



# **Technology and Livelihood Education**

## **Computer Systems Servicing-CSS**

### **Quarter 1 – Module 1:**

# **INSTALLING AND CONFIGURING COMPUTER SYSTEMS**



**S.Y. 2020-2021**  
**NAVOTAS CITY PHILIPPINES**

**PAG-AARI NG PAMAHALAAN  
HINDI IPINAGBIBILI**

**Technology and Livelihood Education– Computer Systems Servicing-Grade 10**  
**Alternative Delivery Mode**  
**Quarter 1 – Module 1: INSTALLING AND CONFIGURING COMPUTER SYSTEMS**  
**First Edition, 2020**

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**Technology and  
Livelihood Education  
Computer Systems Servicing-CSS  
Quarter 1 – Module 1:  
INSTALLING AND CONFIGURING  
COMPUTER SYSTEMS**

# Introductory Message

For the facilitator:

Welcome to the Computer Systems Servicing 10 Alternative Delivery Mode (ADM) Module on INSTALLING AND CONFIGURING COMPUTER SYSTEMS.

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 10 Alternative Delivery Mode (ADM) Module on INSTALLING AND CONFIGURING COMPUTER SYSTEMS!

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 skill into real life situations or concerns.



### **Assessment**

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!



## ***What I Need to Know***

This module was designed and written with you in mind. It is here to help you master the nature of Types and Parts of Computer. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module mainly focuses on one lesson:

Lesson 1: Assemble Computer Hardware. TLE\_IACSS9-12ICCS-Ia-e-28

After going through this module, you are expected to:

1. Plan unit assembly to ensure OHS policies and procedures are followed in accordance with systems requirements.
2. Prepare unit assembly to ensure OHS policies and procedures are followed in accordance with systems requirements



## ***What I Know***

**Directions:** Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. While working on your document, the mouse suddenly malfunctioned and you cannot select any commands. What is the fastest way for you to be able to save file?
  - a. Click the File menu and select the SAVE command
  - b. Press ALT + F4 and discard the information
  - c. Press CTRL + S and troubleshoot problem
  - d. Reboot computer and rely on the auto-recovery feature of the Word
2. SD Card is a memory cards used in electronic equipment including digital cameras and cell phones. What does SD stand for?
  - a. Secure Digital
  - b. Scan Disk
  - c. Short Drive
  - d. Slot Disk
3. When you buy a new computer, which of the following is most likely pre-installed on your computer?
  - a. operating system
  - b. accounting program
  - c. database program
  - d. spreadsheet program
4. Also known as the main circuit board where all the electronic parts of the computer are attached. What part of system unit is being described?
  - a. CPU
  - b. Graphics card
  - c. Motherboard
  - d. RAM
5. When an application is opened on a computer it is loaded into what?
  - a. Hard drive
  - b. CPU
  - c. RAM
  - d. Motherboard
6. You were asked by your professor to burn the compilation of your hands-on activities. Which storage device should you use?
  - a. Flash Drive
  - b. Hard Disk
  - c. Floppy Disk
  - d. Compact Disk
7. Hardware is a set of instructions called programs the computer uses to carry out tasks while Software are all the parts of the computer you can see and touch and is also known as peripherals.
  - a. True
  - b. False.
  - c. Maybe
  - d. None



8. All the statements below are true except one. Which one is false?
- RAM keeps the programs and data that the CPU need to work with.
  - RAM is made of microchips.
  - RAM keeps its contents when the computer is off.
  - RAM stands for Random Access Memory.
9. What drive usually represents the main hard drive?
- A
  - C
  - H
  - F
10. ABC Inc. has a large science and research facility. They hope to improve their systems performance and simulations, the types of computers they are using is\_\_\_\_\_.
- Mainframe
  - Supercomputer
  - Minicomputer
  - Servers
11. The power supply provides power for\_\_\_\_\_.
- both the parts in the computer and other peripherals.
  - only parts in the computer.
  - computer peripherals.
  - only motherboard
12. Which of the following best describes the hard disk drive?
- most expensive form of memory.
  - a stack of optical platters.
  - volatile storage space in the computer system.
  - sealed in a protective case.
13. What is the name of the circuit board that contained within the processor of computer?
- CPU
  - Chipboard
  - Microprocessor
  - Motherboard
14. How many types of memory are present in a computer?
- ONE
  - TWO
  - THREE
  - FOUR
15. Which unit is responsible for accepting data and instructions from the user into computer understandable format?
- Memory
  - Input device
  - CPU
  - Output device

# Lesson 1

## Assemble Computer Hardware

The goal of this module is to enable learners to understand the components of computer systems and develop the skills needed to recommend appropriate systems for business purposes and set up and maintain computer systems.



### *What's In*

Utilizing computer at schools brings important role among students and teachers. Children can now access e-libraries such as online video tutorials, free e-books, where they can acquire ideas easily.

