

# TVL – Computer Systems Servicing

## Quarter 1 – Module 3: Computer Hardware Disassembly and Assembly



Week 6-7

SELF-LEARNING MODULE



DIVISION OF GENERAL SANTOS CITY

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**Subject Area – 11 – Computer Systems Servicing**  
**Self-Learning Module (SLM)**  
**Quarter 1 – Module 3: Computer Hardware Disassembly and Assembly**  
**First Edition, 2020**

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## **TVL – Computer Systems Servicing**

Quarter 1 – Module 3: Computer  
Hardware Disassembly and  
Assembly

Week 6-7

# Introductory Message

For the facilitator:

Welcome to the Computer Systems Servicing 11 Self-Learning Module (SLM) on Computer Hardware Disassembly and Assembly!

This module was collaboratively designed, developed and reviewed by educators both from public and private institutions to assist you, the teacher or facilitator in helping the learners meet the standards set by the K to 12 Curriculum while overcoming their personal, social, and economic constraints in schooling.

This learning resource hopes to engage the learners into guided and independent learning activities at their own pace and time. Furthermore, this also aims to help learners acquire the needed 21st century skills while taking into consideration their needs and circumstances.

In addition to the material in the main text, you will also see this box in the body of the module:



### *Notes to the Teacher*

This contains helpful tips or strategies that will help you in guiding the learners.

As a facilitator you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Furthermore, you are expected to encourage and assist the learners as they do the tasks included in the module.

For the learner:

Welcome to the Computer Systems Servicing 11 Self-Learning Module (SLM) on Computer Hardware Disassembly and Assembly!

The hand is one of the most symbolized part of the human body. It is often used to depict skill, action and purpose. Through our hands we may learn, create and accomplish. Hence, the hand in this learning resource signifies that you as a learner is capable and empowered to successfully achieve the relevant competencies and skills at your own pace and time. Your academic success lies in your own hands!

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

This module has the following parts and corresponding icons:



***What I Need to Know***

This will give you an idea of the skills or competencies you are expected to learn in the module.



***What I Know***

This part includes an activity that aims to check what you already know about the lesson to take. If you get all the answers correct (100%), you may decide to skip this module.



***What's In***

This is a brief drill or review to help you link the current lesson with the previous one.



***What's New***

In this portion, the new lesson will be introduced to you in various ways such as a story, a song, a poem, a problem opener, an activity or a situation.



***What is It***

This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.



***What's More***

This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.



***What I Have Learned***

This includes questions or blank sentence/paragraph to be filled in to process what you learned from the lesson.



***What I Can Do***

This section provides an activity which will help you transfer your new knowledge or



### **Assessment**

skill into real life situations or concerns.

This is a task which aims to evaluate your level of mastery in achieving the learning competency.



### **Additional Activities**

In this portion, another activity will be given to you to enrich your knowledge or skill of the lesson learned. This also tends retention of learned concepts.



### **Answer Key**

This contains answers to all activities in the module.

At the end of this module you will also find:

**References** This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!

## Lesson

# 3

# Computer Hardware Disassembly and Assembly



## *What I Need to Know*

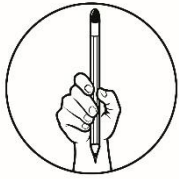
Hi there! Can you name materials, tools, equipment and testing devices used in a computer hardware installation? Have you ever tried to disassemble or assemble personal computer? What do you think are the skills needed to perform this tasks? In this module, you are going to learn the uses and functions of the different materials, tools, equipment, testing devices, protective equipment and perform disassembling and assembling desktop computer in step-by-step procedures.

Installing and Configuring Computer Systems (ICCS) is divided into five learning outcomes;

- ✓ LO 1. Assemble computer hardware - **TLE\_IACSS912ICCS-Ia-e-28**
  - Obtain materials necessary to complete the work in accordance with established procedures and check against system requirements.
  - Obtain tools, equipment and testing devices needed to carry out installation work in accordance with established procedures and check for correct operation and safety.
  - Assemble computer hardware in accordance with established procedures and system requirements.

After going through on this module, you should be able to:

- Identify the materials, tools, equipment, testing devices, and protective equipment needed in the computer hardware disassembly and assembly.
- Identify the system components for computer hardware disassembly and assembly
- Perform computer hardware disassembly and assembly.



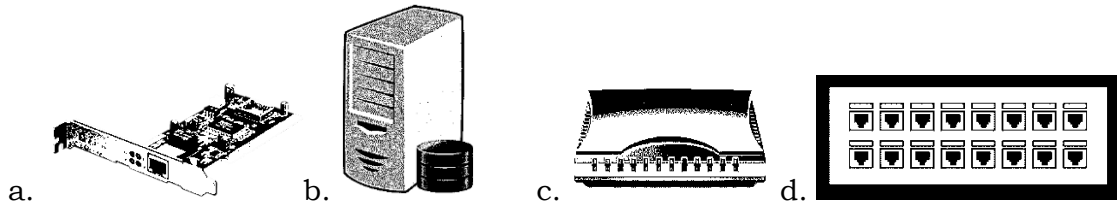
## What I Know

Hello! Are you ready for the next lesson? Let us see how much you know about different materials, tools, equipment, testing devices, protective equipment and disassembling and assembling computer hardware in step-by-step procedures.

**General Direction:** Read the instruction carefully and write your answer on a separate sheet of paper.

**Multiple Choice:** Chose the letter of the correct answer.

1. Which of the following does NOT belong to the group?  
a. USB printer    b. Fax machine    c. LAN card    d. Long nose plier
2. What type of cable is used in computer networking that consist of two shielded wires twisted around?  
a. coaxial    c. shielded twister pair  
b. fiber optic    d. unshielded twisted pair
3. MoDem is a device that allows a given computer to share data or otherwise a device that let computers exchange information. Which is a Modem?



4. All of the following are functions of LAN tester EXCEPT:  
a. Continuosly tracks LAN links  
b. Allows user to access network  
c. Check hub to hub transmission  
d. Verify PC to hub speed and data transmission
5. Which provides a network service across a series of connected computers to perform specific task on behalf of the user?  
a. Serve    b. Modem    c. LAN Card    d. Fax Machine
6. What type of tool is used to hold objects firmly, for bending, or physical compression?  
a. Pliers    c. Desoldering tools  
b. Soldering gun    d. Flat Screw Driver
7. Which tool is used to install the RJ45 connector to the UTP cable?  
a. Tweezers    b. Multi-meter    c. Crimping tool    d. Allen wrench



8. Which of the following BEST describes the function of multi-tester?
  - a. It is a device used for testing the network connection.
  - b. It is a device used for eliminating electrostatic discharge in the work area.
  - c. It is used for soldering metals using tin-based solder to achieve a highly conductive contact
  - d. It is an electronic measuring instrument that combines several measurement functions in one unit.
  
9. Which is used for covering for the face to prevent the inhaling or absorbing dust and other chemicals?
  - a. Apron
  - b. Face mask
  - c. Protective eyewear
  - d. Anti-static wrist strap
  
10. A *device driver* is a computer program that operates or controls a particular type of *device* that is attached to a computer. How does it work?
  - a. It transmits data through the external bus which connects the device.
  - b. It receives data signals from your ISP's network in the device of the computer.
  - c. It processes requests and delivers data to another computer over the internet device.
  - d. It communicates with the device through the computer bus which is used to connect the device with the computer.
  
11. The first step should be performed in computer assembly is to prepare the \_\_\_\_\_.
  - a. device drivers
  - b. workplace
  - c. motherboard
  - d. grounding protection
  
12. The hard drive is the device that stores all of your data. What might happen if you failed to install the hard drive while assembling the computer?
  - a. Overheating
  - b. Permanent data lost
  - c. Boot or mount issues
  - d. Computer will not start
  
13. You finished assembling your PC and are now installing the operating system. Suddenly you hear a sound similar to a siren coming from the PC speaker and five seconds later the PC shuts down and doesn't turn on anymore. What could be the reason for this?
  - a. The CPU overheated.
  - b. The motherboard has just burned.
  - c. The Memory is not properly installed.
  - d. The CPU fan is disconnected from the power supply.
  
