

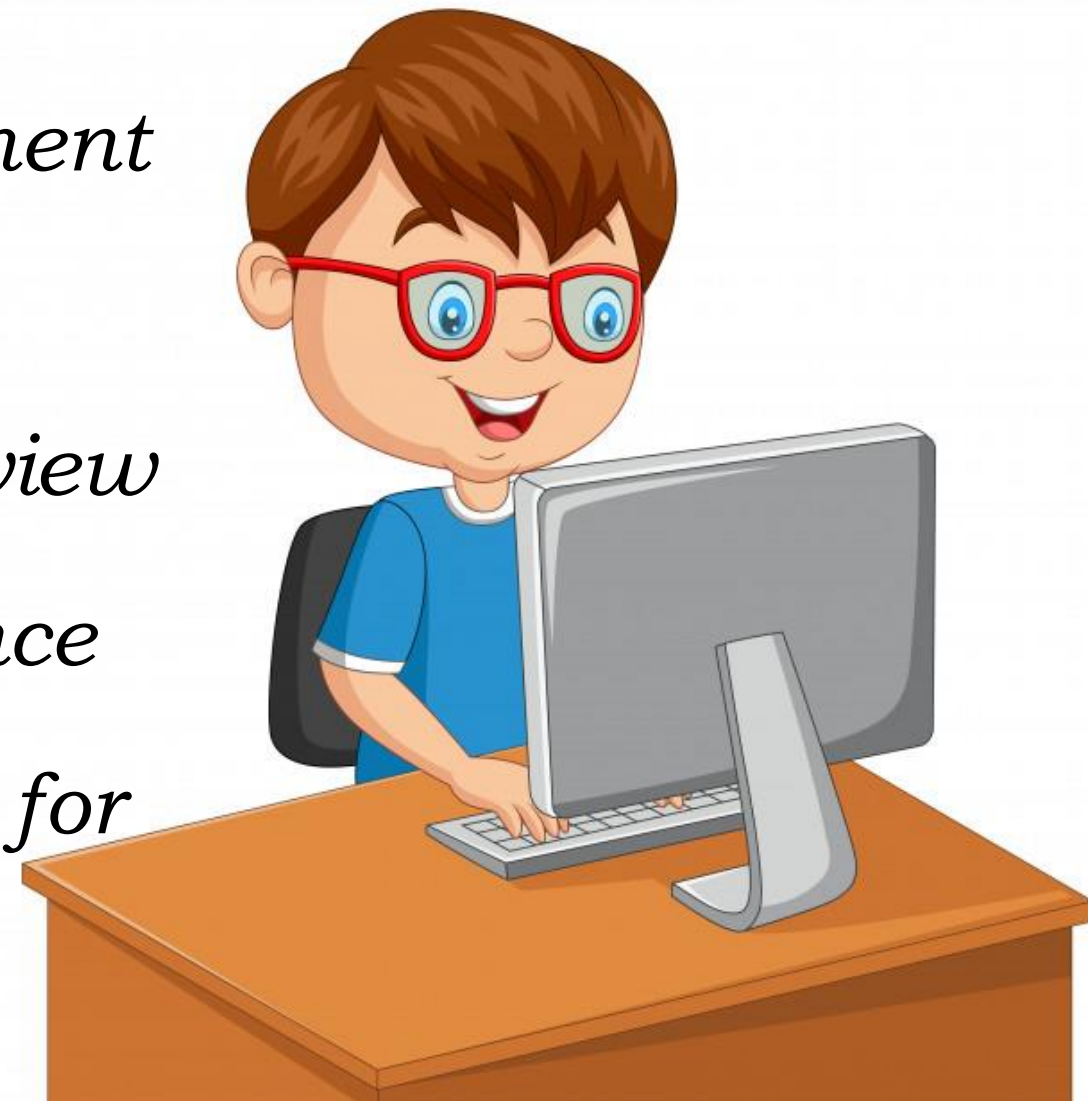
# Laptops and Mob

## Chapter 9



# Objective

- *9.1 Laptop Components*
- *9.2 Laptop Configuration*
- *9.3 Laptop Hardware and Component Installation and Configuration*
- *9.4 Mobile Device Hardware Overview*
- *9.5 Common Preventive Maintenance*
- *9.6 Basic Troubleshooting Process for Laptops and Mobile Device*