**Directions:** Using the Internet, research at least three types of computer (ex. desktop computer, laptop and netbook). Create a chart that compares the price, function or purpose, and advantage of using it. Determine which computer would be most appropriate for working with documents, graphics, gaming, etc.

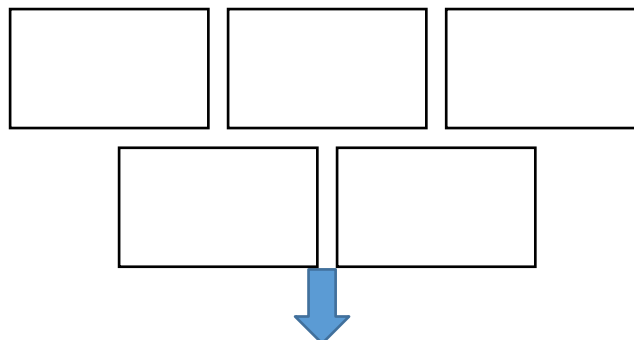


### *What's New*

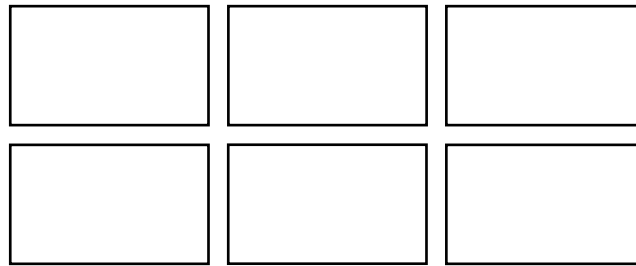
**Directions:** Design a diagram of a computer system with the following components:

1. Input device
2. Internal parts of a computer system
3. Output devices

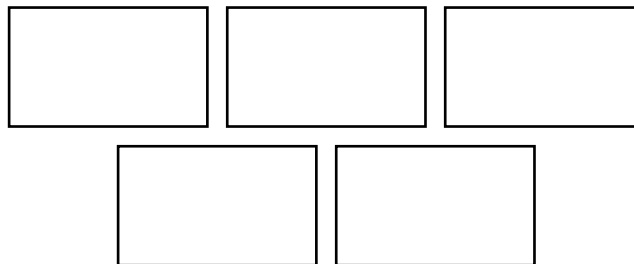
#### **Input Devices**



### Internal Parts of a Computer System



### Output Devices



## *What is It*

### WHAT IS A COMPUTER?

A computer is a machine that changes information from one form into another by performing four basic actions. Those actions are input, processing, output, and storage. Together, these actions make up the information processing cycle. By following a set of instructions, called a program, the computer turns raw data into organized information that people can use. Creation of usable information is the primary benefit of computer technology. There are three kinds of computers:

**Analog computers** are almost extinct today. These are different from a digital computer because an analog computer can perform several mathematical operations simultaneously. It uses continuous variables for mathematical operations and utilizes mechanical or electrical energy. Think of the scales on a mercury thermometer or on the gas gauge of a car.

**Digital computers** work with data that has a fixed value. They use data in digital, or number, form. The computers that run programs for playing games or searching the internet are digital computers.

**Hybrid Computers** are a combination of both digital and analog computers. In this type of computers, the digital segments perform process control by conversion of analog signals to digital ones.

Most computers are not just digital but binary, too. That is, they only recognize two possible values. Think of a television's power switch. It, too, is binary: The switch is either on or off. There are no other possibilities.

Computers break data into pieces called bits and give each bit a value of either 0 or 1. A byte is a group of bits—usually 8. Using 8 bits in different combinations, each byte can represent a different value. For example, one byte might be 00000000, another might be 01010101, and another might be 00110011. There are 256 possible combinations!

## **CLASSIFICATIONS OF COMPUTER**

### **1. Mainframe Computers**

Large organizations use mainframes for highly critical applications such as bulk data processing and Enterprise Resource Planning (ERP). Most of the mainframe computers have the capacities to host multiple operating systems and operate as a few virtual machines and can substitute for several small servers.

### **2. Minicomputers**

In terms of size and processing capacity, minicomputers lie in between mainframes and microcomputers. Minicomputers are also called mid-range systems or workstations. The term began to be popularly used in the 1960s to refer to relatively smaller third generation computers.

### **3. Servers**

They are computers designed to provide services to client machines in a computer network. They have larger storage capacities and powerful processors. Running on them are programs that serve client requests and allocate resources like memory and time to client machines. Usually they are very large in size, as they have large processors and many hard drives. They are designed to be fail-safe and resistant to crash.

### **4. Supercomputers**

The highly calculation-intensive tasks can be effectively performed by means of supercomputers. Quantum physics, mechanics, weather forecasting, molecular theory are best studied by means of supercomputers. Their ability of parallel processing and their well-designed memory hierarchy give the supercomputers, large transaction processing powers.