14. Which of the following statements about computer disassembly is NOT true?
  - a. To remove the RAM, push down on both tabs holding the RAM in place.
  - b. To remove the fan from the heat sink, immediately pull it from the motherboard.
  - c. In opening the outer shell, unscrew the four screws at the back of the computer.
  - d. To remove the hard drive, unplug the connector at the back of the slot, and unplug the other end from the motherboard.
  
15. All of the following statements are TRUE about CPU and Heat Sink installation EXCEPT
  - a. Place the CPU by forcing it into the socket.
  - b. Tighten the heat sink assembly retainers to secure the assembly in place.
  - c. Apply a small amount of thermal compound to the CPU and spread it evenly.
  - d. Align the CPU so that the connection 1 indicator is lined up with pin 1 on the CPU socket.

16. Which of the following BEST describes the purpose of heat sink on a processor?
- It generates cooler air into the computer to cool the hot circuitry.
  - It pull cooler air into the computer to cool the hot circuitry.
  - It delivers the cold air inside the computer.
  - It carries heat away from the CPU.
17. It is advisable to plug in the power cable after you have connected all other cables in order to avoid \_\_\_\_\_.
- electrocution
  - overheating of the CPU
  - damages in the computer
  - the build-up of the static electricity in the body
18. What happens if you install a DDR memory module on a DDR2 socket?
- The PC will be very unstable.
  - You will burn your memory module.
  - It is not possible to install a DDR module on a DDR2 socket.
  - The PC will work, however memory speed will be lower than if DDR2 memory were used.
19. SATA power connectors use a 15-pin connector to connect to hard disk drives, optical drives, or any devices that have a SATA power socket. What does the acronym SATA stands for?
- Serial Advanced Technology Access
  - Serial Advanced Technology Attachment
  - Serial Advanced Technology Application
  - Serial Advanced Technology Architecture
20. Which of the following statement is **TRUE** about installation of add-in cards?
- Secure the card with a thermal paste.
  - For each add-in card, you must choose a free PCI slot.
  - Remove its backplane cover to allow access from the rear of the case.
  - Carefully position the card below the slot, and press down firmly to seat the card.



## *What's In*

### **Activity 3.1 Word Search Puzzle!**

**Direction:** Find and encircle the 10 hidden words related to materials, tools, equipment, and protective equipment in the grid. Use a separate sheet for your answer.



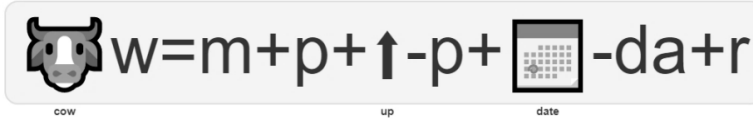
Let us answer the following questions.

1. How do you find the activity?
2. What words were formed after connecting the texts in the grid?
3. How did you solve the puzzle?

### Activity 3.2 Rebus Puzzle!

**Directions:** Guess the hidden word(s) based on the illustration as show below. Use a separate sheet for your answer.

Example



Answer: Computer



1.

Answer: \_\_\_\_\_



2.

Answer: \_\_\_\_\_



3.

Answer: \_\_\_\_\_



4.

Answer: \_\_\_\_\_



5.

Answer: \_\_\_\_\_

Answer the following questions.

1. How do you find the activity?
2. What words were formed when you connect the texts and pictures?
3. How did you solve the puzzle?



## **What's New**

Let us find out how much you have already learned about tools, equipment, testing devices, materials, and protective equipment. Let us also check if you are knowledgeable in disassembling and assembling computer hardware. Thus, I want you to answer the following activities.

### **Activity 3.3 Solve It!**

**Direction:** Read and study the situation carefully and answer the question based on it. Use a separate sheet for your answer.

You are having your industry immersion at one of computer stores in your place. Because of your dedication and commitment, the computer store manager is very impressed with your performance in doing your job. Thus, you are given a task to do the installation of the hardware components in the store. However, before he lets you proceed to do the hardware installation, you have to convince him that you can perform this type of work. He asks you to prepare the list of the needed materials, tools, equipment, testing devices, and protective equipment for the computer hardware installation.

#### **A. Materials**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

#### **B. Tools**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

#### **C. Equipment**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

#### **D. Testing Devices**






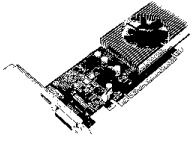
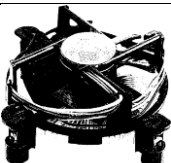
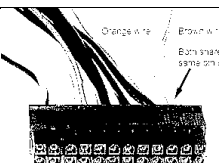
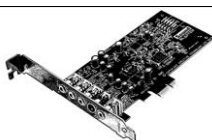

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

#### **E. Protective Equipment**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

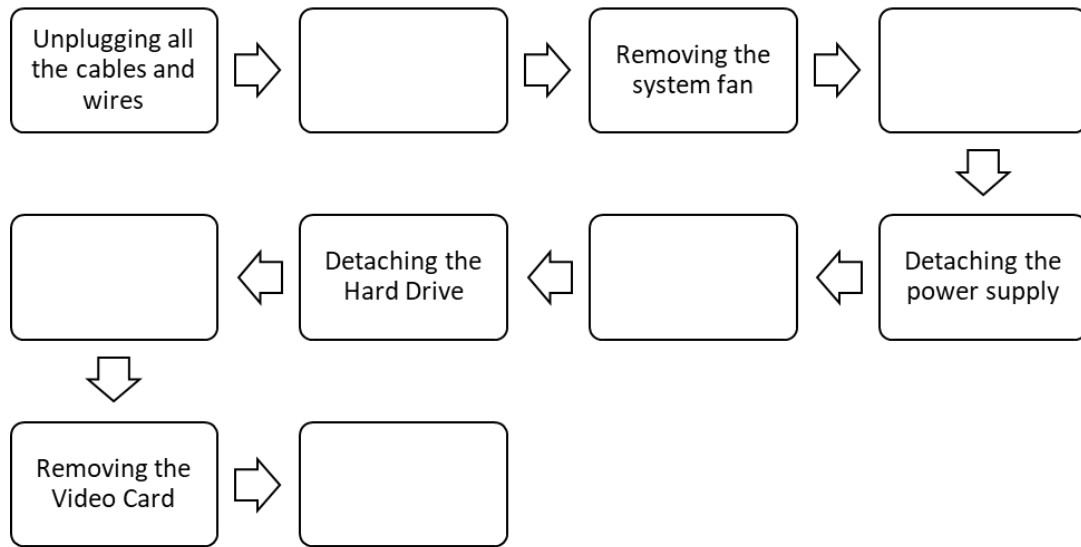
### Activity 3.4 Naming System Components

**Directions:** Name the following system components for computer hardware installation as shown on the illustration. Use a separate sheet for your answer.

System Components	Name
1. 	
2. 	
3. 	
4. 	
5. 	
6. 	
7. 	
8. 	
9. 	
10. 	

### Activity 3.5 Steps in PC Disassembly

**Direction:** Fill in the empty boxes with the missing steps of the computer hardware disassembly. Use a separate sheet for your answer.

