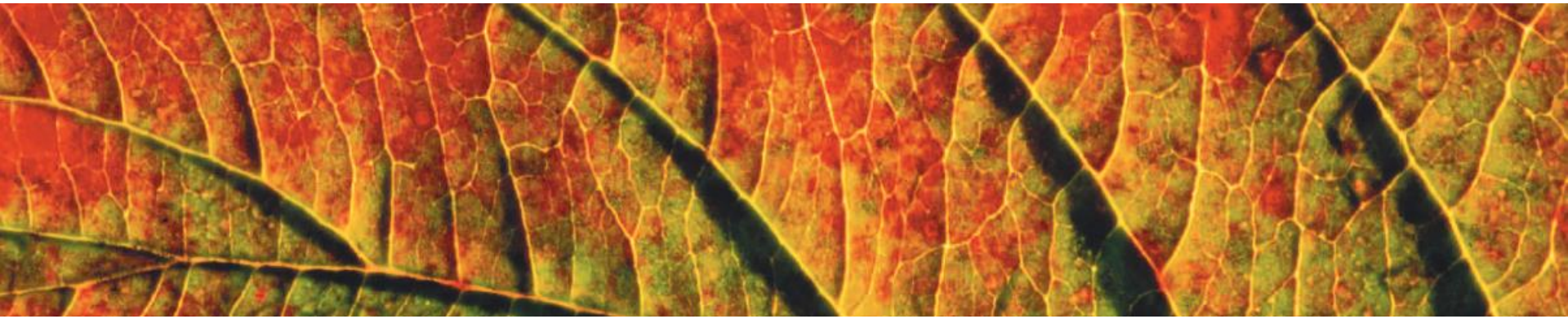
Essential Computer Concepts

Microsoft® Office 2010



Objectives

- Compare the types of computers
- Describe the components of a computer system
- Examine data representation and the ASCII code
- Learn about processing hardware
- Define memory and storage
- Describe input and output peripheral devices

Objectives

- Identify the hardware and software that are used for data communications and to establish a network connection
- Explain how Internet access, email, and the World Wide Web affect the use of computers
- Describe potential security threats to computers and protection methods
- Discuss the types of system software and their functions
- Identify popular application software
- Learn about cloud computing

Computer Advertisement

The motherboard and the microprocessor, the hard disk, and the cards that expand the capabilities of the motherboard are inside the **tower** in a desktop computer.

The **monitor** is the device that displays the output from a computer.

The **keyboard** is the most frequently used input device.

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This desktop PC is powerful enough to meet your most demanding computing needs.

The technical details about each component are called **specifications**.

Specifications:

Processor:	Intel Pentium Dual-Core 2.93GHz
Memory:	2 GB DDR2 SDRAM (expandable to 8 GB)
Hard drive:	1 TB SATA II
DVD:	16x DVD +/-RW drive
Operating system:	Microsoft Windows 7 Home Premium 32-bit
Monitor:	MicroPlus 17-inch LCD monitor with built-in speakers
Video:	NVIDIA 512 MB GDDR3 SDRAM
Keyboard:	MicroPlus ergonomic keyboard
Mouse:	Optical wheel mouse
Sound:	Sound Blaster X-Fi sound card
Speakers:	Built into monitor
Expansion slots:	4 PCI expansion slots
USB ports:	6 USB ports
Controller:	Integrated Serial ATA controller
Network card:	Integrated 10/100 Ethernet
Installed software:	Microsoft Office Home and Student 2010 and 30-day trial of Norton Antivirus
Printer (not shown):	MicroPlus PhotoPlus color inket printer and scanner

The **processor** is responsible for executing instructions to process data.

RAM temporarily holds programs and data while the computer is on.

A hard disk drive and DVD are storage media used for storing files permanently.

An **operating system** is special software that controls instructions and data and how results are displayed, allocates system resources, manages storage space, maintains security, and detects equipment failure.

What Is a Computer?