### **5. Microcomputers**

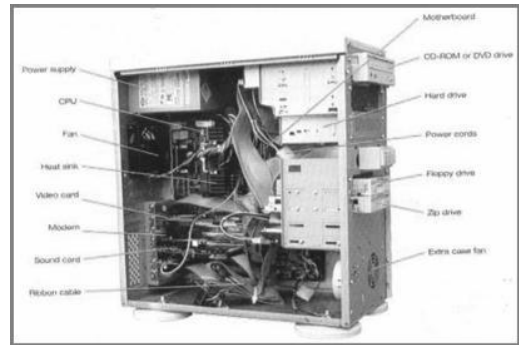
A computer with a microprocessor and its central processing unit it is known as a microcomputer. They do not occupy space as much as mainframes do. When supplemented with a keyboard and a mouse, microcomputers can be called personal computers. A monitor, a keyboard and other similar input output devices, computer memory in the form of RAM and a power supply unit come packaged in a microcomputer. These computers can fit on desks or tables and prove to be the best choice for single-user tasks.

## COMPUTER HARDWARE

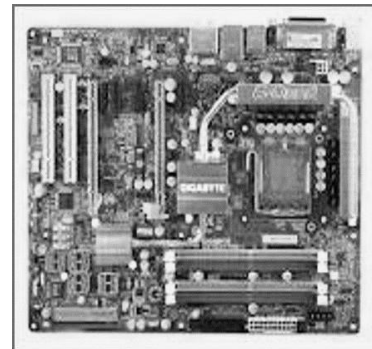
**HARDWARE-** physical, touchable, electronic and mechanical parts of a computer system.

A. **System Unit-** The main part of a microcomputer, sometimes called the chassis. It includes the following parts:

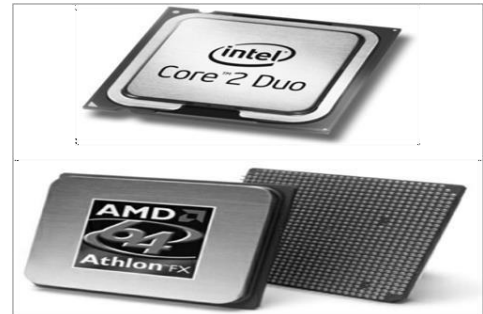
Motherboard  
Microprocessor  
Memory Chips  
Buses  
Ports  
Expansion Slots and Cards.



**Motherboard / Mainboard / System Board** - The main circuit board of a computer. It contains all the circuits and components that run the computer.



**CPU (Central Processing Unit)** - The processor is the main “brain” or “heart” of a computer system. It performs all the instructions and calculations that are needed and manages the flow of information through a computer.



**Primary storage** (internal storage, main memory, or memory) is the computer's working storage space that holds data, instructions for processing and processed data (information) waiting to be sent to secondary storage. Physically, primary storage is a collection of RAM chips.

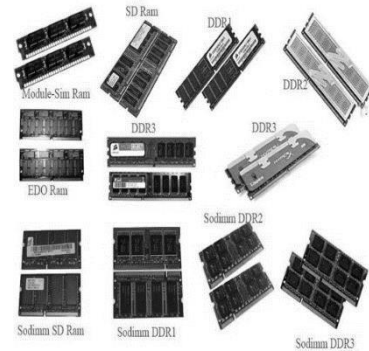
### Two (2) Types of Memory

#### ROM – (Read Only Memory)

ROM is non-volatile, meaning it holds data even when the power is ON or OFF.

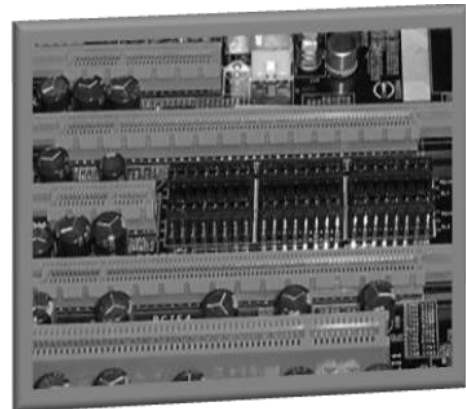
## **RAM – (Random Access Memory)**

RAM is volatile, meaning it holds data only when the power is on. When the power is off, RAM's contents are lost.



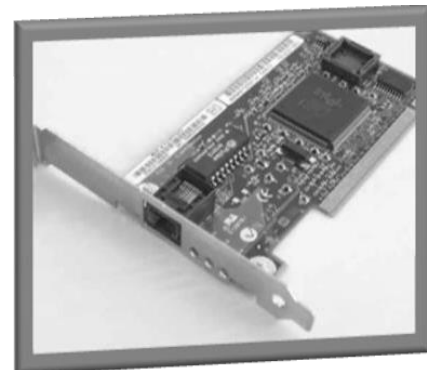
## **Expansion Bus**

A bus is a data pathway between several hardware components inside or outside a computer. It does not only connect the parts of the CPU to each other, but also links the CPU with other important hardware.



## **Adapters**

Printed-circuit boards (also called interface cards) that enable the computer to use a peripheral device for which it does not have the necessary connections or circuit boards. They are often used to permit upgrading to a new different hardware.