## 9.1 Laptop Components

*Understand the using variety of computer laptop components*

### 9.1.1 Features of Laptop Components



# Features of Laptop Components

- External Features Unique to Laptops: Battery, Security keyhole, Docking Connector
- Common Input Devices and LEDs in Laptops: Touchpad, Pointing stick, Keyboard, Fingerprint readers, Microphone, Web camera, LED indicators

- Internal Components: Motherboards, RAM (SODIMMs), CPUs, Storage
- Special Function Keys: Display settings, Media options, Sleep states, WI-FI & Bluetooth functionality
- Docking Station vs. Port Replicator: Both add ports to laptop. Docking Station adds the ability to connect to PCI cards, additional hard drives, and optical drives.

## 9.1.2 Laptop Displays

Laptop Displays type

- LCD, LED, and OLED Displays
  - LCD: Liquid Crystal Display
  - LED: Light Emitting Diode
  - OLED: Organic light-emitting diode



- 2 types of **LCD**: Twisted Nematic (TN) and In-Plane Switching (IPS)
  - **TN**: Offer high brightness, uses less power than IPS, inexpensive
  - **IPS**: Better color reproduction and better viewing angles
- **LEDs**: Use less power and have longer lifespan
- **OLED**: Commonly used for mobile devices and digital cameras

## **Backlights and Inverters**

- LCD: Cold Cathode Fluorescent Lamp (CCFL) & Inverter
- LED: LED based backlights

## **WI-FI Antenna Connectors**

- Typically located above the screen
- Connects to wireless card

## **Webcam and Microphone**

- Built into most laptops today



## 9.2 Laptop Configuration

### 9.2.1 Power Settings Configuration

- **Power Management**

Advanced Configuration and Power Interface (ACPI) standards

- Creates a bridge between hardware and Operating System
  - Provides power management schemes for better performance
  - Standards: S0 – S5
- Managing ACPI Settings in the BIOS
  - Managing Laptop Power Options
    - Sleep
    - Hibernate
    - Shutdown



## 9.2.2 Wireless Configuration

### Bluetooth

- Personal Area Network (PAN)
- 3 Classes: Most common is Class 2 with a range of approx. 33 feet
- 4 Specifications: Version 4 is newest with more advanced capabilities
- Supports 128-bit encryption and PIN authentication

### Cellular WAN

- Tethering: Can be made using Wi-Fi, Bluetooth, or USB cable
- Laptops can have integrated cellular WAN capabilities.





## WI-FI

- Mini-PCI: older laptops, 124 pins, 802.11a, 802.11b, and 802.11g
- Mini-PCIe: Most common, 54 pins, all 802.11 standards
- PCI Express Micro: ½ size of Mini-PCIe, 54 pin, all 802.11 standards



## 9.3 Laptop Hardware and Component Installation and Configuration

### 9.3.1 Expansion Slots



### Expansion Cards

- 2 Models: ExpressCard/34 & ExpressCard/54
- Add functionality to laptop: Additional memory card reader, External hard drive access, TV tuner cards, USB and FireWire ports, Wi-Fi Connectivity

## **Flash Memory**

External Flash Drive (SSD)

Flash Cards (SD, SDHC)

