of 7)

- When you copy, distribute, download, or otherwise use without permission or payment any programs and apps, you are **violating the law**.
- The copyright law led to the development of digital rights management (DRM). **DRM** for programs and apps defines restrictions regarding their use, modification, and distribution.
- **Access controls** are security measures that define who can use a program or app, as well as what actions they can perform within the program or app.

Figure 4-7 Passwords and biometrics are types of access controls.

Ethics and Issues: Acquire Programs and Apps Responsibly (2 of 7)

- Programs and apps are distributed in a variety of forms: retail, custom, software as a service (SaaS), shareware, freeware, open source, and public domain.
- **Shareware** is copyrighted and distributed at no cost for a trial period. Payment is to be made to use shareware beyond that period unless you cancel within a specified period.
- **Freeware** is copyrighted and provided at no cost by an individual or a company that retains all rights.
- **Open-source** programs and apps have no restrictions from the copyright holder regarding modification and redistribution; users can add functionality and sell or give away their versions to others.
- **Public domain** programs and apps have been donated for public use and have no copyright restrictions.

Ethics and Issues: Acquire Programs and Apps Responsibly (3 of 7)

Table 4-3 Popular types of mobile apps.

Type of App	Helps You to	Examples
Banking and payment	Manage bank accounts, pay bills, deposit checks, transfer money, and make payments	Your bank's mobile app, Venmo, PayPal
Calendar	Maintain your online calendar and schedule appointments	Google Calendar, Outlook Calendar
Email	Send and receive email messages from your mobile device	Outlook, Gmail
Fitness	Track workouts, set weight-loss goals, review stats from fitness tracking devices	Fitbit, MyFitnessPal, Apple Fitness
Location sharing	Share your location with friends	Find My friends, Find My Family, Google Maps
Mapping/GPS	View maps and obtain travel directions based on your location	Google Maps, Waze
Messaging	Send text messages, photos, or short videos or make voice or video calls to your friends	Facebook Messenger, FaceTime, WhatsApp, GroupMe

Ethics and Issues: Acquire Programs and Apps Responsibly (4 of 7)

Table 4-3 Popular types of mobile apps (continued).

Type of App	Helps You to	Examples
Photo and video editing and sharing	Modify photos and videos by cropping, adding filters, adjusting brightness and contrast	Fotor, Canva, Adobe Premiere Clip
Shopping	Make online retail purchases	Amazon.com
Social media	Share status updates, photos, or videos on social networking sites or view friends' posts	Facebook, Instagram, LinkedIn, Twitter
Travel	Make airline, hotel, and restaurant reservations; read and post reviews	Airbnb, Kayak, Priceline, Yelp, TripAdvisor
News and information	Stay up to date on current affairs of interest to you	Flipboard, Google News, Weather Channel, CNN
Personal assistant	Search the Internet, set timers, add appointments to your calendar, and make hands-free calls by speaking commands	Siri, Cortana, Google Home, Amazon Alexa

Ethics and Issues: Acquire Programs and Apps Responsibly (5 of 7)

A **license agreement** specifies the number of devices on which you can install the product, any expiration dates, and other restrictions.

Table 4-4 Types of license agreements.

Type	Description
Single-user or **end-user license agreement** (**EULA**)	Grants permission for one installation
Multiple-user license agreement	Allows a specified number of users access the program or app
Site license	Allows an organization to provide access to as many users as they want, either by individual installations or by providing network access or Internet passwords

Ethics and Issues: Acquire Programs and Apps Responsibly (6 of 7)

Update Programs and Apps

- **Updates** can prevent or repair problems, provide additional functionality, or address any security or other issues.
- Many desktop and mobile apps use an **automatic update** feature that provides the latest system software and security updates automatically.
- Updates that address a single issue are called **patches.**
- A **service pack** is a collection of updates combined in one package.
- **Upgrades** are new releases of the program or app and may require an additional fee to enable the upgrade to install.

Ethics and Issues: Acquire Programs and Apps Responsibly (7 of 7)

- An **uninstaller** is a tool that removes the program files as well as any associated entries in the system files.
- A common infringement on copyrights is **piracy**, where people illegally copy software, movies, music, and other digital materials.
- **Piracy** is common in software, where the code and files are digital.
- Piracy is illegal, and you can be fined or otherwise punished if you purchase or sell pirated programs and apps.

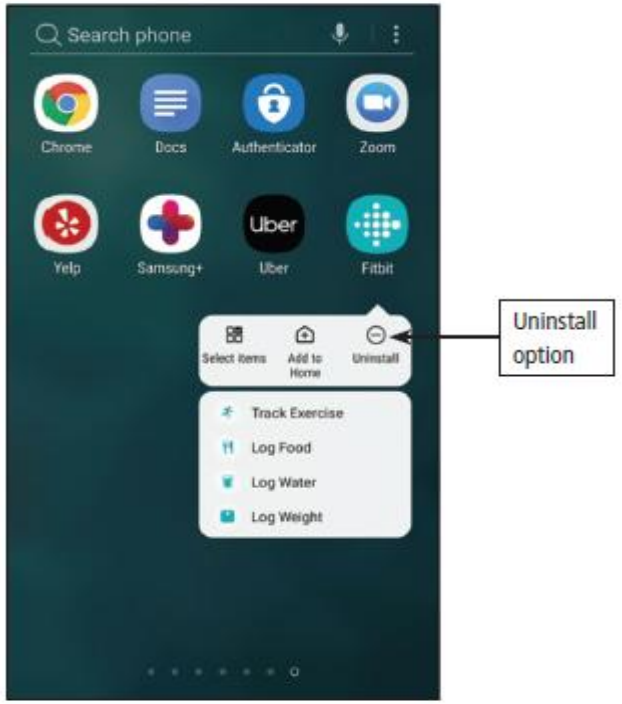


Figure 4-10 Tap and hold an icon on a smartphone.

Productivity Apps (1 of 11)

- **Productivity apps** are apps for personal use that you may use to create documents, develop presentations, track appointments, or stay organized.
- Productivity applications include **word processing, spreadsheets, presentations, databases, productivity suites, and enterprise computing**.
- During the process of developing a project, you will likely switch back and forth between the following activities.
  - ✓ When you create a project, you enter text or numbers, insert images, add contacts, schedule appointments, and perform other tasks using a variety of input methods, such as a keyboard, a mouse, touch, or voice.
  - ✓ To edit is to make a change to the contents of a document, worksheet, or presentation, such as font, spacing, and alignment, among others.

Productivity Apps (2 of 11)

- When you **save a project,** the computer transfers the project from memory to a local storage medium.
- A **hard copy** is information that exists on a physical medium, such as paper.
- A **word-processing app, sometimes called a word processor,** includes tools for entering, editing, and formatting text and graphics.
- Word processors can be used to create documents and reports, mailing labels, flyers, brochures, newsletters, resumes, letters, and more.