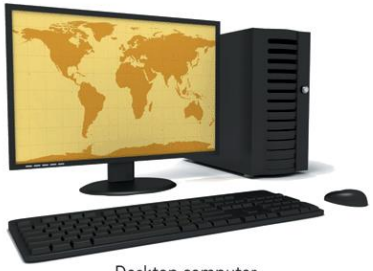
- A **computer** is an electronic device that accepts information and instructions from a user, manipulates the information according to the instructions, displays the information in some way, and stores the information for retrieval later

Types of Computers

- Desktop computers
- Notebook (laptop) computers
- Tablet PCs
- Subnotebook computers
- Netbooks
- Slate computers
- Handheld computers
- Smartphones
- MP3 players
- Mainframe computers
- Supercomputers

Types of Computers

Personal computers



Desktop computer

Laptop computer

Tablet PC

Netbook

Smartphone

Supercomputer

Computer Systems

- Includes computer hardware and software
  - **Hardware** refers to the physical components of a computer
  - **Software** refers to the intangible components of a computer system, particularly the **programs**, or lists of instructions, the computer needs to perform a specific task
- The design and construction of the hardware of a particular computer is referred to as its **architecture** or **configuration**
- The technical details about each component are called specifications

Data Representation

- **Data** refers to the words, numbers, figures, sounds, and graphics that describe people, events, things, and ideas
- **Binary digits** (**bits**)
- A series of eight bits is called a **byte**
  - **Kilobyte** (**KB** or **K**)
  - **Megabyte** (**MB**)
  - **Gigabyte** (**GB**)
  - **Terabyte** (**TB**)
- **ASCII**
  - **American Standard Code for Information Interchange**

Data Representation

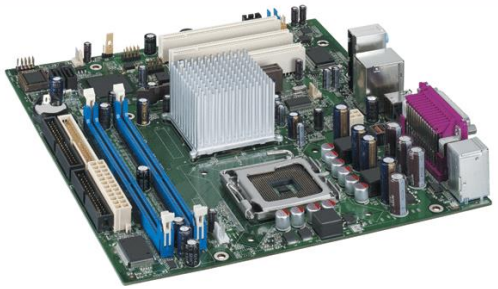
Figure 5 Sample ASCII code representing letters and symbols

Character	ASCII Code	Binary Number
(space)	32	00100000
$	36	00100100
A	65	01000001
B	66	01000010
a	97	01100001
b	98	01100010
?	129	10000001
£	163	10100011
®	217	11011001
é	233	11101001

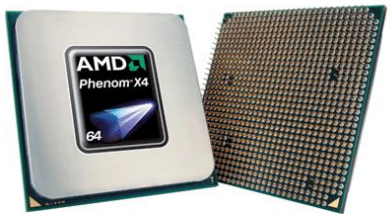
Processing Hardware

- The **motherboard** is the main electronic component of the computer
  - **Circuit board**
- The **microprocessor** is one of the most important pieces of processing hardware on the motherboard
- **Cards** are removable circuit boards

Motherboard



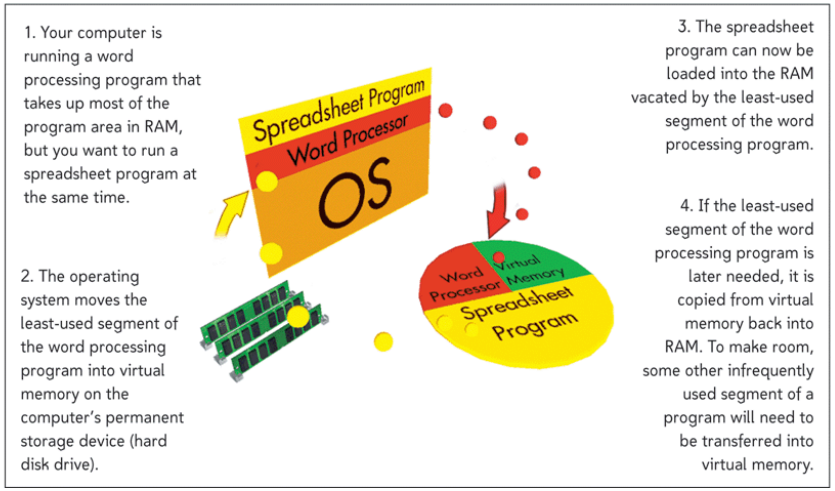
Microprocessor (front and back views)