## **Smart Card Readers**

Contact – requires a physical connection to the card

Contactless – works on a radio frequency

## **SODIMM Memory**

32-bit: 72-pin and 100-pin

64-bit: 144-pin, 200-pin, and 204-pin

## 9.3.2 Replacing Hardware Devices

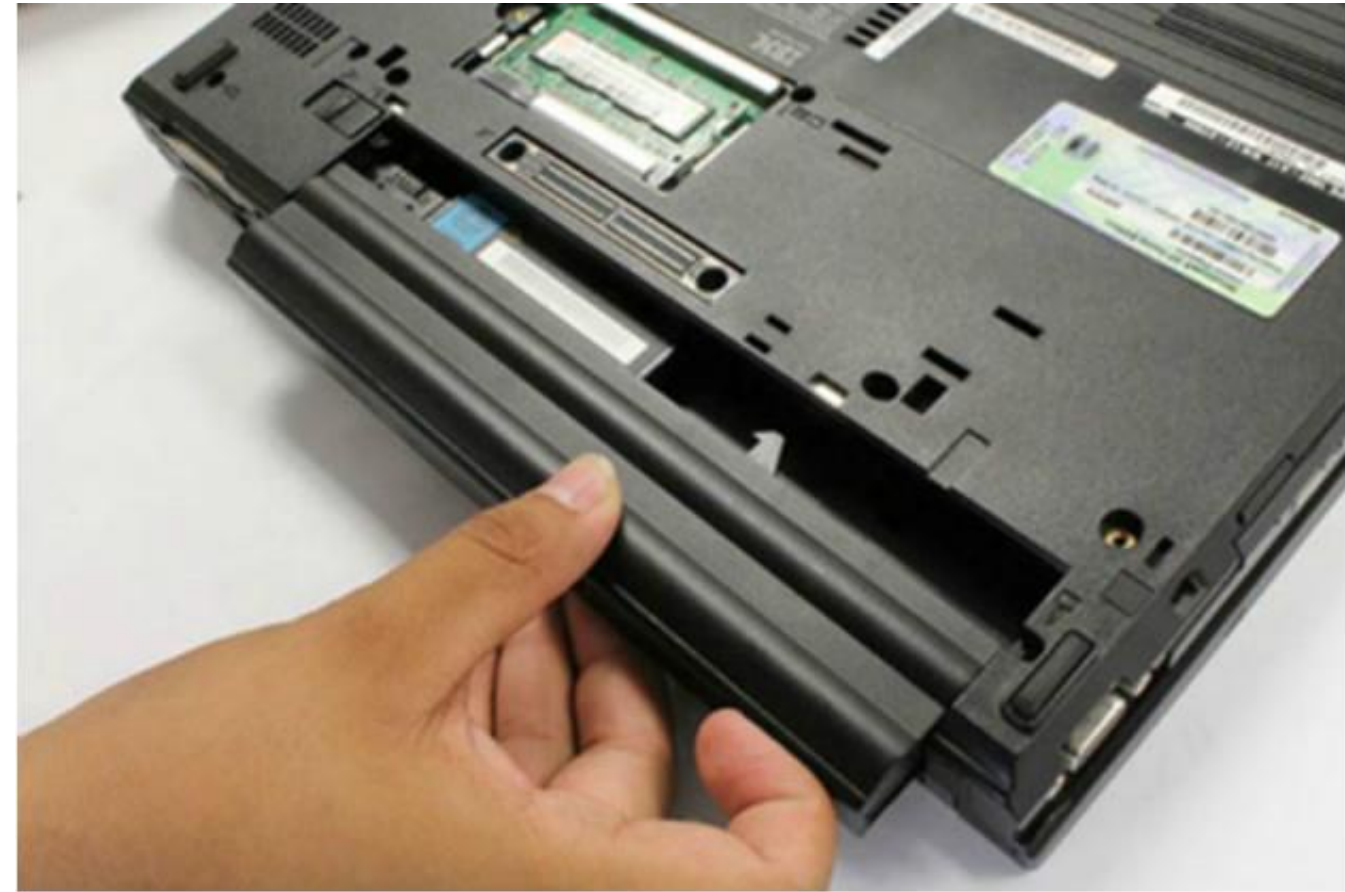
### Overview of Hardware Replacement

- Customer-Replaceable Units (CRUs)
- Field-Replaceable Units (FRUs)

### Power

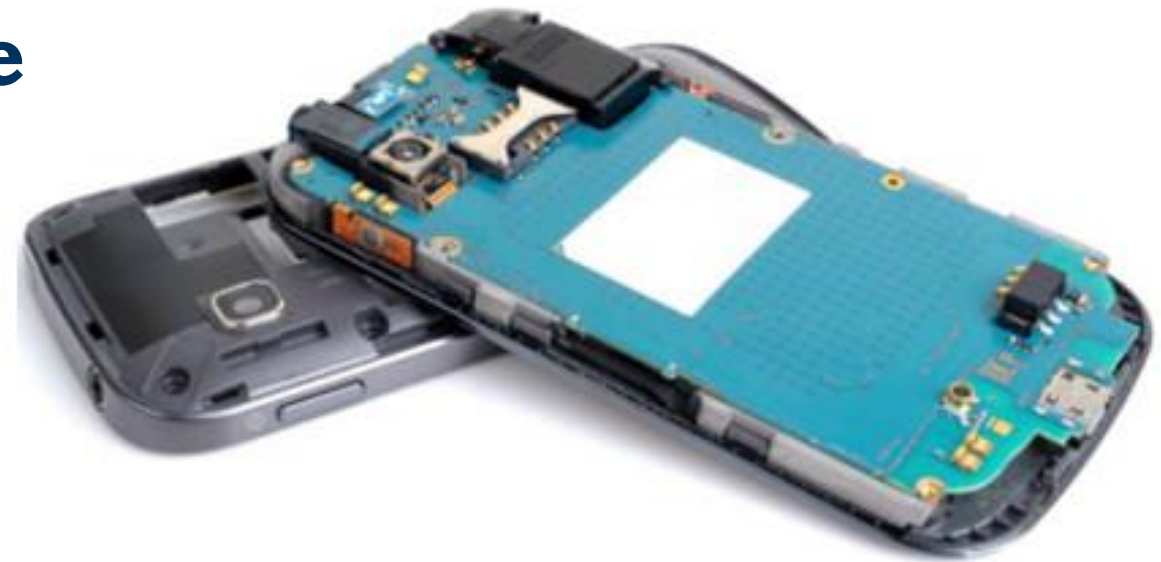
- Most batteries are CRU
- Signs Battery needs to be replaced: Does not hold charge, overheats, leaking

