

# Hardware Troubleshooting Techniques

## Troubleshooting using logical reasoning

What will you be, a gunslinger or a great technician? Well, gunslingers, although will make money in the short term, will be out of work in a short amount of time. These technicians “shoot from the hip” when it comes to troubleshooting computer problems, and although get lucky sometimes, most of the time the cause more damage.

A technician who uses the logical reasoning approach to troubleshooting is more valuable and will withstand the test of time. By learning and implementing a logical reasoning approach, you will be able to take on any problem and conquer it with success.

There is a danger though that you should be made aware of, so that you don't get caught up on the trap that most technicians fall into. Over time and through experience, you will learn how to solve a problem without going through the entire troubleshooting process. This can be dangerous. Just keep in mind, if your first attempt at solved the problem does not work, approach the situation using the “Logical reasoning method.”

The logical reasoning approach to troubleshooting can be broken down into the following six steps:

1. Re-create the problem.
2. Divide the problem into hardware or software.
3. Divide and conquer: divide the problem into logical areas to isolate it.
4. Repair the problem or go back to test another theory.
5. Test the solutions.
6. Provide feedback to the user.

## 1. Re-create the problem

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Computer problems come in all shapes and sizes. Many problems relate to the people who operate computer – the users. The frequently perceive the computer as the problem. The problem may end up being the user's behavior, such as facility to choose the correct printer, pushing the wrong key for a specific function, or issuing an incorrect command.

Have the user demonstrate or re-create the problem. Because the user themselves is often the problem, you can save a great deal of time with this step. Do not assume anything! A user may complain that “my hard drive does not work” when in fact, there is no power to the computer. Users often repeat computer terms they have heard or read, but cannot use them correctly or in the right syntax. By asking a user to re-create a problem, a technician creates the chance to see it as the client sees it. Even in a phone consultation, the same rule applies never assume and have the user re-create the problem step-by-step.

If you think the problem is related to software, you can ask the user if they have installed any new software before or since the problem started. Not all software programs work together on the same computer. There could be conflicts cause other software issues.

## 2. Hardware or Software

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A technician determines if the computer problem is hardware or software related (or both) by using his or her senses: sight, hearing, and smell can tell you a great deal. Watch the computer boot, look for lights, listen for beeps, and **take notes**. Frequently, a hardware problem is detected during POST (Power On Self-Test) executed by the BIOS during a cold boot. POST checks out the hardware in a sequential order and if it finds an error, the BIOS issues a beep and/or displays a numerical error code. Make note of any error codes or beeps. Look them up on the Internet to determine the problem.

POST error codes only direct a technician to the right general area. Sometimes multiple POST errors occur. If this is the case, start the troubleshooting process with the first error code detected.

Because manufacturers constantly produce BIOS upgrades, you must contact the chip manufacture for a current list of error codes or use the Internet to download the latest copy of error codes.

Hardware errors might also occur. For example, the monitor might suddenly go black the floppy drives' access light might not go on when it attempts to access the floppy disk, or the printer might repeatedly flash an error code. Hardware errors are usually obvious because of POST error codes or errors that occur when accessing a particular device.

Software errors, on the other hand, occur when the computer user access a particular application or when the system boots (Operating Systems). Files that affect the booting process are operating system-dependent.

If in doubt as to whether a problem is hardware or software, run diagnostics on the hardware to eliminate that possibility.

The first step in troubleshooting a software problem is to reboot the computer and try to re-create the problem. Most of the time, this will solve a problem.

## 3. Divide and Conquer

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Divide the problem into logical areas and continue sub-dividing the problem until it is isolated. This is done by thinking of everything that might be causing the problem at hand. For example, if the problem is with the computer saving files on a floppy disk, the problem would be within the area of the floppy drive system. This would include: the disk, the floppy drive, the cable connecting the floppy drive to the mother board, the power connector, and the electronics on the mother board.

From your list, develop theories that might be causing the problem, and research potential solutions. Again with the example one theory must be, you have a bad floppy disk.

Organize all of your theories with the simplest and most cost effective fixes first. A good technician tries to solve the problem for their customer in the most cost effective and quickest time possible.

Knowing what all is involved, or what could possibly be wrong, will develop with experience. Don't be concerned that you forgot something at first. Just make a list of what you know or research the problem on the Internet.

## **4. Repair the Problem or Test Another Theory**

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Swapping a part, checking hardware settings, referring to documentation – all are necessary steps in troubleshooting. Noting error or beep codes is just one element in the diagnostic routine. Determining what the problem is usually takes longer than fixing it. Software problems frequently involve reloading software applications, software drivers, or getting software updates and patches from the appropriate vendor. The Internet is an excellent resource for these files.

Hardware problem resolution simply involves swapping the damaged part. If swapping a part or reloading the software does not solve the problem, go back to the logical troubleshooting. Step 2 reminds you to divide the problem into hardware and software. Go back to this step if necessary. Step 3 advises you to divide and conquer. This step is the mostly likely place to resume your troubleshooting. Eliminating what could be the problem is important. Take notes during these steps so that you know what you have tried.

## **5. Test the Solution**

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Never assume the hardware component or the replaced software repairs the computer. The computer can have multiple problems, or the repair may not offer a complete solution. Test the computer yourself and have the user test the computer in normal conditions to prove that the problem is indeed solved.

## **6. Provide Feedback to the User**

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Unfortunately, one of the biggest problems with technicians is their inability to communicate effectively with users. The best computer technicians are the ones the users trust, and those who explain problems in a way the customers understand. A computer repair is never finished until the user is updated. Do not use technical terms with users who are not technically competent. Treat computer users as if they are intelligent, even if they are not proficient in technical terminology.

Each computer repair is a different scenario because of the plethora of vendors, products, and standards in the marketplace. But that is what makes the job so interesting and challenging. Break each problem down into a manageable task, isolate the problem, and use all available resources, including other technicians, documentation, and the Internet, to solve it. Never forget to give feedback.