Memory

- **Random access memory (RAM)**
  - **Volatile memory**
  - **SDRAM**
- **Cache memory (RAM cache or CPU cache)**
- **Virtual memory**

Figure 8 How virtual memory works



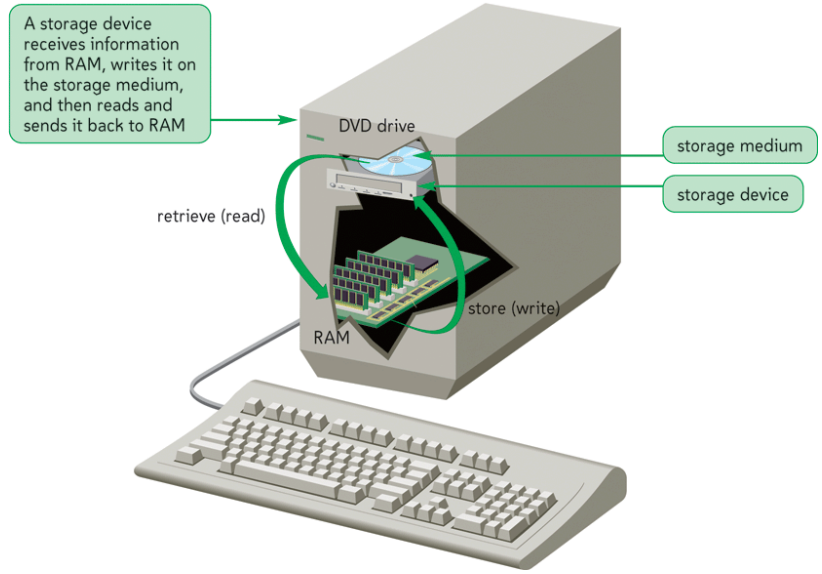
Memory

- Read-only memory (ROM)
  - BIOS
  - Boot process
  - Nonvolatile memory
- Complementary metal oxide semiconductor memory (CMOS)
- Semipermanent memory

Storage Media

- A computer **file** is a named collection of stored data
- An **executable file** contains the instructions that tell a computer how to perform a specific task
- A **data file** is created by a user

Figure 9 Storage and RAM



Storage Media

- Magnetic storage media
  - A hard disk contains several magnetic oxide-covered metal platters that are usually sealed in a case inside the computer

Figure 10 Storing data on magnetic media

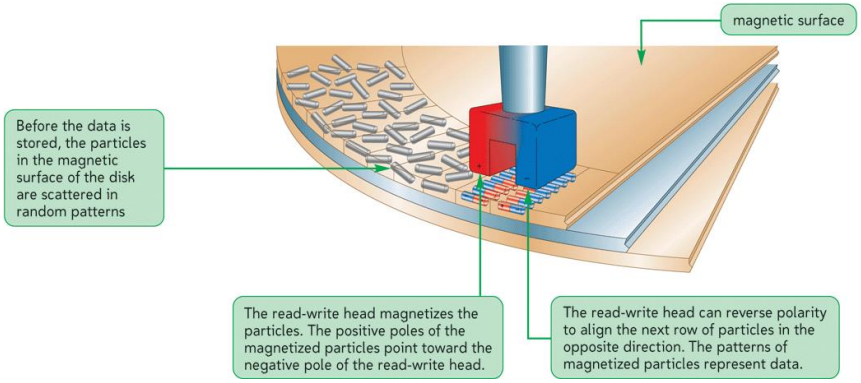
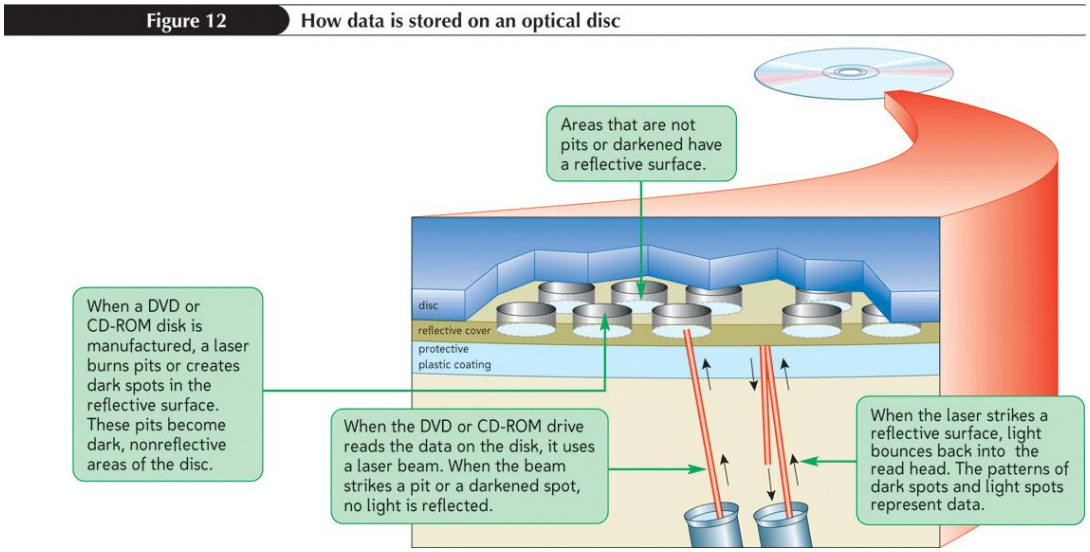


