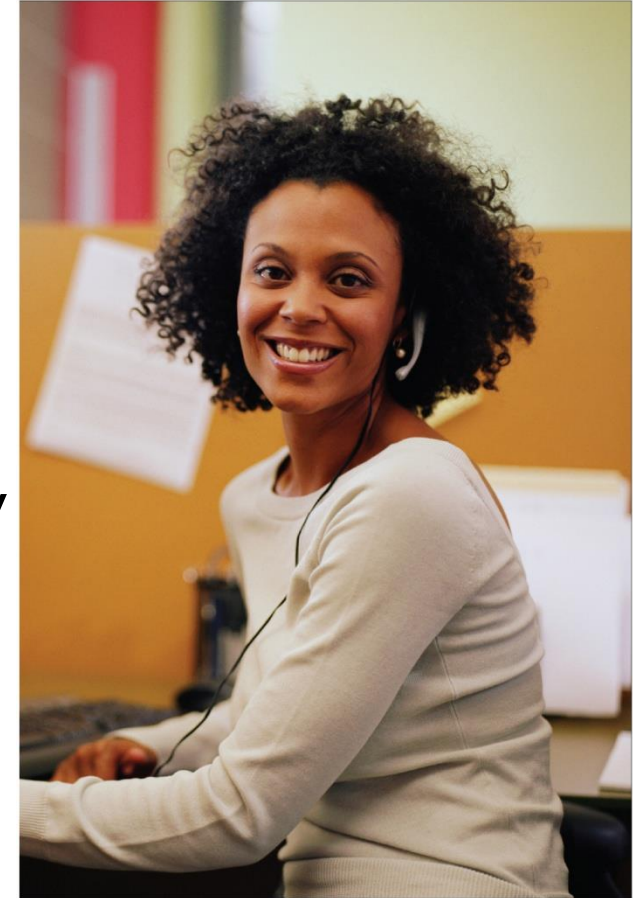# System Software

Chapter 4

Learning Objectives

1. Describe the differences between system software and application software.
2. Identify the four types of system software.
3. Explain the basic functions, features, and categories of operating systems.
4. Compare mobile operating systems iOS, Android, and Windows Phone.
5. Compare desktop operating systems including Windows, Mac OS, UNIX, Linux, and virtualization.
6. Explain the purpose of utilities and utility suites.
7. Identify the four most essential utilities.
8. Describe Windows utility programs.

Introduction

- Computers and computer applications have become a part of the fabric of every day life
  - They are great as long as they are working
- We give little thought to the processes and programs running behind the scenes to keep them functioning effectively.
- Such programs (i.e. operating systems, utility programs, and device drivers) are the system software you learn about here.
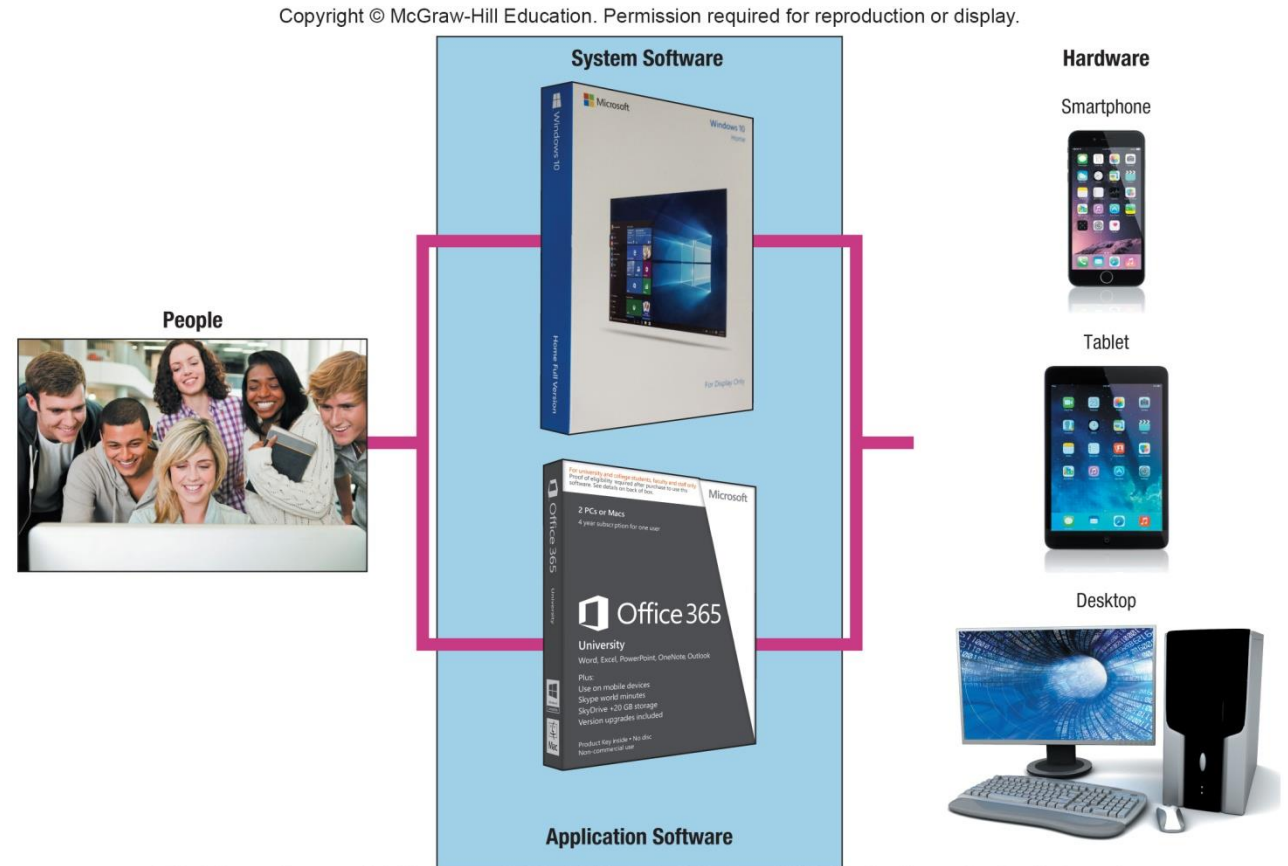
System Software

