Chapter 9

PC Maintenance and Troubleshooting Strategies

At a Glance

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Overview

This chapter focuses on PC support strategy. When supporting personal computers and their users, having a strategy in mind can make the difference between feeling overwhelmed and feeling in charge. A strategy provides the technician direction, purpose, and a plan.

Staying safe and protecting equipment is essential to the strategy as a professional support technician. The best support technicians are good at preventing a problem from happening in the first place. In this chapter, the student will learn how to develop a preventive maintenance plan and use it. Finally, the student will learn a strategy to solve any computer problems. This strategy may be applied to all the troubleshooting skills presented learned so far in this book. The student can then build on this strategy in future troubleshooting situations to become an expert problem solver who is confident that he or she can face any computer problem.

Chapter Objectives

After reading this chapter and completing the exercises, the student will learn:
- About operational procedures to keep you, other people, the equipment, and the environment safe
- How to develop a preventive maintenance plan and what to include in it
- How to approach and solve a PC problem

Teaching Tips

Operational Procedures When Supporting Personal Computers

1. Introduce the topics covered in the section.

Stay Safe and Keep Others Safe

1. Review the dangers PC support technicians face when working on and around equipment.

2. Use Figure 9-1 to illustrate and describe different cleaning solutions and cleaning pads used to clean a variety of devices.
   a. Explain the hazards associated with these cleaners.
   b. Describe the steps to take if a technician becomes exposed to these hazards.
   c. Use Figure 9-2 to illustrate a Material Safety Data Sheet (MSDS).
   d. Emphasize that a technician should always check with his or her organization to find out how to handle reporting these types of incidents.
3. Describe the dangers associated with cables running across the floor and explain how to minimize these hazards.

4. Emphasize that back injury, caused by lifting heavy objects, is one of the most common injuries that happen at work.
   a. Discuss guidelines for avoiding back injuries.

**Physically Protect Your Equipment**

1. Discuss precautions that may be taken to physically protect computer equipment.

**How to Dispose Of Used Equipment**

1. Point out that a PC technician is often responsible for the proper disposal of used equipment and consumables. These include batteries, printer toner cartridges, hard drives, and monitors.

2. Using Table 9-1, discuss how to dispose of equipment and consumable items.

3. Explain how to discharge monitors.

4. Describe how to destroy media containing sensitive or private data.

**How to Move Computer Equipment**

1. Describe risks involved with shipping a computer.

2. Describe how to prepare a computer for shipping.

**Protecting Software Copyrights**

1. Explain the difference between a licenses and copyrights.

2. Emphasize that a PC technician has responsibility, under the law, to protect software copyrights.

3. Point out that the potential for copyright violation exists during the installation, upgrading, and customization of software.

4. Review the provisions of the Federal Copyright Act of 1976 pertaining to software piracy (copyright infringement).

5. Indicate that by purchasing a site license a company can obtain the right to use multiple copies of software.

6. Advise students to read the licensing agreement of any software to determine the terms of distribution.
7. Use Figure 9-4 to illustrate the sample end-user licensing agreement (EULA) usually displayed during installation.

8. Describe two organizations dedicated to combating software piracy:
   - Software Information Industry Association
   - Business Software Alliance

9. Define the term “hard-disk loading”.
   a. Review the warning signs of hard-disk loading, such as the absence of an end-user license in the installation package.

10. Review the terms of the Software Rental Amendment Act passed in 1990.
    a. Discuss the criminal penalties for software copyright infringement instituted in 1992.

11. Discuss the responsibilities of individual users and employers with respect to the use of software.
    a. Explain the Software Rental Amendment Act passed by the U.S. Congress in 1990.
    b. Describe the criminal penalties for software copyright infringement.
    c. Point out that the PC technician is responsible for complying with a site license agreement.
    d. Point out that the PC technician is responsible for purchasing only legitimate software.
    e. Mention that if a software budget is very low, instead of purchasing or pirating commercial software, a company or individual may consider using open source software.

**Teaching Tip**

More information on the Federal Copyright Act of 1976 may be found at:
http://www.copyright.gov/title17

More information on open source software may be found at:
http://sourceforge.net

**Quick Quiz 1**

1. A(n) __________________ explains how to properly handle substances, such as chemical solvents.
   Answer: Material Safety Data Sheet (MSDS)

2. True or False: For optimum airflow, remove expansion slot covers on the rear of the case.
   Answer: False
3. True or False: When someone purchases software from a software vendor that person legally owns the software.
   Answer: False

4. Making unauthorized copies of original software is called ____________________.
   Answer: piracy

5. True or False: By purchasing a site license, a company can obtain the right to use multiple copies of software, which is a popular way for companies to provide software to employees.
   Answer: True

**Personal Computer Preventive Maintenance**

1. Introduce and describe preventative maintenance.

**Set Up a Method of Documentation**

1. Explain how to create and store a new computer record book.

**Create a Preventive Maintenance Plan**

1. Explain why it is important to create an overall preventative maintenance plan.

2. Using Table 9-2, review the guidelines for developing a preventive maintenance plan.

**How to Troubleshoot a PC Problem**

1. Introduce PC troubleshooting.

2. Use Figure 9-5 to explain the systematic method to solve a problem.

3. Note that the six steps in the systematic method to solve a problem have 15 rules interspersed among the steps.

4. Discuss Rule 1: Approach the Problem Systematically.

**Step 1: Interview the User and Back Up Data**

1. Describe how to begin the troubleshooting process by interviewing the user and asking questions to help identify the problem.