Figure 11 Inside a hard disk drive

Storage Media

- Optical storage device
  - CD
  - DVD
  - CD-R
  - CD-RW
  - CD-ROM
  - DVD-R
  - DVD+R
  - DVD-RW
  - DVD+RW
  - BD-RE



Storage Media

- Flash memory
  - Solid state storage
  - Flash memory cards
  - USB flash storage device
    - USB flash drive

Figure 13 Flash memory card

Figure 14 USB flash storage device

Input and Output

- The data or instructions you type into the computer are called **input**
- The result of the computer processing your input is referred to as **output**
- **Peripheral devices** accomplish input and output functions

Input Devices

- You use an **input device**, such as a keyboard or a mouse, to input data and issue commands
  - Keyboard
    - **Ergonomic**
  - **Pointing device**
    - Controls the **pointer**
    - Mouse
      - **Scroll wheel**
    - **Trackball**
    - **Touchpad**
    - **Pointing stick**
  - **Touchscreen**
  - **Scanner**

Output Devices

- **Output devices** show you the results of processing data
  - Monitor
    - **Flat panel**
    - **LCD**
    - **LED**
  - Printer
    - **Laser**
    - **Inkjet**
    - **Dot matrix**

Figure 18 LCD monitor

Figure 19 Printers

Laser printer

Inkjet printer

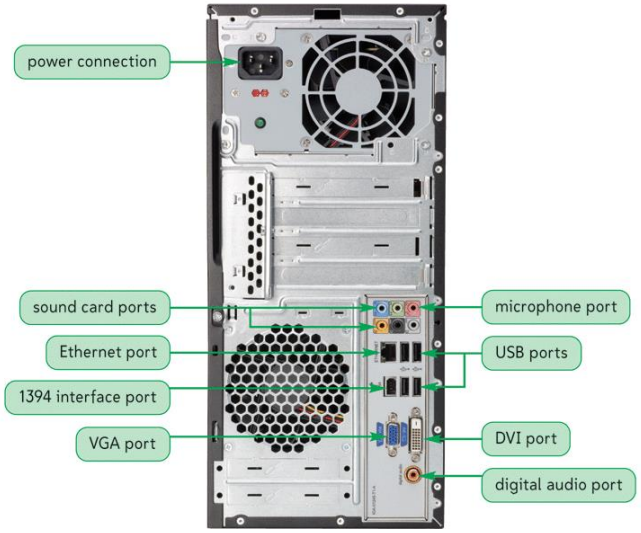
Data Communications

- The transmission of text, numeric, voice, or video data from one computer to another or to a peripheral device is called **data communications**
  - **Sender** and **receiver**
  - **Channel**
  - **Protocol**
  - **Device driver** (**driver**)

Data Bus

- This path between the microprocessor, RAM, and peripherals is called the **data bus**
- **Controller card**
- **Expansion card**
- **Expansion slot**