System Software

- Works with end users, application software, and computer hardware
  - Handles the technical details
  - Includes
    - operating system
    - utilities
    - device drivers
    - language translators

System Software

Hardware

Smartphone

Tablet

Desktop

People

Application Software

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(middle bottom): Used with permission from Microsoft; (top right, middle right, bottom right): © Maxim Kazmin/Getty Images RF
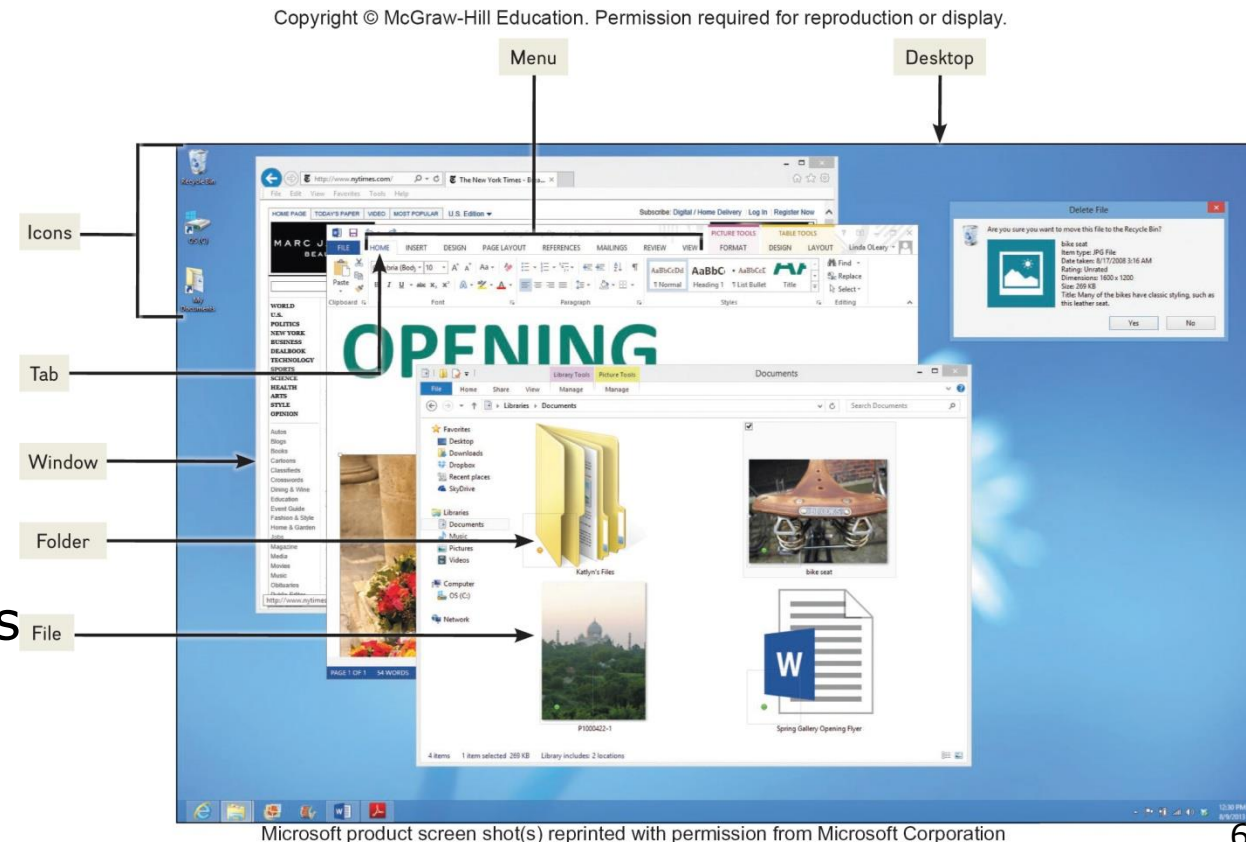
Operating Systems