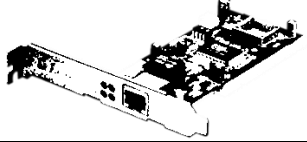

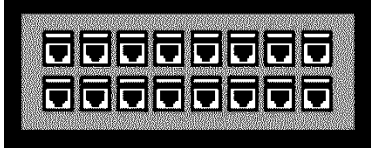
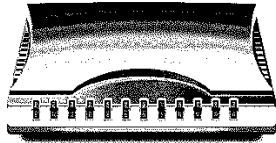

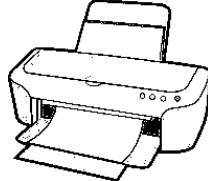

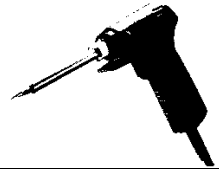


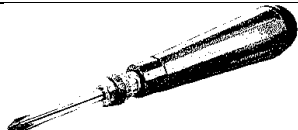



### *What is It*

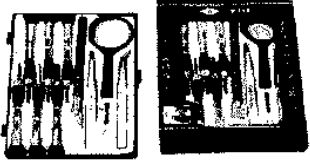
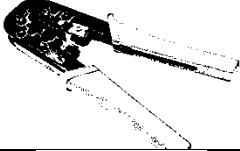
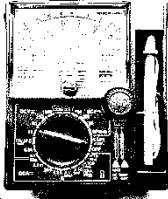
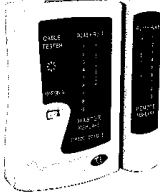

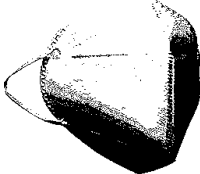


#### **MATERIALS, TOOLS, EQUIPMENT AND TESTING DEVICES**


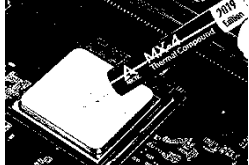
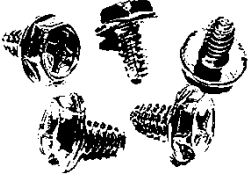
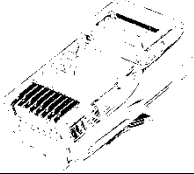

The following tools and equipment are classified according to their functions and uses.

<b>Equipment and Accessories</b>	<b>Tools</b>	<b>Materials</b>
LAN Card UPS Server 24 port-hub Modem Fax machine PC Video camera USB External CD writer USB scanner USB printers USB Flash Drive	Screwdriver(standard) Screwdriver(Philips) Long nose pliers Mechanical pliers Allen wrench Multi-tester Crimping tools Soldering iron (30 watts) Wire stripper LAN Tester Anti-static wrist wrap Device drivers/installers	Software applications Network OS Software RJ 45 UTP Cat 5 cable Motherboard's manual and installer Sound device driver installer

<p><b>LAN Card</b> – is a network interface card. This is a computer circuit board or card that is installed in a computer so that it can be connected to a network.</p>	
<p><b>Server</b> – is a part of a network. It is a special computer that users on the network can access to carry out a particular job.</p>	
<p><b>Port hub /Port</b> – is a connector on the back of a computer or other device. A port is either a serial port or a parallel port.</p>	
<p><b>Modem - (Modulator-Demodulator)</b> The modem is a device that allows a given computer to share data or otherwise a device which let computers exchange information</p>	
<p><b>Scanner</b>- it is an input device that read text or illustration printed on paper, translates the information into a form that a computer can use.</p>	
<p><b>Printer</b> - is a piece of hardware that produces a paper copy (also known as 'hardcopy') of the information generated by the computer.</p>	
<p><b>Pliers</b> is a hand tool used to hold objects firmly, for bending, or physical compression.</p>	
<p><b>Soldering gun</b> is a tool for soldering metals using tin-based solder to achieve a highly conductive contact.</p>	
<p><b>Desoldering tools</b> are used for removing the molten solder so that the joint may be separated.</p>	
<p><b>Flat Screw Driver</b> – is used to drive or fasten negative slotted screws.</p>	
<p><b>Philips Screw Driver</b>- is used to drive or fasten positive slotted screws.</p>	
<p><b>Allen wrench</b> (also known by various other synonyms) is a tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in the head.</p>	



<p><b>Pliers and tweezers</b> - are used for picking small parts in the computer unit.</p>	
<p><b>Crimping tool-</b> is a device used to crimp the RJ45 connector to the UTP cable.</p>	
<p><b>Multi-meter</b> or a <b>multi-tester</b>, also known as a <b>VOM</b> (Volt-Ohm meter), is an electronic measuring instrument that combines several measurement functions in one unit.</p>	
<p><b>LAN Tester</b> – is a device used for testing the network connection.</p>	
<p><b>Protective Eyewear</b> - enclose or protect the eye area in order to prevent particulates, infectious fluids, or chemicals from striking the eyes.</p>	
<p><b>Face Mask</b> - covering for the face to prevent the inhaling or absorbing dust and other chemicals.</p>	
<p><b>Anti-static wrist strap, mat and spray-</b> are used for eliminating electrostatic discharge in the work area.</p>	
<p><b>A gloves</b> are garments for covering and protecting the whole hand.</p>	
<p><b>Apron</b> A garment worn over the front of the body as a protection for one's cloth.</p>	

<p><b>Rubber Sole</b> A special type of shoes used to prevent electrical shock and for waterproofing and insulating purposes.</p>	
<p><b>Thermal paste</b>-is a paste used for heat dissipation of the processor.</p>	
<p><b>Computer case screws</b> are the hardware used to secure parts of a <i>desktop computer</i> to the system case.</p>	
<p><b>RJ45</b> is a type of <i>connector</i> commonly used for Unshielded Twisted Pair (UTP) cable to setup Ethernet network.</p>	
<p><b>UTP Cat 5 Cable</b> is a network cable that consists of four twisted pairs of copper wire terminated by an RJ-45 connector.</p>	

## INSTALLATION OF HARDWARE COMPONENTS AND OTHER PERIPHERALS

One of the basic skills that you must acquire in Computer Systems Servicing is to independently assemble and disassemble a personal computer or simply setting up a PC. After familiarizing with all the tools, devices, peripherals and safety precautions, I believe that you are now ready to gain another experience in CHS by going through this lesson.

### Personal Computer Disassembly

Before starting computer disassembly, make sure you have the tools you need, and they're all close by and handy and be sure to have a container to keep the screws in so you have them when you want to put things back together.

**Step 1. Unplugging** - The first thing you do is to unplug every cable that is plugged into your computer. That includes cables such as Power, USB, Mouse, Keyboard, Internet, Ethernet, Modem, AM\FM Antenna, Cable TV, etc. Just unplug all the cables for safety purposes.

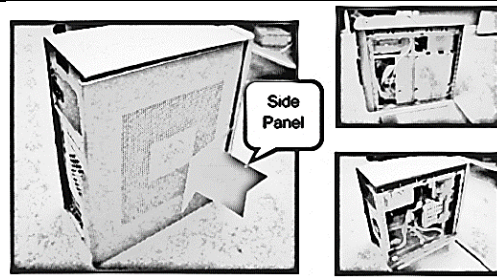
Now that your computer is fully unplugged move your PC to a clean workspace.

### Step 2. Opening the Outer Shell/Case-

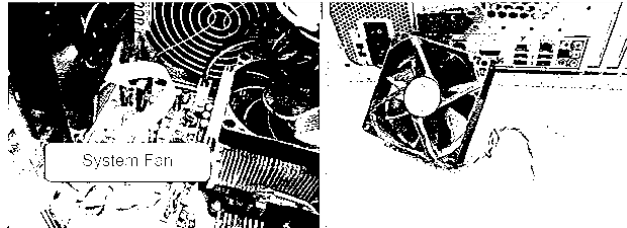
First, unscrew the four screws at the back of the computer. On most computer cases, there will be large knobs that you can unscrew by hand or by screwdriver on the back-right side of the computer. The left side has small screws because on that side you can't access much on the inside.