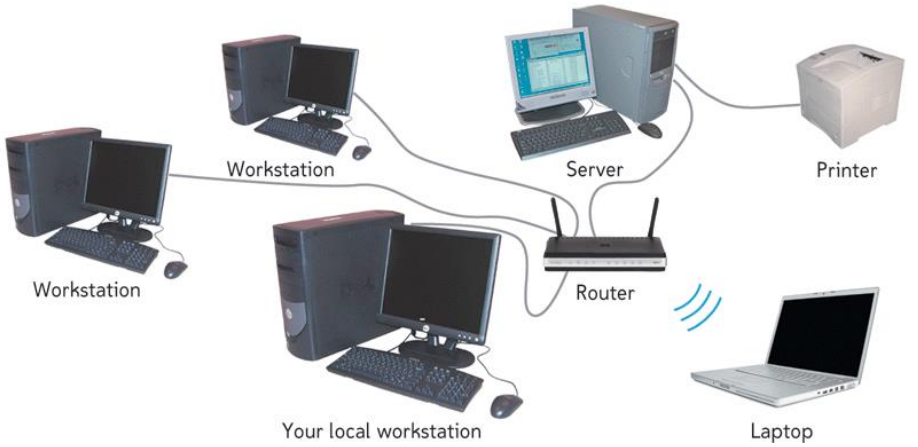
Figure 20 Computer expansion ports



Networks

- A **network** connects one computer to other computers and peripheral devices, enabling you to share data and resources with others
- **Network interface card** (**NIC**)
- **LAN**
- **WAN**
- **WLAN**
- **PAN**
- **WiMax**

Figure 22 Typical network configuration



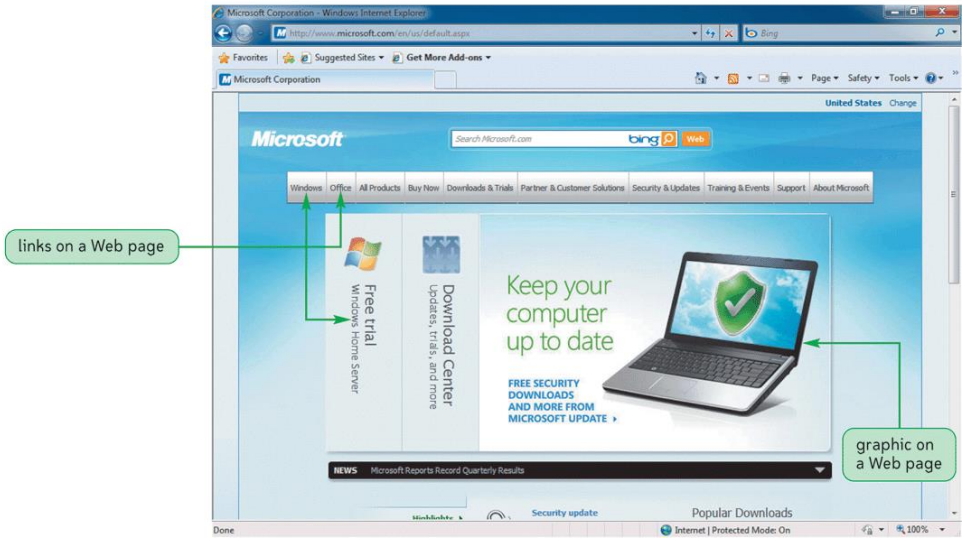
Telecommunications

- **Telecommunications** means communicating over a comparatively long distance using a phone line or some other data conduit
  - Modem
    - **Digital** and **analog signals**
  - **DSL**
  - **Broadband connections**

The Internet

- The **Internet** is the largest network in the world, connecting millions of people
  - **Email**
  - **World Wide Web**
    - **Web page**
    - **Web site**