A collection of programs that handle technical tasks

- Functions
  - Manages computer resources
  - Coordinate memory, processing, storage, printers and monitors
  - Monitor system performance
  - Schedule tasks
  - Provide security
  - Start-up the computer
- Provides user interface
  - Graphical user interface (GUI)
- Runs applications
  - Multitasking
  - Foreground and background applications

Features of an Operating System

- Booting – starting or restarting the computer
- Features in common with application software
  - Icons
  - Pointer
  - Windows
  - Menus
  - Tabs
  - Dialog boxes
  - Help
  - Gesture Control
- Files and Folders
  - Files share data and programs
  - Folders store related files

Menu

Desktop

Icons

Tab

Window

Folder

File

System Software

Categories of Operating Systems

- Three basic categories
  - Embedded operating systems – RTOS (real-time operating systems)
    - Smartphones
    - Smartwatches
    - Video game systems
  - Stand-alone operating systems
    - Also called desktop operating system
  - Network operating systems (linked computers)
    - Windows Server, Linux, Unix
    - OS stored on network server which coordinates all communication between the other computers

Mobile Operating Systems

- Mobile OS
  - Embedded operating system
    - Less complicated and more specialized for wireless
  - Some of the best known
    - Android
    - iOS
    - Windows Phone

Desktop Operating Systems

- Operating systems commonly used by individuals
  - Windows – most widely used
  - Mac OS – powerful and easy to use
  - UNIX – network; originally designed for Web
  - LINUX – non proprietary; free from the Web

System Software

Windows – Most Used OS

- Windows 8
- Integrates the desktop OS with its mobile OS

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- Windows 10
- Merges Windows desktop and mobile operating systems

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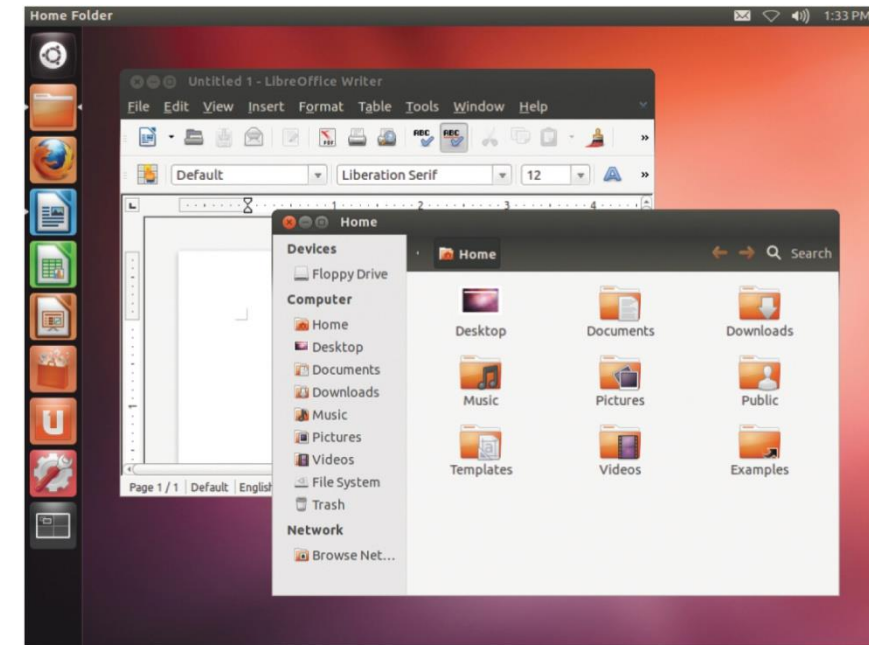