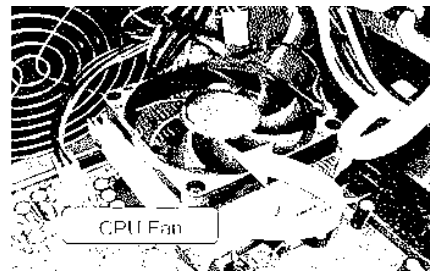
Once the screws are removed, you can remove the side panels. On most computers, they just slide off. Start with the left side panel (the side that once had the knobs), slide it towards the back of the computer. Now you can remove the left panel. Just like the other side, slide it towards the back of the computer



**Step3. Removing the System Fan** - First, unplug the fan from the motherboard. You can find the plug by following the wire from the fan. It should be labelled "SYS\_FAN1". Next, you will have to unscrew the fan from the outside. You should now be able to lift the fan out of the PC.

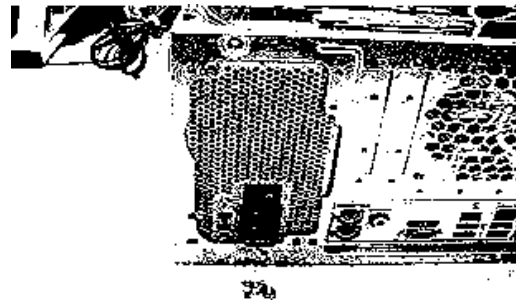


**Step 4. Removing the CPU Fan-** The CPU fan is located right on top of the CPU heat sink, which is a large piece of metal with fins on the top. The CPU fan plugs into the motherboard in an awkward place, that is hard to access. But just follow the wires and you should easily find it. It is labelled "CPU FAN1". To remove the fan from the heat sink, remove the four screws securing it in place.

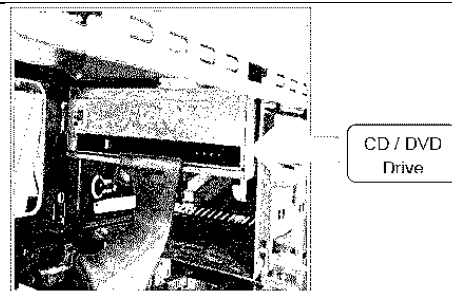


**Step 5. Power Supply** - The first thing to do is unplug every wire coming from the power supply. You must disconnect the motherboard (very large connector/plug), CD/DVD drive(s) power, internal hard drive power and portable hard drive slot power.

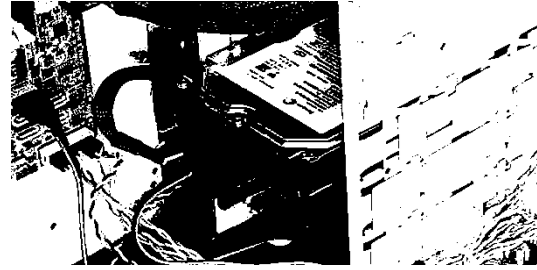
Once everything is unplugged, unscrew the four screws holding the power supply in place, on the back of the computer. Next, push the power supply from the outside, and then lift it out.



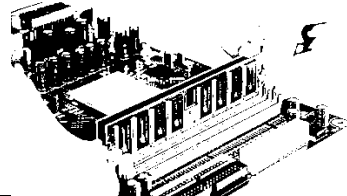
**Step 6. CD/ DVD Drive(s)**-First, unplug the ribbon from the back of the drive. Once that is completed, pull on the tab securing the drive in place, then push it out from the inside.



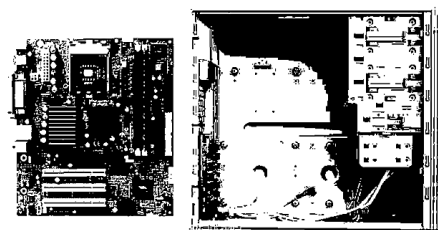
**Step 7. Hard Drive** - First, unplug the connector at the back of the slot, and unplug the other end from the motherboard. Also unplug the SATA cable from the motherboard and the hard drive. The portable hard drive slot is secured the same way the CD/DVD drive is, with a tab. Pull on the tab, then slide the slot out.



**Step 8. Memory (RAM)** - To remove the RAM, push down on both tabs holding the RAM in place, which are located at both ends of the RAM.



**Step 9. Motherboard** - The motherboard has seven screws holding it to the frame, which are indicated by large white circles around them. Remove them and then lift the motherboard out of the frame.



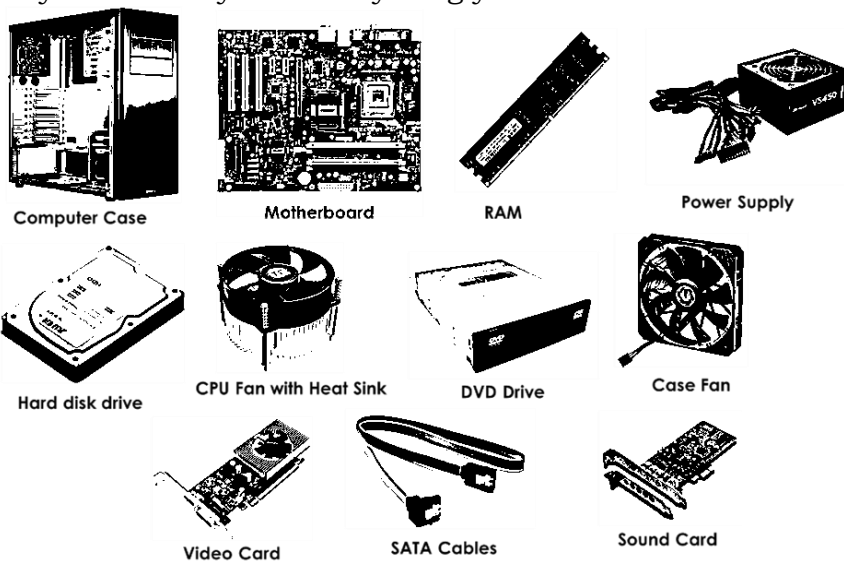
### Personal Computer Assembly

Now that you have the skills in disassembling a personal computer, I believe that you are ready to take another step of this module which is assembling a personal computer. All you need to do is to follow the step by step procedures provided in this module.

#### Step 1. Prepare your workplace

1. Take Inventory:

Before you start, take an inventory of your parts. Do not begin assembling your computer if you don't have everything you need. Begin the step-by-step process once you are ready with everything you need.



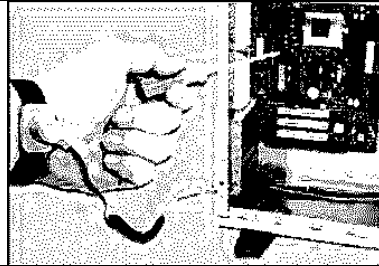
2. Make Space, Make Time:

Building a PC takes up space - about a dining room table worth. So make sure you have plenty of working room and a few hours to proceed with minimal interruption. Work on a flat, stable table top surface, or bare floor, where you

have room to layout all of the items.

### 3. Prepare Grounding Protection:

Use an inexpensive antistatic wrist strap. Make sure you are wearing your antistatic wrist strap correctly (it does you no good at all if you do not wear it!), and you are ready to proceed.

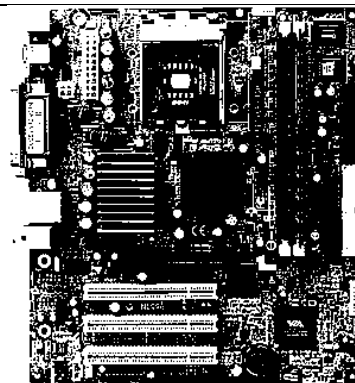


### 4. Have the Drivers Ready:

Assuming you have another internet connected PC, download the latest drivers from the vendors' websites for each component you will be installing. Sometimes drivers are updated between the time the component was manufactured and the time you are installing it. It is always best to have the latest.

### Step 2. Prepare the Motherboard

1. Great care should be taken when installing the motherboard. First, take the board out of its packaging and put it on top of the antistatic bag it came in. Remember, you always want to safeguard your components from potentially hazardous static electricity (wear your strap)
2. Before you secure the motherboard onto the PC case/chassis, inspect it carefully for any visible defects.