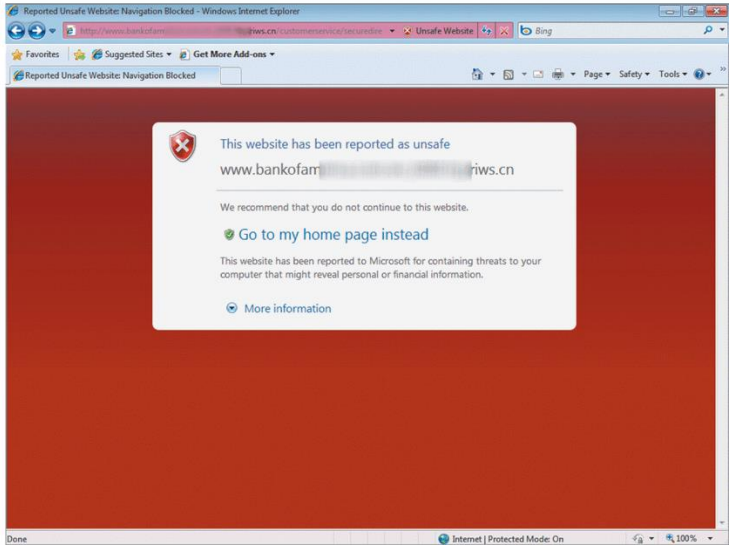
Figure 23 Web page on the World Wide Web



Security Threats on Your Computer

- **Security** refers to the steps a computer owner takes to prevent unauthorized use of or damage to the computer
  - **Malware**
    - **Viruses**
      - **Antivirus software**
    - **Spyware**
    - **Adware**
- **Firewall**
- **Spoofed** site
- **Phishing**
- **Pharming**

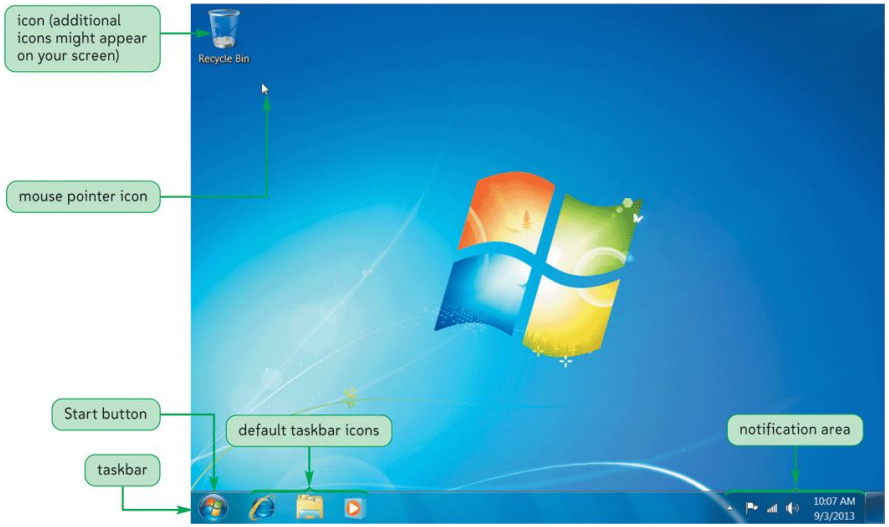
Figure 25 The Internet Explorer browser when a known spoofed site is visited



System Software

- **System software** helps the computer carry out its basic operating tasks
  - Operating system
    - **System resource**
    - **Multitasking**
  - **Utilities**
  - **Programming Languages**