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Mac OS

- Mac OS X runs on Apple computers
- Two most recent versions:
  - OS X Mavericks
    - Improved power management
  - OS X Yosemite
    - New user interface

UNIX and LINUX

- UNIX operating system
  - Servers on the Web
  - Mainframe computers
  - Personal Computers
- LINUX - version of UNIX
  - Alternative to windows
  - Open source - free
  - Google Chrome OS based on Linux
    - Focuses on Internet connectivity and cloud computing
    - Speed is determined by the speed of the Internet

System Software

Virtualization

- Ability to support multiple operating systems on a single physical machine
- Virtualization software
  - Each virtual machine appears as a separate independent computer
    - Host operating system
    - Guest operating system
- Parallels
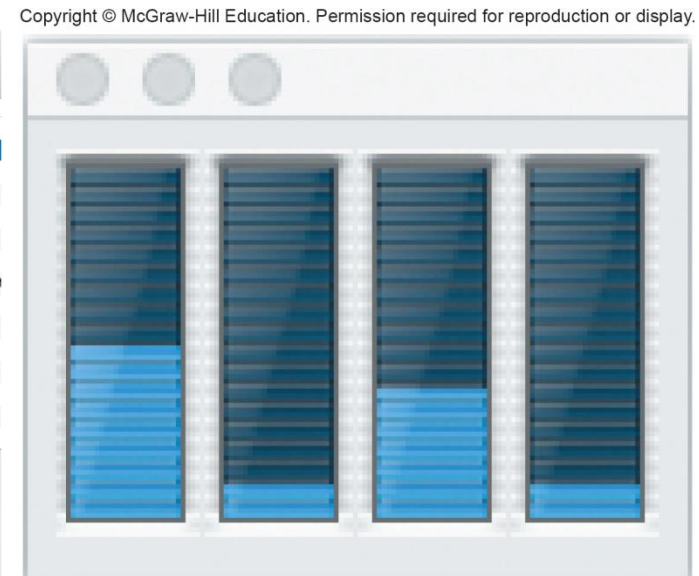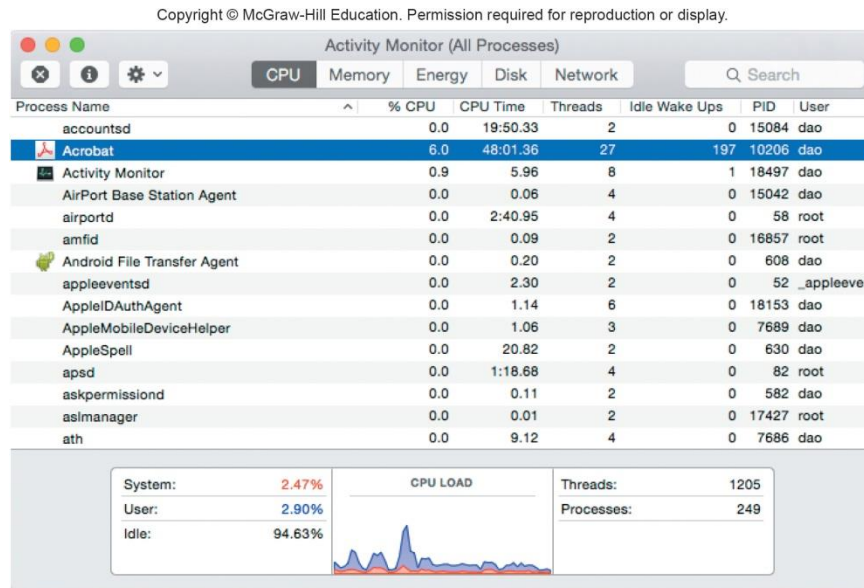 - Mac to run Windows programs in OS X