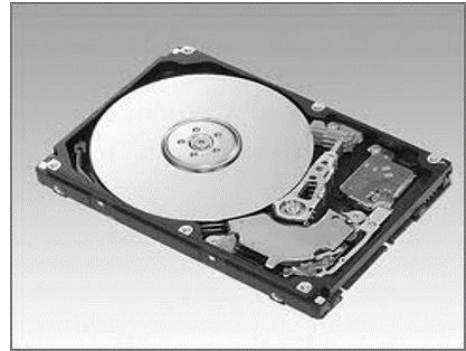
## **Power Supply Unit (PSU)**

Installed in the back corner of the PC case, next to the motherboard. It converts 120vac (standard house power) into DC voltages that are used by other components in the PC.



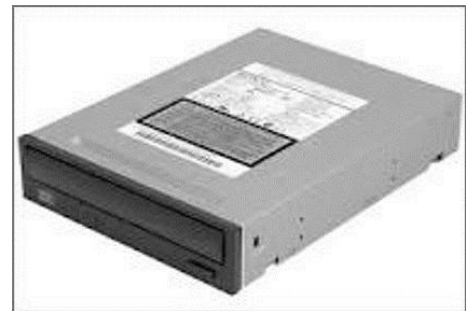
### **Hard Disk Drive (HDD)**

Also known as hard drive, is a magnetic storage device that is installed inside the computer. The hard drive is used as permanent storage for data. In a Windows computer, the hard drive is usually configured as the C: drive and contains the operating system and applications.



### **Optical Drive**

An optical drive is a storage device that uses lasers to read data on the optical media. There are three types of optical drives: Compact Disc (CD), Digital Versatile Disc (DVD) and Blu-ray Disc (BD).



### **Digital Versatile Disc (DVD)**

Designed to optically access data stored on a DVD. A laser moves back and forth near the disk surface and accesses data at a very fast rate.



**B. Input Devices** - Accepts data and instructions from the user or from another computer system.

**Keyboard** - The first input device developed for the PC. Data is transferred to the PC over a short cable with a circular 6-pin Mini-din connector that plugs into the back of the motherboard.



### **Pointing Devices**

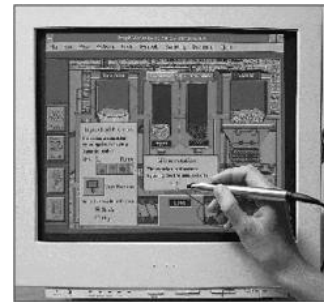
**Mouse**- The most common 'pointing device' used in PCs. Every mouse has two buttons and most have one or two scroll wheels.



**Touch screen** - A display screen that is sensitive to the touch of a finger or stylus. Used in myriad applications, including ATM machines, retail point-of-sale terminals, car navigation and industrial controls. The touch screen became wildly popular for smart phones and tablets.



**Light Pen** - A light-sensitive stylus wired to a video terminal used to draw pictures or select menu options. The user brings the pen to the desired point on screen and presses the pen button to make contact.



**Digitizer Tablet** - A graphics drawing tablet used for sketching new images or tracing old ones. Also called a "graphics tablet," the user contacts the surface of the device with a wired or wireless pen or puck. Often mistakenly called a mouse, the puck is officially the "tablet cursor."



**Scanning Devices** - A device that can read text or illustrations printed on paper and translates the information into a form the computer can use.



**Voice- Input Devices** - Audio input devices also known as speech or voice recognition systems that allow a user to send audio signals to a computer for processing, recording, or carrying out commands. Audio input devices such as



microphones allow users to speak to the computer in order to record a voice message or navigate software.

**C. Output Devices** -Any piece of computer hardware that displays results after the computer has processed the input data that has been entered.

**Computer Display Monitor** - It displays information in visual form, using text and graphics. The portion of the monitor that displays the information is called the screen or video display terminal.

### **Types of Monitor**

1. **CRT Monitor** Cathode Ray Tubes (CRT) were the only type of displays for use with desktop PCs. They are relatively big (14" to 16" deep) and heavy (over 15 lbs.).
2. **LCD Monitor** Liquid Crystal Display (LCD) technology has been used in laptops for some time. It has recently been made commercially available as monitors for desktop PCs.
3. **LED Monitor (Light Emitting Diode)** - A display and lighting technology used in almost every electrical and electronic product on the market, from a tiny on/off light to digital readouts, flashlights, traffic lights and perimeter lighting.

**LCD Projectors** - utilize two sheets of polarizing material with a liquid crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them. Each crystal, therefore, is like a shutter, either allowing light to pass through or blocking the light.

**Smart Board** - A type of display screen that has a touch sensitive transparent panel covering the screen, which is like a touch screen.

**Printer** - A device that prints text or illustrations on paper.

### **WHAT IS A STORAGE DEVICE?**

Storage device is any apparatus for recording computer data in a permanent or semi-permanent form.