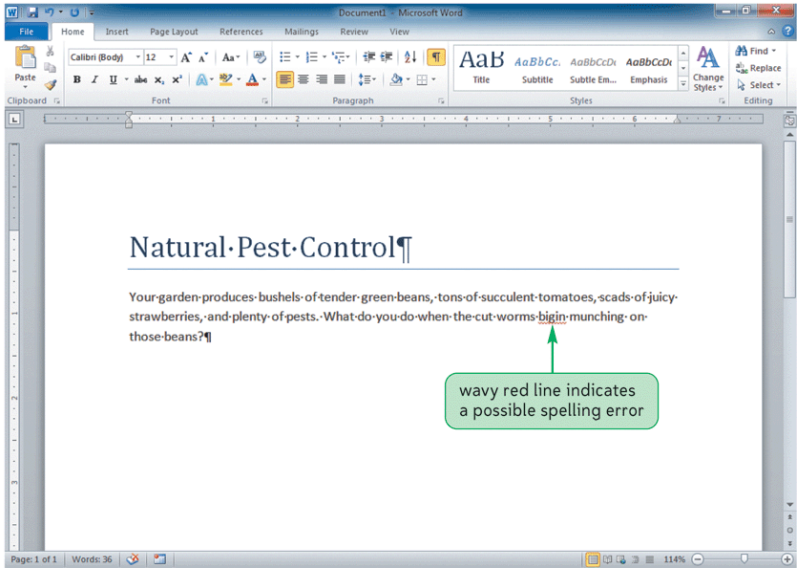
Figure 26 Windows 7 starting screen



Application Software

- **Application software** enables you to perform specific computer tasks, such as document production, spreadsheet calculations, and database management
  - **Document production software**

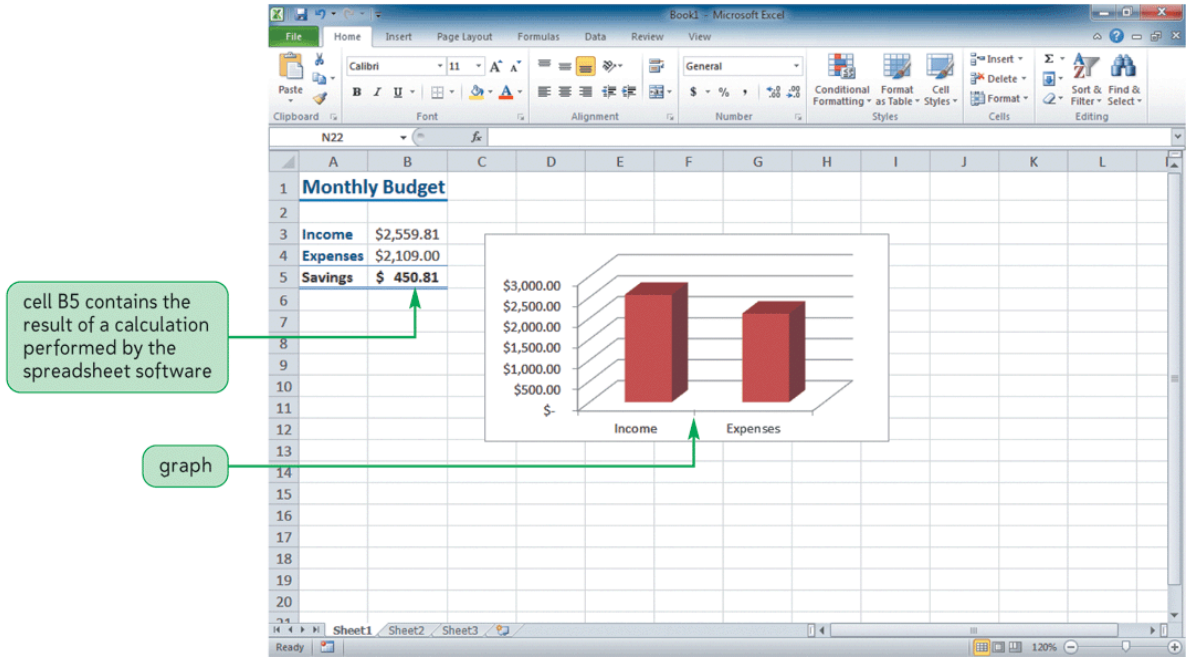
Figure 27 Checking the spelling in a document



Application Software

- Web site creation and management software
- Spreadsheet software
- Database management software