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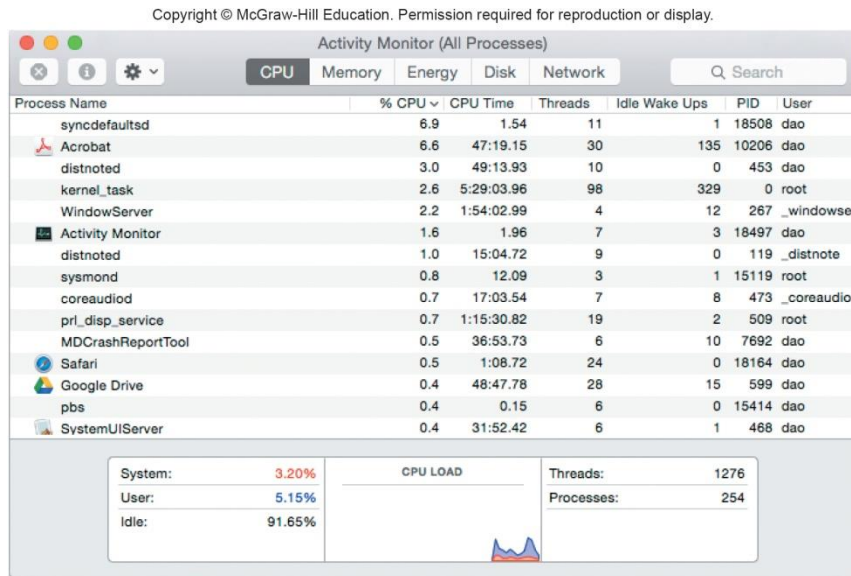
Utilities

- Specialized programs to make computing easier
- Most essential utilities
  - Troubleshooting or diagnostic programs
    - Recognizes and correct problems
  - Antivirus programs
    - Guard your computer against viruses
  - Backup programs
    - Copies of files to restore if necessary
  - File compression programs
    - Reduces the size of files for more efficient storage

Making IT Work for You – Mac OS X Activity Monitor

- Has your computer ever just stopped responding? What do you do?
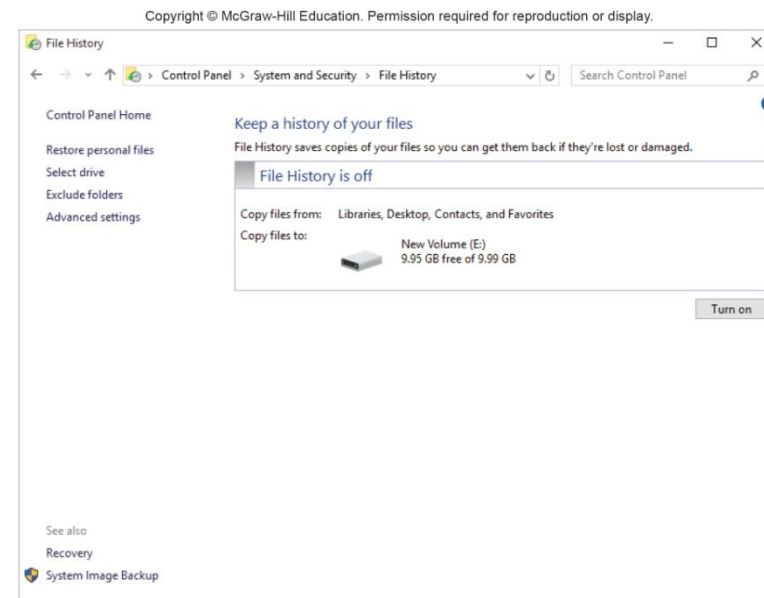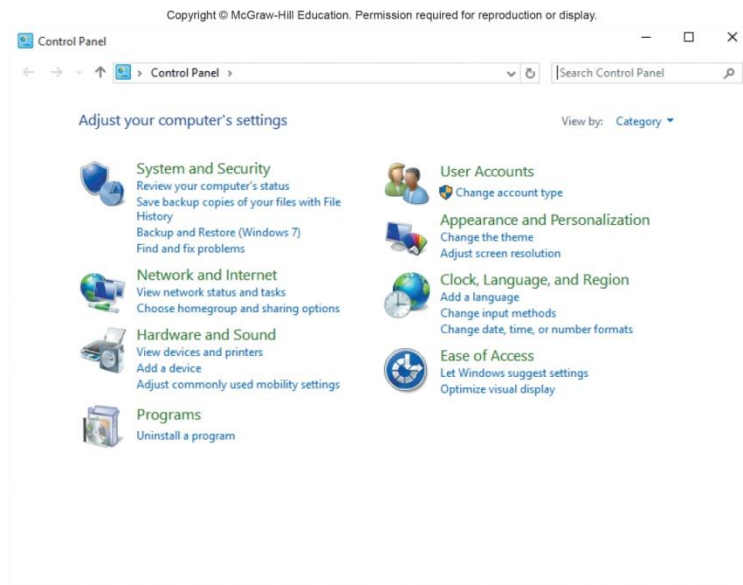- Mac OS X Activity Monitor is designed to help.

