

## **CIT620 Computer Support and Maintenance (4 CH) – Week 1 Notes**

**Course:** Computer Support and Maintenance

**Credit Hours:** 4 CH

**Course Outline:** Hardware components, troubleshooting, maintenance procedures, operating systems, basic networking.

**Assessment:** Labs (30%), midterm (30%), final exam/project (40%) (assumed based on similar IT courses; adjust if specific structure provided).

### **Resources:**

- CompTIA A+ Certification All-in-One Exam Guide by Mike Meyers (Chapter 1 for hardware basics).
- Online tutorials: Search “PC hardware basics” or “computer maintenance” on CompTIA’s website or YouTube (e.g., Professor Messer’s A+ videos).
- Tools: iFixit (free repair guides), Canva (for creating maintenance posters).

**Week 1 Topic:** Introduction to Computer Support and Maintenance

**Objective:** Understand the role of computer support and maintenance, identify key hardware components, and learn basic maintenance practices to ensure system reliability.

### **1. Overview of Computer Support and Maintenance**

Computer support and maintenance involves diagnosing, repairing, and maintaining computer systems to ensure they operate efficiently and reliably. It’s a critical IT skill, combining hardware troubleshooting, software configuration, and preventive care to keep systems running smoothly.

- **Core Idea:** Computer support ensures hardware and software work together to meet user needs, while maintenance prevents issues through regular care. For example, fixing a slow computer or cleaning dust from a PC to prevent overheating.

#### **- Importance:**

- Minimizes downtime in systems like school labs or business offices.
- Extends the lifespan of computers through proper care.
- Supports user productivity by resolving issues (e.g., fixing a printer for a student project).

#### **- Real-World Applications:**

- Repairing a computer that won't boot in a college lab.
- Updating software for a business's point-of-sale system.
- Cleaning hardware to maintain performance in a hot, dusty environment.

## **2. Roles and Responsibilities in Computer Support**

Computer support professionals, often called technicians, perform tasks to keep systems operational. Their work spans hardware, software, and user support.

### **- Key Responsibilities:**

- **Diagnosing Issues:** Identifying why a computer is slow or a printer isn't working.
- **Repairing Hardware:** Replacing faulty components like a hard drive or power supply.
- **Maintaining Systems:** Cleaning dust, updating software, or backing up data.
- **User Support:** Helping users troubleshoot issues (e.g., connecting to Wi-Fi).
- **Documentation:** Recording issues and solutions for future reference.

### **- Skills Required:**

- Technical knowledge of hardware and software.
  - Problem-solving to diagnose issues logically.
  - Communication to explain solutions to non-technical users.
- Example: A technician in a school lab notices a computer is slow, checks for malware, updates the operating system, and cleans the cooling fan to restore performance.

## **3. Key Hardware Components**

Understanding computer hardware is essential for support and maintenance. Below are the primary components of a desktop or laptop computer.

### **- Central Processing Unit (CPU):**

- Function: The "brain" of the computer, executing instructions from programs.

- Example: Intel Core i5 processes calculations for a spreadsheet.
- Maintenance: Ensure proper cooling to prevent overheating.
- **Random Access Memory (RAM):**
  - Function: Temporary storage for active programs and data.
  - Example: 8GB RAM allows multiple browser tabs to run smoothly.
  - Maintenance: Check for faulty RAM causing crashes.
- **Storage Devices:**
  - **Hard Disk Drive (HDD):** Magnetic storage for large data volumes.
  - **Solid State Drive (SSD):** Faster, flash-based storage.
  - Example: An SSD stores the operating system for quick boot times.
  - Maintenance: Defragment HDDs, monitor storage health.
- **Motherboard:**
  - Function: Connects all components (CPU, RAM, storage, etc.).
  - Example: Contains slots for RAM and ports for peripherals.
  - Maintenance: Inspect for damaged connectors or capacitors.
- **Power Supply Unit (PSU):**
  - Function: Supplies power to components.
  - Example: A 500W PSU powers a desktop PC.
  - Maintenance: Check for stable voltage, replace if faulty.
- **Graphics Processing Unit (GPU):**
  - Function: Handles visual output (e.g., for displays or gaming).
  - Example: NVIDIA GPU renders high-quality video.
  - Maintenance: Update drivers, ensure cooling.
- **Input/Output Devices:**
  - Examples: Keyboard, mouse, monitor, printer.
  - Maintenance: Clean devices, check connections.