Keyboard, Touchpad, and Screens, Internal Storage Drive and Optical Drive, Wireless Card, Speakers, CPU, Motherboard, Plastic Frames



## 9.4 Mobile Device Hardware Overview

### 9.4.1 Mobile Device Hardware



- Mobile Device Parts
- Non-Upgradeable Hardware
- Touchscreens
  - Recognize two or more points of contact
  - Common Gestures: Swipe, Double touch, Long touch, Scroll, Pinch, Spread



- Solid State Drives
  - Advantages: Power efficiency, Reliability, Lightweight, Compact, Performance, No noise
- Connection Types
  - Wired: Micro/Mini USB, Lightning, Proprietary vendor specific ports
  - Wireless: NFC, IR, Bluetooth
- Accessories
  - External Battery
  - Docking Station
  - Portable Chargers
  - Ear Buds
  - Headsets
  - Speakers
  - Game Pad
  - SD cards
  - Credit Card Reader

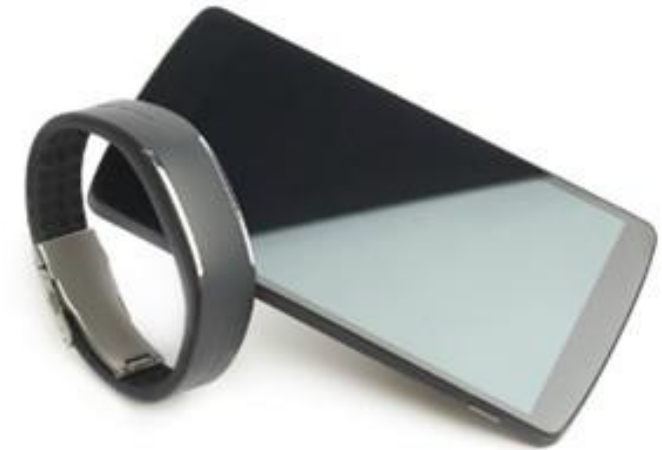
## 9.4.2 Other Mobile Devices

### Wearable Devices

- Smart Watches
- Fitness Monitors
- Smart Headsets

### Specialty Devices

- GPS Receiver
- Smart Cameras
- Electronic Readers



## 9.5 Common Preventive Maintenance Techniques

### 9.5.1 Scheduled Maintenance for Laptops and Mobile Devices

#### Scheduled Maintenance

- **More exposure**
  - ✓ Dirt and contamination
  - ✓ Spills
  - ✓ Wear and tear
  - ✓ Drops
  - ✓ Excessive heat & cold
  - ✓ Excessive moisture
- **Laptops**
  - ✓ Cleaning
  - ✓ Hard drive maintenance
  - ✓ Software updates
- **Mobile Devices**
  - ✓ Cleaning
  - ✓ Backing up the data
  - ✓ Updating the system and applications



## 9.6 Basic Troubleshooting Process

### 9.6.1 Applying

- **Identify the Problem**
  - Open-ended questions
  - Closed-ended questions
- Establish a Theory of Probably Cause
- Test the Theory to Determine Cause
- Establish a Plan of Action to Resolve the Problem and Implement the Solution
- Verify Full System Functionality and Implement Preventive Measures
- Document Findings, Actions, and Outcomes