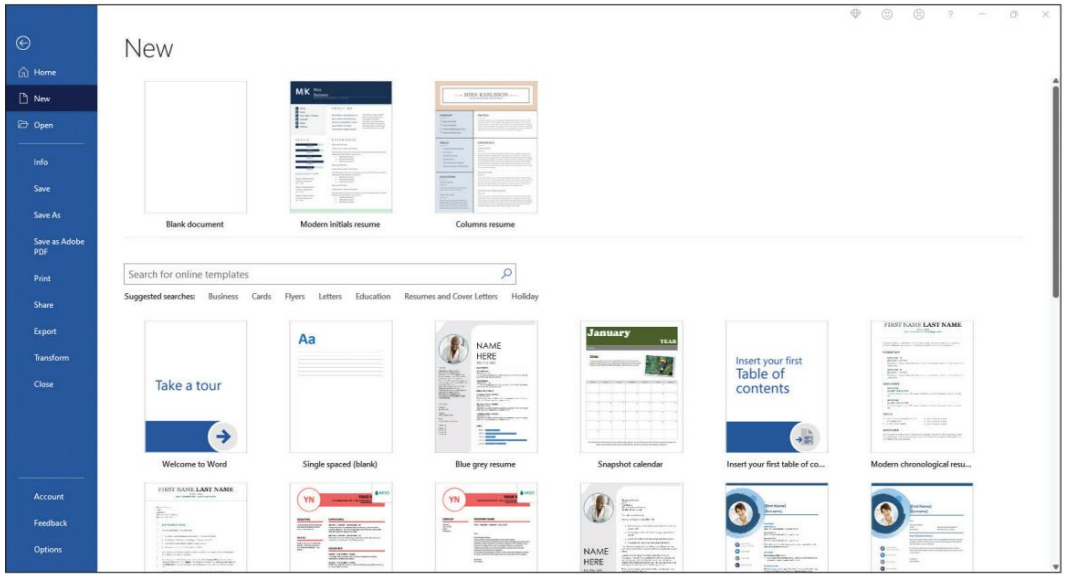


Figure 4-12 Word-processing apps, such as Microsoft Word, enable you to create any different types of documents.

Productivity Apps (3 of 11)

- The files you create are called **documents,** and each document is a collection of one or more pages.
- When you start a word-processing program, a **blank document** opens on the screen
- **Document management tools** protect and organize files and let you share your documents with others.

Table 4-5 Uses of word processing.

Who Uses Word Processing	To Create
Business executives, office workers, medical professionals, politicians	Agendas, memos, contracts, proposals, reports, letters, email, newsletters, personalized bulk mailings and labels
Personal users	Letters, greeting cards, notes, event flyers, checklists
Students	Essays, reports, stories, resumes, notes
Conference promoters and event planners	Business cards, postcards, invitations, conference tent cards, name tags, gift tags, stickers
Web designers	Documents for publishing to the web after converting them to HTML

Productivity Apps (4 of 11)

- Spreadsheet apps allow you to organize data in columns and rows and perform calculations on the data.
- These columns and rows collectively are called a worksheet.
- A spreadsheet file is also known as a workbook as it can contain thousands of related individual worksheets.
- A cell in a worksheet is the location formed by the intersection of a column and a row.
- A workbook is a collection of related worksheets contained in a single file.

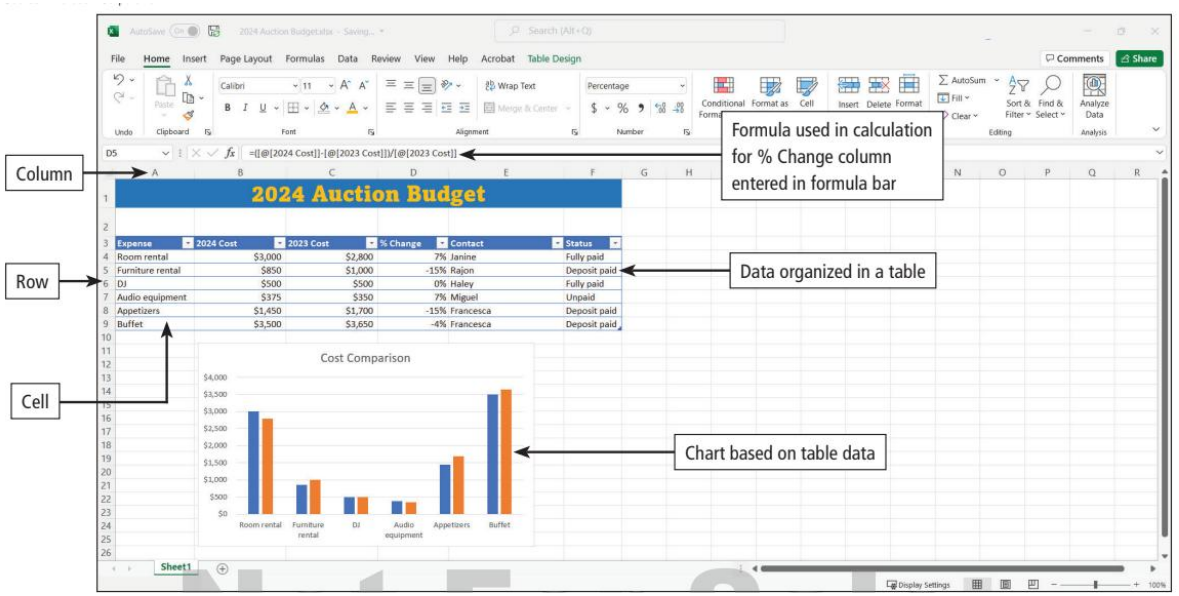
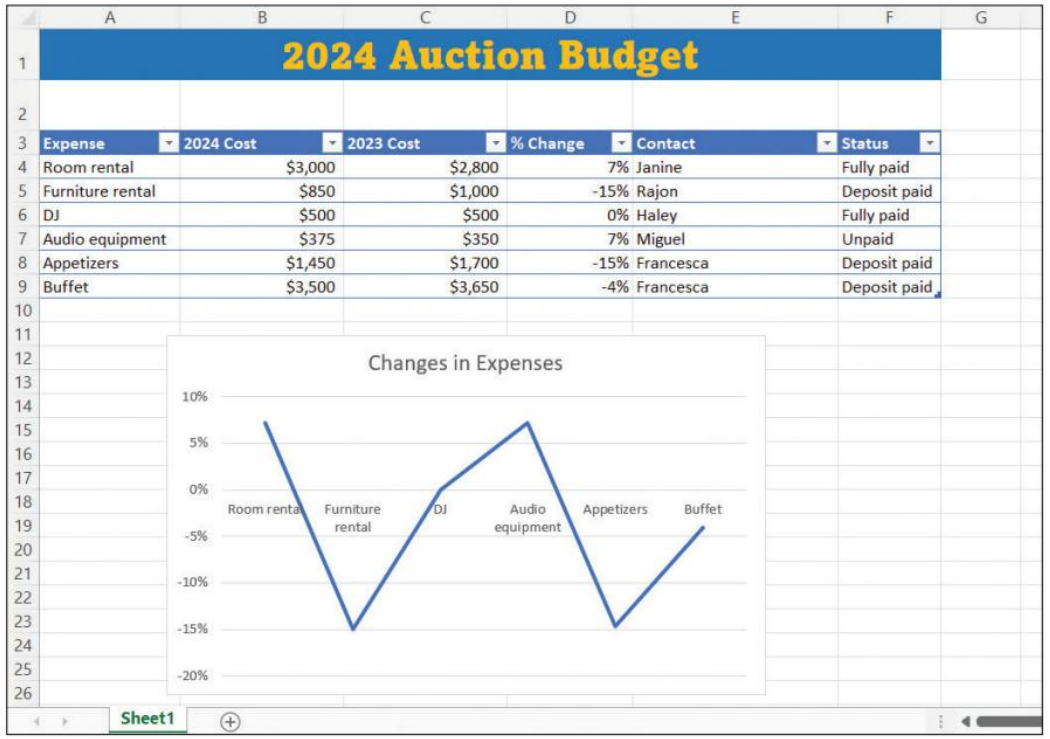


Figure 4-14 Worksheets can contain data, tables, formulas, and charts.

Productivity Apps (5 of 11)

Key Features of Spreadsheets

- **Formatting tools** to change a worksheet's appearance and **Developer tools** to add customized functions.
- **Printing features** to control whether you want to print entire worksheets or only selected areas.
- **Web capabilities** to share workbooks online, add hyperlinks, and save worksheets as web pages.
- Tools to **analyze data** in a spreadsheet.
- **Charts (graphs)** represent data using bars, columns, pie wedges, lines, or other symbols.



