

# Chapter 13: Advanced Laptops and Portable Devices



## IT Essentials: PC Hardware and Software v4.1

# Chapter 13 Objectives

- 13.1 Describe wireless communication methods for laptops and portable devices
- 13.2 Describe repairs for laptops and portable devices
- 13.3 Select laptop components
- 13.4 Describe preventive maintenance procedures for laptops
- 13.5 Describe how to troubleshoot a laptop

# Introduction

- With the increase in demand for mobility, the popularity of laptops and portable devices will continue to grow.
- A technician should be able to configure, optimize, and troubleshoot laptops, portable devices, docking stations and accessories.
- Some laptop manufacturers require technicians complete specialized certification training to perform laptop repairs.



# Wireless Communication Methods

13.1 Describe wireless communication methods for laptops and portable devices

- Bluetooth
- Infrared
- Cellular WANs
- Wi-Fi
- Satellite



# Bluetooth Technology

- A short-range wireless technology designed to eliminate the need for cables between portable or fixed-configuration devices
- Operates at 2.4 to 2.485 GHz in the unlicensed Industrial, Scientific, and Medical (ISM) band
- Low power, low cost, and small size
- Uses adaptive frequency hopping (AFH)
- Speeds:
  - Version 1.2 – up to 1.2Mbps
  - Version 2.0 + EDR – up to 3Mbps
  - Version 3.0 + HS – up to 24Mbps



# Infrared (IR) Technology

- A short-range, low-throughput wireless technology used as a data transmission medium.
- Infrared light signals operate in the lowest light frequency, typically between 100GHz to 1000THz.
- Distances are limited to a few feet or meters.
- IR cannot penetrate any object that blocks the light signal.





# Cellular WAN Technology

- Cellular WAN connections are powerful, 2-way wireless networks that have been around since the late 1970s.
- Cellular networks operate in one of two ranges:
  - Approximately 800 MHz
  - Approximately 1900 MHz
- Three generations of cellular WAN include voice-only analog, digital, and high-speed data and voice.



# Cellular WAN Generations

Cellular Generation	Characteristics	Protocols
G1	Analog: Voice only	AMPS – not in use
G2	Digital: Voice, conference calls, caller ID and data speeds less than 20 Kbps	GSM
G2.5	Data speeds between 30 Kbps to 90 Kbps Supports Web browsing, short audio/video clips, games, and applications and ring tone downloads	GPRS and EDGE
G3	Data speeds between 144 Kbps to 2 Mbps Supports full-motion video, streaming music, 3D gaming, and faster Web browsing	EV-DO
G3.5	Data speeds between 384 Kbps to 14.4 Mbps Supports high-quality streaming video, high-quality video conferencing, and VoIP	HSDPA



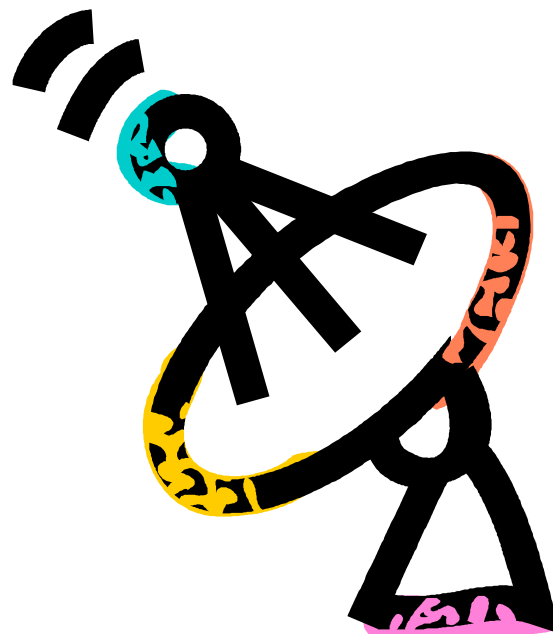
# Wireless Fidelity (Wi-Fi) Technology

- Wi-Fi is a wireless technology that provides a simple connection from anywhere within the range of a base station.
- Connection distances of 300 feet (91 meters) or more, depending on the environment.
- Ease of access makes Wi-Fi a simple solution for network connectivity.