**Visual (Text-Based Diagram):**

[Motherboard]

|--> [CPU: Processes Data]

|--> [RAM: Temporary Storage]

|--> [Storage: HDD/SSD]

|--> [PSU: Powers System]

|--> [GPU: Handles Graphics]

|--> [I/O: Keyboard, Monitor]

#### **4. Basic Maintenance Practices**

Preventive maintenance keeps computers running efficiently and extends their lifespan. These practices are critical for support technicians.

##### **- Physical Cleaning:**

- Remove dust from fans, vents, and components to prevent overheating.
- Example: Use compressed air to clean a desktop's cooling fan.
- Frequency: Every 3–6 months, depending on environment.

##### **- Software Updates:**

- Update operating systems (e.g., Windows, Linux) and drivers to fix bugs and improve security.
- Example: Install Windows updates to patch vulnerabilities.
- Frequency: Check monthly or enable automatic updates.

##### **- Data Backup:**

- Save critical data to external drives or cloud storage to prevent loss.
- Example: Back up student assignments to a USB drive.
- Frequency: Weekly or before major updates.

##### **- Disk Maintenance:**

- Defragment HDDs to optimize file access or check disk health for errors.

- Example: Run Disk Cleanup to free space on a slow PC.
- Frequency: Monthly for HDDs; SSDs require less maintenance.
- **Antivirus Scans:**
  - Run antivirus software to detect and remove malware.
  - Example: Use Windows Defender to scan for viruses.
  - Frequency: Weekly or after suspicious activity.

Example: A technician cleans dust from a school lab PC, updates its antivirus software, and backs up student data to an external drive, ensuring reliable performance.

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## **5. Tools for Computer Support**

Technicians use hardware and software tools to diagnose and maintain systems.

- **Hardware Tools:**
  - Screwdrivers: Open PC cases (e.g., Phillips for screws).
  - Compressed Air: Remove dust from components.
  - Multimeter: Test power supply voltage.
  - Anti-Static Wrist Strap: Prevent static damage to components.
- **Software Tools:**
  - Diagnostic Software: Check hardware health (e.g., CrystalDiskInfo for storage).
  - Antivirus Programs: Remove malware (e.g., Malwarebytes).
  - System Utilities: Optimize performance (e.g., CCleaner for disk cleanup).
- Example: A technician uses a screwdriver to open a PC case, compressed air to clean the fan, and CrystalDiskInfo to check a failing hard drive.

## **6. Practical Examples**

### **Example 1: School Lab PC Maintenance**

- **Scenario:** A computer in a lab is slow and overheats.
- **Process:**
  1. Technician cleans dust from the CPU fan using compressed air.
  2. Runs Disk Cleanup to remove temporary files.
  3. Updates Windows and antivirus software.
  4. Checks RAM usage with Task Manager to identify issues.
- **Outcome:** Improved performance and reduced overheating.

### **Example 2: Business Printer Troubleshooting**

- **Scenario:** A printer won't connect to a computer.
- **Process:**
  1. Technician checks USB or network cable connections.
  2. Updates printer drivers from the manufacturer's website.
  3. Tests printing from another computer to isolate the issue.
- **Outcome:** Printer restored, enabling business operations.

### **Example 3: Personal Laptop Maintenance**

- **Scenario:** A student's laptop is slow and crashes frequently.
- **Process:**
  1. Technician runs an antivirus scan to remove malware.
  2. Backs up data to an external drive.
  3. Checks RAM and storage health using diagnostic tools.
- **Outcome:** Stable laptop, ready for assignments.

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## **7. In-Class and Self-Study Exercises**

### **In-Class Exercises:**

### **1. Component Identification:**

- In groups, identify 5 hardware components in a desktop PC (e.g., CPU, RAM). Write a 50-word description of their functions.

### **2. Maintenance Plan:**

- Discuss in pairs: Create a basic maintenance checklist for a school lab PC (e.g., clean dust, update software). List 5 tasks.

### **3. Tool Usage:**

- Examine a hardware toolkit (e.g., screwdrivers, compressed air). Explain how each tool is used in maintenance (50 words).

## **Self-Study Exercises:**

### **1. Scenario Analysis:**

- Write a 150-word description of how to troubleshoot a slow computer. Include 3 maintenance tasks (e.g., clean dust, scan for malware).

### **2. Component Research:**

- Research one hardware component (e.g., SSD, GPU). Write a 100-word summary of its function and maintenance needs.

### **3. Maintenance Schedule:**

- Create a monthly maintenance plan for a computer lab. List 5 tasks with frequencies (e.g., weekly antivirus scans).

### **4. Tool Exploration:**

- Explore a free diagnostic tool (e.g., CrystalDiskInfo). Write a 100-word summary of its use in maintenance.