Expense	2024 Cost	2023 Cost	% Change	Contact	Status
Room rental	$3,000	$2,800	7%	Janine	Fully paid
Furniture rental	$850	$1,000	-15%	Rajon	Deposit paid
DJ	$500	$500	0%	Haley	Fully paid
Audio equipment	$375	$350	7%	Miguel	Unpaid
Appetizers	$1,450	$1,700	-15%	Francesca	Deposit paid
Buffet	$3,500	$3,650	-4%	Francesca	Deposit paid

Figure 4-15 Charts help to visualize data in the worksheet.

Productivity Apps (6 of 11)

Presentation apps can help you organize your content and create professional-looking digital slide shows

- Presentations can be displayed in different views and have insert, delete, duplicate, hide, and move slides features.
- The main points of a slide are added as a bulleted list by typing them in a text box on the slide.
- Graphics or images can be added to give presentations greater impact.
- Using design ideas can give your slides a more professional appearance.

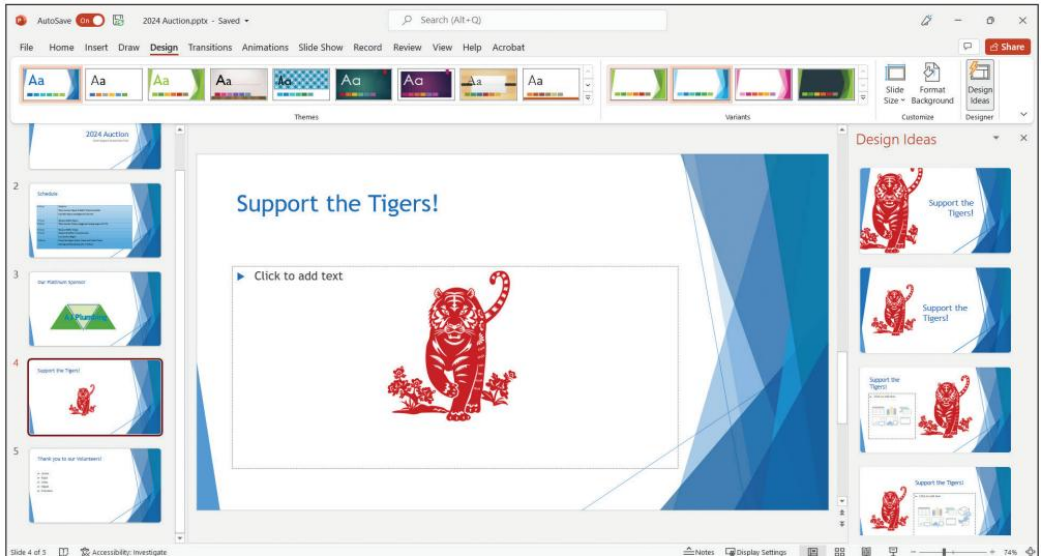


Figure 4-16 Presentation apps provide you with templates and design ideas.

Productivity Apps (7 of 11)

Format Presentation Content

Table 4-6 Adding content to slides.

Slide Content	How to Enter	Provides
Text in a paragraph or bulleted list	Click a placeholder and type, or copy and paste text from another file, or insert text from a document file	Content; most programs offer a variety of bullet styles, including number and picture bullets
Graphics, such as line art, photographs, clip art, drawn objects, diagrams, data tables, and screenshots	Click a content placeholder, draw directly on the slide, or copy and paste a graphic from another file	Illustrations to convey meaning and information for the slide content
Media clips, such as video and audio, including recorded narrations	Click a content placeholder and choose a file, or insert the file directly onto a slide by recording it	Media content to enhance a slide show
Links	Click content placeholder, copy and paste links from a website or type the link directly	Links to another slide, another document, or a web page
Embedded objects	Click menu commands or a content placeholder	External files in a slide
Charts	Link or embed a worksheet or chart from a spreadsheet app to a slide in a presentation	Graphic display of data to support a presentation

Productivity Apps (8 of 11)

Common Presentation Tasks

- With a presentation program, slides can be customized by adding visually interesting effects. These are:
  - ✓ **Transitions**
  - ✓ **Animations**
  - ✓ A **slide master** is an overall template for a presentation format with a theme, customized title, text fonts, backgrounds, and so on.
  - ✓ A **slide show** is a display or delivery of the content of your presentation.

Productivity Apps (9 of 11)

Databases

- A **database** is a collection of data organized in a manner that allows access, retrieval, and reporting of that data.
- A relational database management system (RDBMS), or **relational database,** is a database that consists of a collection of tables where items are organized in columns and rows.
- Large enterprises use databases to store vast quantities of data that enable us to shop online.

Figure 4-17 Databases.

Productivity Apps (10 of 11)

Key Features of Database Apps

- Data is organized into tables of **records (rows of data)** and is stored electronically in a database.
- Each piece of data in a database is entered and stored in an area called a **field.**
- A **column** contains a specific category of information, such as a person, place, object, event, or idea. Columns contain fields; rows contain records
- Each field is assigned a **field name**, which is a column label that describes the field.
- Fields are defined by their data type, such as text, date, or number.
- Hyperlinks store data as web addresses.
- **Tables** are a collection of records for a single subject. Tables store data for the database. A database can contain one or more tables.

Productivity Apps (11 of 11)

A **productivity suite** is a collection of individual related applications available together as a unit.

Table 4-7 Popular productivity suites.

	Microsoft Office	Apple iWork	G suite	Open Office
Operating systems supported	Windows, macOS or web apps	macOS, iOS, or web apps	ChromeOS or web apps	Windows, Linux, macOS
Word processor	Microsoft word	Pages	Google Docs	Writer
Spreadsheet	Microsoft Excel	Numbers	Google Sheets	Calc
Presentation	Microsoft PowerPoint	Keynote	Google Slides	Impress
Database	Microsoft Access			Base
Email	Microsoft Outlook	Apple mail	Gmail	
Online version	Office Online	iWork for iCloud	G Suite	
Cloud storage	Microsoft OneDrive	iCloud	Google Drive	

Graphics and Media Applications (1 of 16)

- **Digital graphics and media** include still images, animated images, and audio.
- **Digital media apps** fall into two categories:
  - ✓ Apps that are used to capture, edit, and create digital media
  - ✓ Apps that play digital media
- **Digital graphics and media** make digital content appealing and entertaining.
- The major types of digital media include graphics, animation, video, and audio.

Figure 4-20 Types of digital media.

Graphics and Media Applications (2 of 16)

- **Digital graphics** can be as simple as a line drawing or as complex as a highly detailed photo or 3-D illustration.
- **Digital media apps** can be used to create, edit, and modify digital graphics.
- **Digital media apps** can be used to create an animation.
- While creating an animation by drawing illustrations, a **digital video can be created by** capturing live action with a video camera.
- Digital video usually includes **digital audio,** which is sound that is recorded and stored as computer data.

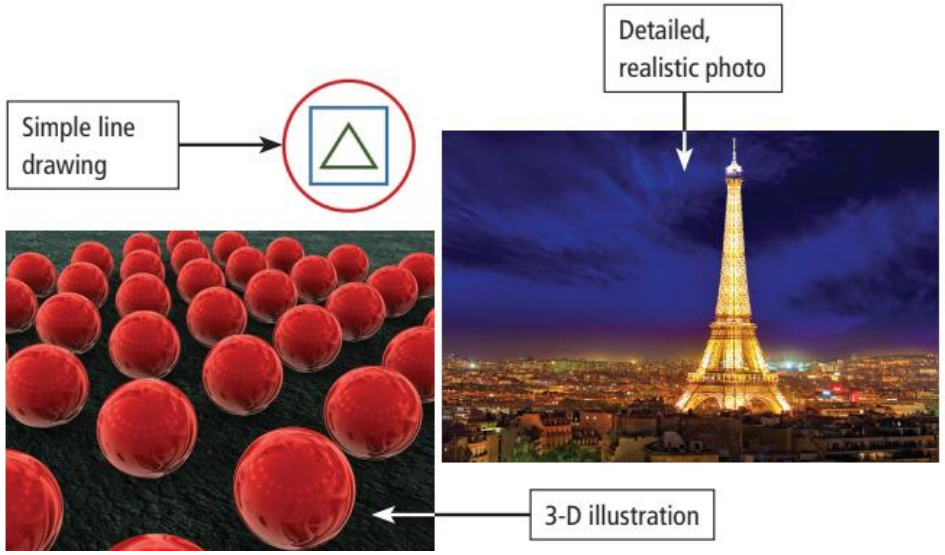


Figure 4-21 Digital graphics.