#### **Types of storage devices**

1. Floppy diskette
2. Compact disc (CD)
3. Digital Versatile Disc (DVD)
4. Jump drive and USB flash drive
5. Hard drive
6. LS-120
7. Zip drive



#### ***Notes to the Teacher***

For the following activities you may inform your students to write the answers on their notebook



## ***What's More***

### **COMPONENT OF COMPUTER SYSTEM**

**Directions:** Draw and label the different hardware of a computer. After drawing and labeling the hardware components, group them into Input Devices, Output Devices and Storage Devices.



## ***What I Have Learned***

**Directions:** Complete each sentence with information from the chapter

1. A(n)\_\_\_\_\_ is a machine that changes information from one form into another.
2. \_\_\_\_\_ is a basic operation of computers.
3. Data and instructions in computers are coded with a(n)\_\_\_\_\_ because computers only understand two values.
4. The CPU uses \_\_\_\_\_ to hold data it is working on.
5. Data in RAM is \_\_\_\_\_ when the computer is turned off.



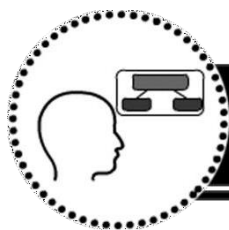
## ***What I Can Do***

**Directions:** Look at a computer. Create a five-column chart. In the first column, list all the hardware that you can identify. In the remaining columns, put check whether each item is used for inputting, processing, outputting, or storage.

LIST OF ALL HARDWARE	INPUT	PROCESSING	OUTPUT	STORAGE

Examine how the different pieces are connected to the computer. Answer the following questions:

1. What other hardware do you think the computer has that you cannot see?
2. What kinds of hardware were usually peripherals?
3. Which were usually in the computer's case?
4. What exceptions did you identify?



## Assessment

**Directions:** Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which of the following best describes the hard disk drive?
  - a. most expensive form of memory.
  - b. a stack of optical platters.
  - c. volatile storage space in the computer system.
  - d. sealed in a protective case.
2. How many types of memory are present in a computer?
  - a. ONE
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5. When you buy a new computer, which of the following is most likely pre-installed on your computer?
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  - b. accounting program
  - c. database program
  - d. spreadsheet program

6. All the statements below are true except one. Which one is false?
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  - c. Press CTRL + S and troubleshoot problem
  - d. Reboot computer and rely on the auto-recovery feature of the Word



## ***Additional Activities***

**Directions:** Answer the following questions in your notebook

1. How do analog and digital computers differ?
2. Which benefit of computers—the ability to use any kind of data, the ability to work rapidly, or the ability to access stored data again and again—do you think is the most important? Why?

## ***References***

Owen M. Milambiling, Cesar T. Arriola, Dante B. Bermas, Ronaldo V. Ramilo, Rosalie P. Lujero, Diana Marie B. Dagli, Dr. Virgilio O. Guevarra, and Maria Angelica G. Mates (2013). *Information and Communications Technology Learner's Material- Computer Hardware Servicing*. Department of Education.



## ***What I Need to Know***

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Lesson 1: Assemble Computer Hardware. TLE\_IACSS9-12ICCS-Ia-e-28

After going through this module, you are expected to:

1. Identify materials necessary to complete the work in accordance with established procedures and check against system requirements
2. Obtain materials necessary to complete the work in accordance with established procedures and check against system requirements



## ***What I Know***

**Directions:** Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Open source software is software whose source code is available for modification or enhancement by anyone. Which of the following is an example of open source software?
  - a. Windows
  - b. LINUX
  - c. MAC
  - d. Android
2. A computer's operating system depends on the memory of \_\_\_\_\_ what computer hardware part?
  - a. CPU
  - b. Graphics system
  - c. RAM
  - d. Motherboard
3. When you buy a new computer, which of the following is most likely pre-installed on your computer?
  - a. operating system
  - b. accounting program
  - c. database program
  - d. spreadsheet program
4. Which of the following statement is TRUE about LINUX?
  - a. LINUX is regularly targeted by viruses and malwares.
  - b. LINUX charges per license acquired
  - c. LINUX uses MS Office as its default productivity application suite
  - d. LINUX is an open source operating system.
5. The primary purpose of an operating system is:
  - a. To make the most efficient use of the computer hardware
  - b. To allow people to use the computer,
  - c. To keep systems programmers employed
  - d. To make computers easier to use
6. What do we call an operating system where a user can run multiple applications at the same time?
  - a. Multi-user
  - b. Multiprocessing
  - c. Multitasking
  - d. Multithreading
7. If CPU executes multiple programs simultaneously, it will be known as?
  - a. Multi-user
  - b. Multiprocessing
  - c. Multitasking
  - d. Multithreading

