The Troubleshooting Process

Lesson 3

An important part of working as a PC technician is troubleshooting. Troubleshooting is more than just fixing a system. Successful technicians employ several steps in the troubleshooting process to ensure that they can identify and resolve problems as efficiently as possible and not cause additional problems.

Below are six steps standards in troubleshooting process, and you'll need to know each of these and in the following order:

1. *Identify the problem.*
2. *Establish a theory of probable cause.*
3. *Test the theory to determine cause.*
4. *Establish a plan of action to resolve the problem, and implement the solution.*
5. *Verify full system functionality, and if applicable, implement preventive measures.*
6. *Document findings, actions, and outcomes.*

1. Identify the Problem

In this step, you'll gather information about the problem. Many problems occur because of a recent action, so it's important to ask the user whether anything has recently changed. Users often make changes to their system and don't recognize the impact that the change can have.

Tech opening the system unit to identify the problem

When questioning users, it's very easy for them to get defensive and stop giving you helpful answers, especially if a technician asks questions in a threatening manner. For example, ask someone, "What did you do?" and the answer is very often, "Nothing."

However, if you think of the user as a partner in your quest to resolve the problem, you can start a conversation and get them to help you. For example, asking something like, "When did it last work?" and "Do you know whether anything has changed since then?" doesn't attack the user and is likely to get you more information.

Also, if a user is working in an environment with other users, it's worthwhile to ask them whether they're having the same problem. This is especially true when troubleshooting network problems. If it's affecting one user, the problem is likely with that user's system. If it's affecting all users, the problem is likely a network problem.

2. Establish a Theory of Probable Cause

In the next step, you'll make an educated guess to identify the source of the problem. During this step, it's important to question the obvious. A useful troubleshooting practice is to check the easy things first. If a computer won't start, an obvious theory is that the PC isn't plugged in or turned on, or you may check the cables as well.

3. Test the Theory to Determine Cause

Next, you'll test your theory by looking at the system. If it's a simple problem, such as a blank display, it can be as easy as checking all the plugs and power connections. Some problems aren't so simple and obvious, so you might need to take a few steps to test the theory. You'll probably be using different hardware or operating system tools described throughout this book to help identify the problem.

Tech checking the connectivity

It's very possible that your educated guess about the cause wasn't correct. If so, look for a new theory of the probable cause.

Establishing and testing are listed as separate steps, but experienced technicians go through the steps very quickly. For example, if you have a blank display, you might go through the following steps.

- Theory: Computer not on.
  * Test theory: Check to see whether it's on.
- Theory: Monitor not plugged in or turned on
  * Test theory: Check for power indicator on monitor.
- Theory: Monitor not plugged into correct graphics port.
  *Test theory: Verify cable plugged into extension card port instead of into motherboard onboard connector.


Tech checking the display connectivity

If you run out of ideas, you might need to escalate the problem by calling in some help. Many organizations have several levels of technicians. If a technician on one level can't solve the problem, the technician escalates it to the next level, and a technician from that level will try to resolve it.

4. Establish a Plan of Action and Implement It

After you've confirmed your theory, you'll need to establish a plan of action to resolve the problem and implement the solution. Ideally, this will solve the problem. If not, you'll need to go back to step 2 to establish a different theory.

It's important to take your time with this. Experienced technicians sometimes use the term shotgunning, referring to a process of just trying everything without taking the time to think things through or analyze the problem.

Consider the given problem. You turn a computer on, and the fans are spinning but nothing else is working. This could be a faulty power supply, faulty CPU, faulty motherboard, faulty RAM, or faulty expansion card. You could just start replacing everything one by one. You might get lucky and fix the problem, but if you take the time to test your theories and implement fixes individually, you'll end up with better results.

- **Theory:** Faulty power supply.
  * **Test theory**: Measure voltages supplied via the primary motherboard connector and CPU power connector with the system turned on.
  * **Plan of action**: If these are out of tolerance, replace the power supply. If you replace the power supply without checking the voltages, you might be replacing a good component and inadvertently cause another problem in the process.