Graphics and Media Applications (3 of 16)

How Computers Represent Images and Sounds

- Cameras, musical instruments, and video projectors are **analog devices.**
- Computers are **digital devices**.
- A digital recorder turns the sound into numbers representing tones and then generates an electronic signal of numbers.

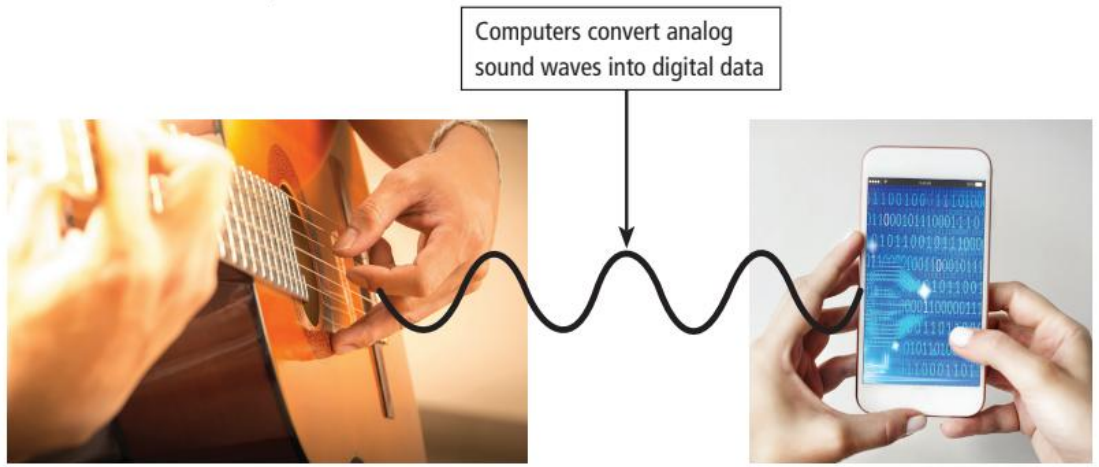


Figure 4-22 Converting analog data into digital data.

Graphics and Media Applications (4 of 16)

- Converting analog data to digital data is also called digitizing the data, which is the process of changing the data into a form that computers and other digital devices can use.
- A process called sampling converts the analog sound waves into digital sound.

Figure 4-23 Sampling sound.

Graphics and Media Applications (5 of 16)

Digital Graphics

- Digital graphics fall into two main types:
  - ✓ **Bitmap graphics** (raster graphics) assign colors to the smallest picture elements, called **pixels.**
  - ✓ **Vector graphics** consist of shapes, curves, lines, and text created by mathematical formulas.
- **Bitmaps** can be created and edited using graphics apps, such as Adobe Photoshop and Windows Paint.
- Bitmap-editing programs are painting programs.
- Adobe Illustrator is used for creating and editing **vector** images.

Graphics and Media Applications (6 of 16)

Resolution and Compression

- **Resolution** refers to the clarity or sharpness of an image: the higher the resolution, the sharper the image and the larger the file size.
- On a digital camera, resolution is typically measured in **megapixels, or millions of pixels.**
- **High-resolution** photos and other complicated graphics can be difficult to copy, download, or send as email attachments.
- **Compression** makes digital media files smaller by reducing the amount of data in the files.
- Some types of bitmap graphics (JPEG files) use **lossy compression,** and other types of media files (TIF, PNG, and GIF) can be compressed using **lossless compression.**

Graphics and Media Applications (7 of 16)

Table 4-8 Common graphics file formats.

Graphic File Format	File Extension	Best Use/notes
Bitmap Graphics		
GIF	.gif (Graphics Interchange Format)	Simple web graphics and short web animations Format is limited to 256 colors; supports transparency; small file size makes it good for websites
JPEG	.jpeg or .jpg (Joint Photographic Experts Group)	Photos on the web, high-quality photos and printed graphics Large file sizes are better suited for print than web use Images have rich colors but discard some data to reduce file size, which can affect quality
PNG	.png (Portable Network Graphics)	Logos, icons, and illustrations Images have good quality even when highly compressed; supports 16 million colors; better quality and smaller file size than GIF
TIF	.tif or .tiff (Tagged Image File Format)	High-quality photos and printed graphics Large file sizes are better suited for print than web use
Vector Graphics		
EPS	.eps (Encapsulated PostScript)	Logos and other illustrations that are frequently resized A standard format for exporting vector graphics without data loss
SVG	.svg (Scalable Vector Graphics)	Illustrations on the web Developed by the World Wide Web Consortium (W3C); allows interactivity and animation

Graphics and Media Applications (8 of 16)

Table 4-9 Common audio file formats.

Graphic File Format	File Extension	Compression	Notes
AAC and M4P	.aac and .m4p	Lossy	Apple uses these formats for iTunes downloads
AIFF (Audio Interchange File Format)	.aiff or .aif	None	Files are large; good to excellent sound quality
MP3	.mp3	Lossy	Common format for music and audio books; most digital audio devices can play MP3 files
WAVE or WAV (Waveform Audio)	.wav	None	Files are large; good to excellent sound quality
WMA (Windows Media Audio)	.wma	Lossless	Played using windows media player; also copy-protected

Graphics and Media Applications (9 of 16)

- Many smartphones have built-in sound recording tools, including microphones.
- A **sound card**, which is a circuit board that computers use to process sound.
- Speakers play sound and can be built-in or attached as peripheral hardware to your device, either by a cable or wirelessly.

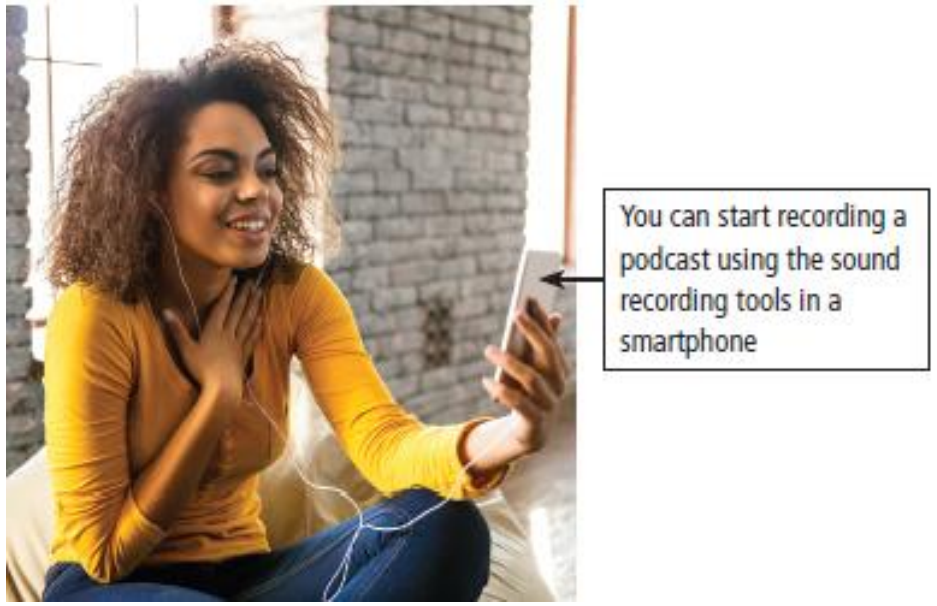


Figure 4-24 Recording sound.