Windows Utilities

Windows Operating Systems includes utilities such as:

- File History
  - Can create a backup for your hard drive
- Disk Cleanup
  - Identifies and eliminates non essential files
- Disk Defragmenter
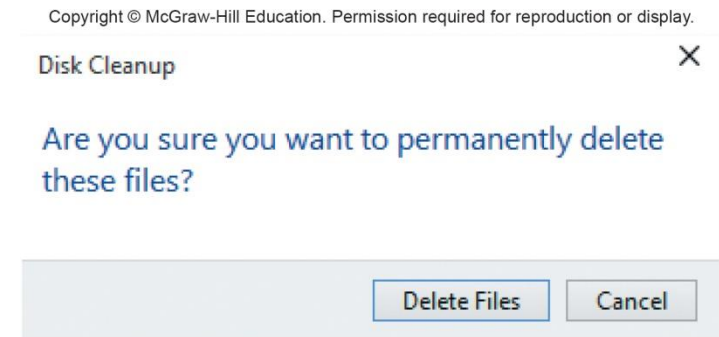 - Rearranges files and unused disk space to optimize performance
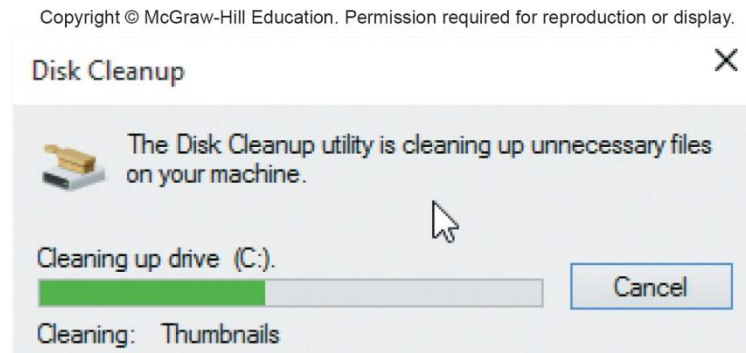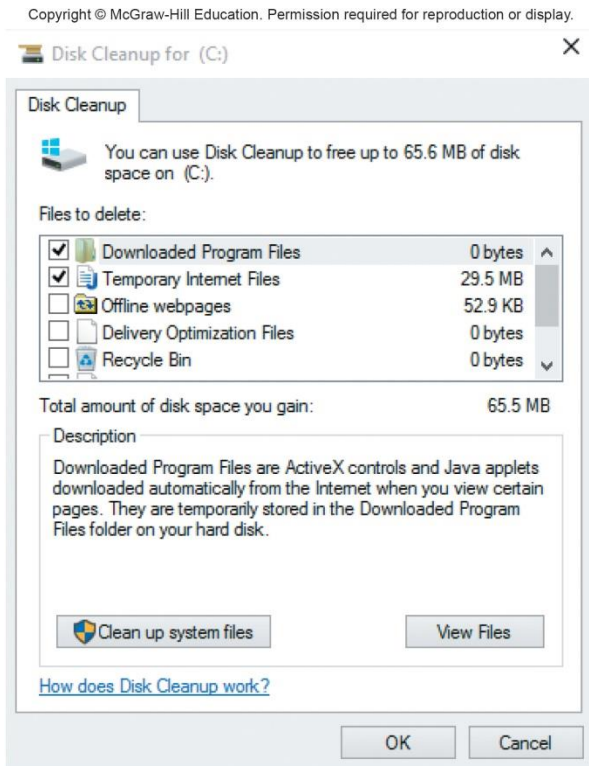
File History