8. Which of these is NOT performed by an operating system?
  - a. Allocating space for files on a disk
  - b. Issuing an instruction to a printer to start printing
  - c. Managing the flow of data from a keyboard
  - d. Searching for a record in a database
9. Which operating system is found most often on large business and scientific computers?
  - a. Microsoft Windows
  - b. Mac OS
  - c. UNIX
  - d. Linux
10. Which of the following is NOT usually handled by the operating system?
  - a. managing programs
  - b. dealing with input/output devices
  - c. publishing Web pages
  - d. interacting with the user
11. Which of the following best describes the operating system?
  - a. collection of programs that operates hardware resources
  - b. system service provider to the application programs
  - c. link to interface the hardware and application programs
  - d. all of the above
12. What is the example of open source operating system?
  - a. UNIX
  - b. WINDOWS
  - c. LINUX
  - d. both a and c
13. What is another called to main memory of the computer system?
  - a. non volatile
  - b. secondary
  - c. volatile
  - d. large
14. Which of the following class of computers cannot support multiple users simultaneously?
  - a. Mainframe Computer
  - b. Mini Computer
  - c. Micro Computer
  - d. All of them
15. What is the primary purpose of an operating system?
  - a. To make the most efficient use of the computer hardware
  - b. To allow people to use the computer,
  - c. To keep systems programmers employed
  - d. To make computers easier to use

# Lesson 1

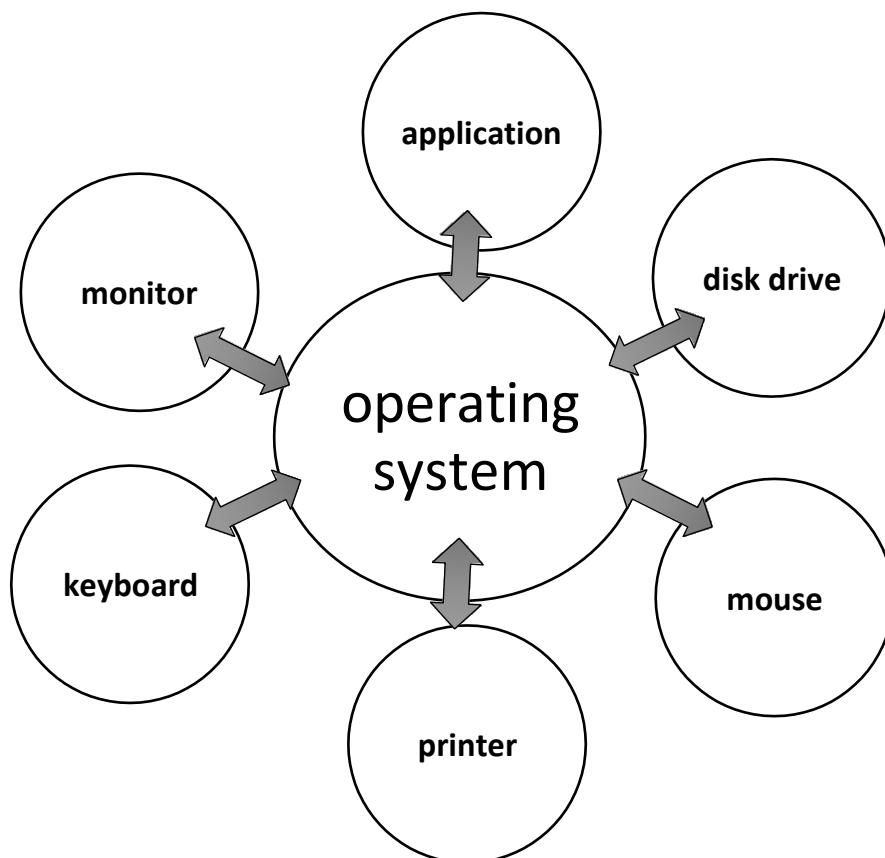
## Assemble Computer Hardware

The purpose of this module is to give an outline of computer operating systems. Topics to be discussed include the definition and types of operating and its classification.



### *What's In*

**Directions:** How the operating system works? Explain your answer using the diagram below. Do this activity in a separate sheet of paper.







## ***What's New***

**Directions:** Find the answers to these three questions on the internet

A. List at least two operating systems (OS) used by smart phones.

1. \_\_\_\_\_
2. \_\_\_\_\_

B. List at least three operating system (OS) used by laptops.

1. \_\_\_\_\_
2. \_\_\_\_\_

C. List at least two operating system (OS) used by desktops.

1. \_ 2. \_\_\_\_\_



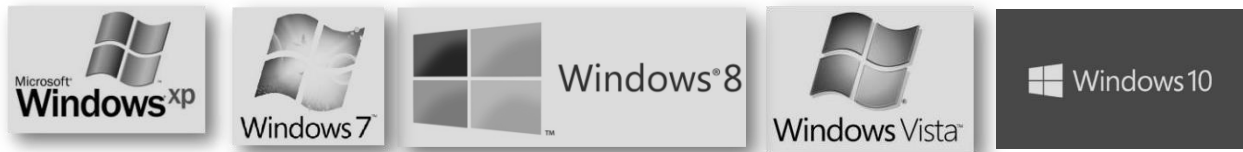
## ***What is It***

Have you ever wondered what happens when you turn on your computer? For many users, just seeing that the computer starts and that they can begin working is enough to meet their needs. But to become a more knowledgeable user, you should know how your computer works. One of the main behind-the-scenes contributors is the operating system. The operating system is like the control center of your computer: it controls everything that happens with your computer. The operating system makes sure that files are stored properly on storage devices, software programs run properly, and instructions to peripherals are sent, among other jobs. Without an operating system, your computer would not be able to perform even basic tasks.