Graphics and Media Applications (10 of 16)

- **Synthesized music** is created as a digital file from the start using electronic instruments called synthesizers, or synths, for short.
- To play a **synthesizer**, you press a key on the keyboard, generating an electrical current that becomes sound
- Musicians play **synthesizers**, which look like piano keyboards, to mimic sounds from acoustic or electric instruments or to produce unusual sounds that other instruments cannot generate.

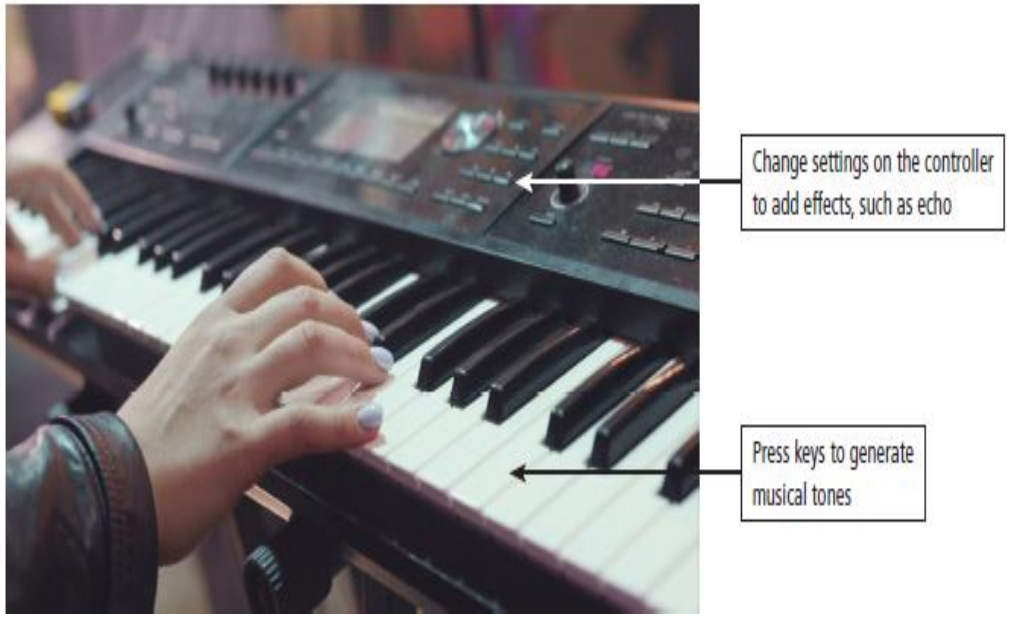


Figure 4-25 Musician playing a synthesizer.

Graphics and Media Applications (11 of 16)

- **Voice recognition** software is used as a security measure to allow access to only authorized people the software recognizes by voice.
- As speech recognition software translates spoken words into text a computing device can understand, a **text-to-speech app** or **read-aloud technology,** does the opposite.
- **Text-to-speech app** breaks words into individual sound units called phonemes and then strings them together to create words and phrases, or **synthesized speech.**
- A video that is shared millions of times over social media in a short period is called a **viral video.**
- Digital video files have two parts:
  - ✓ A **codec** encodes and usually compresses data for storage and then decompresses the data for playback.
  - ✓ A **container which** bundles the video, audio, codec, and other parts into a single package.

Graphics and Media Applications (12 of 16)

- **Video file formats** are one way to describe a video file.
- **Resolution** is another format.
- 720p, HD, or 4K, given as descriptions of videos refer to **resolution**.
- **Digital video resolution** is given as width × height.
- **Video resolutions** can be organized into three categories:
  - ✓ Standard Definition (SD): Resolutions of 640 × 360 and 720 × 480
  - ✓ High Definition (HD): Resolutions of 1280 × 720 and 1920 × 1080 (Full HD)
  - ✓ Ultra High Definition (UHD): The 4K standard provides a resolution of 3840 × 2160, while the 8K standard provides a resolution of 7840 × 4320

Graphics and Media Applications (13 of 16)

Digital Animation

- A **web page** with moving objects is an example of animation.
- **Simulations** are sophisticated computer animations that are useful for training and teaching in many fields, particularly in areas in which learning can be dangerous or difficult.

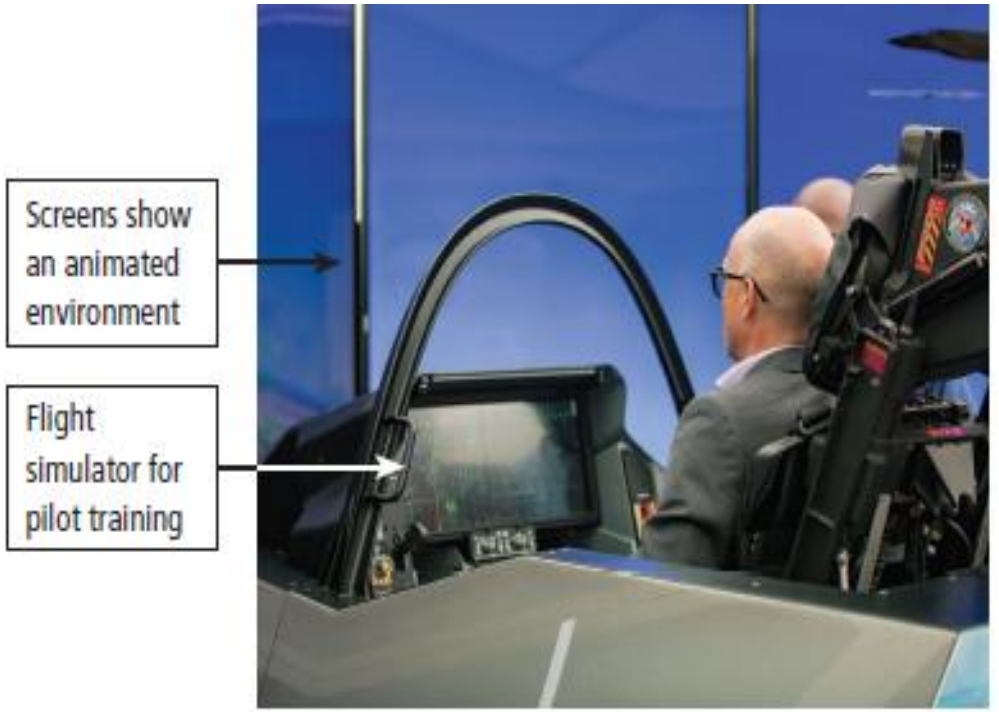


Figure 4-27 Using animation and simulations in training.

Graphics and Media Applications (14 of 16)

Animation in Entertainment

- The most popular uses of **3-D animation** are in ads, films, and computer games.

Ways to Create a Solid 3-D Image

- Apply highlights and shadows to a **wireframe drawing** (a 3-D object composed of individual lines) in a process called **rendering**.
- **Stop motion animation**, in which animators move real-life objects through a sequence of poses and capture the movements one frame at a time.