Tech removing the power supply unit

- **Theory:** Faulty expansion card. In some cases, a faulty expansion card can load down a system and prevent anything from working.
  * **Test theory**: About the only way to test this theory is to remove all the cards to see whether the problem disappears. You can then reinstall the cards one by one to see if the problem comes back when you install a card.
  * **Plan of action**: This will be time-consuming and very risky. It's very possible for a card to be damaged while a technician is removing it. Additionally, it's very possible that cables and connectors might not get returned to their original locations when the cards are reinstalled. This theory should not be tested before doing simpler checks, such as checking the power supply voltages.

Tech removing the power supply

When you're faced with a challenging problem, it's important to document your steps. Each time you test a theory, take some notes so that you can easily recall what you did, and list the results of your actions. If you end up working for several hours on a problem, you might find that your actions from a couple hours ago aren't crystal clear.

One more thing: if you implement a change and it doesn't resolve the problem, you should undo your change. This is especially important when making configuration changes. I've witnessed several problems that started as a simple configuration issue that could be resolved by making one change. However, technicians made multiple changes in an attempt to resolve the problem but never undid them. Eventually, the original problem is resolved, but unfortunately these other changes have caused a host of other problems.

5. Verify Full System Functionality

After implementing a solution, it's important to check out the entire system to ensure that it is operating as expected. For example, imagine that you're troubleshooting a printer with two paper trays. You could fix a problem with one paper tray, test it, and verify that it works. However, you should also check the second paper tray to ensure that you can print using this tray, too.

In some situations, preventive measures are needed when you implement a fix. For example, if you're troubleshooting a system and noticed that the fans and the inside of the system are clogged with an excessive amount of dust, you should use the proper tools and vacuum it out.

Tech checking the functionality of the system

6. Document Findings, Actions, and Outcomes

In the last step, you document what you did to resolve the problem. Many organizations have dedicated applications used to track all troubleshooting activity in trouble tickets. These trouble tickets track the progress until it's resolved. This information is searchable to allow technicians to easily share their knowledge or to research the solution to a previously solved problem.

For example, Microsoft uses a Knowledge Base (KB) system. Problems that have been troubleshot and resolved are documented as KB articles. If you're troubleshooting a software problem that is giving you a specific error, you can type the error in as a search phrase on Bing. This will often take you directly to a KB article that describes the problem and the solution.

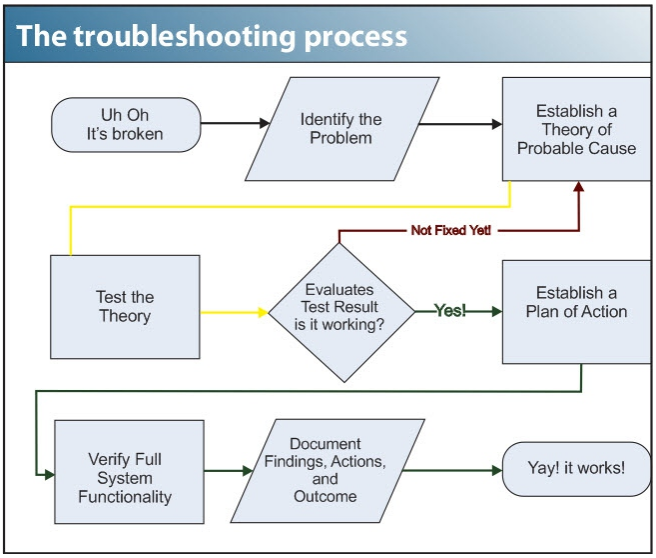
Trouble ticket databases are also useful in other situations, such as tracking trends. Some systems fail more than others, and when the trend is identified, it's possible to take proactive steps to reduce the problems. Also, management often uses information in the database as justification for hiring additional workers and sometimes to identify the most productive workers.