- Utility program included with Windows 8
- Makes a copy of all files in the libraries, contacts, favorites and the desktop
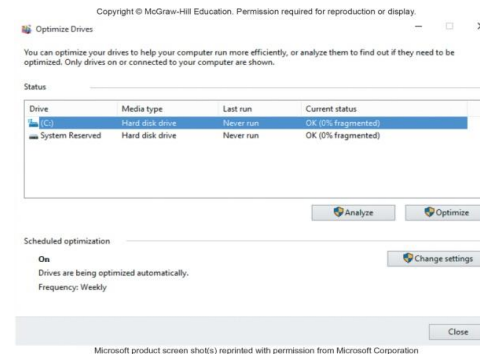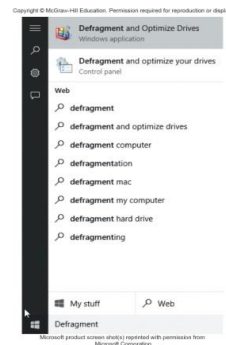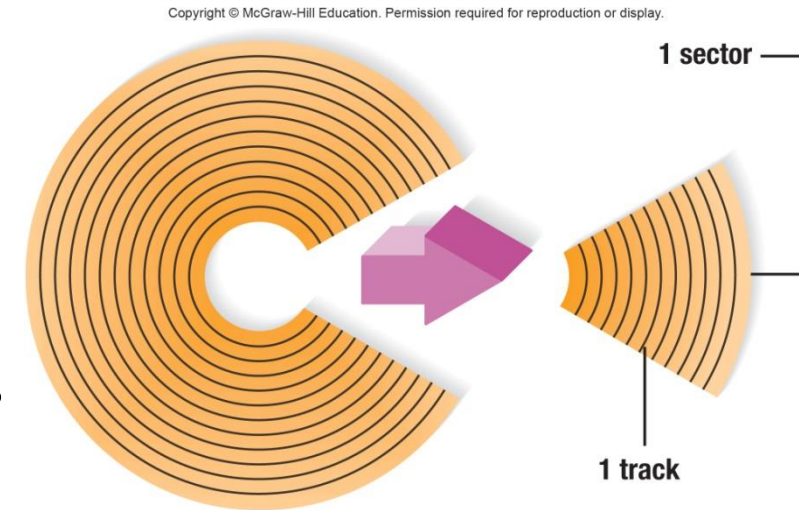- Helps prevent the effect of disk failure

Disk Cleanup

- Identifies and eliminates nonessential files
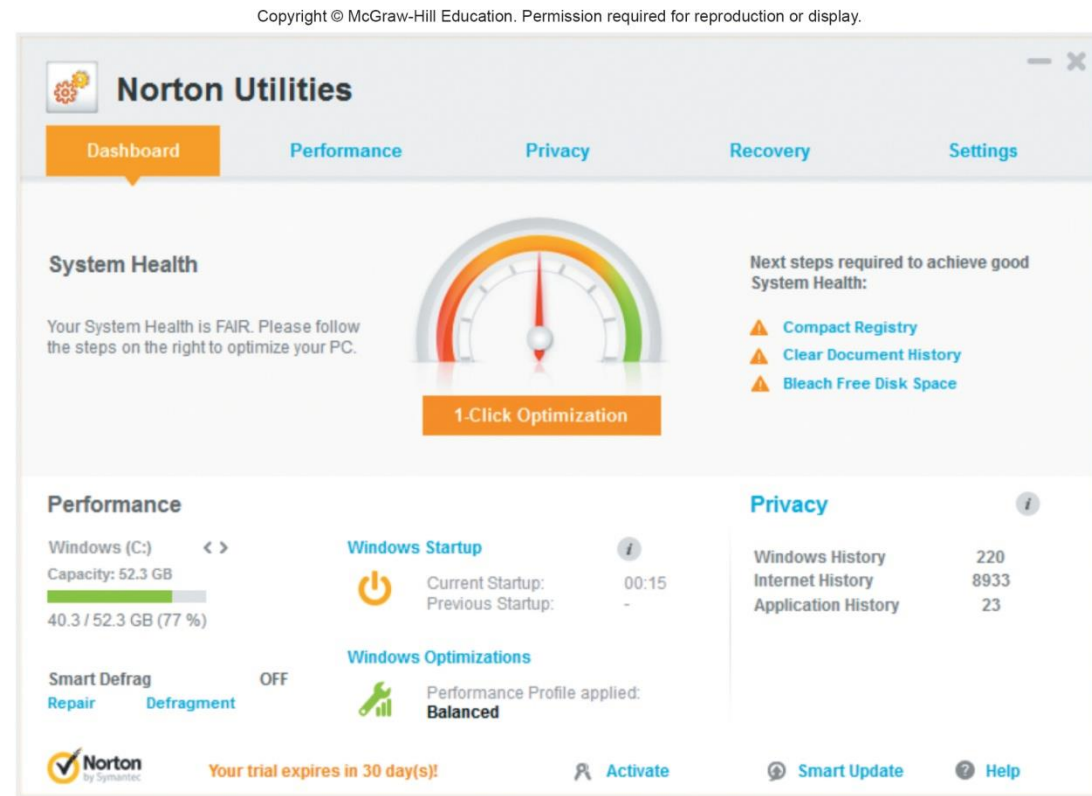- Frees up valuable space and improves system performance