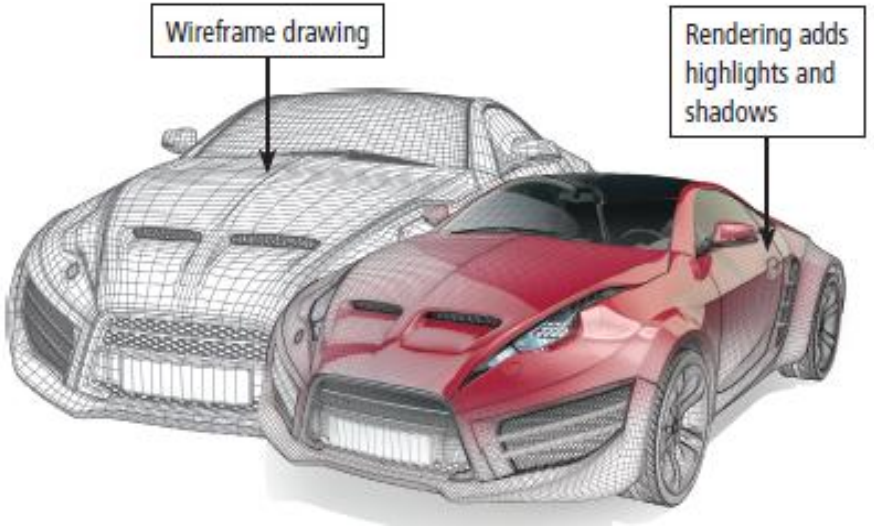


Figure 4-30 3-D rendering.

Graphics and Media Applications (15 of 16)

Digital Media Creation and Editing Apps

- **Graphics apps** can be used to create, view, manipulate, and print digital images such as photos, drawings, clip art, and diagrams.
- **Image-editing apps** help to modify existing images.
- **Drawing apps** help to create simple vector images.
- In some programs, you layer graphics to create **collages**.
- **Advanced programs** can be used to create sketches, logos, typography, and complex illustrations for web or print use.
- **Photo editing apps** can be used to enhance and retouch photographs.

Graphics and Media Applications (16 of 16)

Capture Videos

- Videos can be captured using a smartphone or digital video camera, and then played back on a computing device or post it on a video-sharing website.
- **Digital video camera, camcorder,** tablet, or smartphone can be used to capture full-motion images and store them in a file on the camera or phone.
- Action camcorders are compact, waterproof, and weather-resistant.

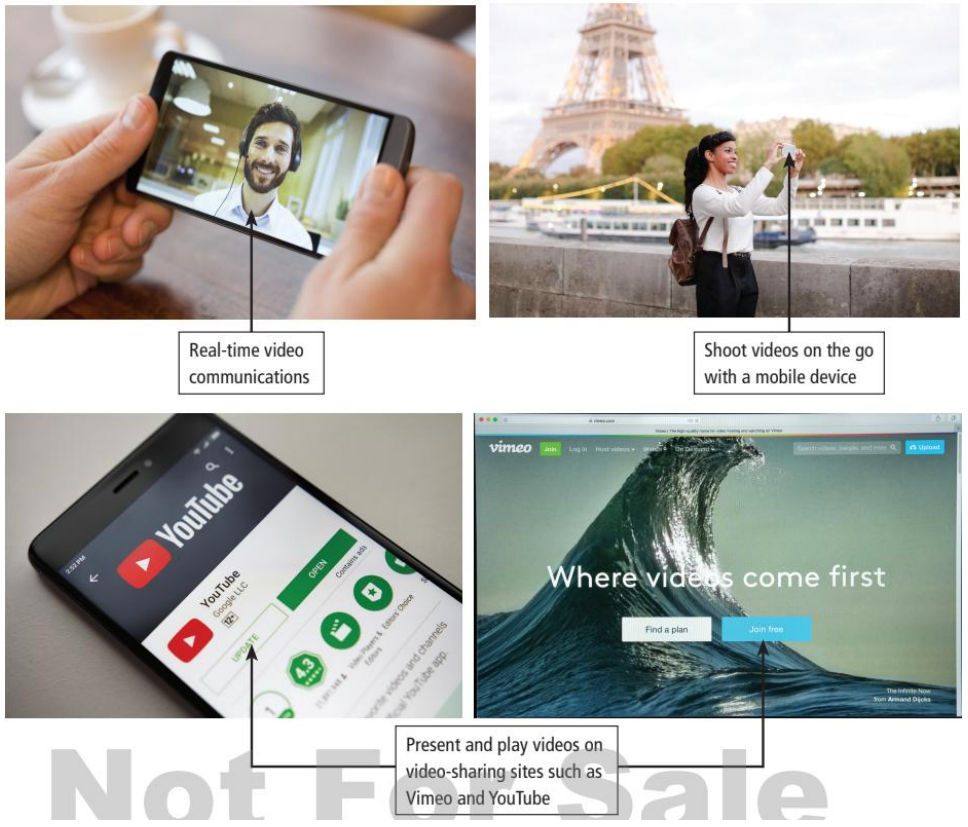


Figure 4-31 Uses for digital video.

Digital Media on the Web (1 of 1)

- **Streaming the media** means receiving the audio or video content on your computer from a server and then watching or listening to the media as it arrives.
- For **on-demand content,** such as **television shows**, the original media file is stored on the media distributor's server.
- With **live video streaming,** often used for sports events, the content is sent out live, as it happens, and is available only once.
- **Smart TVs** connect to a Wi-Fi network and let you view Internet content, including television shows, movies, games, and photos.
- **Streaming video** is more convenient and less expensive than traditional cable and satellite television content.
- Streaming **digital audio** in the form of audio books, using sites such as Audible, and as audio podcasts, may include news stories, music, lectures, or radio shows.

Virtual and Augmented Reality and Artificial Intelligence (1 of 7)

- **Virtual reality (VR)**, a computer-simulated, 3-D environment that you can explore and manipulate, attempts to remove the barrier between the viewer and the media.
- **Augmented reality (AR)** apps overlay information and digital content on top of physical objects or locations.
- In a virtual world, a 3-D computer model creates a convincing illusion of depth and space to make you feel you are part of a real scene you can explore.

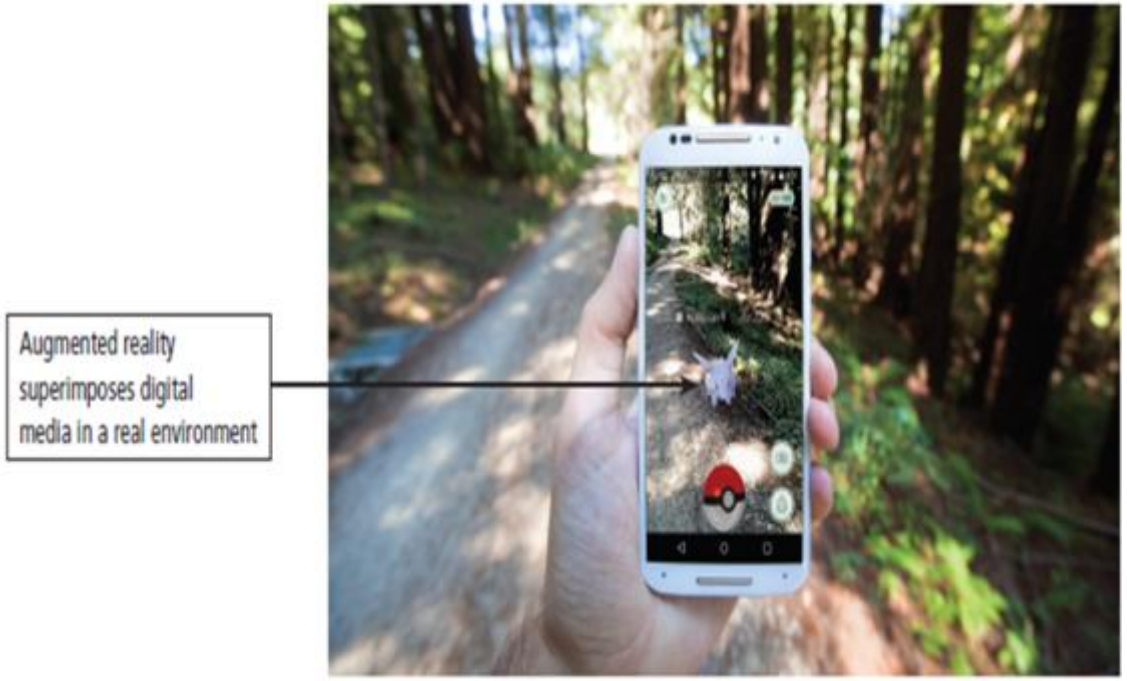


Figure 4-34 AR game Pokemon Go on a smartphone.