# Satellite Technology

- Satellite networks are faster than dial-up connections but slower than Cable and DSL connections.
- Satellite service is ideal for the rural or remote Internet users.
- Downloading files is faster than uploading files.
- Adverse weather conditions can interfere with satellite reception.



# Repairing Laptops and Portable

- **Customer Replaceable Units (CRUs)** can be replaced by the customer.
- **Field Replaceable Units (FRUs)** should only be replaced by a qualified field technician.
  - There are more repair center and manufacturer repairs with laptops than desktops.
  - A technician at a repair center can provide standard service on laptops made by different manufacturers, or a repair center may specialize in a specific brand and be considered an authorized dealer for warranty work and repair.
  - If no local services are available, the laptop may need to be sent to a regional repair center or to the manufacturer. If the laptop damage is severe or requires specialized software and tools, the manufacturer can decide to replace the laptop instead of attempting a repair.

# Selecting Replacement Components

- Laptop components need to be replaced for the following reasons:
  - The original parts are damaged.
  - Additional functionality is required.
  - Improved performance is required.
  
- New components must fit both physically and electrically.
  
- Components fall into two categories:
  - Retail packaged components usually come with documentation, full warranty, cables, mounting hardware, drivers, and software.
  - Original Equipment Manufacturer (OEM) components are usually sold without packaging. OEM components require the user to locate documentation, software, drivers, and any additional hardware that may be needed.

# Selecting Batteries

How do you know when you need a new laptop battery?



- Laptop shuts off immediately when AC power is removed
- Battery is leaking
- Battery overheats
- Battery does not hold a charge

# Select a Docking Station/Port Replicator

- Docking stations and port replicators increase the number of ports available to a laptop. A docking station has the same ports as a port replicator, but adds the ability to connect to PCI cards, additional hard drives, optical drives, and floppy drives.
- The addition of new devices when docking can be handled by using PnP technology that recognizes and configures the newly added components, or by having a separate hardware profile for the docked and undocked state.
- Many docking stations and port replicators are proprietary and only work with particular laptops. Before buying a docking station or port replicator, check the laptop documentation, or the website of the manufacturer to determine the appropriate make and model for the laptop.



# Select Storage Devices

Storage devices are CRUs, unless a warranty requires technical assistance.



- External USB hard drive
- Firewire hard drive
- BD/DVD/CD burner

# Select Additional RAM

- Additional RAM improves laptop performance.
- Most laptops use a Small Outline DIMM (SODIMM). When replacing or adding memory, determine if the laptop has available slots to add memory, and that the laptop supports the quantity and type of memory to be added.
- Before purchasing and installing additional RAM, consult the laptop documentation or the website of the manufacturer for form-factor specifications. Use the documentation to find where to install RAM on the laptop. On most laptops, RAM is inserted into slots behind a cover on the underside of the case.