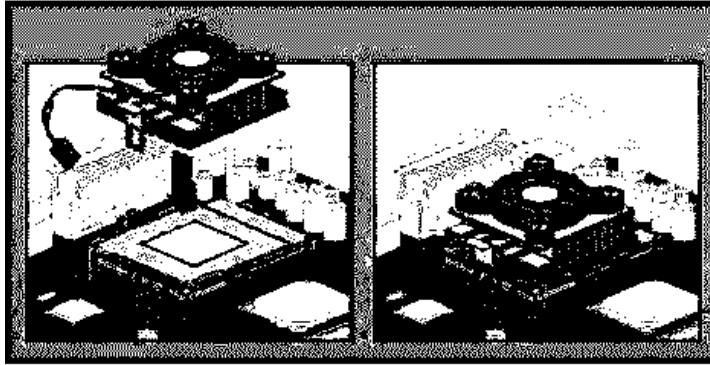
### Step 3. Install the CPU

1. Use the unlocking mechanism to open the CPU socket which is usually a lever.
2. Carefully line up the pins and place the chip in its socket; it will fit only when oriented the proper way. An arrow or a missing pin on one corner of the chip will show you how to line things up.
3. Align Triangular CPU and socket key marks as shown in Figure 46.
4. Lower the lever to lock the CPU into place.



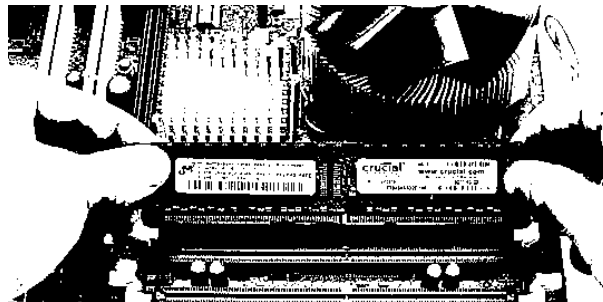
### Step 4. Install the CPU Heat Sink

1. Follow the manufacturer's directions to install the heat sink and the fan that will cool the processor. If you bought an OEM CPU and a separate heat sink, you may need to spread a thin layer of the thermal grease that came with the heat sink over the chip to ensure proper transfer of heat (some heat sinks come with this grease already applied).
2. Attach the clip that holds the heat sink in place keeping in mind that it may require a fair amount of force. Again, follow the instructions that came with the heat sink. They will show you how to fit it correctly. If you are in doubt, you can visit the manufacturer's website for more information.
3. Plug the CPU fan's power connector into the proper connector on the motherboard.



**Step 5. Install Memory (RAM Modules)**

In order to install the memory modules, insert them into the proper sockets (Figure 48) and push down firmly but evenly until the clips on both sides of the socket pop into place. If your motherboard supports dual-channel memory, consult the user manual to determine which pairs of RAM sockets you should use. The motherboard and the CPU are the brain and nerve center of your PC, so selecting these components is the most important decision you'll make.



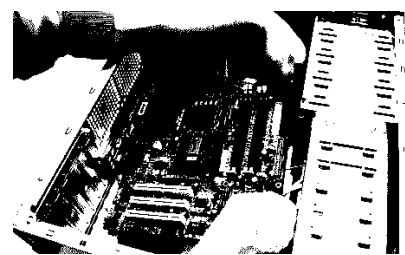
**Step 6. Place the motherboard into the case**

1. Note the pattern of the holes in your motherboard, and screw brass standoffs into the motherboard tray or into the PC case in the correct locations (ALWAYS check the manual and follow their instructions to the letter).



2. Check the layout of the sockets on the motherboard, and confirm that the ports on your motherboard's back panel match the holes on the case's Input/Output (I/O) shield that is installed in your case. If necessary, remove the old I/O shield by tapping it firmly a few times with the butt-end of a screwdriver, and then replace it with the shield that came with the new motherboard.

3. Carefully position the motherboard on top of the brass standoffs, line up all the holes, and use the screws that accompanied the case to fasten down the motherboard. If you are using a removable tray in your system, slide the tray and motherboard back into the case and then secure the tray.

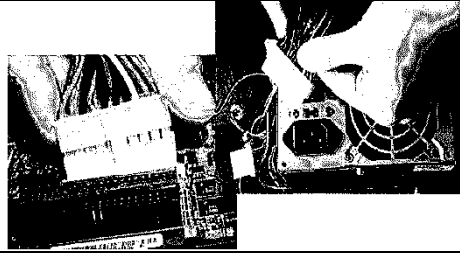


**Step 7. Connect the Power Supply**

Making the proper connections is crucial to successfully assembling your PC system. Fortunately, manufacturers provide color-coded power cables and

unique connector shapes to make the job easy.

1. First, plug the large ATX power connector from your power supply into the matching port on your motherboard.

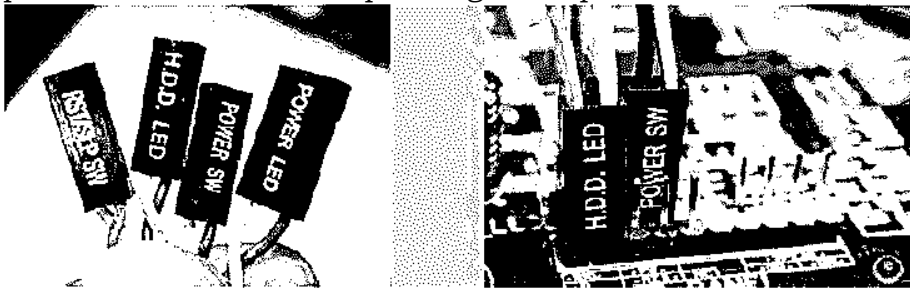


2. Locate the smaller, square processor power connector (you cannot miss it - it is the one sprouting the yellow and black wires) and attach it to the motherboard. Note: your connector is usually located near the processor. As always, refer to your motherboard's manual for the exact locations.



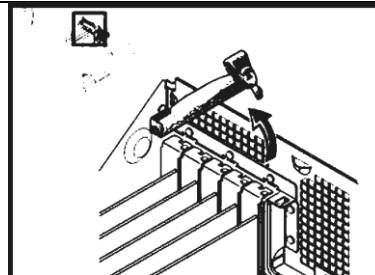
3. Use your motherboard user manual and find the description about front-panel connectors.

4. Attach each of the tiny leads from the power and reset switches, the hard-disk activity lights, the PC speaker, and any front-panel USB and FireWire ports to the corresponding pin on your motherboard. The needle-nose pliers are useful for manipulating small pieces.

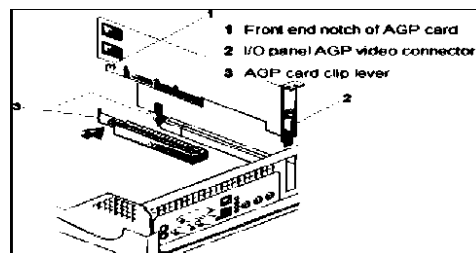


### Step 8. Install Graphics / Video Cards

1. Begin by removing the backplane cover from the AGP or PCI Express X16 slot (the metal piece where the monitor connector will emerge).



2. Install the graphics board in that slot, and then secure the card with a screw.

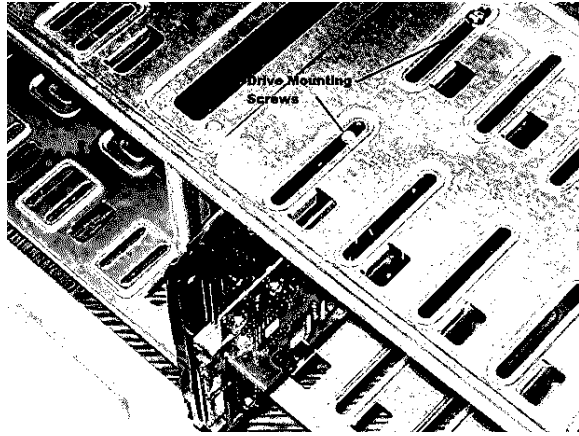


### Step 9. Install Internal Drives

Now it is time to install your drives. This is an easy process, but it requires attention to detail.

