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**Unit 4: Guided Practice 1**

1. **The Printer isn’t printing:** 
   1. **Turning system on/off : Goal Stated through contradictions | Hypothesis Testing** 
      1. Checking if the printer problem can be quickly resolved by turning the system on & off and resetting communication between devices. This will restart the system services & reset communication with the devices. This is a guess and check approach to rule out the possibiliy that the device may start working if the system services are restarted
   2. **Checking Print Queue: Goal stated through contradictions | Mental Model**
      1. Resetting print Queue to make sure no current documents will interfere with the printer’s current task, allowing printer to refresh its memory buffer & end all its current tasks. This is more of an educated approach, based on a mental model. The user has to understand that the print Queue is responsible for sending information to the printer in order to print the documents in a queue. Failure in this step will determine if the problem is assigning tasks to the Queue (more software related problem ) or if there is a possible defect in the hardware. The print Queue is a logical approach to problem solving.
   3. **Taking a step back to Question: Analogical | Metacognition approach**
      1. Checking to see what other issues can be causing the printer to not respond to machine. Wondering if it is a hardware problem: checking drivers?
      2. could it be empty ink or maintenance issue?

When there is no solution to the problem, taking a step back and thinking about what issues did the technician not try & questioning one’s own ability to approach problem solving. This is Metacognition approach. Analogical in the sense that the user may try to relate the problem with some issue that has been used in the past.

**Solution**: maintenance problem & printer ran out of ink, Technician attempted to update the print driver in order to show proper warning message when the printer ran out of ink on the computer. Technician attempted to use problem solving skills, tested a series of cases to attempt to get a response through a series of critical thinking skills: **Hypothesis Testing**, then use critical thinking and **metacognition,** to take a step back and re-assess the situation to find solution.

1. **System Clock Reset:**
   1. **CMOS Battery: Goal Stated | Mental Modeling | Decision Making**
      1. Technician understands that the internal system clock is powered by the CMOS battery. Going back to *CompTia A+* technician’s knowledge.

**Solution:** Technician keeps a spare of CR2032 3V batteries to replace CMOS battery in the motherboard. In here, the tech uses **mental model** to resolve a commonly known situation through experience. He keeps trouble-shooting tools to help him do this.

Technician knows from experience that the system clock of a pc is related to settings that are powered by the CMOS battery. He uses experience to determine the correct solution for the problem, which is a Goal Stated | Mental Modeling | Decision making approach.

1. **Beeping Noise from Computer** 
   1. **Observing Source of Problem: Goal Stated analogical**
      1. Understanding that the problem is not coming from the speakers, generated by the operating system but the noise is coming from the system itself, inside motherboard or internal chassis.
      2. Understanding that the sound is similar to the computer: Power On Self Test. Technician’s knowledge
   2. **Understanding Sequence of Power On Self Test: Mental Model**
      1. Technician understands that if the Operating system is running fine and the sound beeping. is not coming from the initial POST. This alarm will only go off when the CPU is running too hot. (suspected problem).
   3. **Checking For Physical Defects: Creativity & thinking outside the box**
      1. Technician understands that the CPU overheating can be due to ventilation or external factors, checking for these issues is a good habit.
   4. **Re-setting BIOS : Goal Stated | Mental Model | Decision Making**
      1. Technician understands that CPU settings can be adjusted in the BIOS to make sure that it is not set to over-clock & also check for CPU temperature for problems.
   5. **Rebooting Computer Goal Stated | Hypothesis Testing**
      1. Making sure the computer resumes it’s normal operations after reboot.

**Solution**: In here the Technician uses critical thinking skills: **mental model**  to understand the sequence of computer behavior. He took a step to observe the situation and related to similar computer characteristics. The Technician uses an analogical, problem solving approach and relates it with mental-model and his background education with computers. At some point, he is also creative to check for outside defects that can cause the internal behavior & makes a decision to provide a logical solution.

1. **Computer Stuck in restart loop:**
   1. **Attempt to boot in safe-mode: Goal Stated Contradiction | Mental Model**
      1. Rebooting the computer in safe-mode will ensure that the operating system of the computer, is loaded with minimum services. So if this was a operating system or software related issue, then safe-mode will ensure that no extra software service is loaded on the computer when started.
   2. **Suspect Hardware Culprit: Goal Stated Contradictions | Hypothesis Testing**
      1. When safe mode option is not working & reboot operation is running before loading the entire operating system. The technician suspected that issue is hardware related and will attempt to replace RAM.

**Solution:** keeping additional hardware resources for testing, like DDR2 or DDR3 RAM. He is using critical thinking skills: **Hypothesis testing** to isolate the situation.

In here, the technician uses a goal stated contradiction problem solving approach to solve the problem. He also is aware of the operations of the computer to boot into safe mode : Mental modeling. He then suspects a hardware related issue & tests his hypothesis.

1. **Screen On Drugs: Goal Stated Contradiction | Hypothesis Testing**
   1. **Test for Loose Cabling:**
      1. Technician understands that the display image can be due to loosen VGA cabling between display ports. By wiggling the cable & seeing if the display changes, we can safely assume that the cable or connectors, may be causing the problem.

**Solution**: Loose VGA cabling seemed to be the problem here. The technician uses Critical thinking: **Hypothesis testing** from a commonly known issue.

Technician understands that the problem is related to video, he suspects cable to be the culprit. He is ftesting to rule out the problem: Contradiction, goal stated. He comes up with this approach by testing a hypothesis from previous experience of a well-known issue.

**References:**

**(1)** Beisse, F. (2015). *Computer user support for help desk and support specialists.* 6th ed. Cengage

**(2)** Nugget (2016), [5 most common hardware problems solved](https://www.cbtnuggets.com/blog/2016/12/most-common-hardware-problems-solved/)