2. Discuss Rule 2: Establish Your Priorities.

3. Discuss Rule 3: Beware of User Error.
4. Discuss Rule 4: Keep Your Cool and Don’t Rush.

5. Mention that a PC technician needs to back up any important data, not currently backed up, before working on the PC.
   a. Describe ways to back up data on a healthy system and an unhealthy system.
   b. Emphasize that any risks to the data must be the user’s decision.

**Step 2: Examine the System and Make Your Best Guess**

1. Discuss Rule 5: Make No Assumptions.

2. Discuss Rule 6: Try the Simple Things First.

3. Review the steps for forming a best guess (best theory) and testing it.

4. Use Figure 9-6 to illustrate how to use a manufacturer’s web site to ideas and tips.

**Step 3: Test Your Theory**

1. Review two examples where steps 3, 4, and 5 go very fast.

2. Review two examples of Step 3, which include testing a guess that is not correct.

3. Review two examples of Step 3, where the guess is correct and then you move on toward Step 4 to plan a solution.

4. Discuss Rule 7: Trade Known Good for Suspected Bad.

5. Discuss Rule 8: Trade Suspected Bad for Known Good.

6. Discuss Rule 9: Divide and Conquer.

7. Discuss Rule 10: Become a Researcher.


9. Discuss Rule 12: Don’t Assume the Worst.

10. Discuss Rule 13: Reboot and Start Over.

**Step 4: Plan Your Solution and Then Fix the Problem**

1. Explain why a PC technician needs to carefully consider what he or she will do, as well as the order of the tasks.

2. Discuss Rule 14: Use the Least Invasive Solution First.

3. Discuss Rule 15: Know Your Starting Point.
4. Review the steps to plan a solution and fix the problem.

**Step 5: Verify the Fix and Take Preventive Action**

1. Describe how to implement the solution, reboot the system, and verify all is well.

**Step 6: Document What Happened**

1. Explain the benefit of good documentation.

2. Use Figure 9-8 to illustrate a Service Call Report Form that might be used in a small computer repair center.

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**Teaching Tip**

More information on troubleshooting may be found at: [http://www.techadvice.com/tech/T/Troubleshooting.htm](http://www.techadvice.com/tech/T/Troubleshooting.htm)

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**Quick Quiz 2**

1. True or False: A disaster recovery plan is used to manage failures when they occur.
   Answer: True

2. A(n) ________________ is a notebook or file containing a record of any changes in setup data, as well as any problems experienced or maintenance performed on a computer.
   Answer: record book

3. True or False: A preventive maintenance plan tends to evolve from a history or pattern of malfunctions within an organization.
   Answer: True

4. ________________ is a Windows utility that reports errors with hardware devices.
   Answer: Event Viewer

5. True or False: Good documentation helps to satisfy any audits.
   Answer: True
**Class Discussion Topics**

1. Why is it important to involve a customer in the problem-solving process?

2. What is the difference between a license and a copyright?

**Additional Projects**

1. Each student should go to the Microsoft website and research the licensing options for the Windows 2008 Server family of products. The student should provide a written summary of his or her findings.

2. Each student should research a recent (within the past three years) software piracy legal case and provide a 1 to 2 page write-up describing the case and the outcome.

3. Each student should research what items should be included in a good disaster recovery plan. The student should provide a written report justifying each item and a table of contents outlining a disaster recovery plan.

**Additional Resources**

1. Software Piracy:  

2. Business Software Alliance:  
   [http://www.bsa.org](http://www.bsa.org)

3. Software & Information Industry Association:  
   [http://www.siia.net](http://www.siia.net)

4. The MSDSSEARCH, Inc., National MSDS Repository:  

5. Department of Justice: Computer Crime & Intellectual Property Section:  
Key Terms

- **copyright**: An individual’s right to copy his/her own work. No one else, other than the copyright owner, is legally allowed to do so without permission.
- **hard-disk loading**: The illegal practice of installing unauthorized software on computers for sale. Hard-disk loading can typically be identified by the absence of original software disks in the original system’s shipment.
- **license**: Permission for an individual to use a product or service. A manufacturer’s method of maintaining ownership, while granting permission for use to others.
- **Material Safety Data Sheet (MSDS)**: Explains how to properly handle substances such as chemical solvents.
- **site license**: A license that allows a company to install multiple copies of software, or to allow multiple employees to execute the software from a file server.
- **trip hazard**: Loose cables or cords paced in a traffic area where people can trip over them.