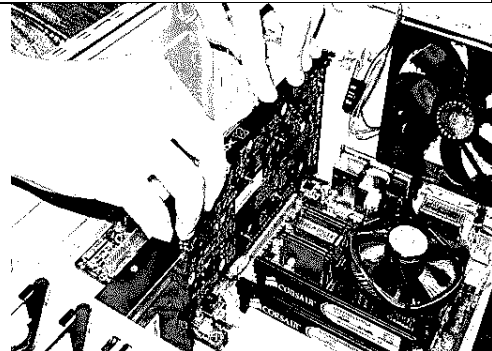
The hard drive is the device that stores all of your data. It is 3.5" wide and needs to be mounted so that you can gain access to the cable connections on the back. If that is not possible you may need to connect cables before you install the drive. To mount the drive:

1. Find a 3.5" drive bay to install the drive in. If you have trouble finding a place to mount the drive consult your case documentation for suggestions.
2. Slide the drive into place until the screw holes on the sides are lined up with the holes in the case.
3. Install the screws.



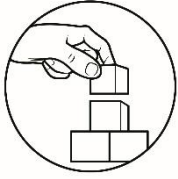
### Step 10. Install the Add-in Cards

1. For each add-in card, you must choose a free PCI slot.
2. Remove its backplane cover to allow access from the rear of the case.
3. Carefully position the card above the slot, and press down firmly to seat the card.
4. Secure the card with a screw.



Many motherboards have additional sound connectors or ports housed on small add-in boards. Some of these plug into slots on the motherboard; others screw into the back of the case in place of slot covers. Usually the additional ports are not essential to your PC's operation. For example, if you install a sound card, you do not need connectors to the motherboard's built-in sound chip. Check your motherboard manual to determine what each of these boards does.


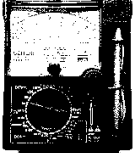




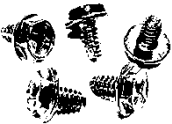







## What's More

### Activity 3.6 Knowing the Functions of Tools and Equipment

**Direction:** Match the following tools, equipment, materials, and protective equipment in Column A to its uses and functions in Column B. Use a separate sheet for your answer.

COLUMN A	COLUMN B
1. Plier 	A. Used to secure parts of a <i>desktop computer</i> to the system case. B. Used to drive or fasten positive slotted screws. C. Used to drive or fasten negative slotted screws. D. Used for picking small parts in the computer unit.
2. Multi-tester 	E. Protect the eye area in order to prevent particulates, infectious fluids, or chemicals from striking the eyes. F. An electronic measuring instrument that combines several measurement functions in one unit.
3. Anti-Static Wrist Strap 	G. A type of <i>connector</i> commonly used for Unshielded Twisted Pair (UTP) cable to setup Ethernet network.
4. Crimping Tools 	H. A protective equipment used for eliminating electrostatic discharge in the work area. I. A hand tool used to hold objects firmly, for bending, or physical compression.
5. LAN Tester 	J. A device used to crimp the RJ45 connector to the UTP cable. K. A device used for testing the network connection.
6. Protective Eyewear 	L. A connector on the back of a computer or other device.
7. Small screw 	
8. Port Hub	

	
<p>9. Flat screw driver</p> 	
<p>10. RJ45 Connector</p> 	

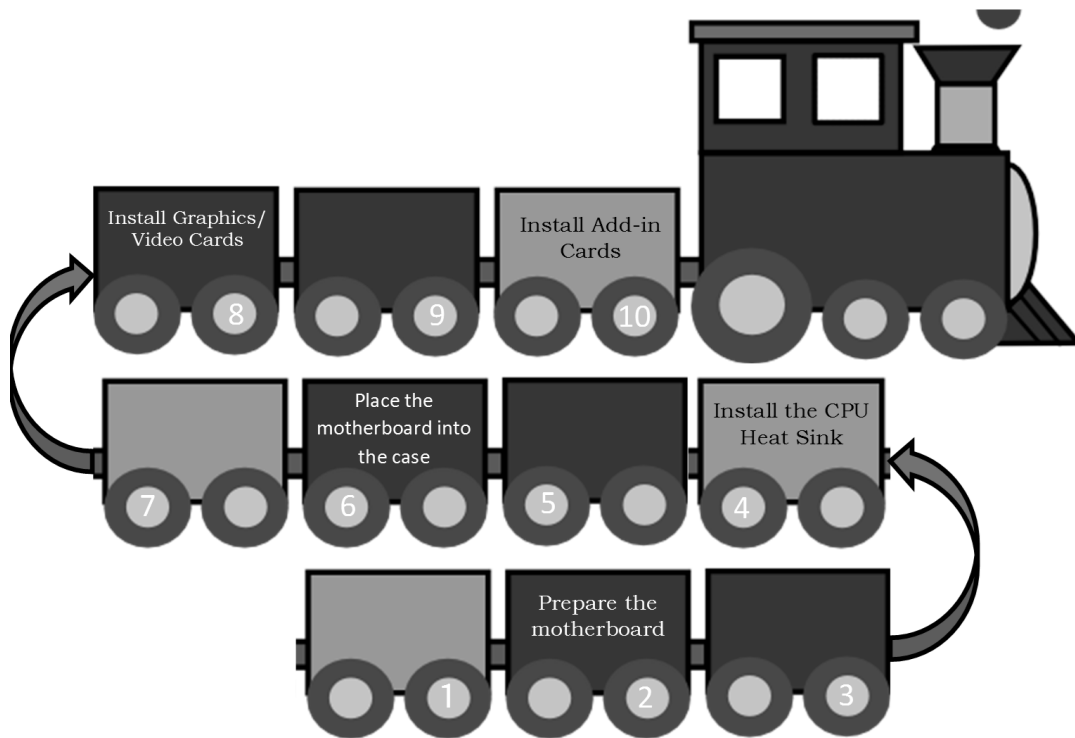
### Activity 3.7 Classifying Tools, Equipment, Testing Devices, Materials, and Protective Equipment

**Directions:** Write **T** if the item is a Tools, **E** for Equipment, **TD** for Testing Devices, **M** for Materials, and **PE** for Protective Equipment. Use a separate sheet for your answer.

- |                            |                                      |
|----------------------------|--------------------------------------|
| _____ 1. UTP Cable         | _____ 6. Grounding strap             |
| _____ 2. Small screw       | _____ 7. Automatic Voltage Regulator |
| _____ 3. Screw driver      | _____ 8. Multi-meter                 |
| _____ 4. Maintenance Bench | _____ 9. Wire Cutter                 |
| _____ 5. Oscilloscope      | _____ 10. Goggles                    |

### Activity 3.8 Steps in PC Assembly

**Direction:** Fill in the empty cabin with the missing steps of the computer hardware assembly. Use a separate sheet for your answer.



### *What I Have Learned*

### Activity 3.9 Arranging Steps in Chronological Order

**Directions:** Rearrange the following steps in chronological order by numbering them from 1 to 10. Use a separate sheet for your answer.

#### A. Computer Hardware Disassembly

- |   |                                   |
|---|-----------------------------------|
| ___ 1. Detaching the Hard Drive               | ___ 6. Removing the CPU fan       |
| ___ 2. Detaching the power supply             | ___ 7. Removing the Memory (RAM)  |
| ___ 3. Opening the outer shell / case         | ___ 8. Removing the system fan    |
| ___ 4. Pull Out the Motherboard               | ___ 9. Removing the Video Card    |
| ___ 5. Removing the CD / DVD Drives and wires | ___ 10. Unplugging all the cables |

## B. Computer Hardware Assembly

- |  |   |
|--|---|
| ___ 11. Connect the Power Supply       | ___ 16. Install the CPU                     |
| ___ 12. Install Graphics / Video Cards | ___ 17. Install the CPU Heat Sink           |
| ___ 13. Install Internal Drives        | ___ 18. Place the motherboard into the case |
| ___ 14. Install Memory (RAM Modules)   | ___ 19. Prepare the Motherboard             |
| ___ 15. Install the Add- in Cards      | ___ 20. Prepare your workplace              |

### Activity 3.10 Wrap Up!

Kindly answer the following questions.