Disk Defragmenter

- Files are organized in tracks and sectors
  - Tracks – concentric ring
  - Sectors – wedge-shaped sections of a track
- Optimize drives - utility program
  - Identifies and eliminates unnecessary fragments
  - Files become fragmented
    - Broken up and stored in non contiguous space
- Rearranges files and unused disk space to optimize operations

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1 sector

1 track

System Software

Utility Suites

- Combine several programs into one package
- Less expensive
- Popular suites
  - Bit Defender
  - Norton Utilities
  - Kaspersky

System Software

Careers In IT

- Computer Support Specialist or Technical Support Specialist
  - Provide technical support to customers and other users
  - Resolve common networking problems and use troubleshooting programs to diagnose problems
  - Employers look for an advanced associate degree or bachelors degree, good analytical, customer service, communication and people skills
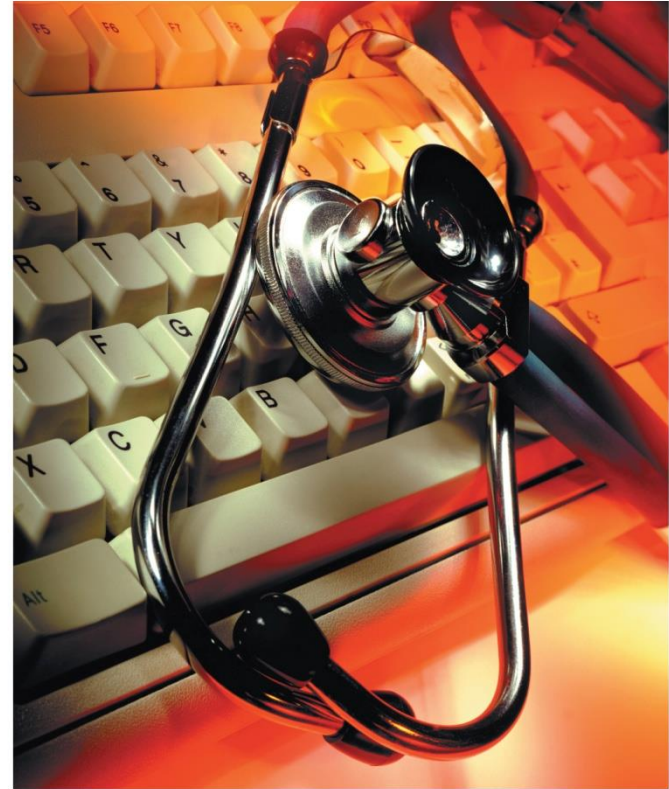 - Computer support specialist can expect to earn $29K - $40K annually

System Software

A Look to the Future – Self Healing Computers

- **Self Healing Computers**
  - Could mean an end to computer crashes and performance problems
  - Fix software problems
  - Reroute functions around broken hardware
- **IBM's Automatic Computing Initiative (ACI)**
  - Handles time-consuming maintenance
  - Self-regulating and virtually invisible
- **Self-maintaining servers**
  - Self-repairing
  - Self-updating
  - Self-protecting

System Software

Open-Ended Questions (Page 1 of 2)

1. Describe system software. Discuss each of the four types of system programs.

2. Define operating systems. Describe the basic features and the three categories of operating systems.

3. What are mobile operating systems? Describe leading mobile operating systems.

System Software

4. What are desktop operating systems? Compare Windows, Mac OS, Linux and Chrome OS. Discuss virtualization.

5. Discuss utilities. What are the most essential utilities? What is a utility suite?

System Software