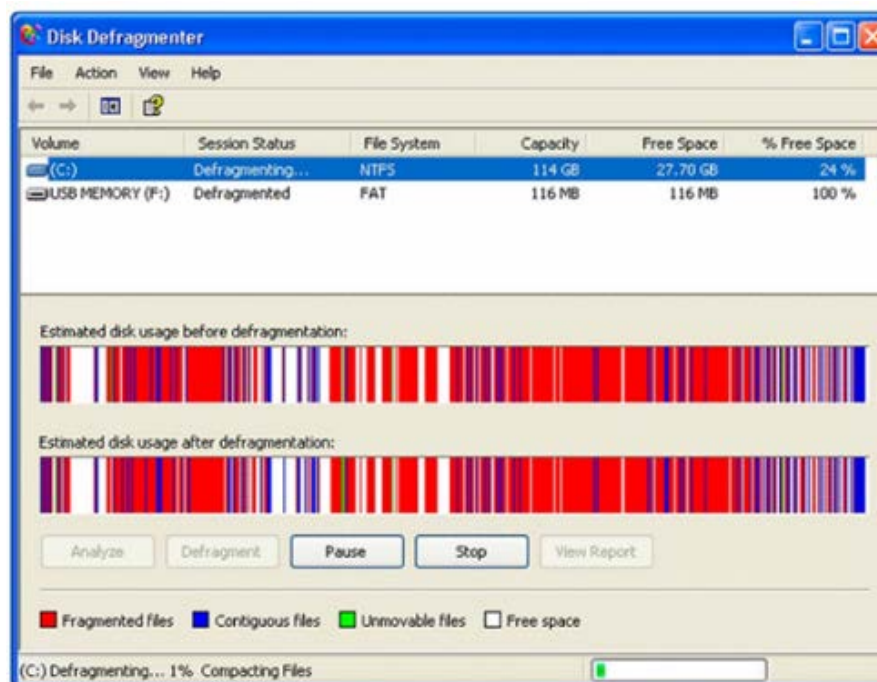
# Laptop Preventive Maintenance

- Preventive maintenance should be scheduled at regular intervals to keep laptops running properly. Because laptops are portable, they are more likely to be exposed to harmful materials and situations than desktop computers.
- Clean the laptop
- Perform hard drive maintenance
  - Disk Cleanup
  - Disk Defragmenter
- Update software



# Disk Cleanup and Disk Defragmenter

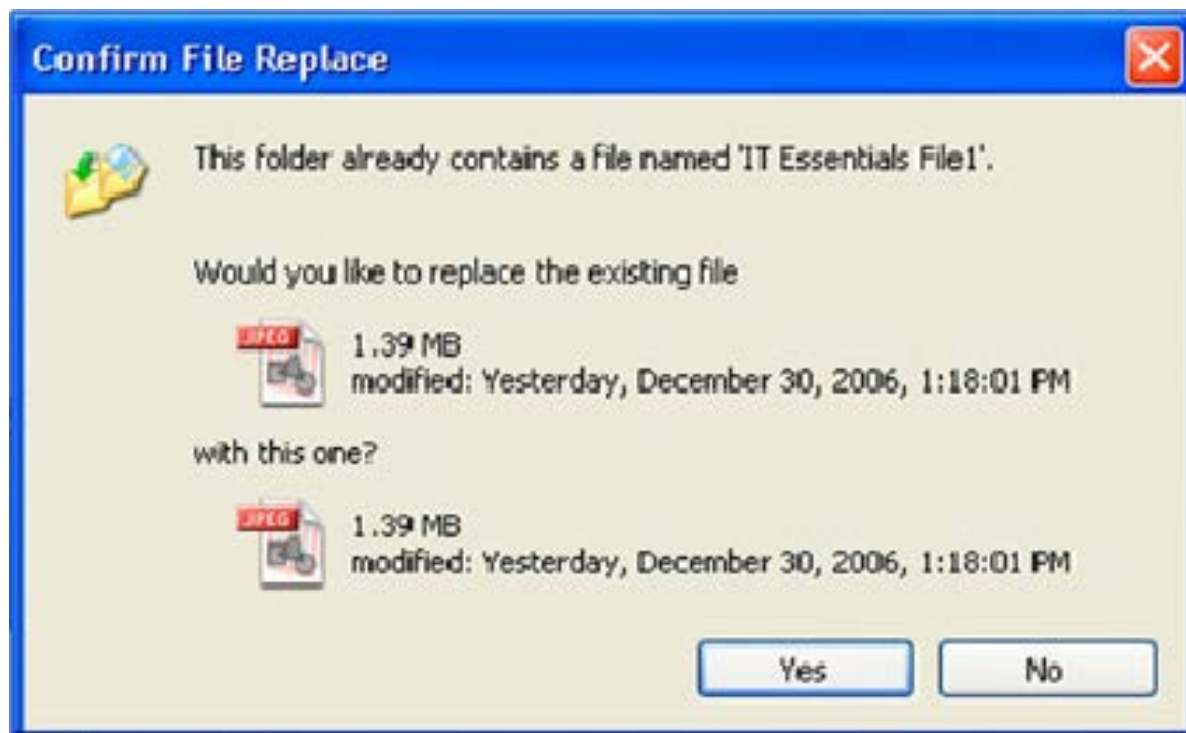
- The computer can slow down if the OS is searching through fragmented files.
- Windows has two programs that help clean up the hard drive:
  - Disk Cleanup
  - Disk Defragmenter





# File Management and Version Control

When moving files from a laptop to a desktop computer, be careful that data copied from one computer does not inadvertently overwrite data on the other computer.