1. What are materials, tools, equipment, testing devices, and protective equipment needed in disassembling and assembling computer hardware?

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2. Among the materials, tools, equipment, testing devices, and protective equipment, which of these are you using commonly in disassembling and assembling computer hardware?

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3. What are system components that you have disassembled and assembled?

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4. What are steps in disassembling and assembling computer hardware?

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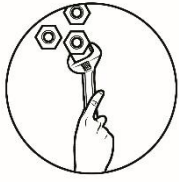
5. Which particular steps did you find difficult in disassembling and assembling computer hardware?

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## ***What I Can Do***

### **Activity 3.11 Hands-on Activity**

**Direction:** Given the necessary components, materials, tools, equipment, and testing devices, perform disassembling and assembling computer hardware in Thirty (30) minutes. Safety precautions must be observed when working. You will be assessed in accordance with the checklist provided after the activity.

#### **Performance Criteria Checklist**

<b>CRITERIA</b>	<b>YES</b>	<b>NO</b>
<b>Did you....</b>		
Plan and prepare unit for computer hardware disassembly and assembly?		
Identify and obtain materials necessary?		
Prepare tools, equipment and testing devices?		
Perform computer hardware disassembling and assembling following computer hardware according to established OH & S policies and procedures:		
a. Motherboard and its components?		
b. Internal drives and its accessories?		
c. Power supply?		
d. Add-in Cards?		
e. Peripherals such as keyboard, mouse, cables?		
<b>Observe safety during the activity?</b>		
<b>Finish the task on time?</b>		

### **Activity 3.12 Think It!**

Now its time to apply your knowledge in real life situation. Answer the following questions.

1. What are usually the factors for damage equipment during the hardware installation in relation to tools and equipment?

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2. Why is it important to identify the appropriate materials, tools, equipment, testing devices, and protective equipment in disassembling and assembling computer hardware?

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3. After disassembling and assembling computer hardware, what were the tools, equipment, testing devices, materials, and protective equipment did you use?

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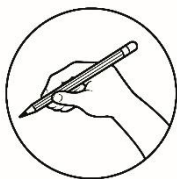
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4. Why does important to follow a step-by-step procedure in disassembling and assembling computer hardware?

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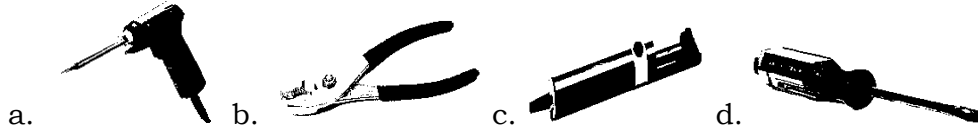
## ***Assessment***

**A. Directions:** Choose the letter of the correct answer. Use a separate sheet for your answer.

1. Tools and equipment are classified according to their functions and uses. Which of the following does NOT belong to the group?  
a. Screw Driver                      b. Crimper                      c. Plier                      d. 24-port Hub
2. Which is a computer circuit board that is installed in a computer so that it can be connected to a network?  
a. LAN card                      b. Modem                      c. Fax Machine                      d. USB port
3. Which tool is used to drive bolts and screws that have a hexagonal socket in the head?  
a. desoldering tools                      c. flat screw driver  
b. crimping tools                      d. allen wrench
4. What type of network cable that consists of four twisted pairs of copper wire terminated by an RJ-45 connector?  
a. Coaxial                      c. UTP Cat 5  
b. Fiber optic                      d. Shielded Twister Pair

5. A *MoDem* (Modulator-Demodulator) is a networking device. How does it work?
- stores and processes information in the computer
  - helps the processor to interact and control other components
  - houses and connects most of the internal components of computer.
  - allows a given computer to share data or otherwise a device which let computers exchange information

6. Which tool is used for soldering metals using tin-based solder to achieve a highly conductive contact?



7. UPS also known as a battery backup, provides backup power when your regular power source fails or voltage drops to an unacceptable level. What does the acronym UPS stands for?

- Unidirectional Power Supply
- Unified Power Supply
- Uninterruptible Power Supply
- Universal Power Supply

8. All of the following are classified as testing tools **EXCEPT**

- Multi-tester
- RJ45
- LAN Tester
- Oscilloscope

9. Which is used as covering for the face to prevent the inhaling or absorbing dust and other chemicals?

- apron
- anti-static wrist strap
- protective eyewear
- face mask

10. Which of the following is used for eliminating electrostatic discharge in the work area?



11. Which of the following steps should be first to perform in computer disassembly?

- Pull out the motherboard
- Open the computer case
- Unplug all the cables and wires
- Prepare the system components

12. Which of the following should be done in the opening the outer shell or case?

- Unplug all the cables and wires that are connected to the system unit.
- Unplug the ribbon at the back of the drive.
- Remove directly the side panels using knife.
- Unscrew the four screws at the back of the computer.

13. Test run is performed after the power has been connected to the motherboard in order to \_\_\_\_\_.

- check if the installation is appropriately perform and the motherboard is not damaged
- modify the date, time and sets the loading procedures
- identify errors in the computer
- perform network configuration.





20. Which of the following shows the correct steps in computer assembly?

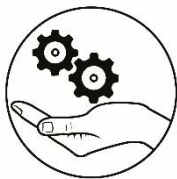
- I. Connect the Power Supply
- II. Install Graphics / Video Cards
- III. Install Internal Drives
- IV. Install Memory (RAM Modules)
- V. Install the Add- in Cards
- VI. Install the CPU
- VII. Install the CPU Heat Sink
- VIII. Place the motherboard into the case
- IX. Prepare the Motherboard
- X. Prepare your workplace

- a. X,VI,I,VII,V,II,IV,III,VIII,IX      c. X,III,VIII, II,IX, VII, I,VI,V,IV  
 b. X, II,VII, IX,VIII,I,IV, V,III,VI      d.X,IX,VI,VII,IV,VIII,I,II,III,V

**B. Directions:** Given the necessary components, materials, tools, equipment, and testing devices, perform disassembling and assembling computer hardware in Thirty (30) minutes. Safety precautions must be observed when working. You will be rated in accordance with the rubrics provided after the activity.

**Rubrics for your performance Test**

Criteria	Percentage	Grade
Accuracy	50 %	
Adherence to the procedures	20%	
Workmanship(applied safety precautions)	20%	
Speed	10%	
<b>Performance Rating</b>		

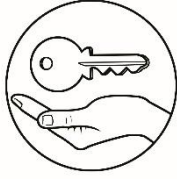


***Additional Activities***

**Directions:** Make flowchart showing the step-by-step procedures either in disassembling or assembling computer hardware. I want you to be creative on this because I am going to choose the best output. The best output will be posted in our computer laboratory room.