### **WHAT IS OPERATING SYSTEM**

- It is the most important program that runs on a computer.
- It performs basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk.
- It makes sure that different program and users running at the same time do not interfere with each other.
- is also responsible for security, ensuring that unauthorized users do not access the system.
- manages all the related tasks needed to run the computer.

## TYPES OF OPERATING SYSTEM



**MICROSOFT WINDOWS**, also called Windows and Windows OS, computer operating system (OS) developed by Microsoft Corporation to run personal computers (PCs). Featuring the first graphical user interface (GUI) for IBM-compatible PCs, the Windows OS soon dominated the PC market.



**LINUX** is the best-known and most-used open source operating system. As an operating system, Linux is software that sits underneath all the other software on a computer, receiving requests from those programs and relaying these requests to the computer's hardware.

Linux also is different from other operating systems in many important ways. First, and perhaps most importantly, Linux is open source software. *The code used to create Linux is free and available to the public to view, edit, and—for users with the appropriate skills—to contribute to.*

Who uses Linux?

Companies and individuals choose Linux for their *servers* because it's secure, flexible, and you can receive excellent support from a large community of users, in addition to companies like Canonical, SUSE, and Red Hat, each of which offer commercial support.



**Macintosh Operating System (Mac OS)** is an operating system (OS) designed by Apple Inc. to be installed and operated on the Apple Macintosh series of computers. Introduced in 1984, it is a graphical user interface (GUI) based OS that has since been released as multiple different versions.

### **WHAT IS A MOBILE OPERATING SYSTEM (MOBILE OS)?**

A mobile operating system, also called a mobile OS, is an operating system that is specifically designed to run on mobile devices such as mobile phones, smartphones, PDAs, tablet computers and other handheld devices.

- |                                       |                                   |
|---------------------------------------|-----------------------------------|
| 1. Android OS (Google Inc.)           | 6. Palm OS (Garnet OS)            |
| 2. Bada (Samsung Electronics)         | 7. Symbian OS (Nokia)             |
| 3. BlackBerry OS (Research In Motion) | 8. webOS (Palm/HP)                |
| 4. iPhone OS / iOS (Apple)            | 9. Windows Mobile (Windows Phone) |
| 5. MeeGo OS (Nokia and Intel)         |                                   |

Operating systems can be classified as follows:

1. Multi-user – Allows two or more users to run programs at the same time. Some operating systems permit hundreds or even thousands of concurrent users. ex: Linux, Unix, Windows 2000.
2. Multiprocessing – Supports running a program on more than one CPU. ex: Linux, Unix, Windows 2000.
3. Multitasking – Allows more than one program to run concurrently. ex: Unix, Windows 2000, and Windows Multi Point
4. Multithreading – Allows different parts of a single program to run concurrently. ex: Linux, Unix, Windows 2000, and Windows 7
5. Real time – Responds to input instantly. General-purpose operating systems, such as DOS and UNIX, are not real-time.



## ***What's More***

**Directions:** Write your answers on the space provided.

### **A. What is an Operating System**

Give 3 points to say what an OS does

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

### **B. Two types of OS.**

Explain the two types of OS:

1. \_\_\_\_\_
2. \_\_\_\_\_

### **C. Functions of an OS**

List 5 functions of an OS:

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



## ***What I Have Learned***

**Directions:** Complete each sentence with information from the chapter

1. \_\_\_\_\_ computer operating system developed by Microsoft Corporation to run personal computers.
2. \_\_\_\_\_ allows more than one program to run concurrently.
3. \_\_\_\_\_ is an operating system that is specifically designed to run on mobile devices such as mobile phones.
4. \_\_\_\_\_ is the best-known and most-used open source operating system.
5. \_\_\_\_\_ is the most important program that runs on a computer.



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

**Directions:** Interview three smartphone users: one who uses Android OS, one who uses an iOS (iPhone), and one who has experience with both operating systems. Prepare written questions related to ease of learning the operating system, ease of use, availability of programs, and overall satisfaction with the operating system. Add your findings to your own experiences and write a conclusion using table about the user preferences of the two major operating systems.