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## **8. Week 1 Assignment (Contributes to Labs – 30%)**

**Task:** Create a Computer Maintenance Poster

**- Description:**

- Use Canva to create a poster outlining 5 maintenance tasks for a computer (e.g., cleaning dust, updating software).

- Include:

- A brief description of each task (20–30 words each).

- One hardware component involved (e.g., CPU fan for cleaning).

- One tool used (e.g., compressed air).

- Write a **200-word explanation** of why maintenance is important and how the tasks improve performance.

- Include a handwritten note (scanned/photographed) with your name and a 2-sentence summary of the poster’s purpose.

- **AI-Proof Measures:**

- Handwritten note ensures originality.

- Explanation must reflect personal understanding of maintenance benefits.

- **Learning Outcomes:**

- Reinforces understanding of hardware components and maintenance practices.

- Develops skills in communicating technical concepts visually.

- **Portfolio Value:**

- Save the poster as a PDF in a GitHub repository with a README (e.g., “Computer Maintenance Poster”).

- The explanation demonstrates analytical skills for job applications.

- **Submission Format:**

- PDF (poster + 200-word explanation + handwritten note photo, 25% of lab grade).

- Optional: MP3 (1-minute voice summary, 5% of lab grade, if required).

- **Grading Rubric:**

- 40% Technical Accuracy: Correct maintenance tasks, component, and tool.

- 30% Clarity: Clear poster design and explanation.

- 20% Originality: Unique tasks and handwritten note.

- 10% Presentation: Neat poster and readable text.

- **Tips:**

- Use Canva’s templates but customize with clear labels and visuals (e.g., image of a CPU fan).



- Test your explanation by listing specific benefits (e.g., “Cleaning prevents overheating”).
  - Ensure the handwritten note is legible and includes your name.
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## **11. Glossary of Key Terms**

- Computer Support: Diagnosing and resolving computer issues.
- Maintenance: Preventive tasks to ensure system reliability.
- CPU: Processes instructions, the computer’s brain.
- RAM: Temporary storage for active programs.
- HDD/SSD: Permanent storage for data and programs.
- Motherboard: Connects all components.
- PSU: Supplies power to components.
- GPU: Handles visual output.
- Physical Cleaning: Removing dust to prevent overheating.
- Data Backup: Saving data to prevent loss.

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## **12. Frequently Asked Questions**

- What’s the difference between support and maintenance?
  - Support involves fixing issues (e.g., troubleshooting a crash). Maintenance prevents issues (e.g., cleaning dust).
- How do I create a good poster for the assignment?
  - Use Canva’s templates, include 5 tasks with visuals (e.g., fan image for cleaning), and explain benefits clearly.
- What if I’m unsure about hardware components?
  - Review the CPU, RAM, and storage functions. Use diagrams to visualize connections.

- How do I prepare for the quiz?
  - Study these notes, review Chapter 1 of the textbook, and practice identifying components and tasks.
- Why is maintenance important?
  - It prevents issues like overheating or malware, ensuring systems remain reliable and efficient.

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### 13. Troubleshooting Tips

- **Problem:** My poster lacks detail.
    - **Solution:** Include 5 tasks, a component (e.g., CPU), and a tool (e.g., compressed air). Check the example for guidance.
  - **Problem:** I don't understand hardware components.
    - **Solution:** Compare to real-world objects (e.g., CPU as brain, RAM as short-term memory). List one function for each.
  - **Problem:** My explanation is too short.
    - **Solution:** Describe each task's benefit (e.g., "Cleaning prevents overheating"). Use the school lab example as a guide.
  - **Problem:** I'm stuck on the application question.
    - **Solution:** Think of systems like school labs or offices. Explain how maintenance improves productivity.
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### 14. Self-Study and Portfolio Tips

- **Practice:**
  - Identify components in a PC (e.g., CPU, RAM) and write their functions.
  - Create a maintenance checklist for a scenario (e.g., office computers).
  - Experiment with Canva to design a practice poster.
- **Resources:**

- Read Chapter 1 of CompTIA A+ Certification by Mike Meyers.
- Watch Professor Messer's A+ videos on YouTube (free).
- Explore iFixit's repair guides for hardware maintenance tips.
- **Portfolio:**
  - Create a GitHub repository for IT assignments.
  - Upload the poster PDF and explanation with a README (e.g., "Computer Maintenance Poster").
  - Include a sample maintenance checklist to show practical skills.
- **Applications:** Consider how maintenance supports systems like school labs, businesses, or personal devices to appreciate its impact.