Virtual and Augmented Reality and Artificial Intelligence (2 of 7)

AR and VR in Gaming

- Today's video games use high-end graphics, powerful processors, and the Internet to create environments.
- These systems use handheld controllers as input devices, speakers and a television screen or computer monitor as output devices, a hard drive and memory cards or optical discs for storage.

Figure 4-35 Gaming system.

Virtual and Augmented Reality and Artificial Intelligence (3 of 7)

- A **VR gaming system** can be set up using hardware.
- These systems run on customized desktops and include a headset, controllers, and sensors to track the movements.
- Augmented reality gaming integrates visual and audio game content with your environment.

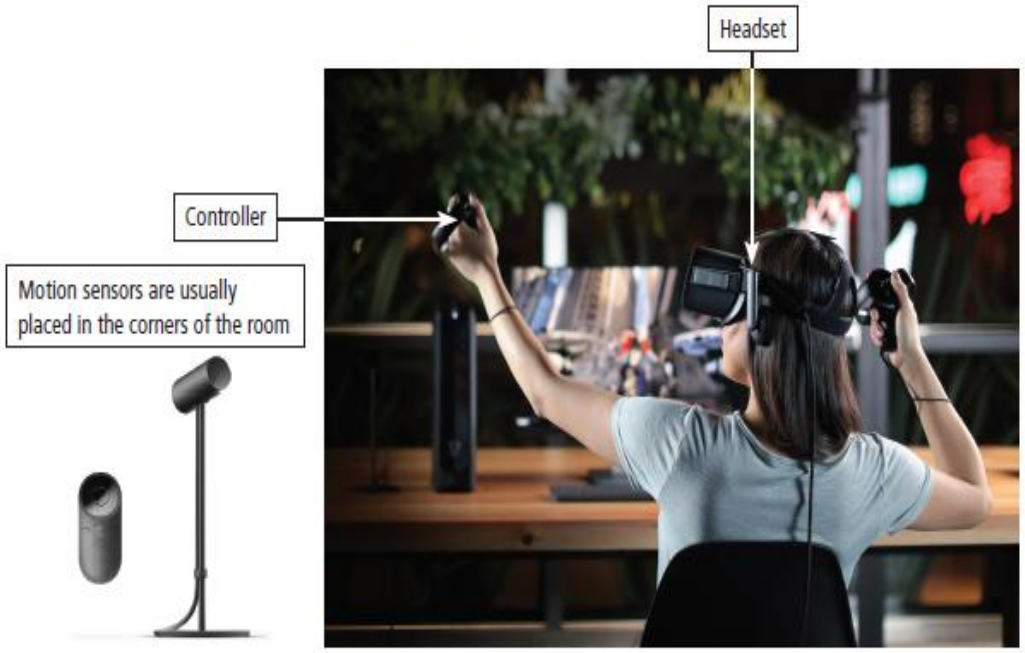


Figure 4-36 VR gaming system.

Virtual and Augmented Reality and Artificial Intelligence (4 of 7)

- Microsoft offers the HoloLens headsets, which use **holograms,** projected images that appear three-dimensional.
- **Motion-sensing game consoles** allow you to interact with the system through body movements.
- Physical therapists use these consoles along with virtual reality gaming techniques to challenge and motivate patients undergoing rehabilitation.

Figure 4-37 Using a motion-sensing game console.

Virtual and Augmented Reality and Artificial Intelligence (5 of 7)

- **Artificial intelligence (AI)** is the technological use of logic and prior experience to simulate human intelligence.
- **Machine learning** is a branch of AI that trains machines to learn from data, identify patterns, and make decisions to progressively improve their performance without much human intervention.
- Some of the practical uses of AI include strategic gaming, military simulations, statistical predictions, and self-driving cars.
- Navigation apps, which provide you with information about traffic and the best routes, along with preferred stops along your way.
- Security, such as using your fingerprint to access your phone, or facial recognition and motion-detection cameras that alert you to unusual or unauthorized visitors.

Virtual and Augmented Reality and Artificial Intelligence (6 of 7)

- **Natural language processing** is a form of data input in which computers interpret and digitize spoken words or commands.
- **Digital assistants** use natural language processing to respond to verbal commands or questions, using search technology to provide answers or perform a task.

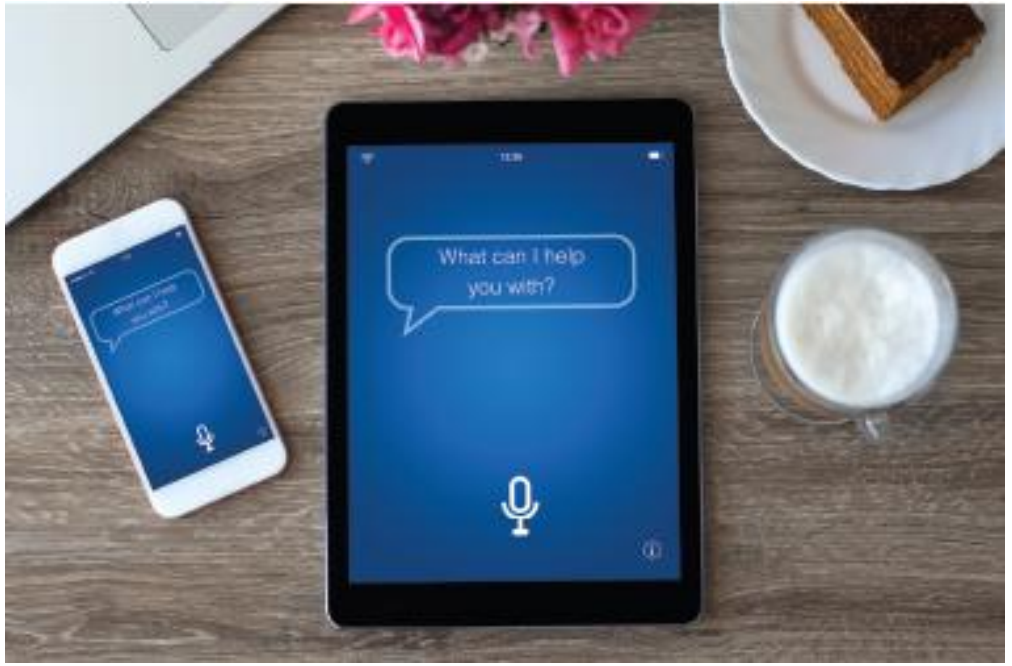


Figure 4-38 Smart devices provide you with assistance.

Virtual and Augmented Reality and Artificial Intelligence (7 of 7)

- **Robotics** is the science that combines engineering and technology to create and program robots.
- A robotic arm or instrument can be more precise, flexible, and controlled than a human hand.
- Robotic surgeries often take less time to heal and can prevent risk of infection as they require a smaller incision site.

Figure 4-39 Robot used to detect weeds and spray chemicals.