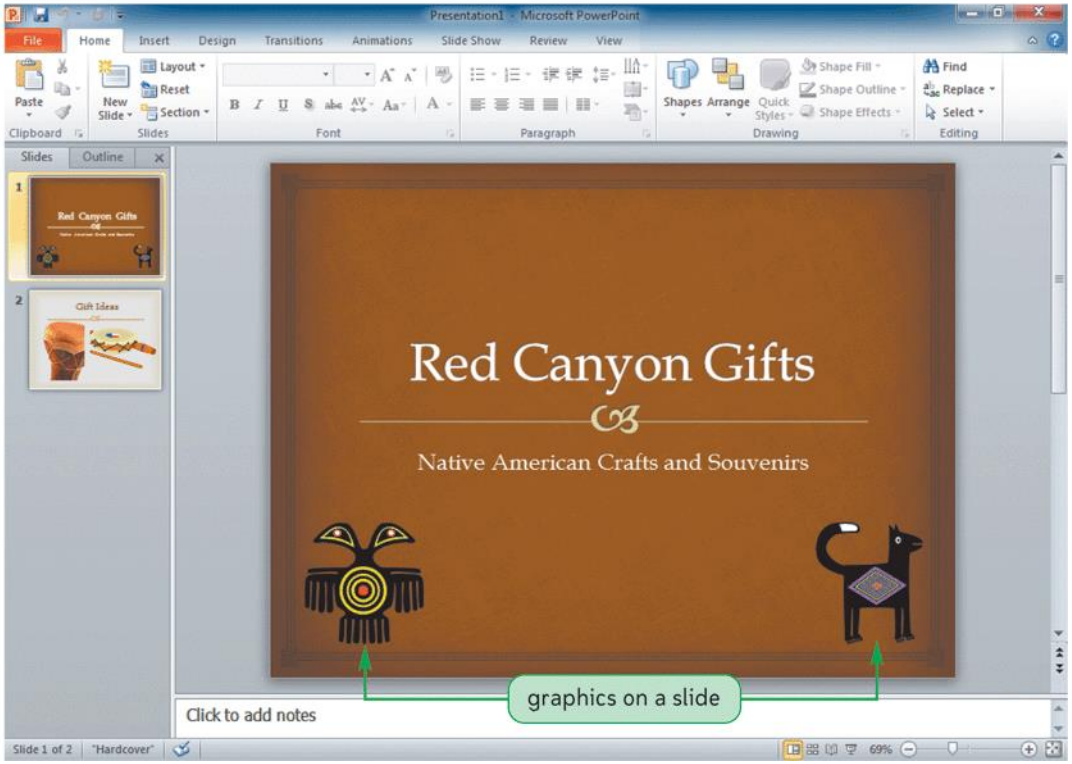
Figure 28 Typical worksheet with numerical data and a graph



Application Software

- **Presentation software**

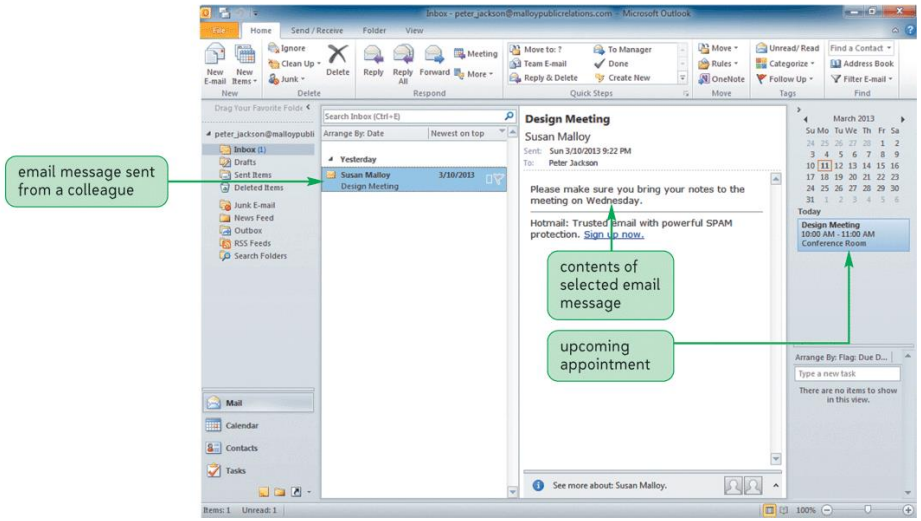
Figure 29 Slide in Microsoft PowerPoint 2010



Application Software

- Photo editing software
- Video editing software
- Multimedia authoring software
- Accounting software
- Information management software

Figure 30 Microsoft Outlook 2010 program window



Computing in the Cloud

- **Cloud computing** means that data, applications, and even resources are stored on servers accessed over the Internet rather than on users' computers, and you access only what you need when you need it
  - Windows Live SkyDrive

Figure 31 Windows Live Skydrive