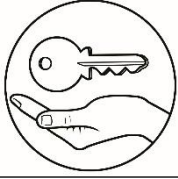
Scoring Rubrics

Criteria	Rating
1. Content	5
2. Correctness	5
3. Creativity	5
4. Presentation	5
<b>TOTAL:</b>	<b>20</b>

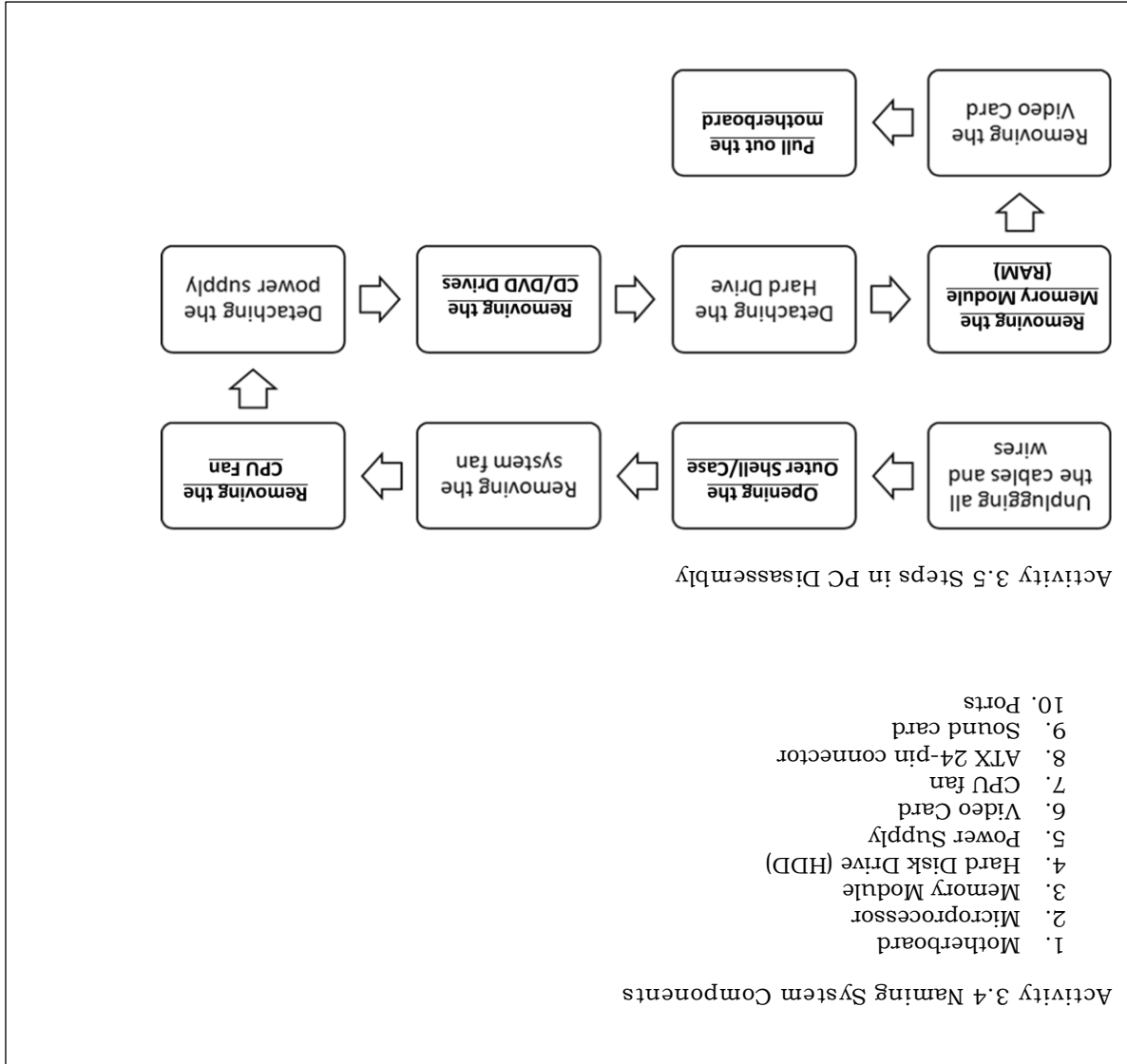


# Answer Key

<p>Assessment</p> <p>1. d 2. a 3. d 4. c 5. d 6. a 7. c 8. b 9. d 10. d 11. b 12. d 13. a 14. c 15. d 16. b 17. a 18. b 19. a 20. d</p>	<p>What's More</p> <p>Activity 3.6</p> <p>1. I 2. F 3. H 4. J 5. K 6. E 7. A 8. L 9. C 10. G</p> <p>Activity 3.7</p> <p>1. M 2. M 3. T 4. E 5. TD 6. PE 7. E 8. TD 9. T 10. PE</p> <p>Activity 3.8</p> <ul style="list-style-type: none"> <li>• Prepare the workplace</li> <li>• Install the CPU</li> <li>• Install Memory (RAM Modules)</li> <li>• Connect Power Supply</li> <li>• Install Internal Drives</li> </ul>	<p>Activity 3.1 Word Search</p> <p>Puzzle!</p> <p>Hidden Words:</p> <ul style="list-style-type: none"> <li>• DEVICE DRIVER</li> <li>• SCREW DRIVER</li> <li>• PLIER</li> <li>• THERMAL PASTE</li> <li>• POWER SUPPLY</li> <li>• CONNECTOR</li> <li>• CRIMPING TOOL</li> <li>• LAN TESTER</li> <li>• MULTI-TESTER</li> <li>• EYEWEAR</li> </ul> <p>Activity 3.2 Rebus Puzzle!</p> <p>1. system Case 2. motherboard 3. power supply 4. sata cables 5. microprocessor</p> <p>Activity 3.3 Solve It!</p> <p>Materials</p> <p>1. RJ 45 2. UTP Cat 5 cable 3. Installers 4. Compact Disks</p> <p>Tools</p> <p>1. Flat screw driver 2. Phillips screw driver 3. Plier 4. Soldering gun</p> <p>Equipment</p> <p>1. Server 2. Modem 3. Fax machine 4. Scanner</p> <p>Testing Devices</p> <p>1. LAN tester 2. Multi-tester 3. Oscilloscope 3. Voltmeter</p> <p>Protective Equipment</p> <p>1. Protective Eyewear 2. Face Mask 3. Anti-static wrist strap 4. Gloves</p>	<p>What I Know</p> <p>1. d 2. d 3. c 4. b 5. a 6. a 7. c 8. d 9. b 10. d 11. b 12. c 13. a 14. b 15. a 16. d 17. c 18. c 19. b 20. a</p>
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# Answer Key



<p>Computer Hardware assembly</p> <ol style="list-style-type: none"> <li>1. 7</li> <li>2. 8</li> <li>3. 9</li> <li>4. 5</li> <li>5. 10</li> <li>6. 3</li> <li>7. 4</li> <li>8. 6</li> <li>9. 2</li> <li>10. 1</li> </ol>	<p>Activity 3.9 Arranging Steps in Chronological Order</p> <p>Computer Hardware Disassembly</p> <ol style="list-style-type: none"> <li>1. 7</li> <li>2. 5</li> <li>3. 2</li> <li>4. 10</li> <li>5. 6</li> <li>6. 4</li> <li>7. 8</li> <li>8. 3</li> <li>9. 9</li> <li>10. 1</li> </ol>
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Activity 3.10 Wrap Up!

Scoring Rubrics

<b>Category</b>	<b>5</b> Exemplary	<b>4</b> Accomplished	<b>3</b> Developing	<b>2</b> Beginning
<b>Content</b>	The output exceeds the expectations.	The output is complete.	The output is somewhat complete.	The output is incomplete.

Activity 3.11 Think It!

Scoring Rubrics

<b>Category</b>	<b>5</b> Exemplary	<b>4</b> Accomplished	<b>3</b> Developing	<b>2</b> Beginning
<b>Content</b>	The output exceeds the expectations.	The output is complete.	The output is somewhat complete.	The output is incomplete.

## **References**

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## **DISCLAIMER**

This Self-learning Module (SLM) was developed by DepEd SOCCSKSARGEN with the primary objective of preparing for and addressing the new normal. Contents of this module were based on DepEd's Most Essential Learning Competencies (MELC). This is a supplementary material to be used by all learners of Region XII in all public schools beginning SY 2020-2021. The process of LR development was observed in the production of this module. This is version 1.0. We highly encourage feedback, comments, and recommendations.

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