# Troubleshooting Process

- Step 1** Identify the problem
- Step 2** Establish a theory of probable causes
- Step 3** Determine an exact cause
- Step 4** Implement a solution
- Step 5** Verify solution and full system functionality
- Step 6** Document findings



# Step 1 - Identify the Problem

- Laptop information
  - Manufacturer, model, OS, network environment, connection type
- Open-ended questions
  - Which specific computer resources are you trying to access with your laptop?
  - Are there any laptop resources that you can access?
  - When were you last able to access the resources?
- Closed-ended questions
  - Is your network cable plugged in?
  - Does anyone else have this problem?
  - Have you changed your password recently?
  - Have you received any error messages on your laptop?

# Step 2 - Establish a Theory of Probable Causes

- The Problem may be simpler than the customer thinks.
- Create a list of the most common reasons why the error would occur.
  - Is the laptop plugged in with the AC adapter?
  - Is the battery secure?
  - Is the power switch turned on?
  - Have there been any power outages?
  - Have any cables been unplugged?
  - Are the cables or connectors damaged?

## Step 3 - Determine the Exact Cause

- Test your theories of probable causes one at a time, starting with the quickest and easiest.
  - Reboot
  - Install a known good network cable to this computer
  - Boot in safe mode using the F8 menu
  - Boot to last known good configuration using the F8 menu
  - Boot from startup disk
  
- If the exact cause of the problem has not been determined after you have tested all your theories, establish a new theory of probable causes and test it.

## Step 4 - Implement a Solution

- Sometimes quick procedures can determine the exact cause of the problem or even correct the problem.
- If a quick procedure does not correct the problem, you might need to research the problem further to establish the exact cause.
- Divide larger problems into smaller problems that can be analyzed and solved individually.

## Step 5 - Verify Solution and System Functionality

- Verifying full system functionality and implementing any preventive measures if needed. Ensures that you have not created another problem while repairing the computer.
  - Reboot the laptop
  - Attach all peripherals
  - Operate laptop using only battery
  - Print a document from an application
  - Type sample document to test keyboard
  - Check Event Viewer for warnings or errors
  
- Have the customer verify the solution and system functionality.

## Step 6 - Document Findings

- Discuss the solution with the customer
- Have the customer confirm that the problem has been solved
- Document the process
  - Problem description
  - Solution
  - Components used
  - Amount of time spent in solving the problem



# Common Problems and Solutions

- Laptop problems can be attributed to hardware, software, networks, or some combination of the three. You will resolve some types of laptop problems more often than others.

# Apply Troubleshooting Skills

- Now that you understand the troubleshooting process, it is time to apply your listening and diagnostic skills.
- The worksheet is designed to reinforce your communication skills to verify information from the customer.
- The optional labs are designed to reinforce your troubleshooting skills.



# Chapter 13 Summary

Some of the important concepts to remember from this module:

- Bluetooth creates a small wireless PAN for connected cell phones, printers, and laptops.
- An IR network uses infrared light to create short-range networks that are primarily used to control input devices and mobile devices.
- A cellular WAN allows you to use your cell phone and laptop for voice and data communications.
- The most popular wireless technology is Wi-Fi. There are four major Wi-Fi releases, each with different speed and bandwidth ratings: IEEE 802.11 a, b, g, and n.
- Satellite networks are faster than modems, but slower than DSL and cable networks. Satellite networks are primarily used in remote locations.

# Chapter 13 Summary (Continued)

Some of the important concepts to remember from this module:

- A CRU is a component that a user can easily install without technical training.
- A FRU is a component that a trained service technician may install at a remote location.
- Most repairs can be done at customers' sites or at any local repair center. However, there are occasions when a laptop must be sent directly to the manufacturer for repairs.
- Professional technicians follow preventive maintenance schedules to keep their equipment at optimal performance levels.
- Laptops are more susceptible to contamination and damage. A well-maintained laptop will reduce repair costs.

# Chapter 13 Summary (Continued)

Some of the important concepts to remember from this module:

- A docking station allows a laptop to easily connect to peripheral devices similar to those found on desktop computers. A port replicator can be added to a laptop if the user needs more I/O ports.
- Mastering the steps in troubleshooting laptop problems is considered a career milestone by many technicians.
- A well-trained technician must possess good customer communications skills.

---

# Cisco | Networking Academy<sup>®</sup>

Mind Wide Open<sup>™</sup>