A Tech documenting his findings and diagnosis

Troubleshooting Process Diagram

The diagram (below) is the complete flow of all the steps mentioned in the previous pages. To summarize: First identify the problem then establish a theory of the probable cause. After establishing the theory, you have to test. Upon testing evaluate if it works then you may proceed to the plan of action else if it does not work you go back to step 2 until it works.

Let's assume that you have your plan of action already, verify the system functionality and finally document your findings, actions and outcomes on how you solve the problem.



The Troubleshooting Process diagram

Chapter 1
Laboratory Manual

OPERATIONAL PROCEDURES for PC Tech

Laboratory Activities

1.01 How Computer Tech Should Be
1.02 Effectively Communicating
1.03 Preparing for the Technical Interview
1.04 Integrating Safety into the Workplace
1.05 Safeguarding Your IT Future - Becoming a Professional

Chapter Analysis and Written Test

Lab Activity 1.03 **Preparing for the Technical Interview**

Sitting for an interview and selling yourself to complete strangers is the stuff of many a PC tech's nightmares. Trust me! You might think it sounds easy, but once you're in the hot seat and actually doing it, everything changes. So buckle down and pay attention during this lab because it could make or break your chance of landing that dream job!

Before we get started in earnest, here are some tips to keep in mind when interviewing for a job.

- No chewing gum.
- Turn your cell phone off and keep it out of sight. No texting!
- Comb your hair and keep it out of your eyes (if you have to swing your hair to the side every minute, get a haircut). Messy hair looks very unprofessional and reflects poor self-image.
- Brush your teeth.
- Males - Tuck in your shirt, pull up your pants, and wear a belt.
- Females - No miniskirts or low tops, and keep your stomach covered.
- Shake hands firmly.
- Maintain good eye contact at all times.
- No sneakers allowed!
- Do not offer information that is not pertinent to the interview. Think before speaking and always tell the truth.

Learning Objectives

In this lab exercise, you will practice role modeling as an interviewee (if no interviewers are present, you may also have to roleplay as an interviewer). You will be critiqued as you are probed to say and do the right thing at all times. So get ready for some fun in preparing for the interview process.

At the end of this lab, you'll be able to

- speak clearly, professionally, and technically
- describe how IT affects the workplace
- effectively communicate what you know
- know what to bring and wear to the interview

Lab Materials and Setup

The materials you need for this lab are:

- an updated résumé that lists all your skills; technology courses that you're currently taking or have completed; and reliable references, other than family preferably customers or people that know your skill level and character, and have worked with you for a period of a minimum of six months.
- a digital portfolio (a CD) that includes an updated copy of your résumé; pictures or short video clips of you working on computers, possibly building a computer; any presentations or technology-related projects you've been involved in implementing; a log of customers you've supported; and any Web sites you've created that demonstrate your skills. Not MySpace or Facebook! By the way, this is a CD you will leave with your interviewer, so make it good.

Let's Get the Lab Started

This is a work-in-progress lab that will be beneficial to you for life. Once you've started the process of learning to present yourself effectively, you will be surprised at how many opportunities you'll get to use these skills.

Step 1 Write your résumé and save it to multiple places. Have your instructor guide you as to what to include and what not to include. Run a spell check! Print and proof it yourself first and then allow your instructor to critique it.

Step 2 Type a list of personal and professional references on a separate document and contact the people you are listing to make them aware they may get a call about your potential interview.

Step 3 Have a room set up with at least four tables/stations, one for each volunteer interviewer, with at least three chairs at each station. Have students "dress for success" on the day of the interview and let them know that evaluation of their appearance comprises 50 percent of their grade.

Step 4 Enter the interview area quietly. Make sure to have your printed résumé, references, and digital portfolio ready to turn in. Interviews should last no more than ten minutes. Ideally, the interviewers will ask everyone the same questions, but you never know what you'll be asked.

Step 5 Once you have been interviewed, the interviewers will compare their thoughts and choose two or three top students to be interviewed by the entire group of interviewers. This is called a panel interview and is the type of interview students will most likely encounter when being interviewed for various jobs.