Personal Interest Applications (1 of 1)

Countless desktop, mobile, and web apps are designed specifically. Some applications focus on a single service, while others provide several services in a single application, including:

- Lifestyle applications
- Medical applications
- Entertainment applications
- Convenience applications
- Education applications
- Financial applications

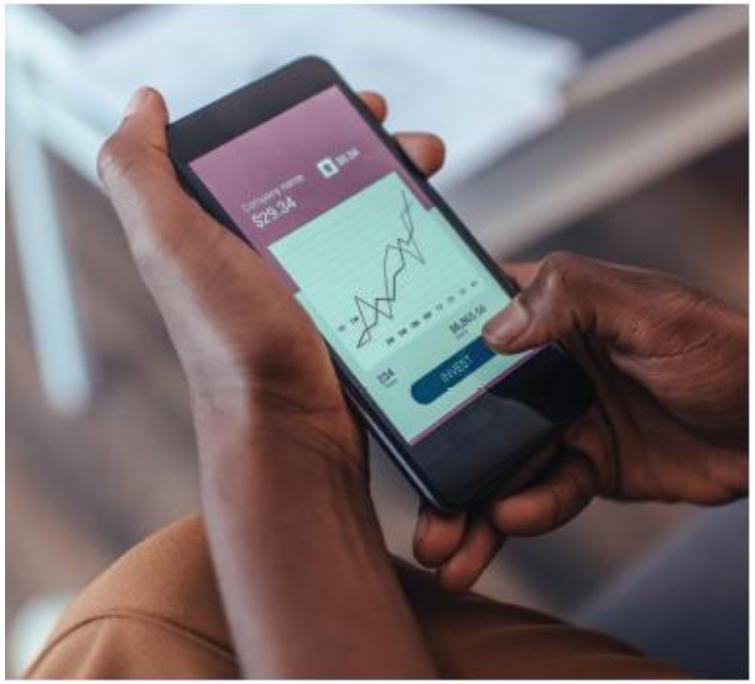


Figure 4-40 Using a financial app.

Secure IT: Security Tools (1 of 5)

- To protect your computer and mobile devices against malware, you can use one or more **security tools**.
- These security tools include personal **firewalls, antivirus programs, malware removers, and Internet filters.**
- A **firewall** is a protective barrier between a computer or network and others on the Internet.
- A **personal firewall** is a security tool that detects and protects a personal computer and its data from unauthorized intrusions.
- An **antivirus app** protects a computer against viruses by identifying and removing any computer viruses found in memory, on storage media, or on incoming files.

Secure IT: Security Tools (2 of 5)

Spyware, Adware, and Other Malware Removers

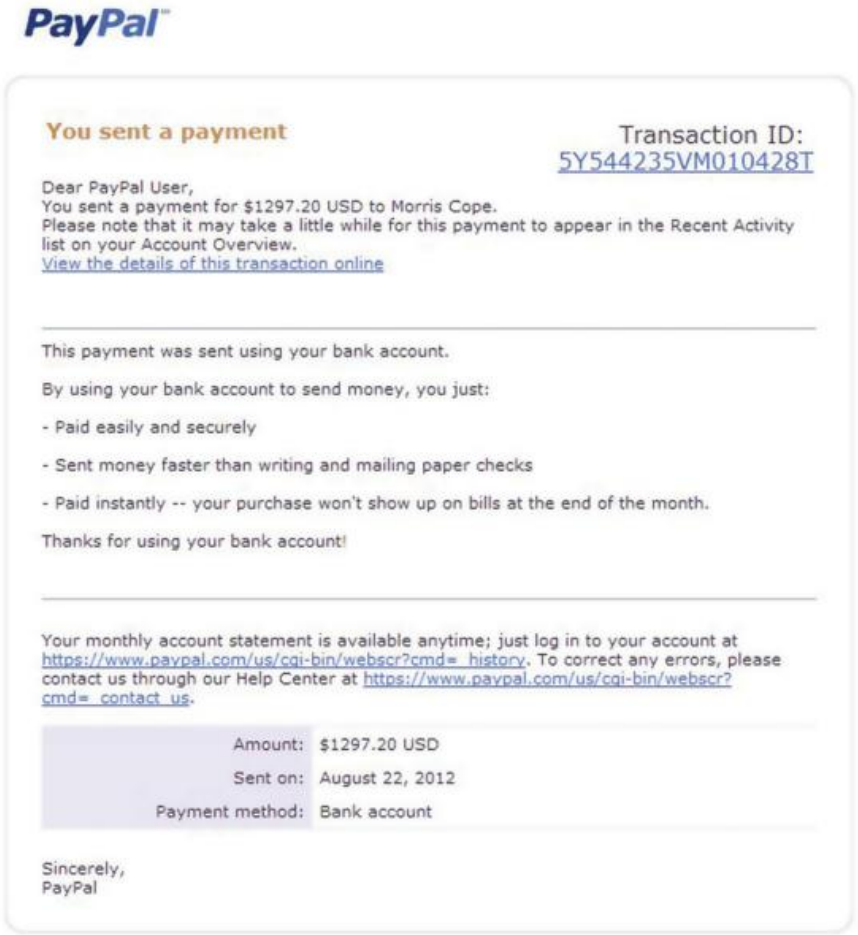
- **Spyware** is a type of program placed on a computer or mobile device without the user's knowledge that secretly collects information about the user. It can enter your computer when you install a new program, through a graphic on a web page or in an email message, or malware.
- **Adware is a type of program that displays an online** advertisement in a banner or pop-up or pop-under window on web pages, email messages, or other Internet services. An **adware remover** is a program that detects and deletes adware
- A **spyware remover** is a type of program that detects and deletes spyware and similar programs.
- **Malware removers** detect and delete spyware, adware, and other malware.

Secure IT: Security Tools (3 of 5)

- If an **antivirus program** identifies an infected file, it attempts to remove the malware.
- If the **antivirus program** cannot remove the infection, it often quarantines the infected file.
- A **quarantine** is a separate area of a hard drive that holds the infected file until the infection can be removed.
- **Quarantined files** remain on a computer or mobile device until the user deletes them or restores them.
- **Filters** are programs that remove or block certain items from being displayed.
- Five widely used Internet filters are **anti-spam programs**, **web filters**, **phishing filters**, **pop-up** and **pop-under blockers**, and **ransomware** apps.

Secure IT: Security Tools (4 of 5)

- **Web filtering software** is a program that restricts access to certain material on the web.
- **Phishing** is a scam in which a perpetrator sends an official-looking email message that attempts to obtain your personal and/or financial information.
- Some browsers include phishing filters.
- A **pop-up blocker** or pop-under blocker is a filtering program that stops pop-up or pop-under ads from displaying on web pages.



PayPal

You sent a payment

Transaction ID: 5Y544235VM010428T

Dear PayPal User,
You sent a payment for $1297.20 USD to Morris Cope.
Please note that it may take a little while for this payment to appear in the Recent Activity list on your Account Overview.
View the details of this transaction online

This payment was sent using your bank account.

By using your bank account to send money, you just:

- Paid easily and securely

- Sent money faster than writing and mailing paper checks

- Paid instantly -- your purchase won't show up on bills at the end of the month.

Thanks for using your bank account!

Your monthly account statement is available anytime; just log in to your account at https://www.paypal.com/us/cgi-bin/webscr?cmd=_history. To correct any errors, please contact us through our Help Center at https://www.paypal.com/us/cgi-bin/webscr?cmd=_contact_us.

Amount:	$1297.20 USD
Sent on:	August 22, 2012
Payment method:	Bank account

Sincerely,
PayPal

Figure 4-41 Phishing email message.

Secure IT: Security Tools (5 of 5)

- **Ransomware** is a type of attack that affects your files and personal data. Some attacks encrypt your data and files or otherwise restrict access.
- Some ransomware threatens to publish your personal data, or in the case of a corporation, sensitive company files, unless a payment is made.

Figure 4-42 Ransomware attacks affect your data and files until you pay.

How To: Use System Management Tools (4 of 5)

- A **crash** occurs when the program or app stops functioning correctly. This can be caused by an issue with the hardware, the software, a virus or other malware, or using invalid data or commands.
- **Troubleshooting** refers to the steps you take to identify and solve a problem, such as a crash.
- Patch finders compare the software versions. Restorers allow you to restore.
- File managers perform functions such as displaying a list of files on a storage medium; organizing files in folders; and copying, renaming, deleting, moving, and sorting files.
- Search tools allow you to locate a file, contact, calendar event, app, or any other item stored on your computer or mobile device.