Lab - Troubleshoot Hardware Problems (Instructor Version)

**Instructor Note**: Red font color or gray highlights indicate text that appears in the instructor copy only.

# Introduction

In this lab, you will diagnose the cause of various hardware problems and solve them.

# Recommended Equipment

* A computer with an operating system installed.
* Additional hardware that is either broken or in a working condition. You may wish to use working hardware, but sabotage it in some way.

# Scenario

You must solve hardware problems for a customer. You might also need to troubleshoot hardware connected to the computer. Make sure you document all the problems and the solutions.

There are several possible errors. Follow through the lab, solving one problem at a time until you can successfully start the computers and all devices are fully functional. You may need to ask the instructor for hardware when needed.

# Lab Setup

**Instructor Note**: This lab requires setup by the instructor to create multiple hardware problems for each student. Include at least two of the problems listed per student. Students working in pairs will alternate between troubleshooting the problems until they have solved all the problems. You will need to inform students of the number of problems applied to each computer.

**Important**: Test each of the problems you implement before assigning the lab to the students.

**Instructor Note**: Students may not solve problems in the same order shown in the instructor document. Students might notice more than one problem at a time while troubleshooting. Remind students to correct and document one problem at a time.

**List of Problems**:

* + - * 1. Hard drive power cable disconnected.
        2. No RAM installed.
        3. Power supply not connected to motherboard.
        4. CPU not installed.
        5. Power cord unplugged from wall outlet.
        6. Case fan power disconnected.
        7. Front panel power button connectors reversed or disconnected.
        8. Non-functional parts are installed.

1. Disconnect power cable from the hard drive.
2. Remove the RAM from the motherboard.
3. Unplug the power cable from the motherboard.
4. Remove the CPU from the motherboard.
5. Unplug the power cord from the wall outlet.
6. Unplug power cable for case fan(s).
7. Install the power button motherboard connector backward, or disconnect.
8. Non-functional parts are installed.

Plug component(s) that do not function into the computer. Examples include: mouse, keyboard, hard drive, video card, RAM, power supply, etc. This lab will use a power supply as an example. Each station could have the same or different components that do not work. The instructor will need good working parts available.

# Instructions

## Start and log in to the computer.

**Instructor Note:** Students work all the way through the lab for each problem, returning to this step after each problem has been fixed and documented. After all problems have been fixed, the lab will end at the end of this step.

* + 1. Start the computer.

### Question:

Did the computer boot successfully?

Type your answers here.

Answers may vary.

* + 1. If the computer started, log on with an account with administrative privileges. Test all internal and external hardware devices.

### Question:

Did all devices operate properly?

Type your answers here.

Answers may vary.

* + 1. If the computer successfully started and all devices are fully functional, you have successfully solved all hardware problems. Hand the lab to your instructor.

## Troubleshoot the hardware problem.

If you could not successfully start the computer and all devices are not fully functional, continue troubleshooting the problem.

Answer the following questions after each problem is solved.

### Questions:

* + - 1. What problem did you find?

Type your answers here.

* + - * 1. Answers may vary, for example: No HDD LED lights on or “No operating system found” error.
        2. Answers may vary, for example: POST error message or beep sequence, the computer fails to boot.
        3. Answers may vary, for example: No front panel LEDs on, the computer will not start.
        4. Answers may vary, for example: Front panel LEDs on, the computer will not start.
        5. Answers may vary, for example: No front panel LEDs on, the computer will not start.
        6. Answers may vary, for example: Case fan(s) not turning.
        7. Answers may vary, for example: Computer will not turn on.
        8. Answers may vary, for example: Computer will not turn on.
      1. What steps did you take to determine the problem?

Type your answers here.

* + - * 1. Examine the power connection to the hard drive.
        2. Examine the motherboard for loose and missing components.
        3. Examine the power connection: wall outlet and motherboard.
        4. Examine the motherboard for loose and missing components.
        5. Examine the power cord connection to the wall outlet.
        6. Examine the power connection to the fan(s).
        7. Examine the front panel case connections to the motherboard.
        8. Examine the power cord connection to the wall outlet. Also, examine switch on power supply.
      1. What is causing the problem?

Type your answers here.

* + - * 1. Power cable disconnected from the hard drive.
        2. No RAM is installed.
        3. Power not connected to the motherboard.
        4. No CPU installed.
        5. Power cord unplugged from the wall outlet.
        6. Case fan(s) unplugged from the motherboard.
        7. Front panel power button connection reversed or disconnected.
        8. Dead power supply.
      1. List the steps taken to fix the problem.

Type your answers here.

* + - * 1. Disconnect the power and remove the case cover.

Locate and plug the power cable into the hard drive.

Put the computer case together.

Connect the power supply to the wall outlet.

Start the computer.

* + - * 1. Disconnect the power and remove the case cover.

Press outward on the clips that hold the sides of the RAM.

Align the notch of the RAM with the RAM socket.

Gently press down until the clips lock.

Put the computer case together.

Connect the power supply to the wall outlet.

Start the computer.

* + - * 1. Disconnect the power and remove the case cover.

Locate and plug the power cable into the motherboard.

Put the computer case together.

Connect the power supply to the wall outlet.

Start the computer.

* + - * 1. Disconnect the power and remove the case cover.

Open the ZIF lever.

Align pin 1 of the CPU with the CPU socket.

Place the CPU gently in the socket.

Close the ZIF lever.

Apply thermal grease to the CPU.

Attach the CPU heat sink and fan assembly

Put the computer case together.

Connect the power supply to the wall outlet.

Start the computer.

* + - * 1. Plug the power cord into the wall outlet.
        2. Disconnect the power and remove the case cover.

Locate and plug the fan power cable into the motherboard.

Put the computer case together.

Connect the power supply to the wall outlet.

Start the computer.

* + - * 1. Disconnect the power and remove the case cover.

Disconnect the incorrectly installed front panel power button connections.

Install the connectors the correct way.

Put the computer case together.

Connect the power supply to the wall outlet.

Start the computer.

* + - * 1. Disconnect the power and remove the case cover.

Remove power supply.

Install working power supply.

Put the computer case together.

Connect the power supply to the wall outlet.

Start the computer.

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