Operating System	Name of the user	Understanding About OS	usability	Availability of programs	Overall Satisfaction
1. Android OS					
2. iOS					

3. Both user of Android and iOS					
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Findings :

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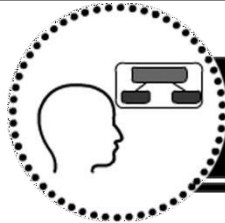
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Conclusion :

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## Assessment

**Directions:** Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

- What is the primary purpose of an operating system?
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  - To allow people to use the computer,
  - To keep systems programmers employed
  - To make computers easier to use
- Which of the following statement is TRUE about LINUX?
  - LINUX is regularly targeted by viruses and malwares.
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  - LINUX is an open source operating system.
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  - collection of programs that operates hardware resources
  - system service provider to the application programs
  - link to interface the hardware and application programs
  - all of the above
- What is the example of open source operating system?
  - UNIX
  - WINDOWS
  - LINUX
  - both a and c

6. What do we call an operating system where a user can run multiple applications at the same time?
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  - b. secondary
  - c. volatile
  - d. large
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  - c. RAM
  - d. Motherboard
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  - a. Allocating space for files on a disk
  - b. Issuing an instruction to a printer to start printing
  - c. Managing the flow of data from a keyboard
  - d. Searching for a record in a database
12. Open source software is software whose source code is available for modification or enhancement by anyone. Which of the following is an example of open source software?
  - a. Windows
  - b. LINUX
  - c. MAC
  - d. Android
13. Which of the following class of computers cannot support multiple users simultaneously?
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  - c. Micro Computer
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  - c. database program
  - d. spreadsheet program
15. Which operating system is found most often on large business and scientific computers?
  - a. Microsoft Windows
  - b. Mac OS
  - c. UNIX
  - d. Linux



## ***Additional Activities***

**Directions:** Answer the following questions in your TLE notebook.

1. What type of computer operating system do you think small, advanced devices such as PDAs use? Why?
2. Which OS is used widely by Universities and research Organizations? Why?
3. Which OS is freely available (no cost) and modifiable?

## **References**

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*“What is Linux”* *www.opensource.com*.

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*“Macintosh Operating System (Mac OS)”* *www.techopedia.com*

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(Accessed 06/18/2020)





## ***What I Need to Know***

This module was designed and written with you in mind. It is here to help you master the nature of Computer System Design. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module mainly focuses on one lesson:

Lesson 1: Assemble Computer Hardware. TLE\_IACSS9-12ICCS-Ia-e-28

After going through this module, you are expected to:

1. Obtain tools, equipment and testing devices needed to carry out installation work in accordance with established procedures and check for correct operation and safety



## ***What I Know***

**Directions:** Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. What is a computer?
  - a. A programmable electronic device that processes data via instructions to output information for future use.
  - b. Raw facts and figures that has no meaning processed via a set of instructions.
  - c. Meaning attached to data letters, pictures, symbols, or sounds.
  - d. All of the above
2. Why do users use computers?
  - a. For their data processing speeds, accuracy, storage capacity and ability to work for long periods.
  - b. Computers are very fast and not very accurate.
  - c. Computers work for long periods without the need for maintenance.
  - d. Computers stores large amounts of data.
3. A computer system consists of both hardware and software.
  - a. True
  - b. False
  - c. Maybe
  - d. None
4. Hardware is a set of instructions called programs the computer uses to carry out tasks while Software are all the parts of the computer you can see and touch and is also known as peripherals.
  - a. True
  - b. False
  - c. Maybe
  - d. None
5. Tasks the computer usually performs are:
  - a. Drawing a picture, typing a letter and perform calculations.
  - b. Word processors, spreadsheets, and graphic packages.
  - c. Hardware and software used to process data.
  - d. All of the above.
6. To accomplish a task a computer must process data in three stages. They are:
  - a. CPU ---> Processing ---> Output
  - b. Input ---> ALU ---> Hardware
  - c. Hardware ---> CPU ---> Software
  - d. Input ---> Processing ---> Output
7. The CPU is also known as:
  - a. The Brain
  - b. The Processor
  - c. The Central Processing Unit
  - d. All of the above.

8. Which smaller unit of the CPU performs all arithmetic and logic functions in a computer?
- CU
  - ALU
  - PROCESSOR
  - All of the above.
9. The central connection point inside the computer where all hardware connects is:
- CPU
  - Northbridge
  - Power Supply
  - Motherboard
10. RAM (Random Access Memory) is considered which type of storage:
- Secondary non-volatile storage
  - Modular
  - Motherboard
  - volatile storage
11. Which tool is used for hardware to stand on to prevent static electricity from building up?
- Anti-static mat
  - Hex driver
  - Philips head screwdriver
  - Wire cutter
12. Which tool is used to loosen or tighten cross-head screws?
- Anti-static mat
  - Hex driver
  - Philips head screwdriver
  - Wire cutter
13. Which tool is used to bundle cables neatly inside and outside of a computer?
- Part Retriever
  - Lint-free Cloth
  - Cable ties
  - Flat head screwdriver
14. Which tool is used to loosen or tighten screws that have a star-like depression on the top, a feature that is mainly found on laptop?
- Anti-static mat
  - Torx screwdriver
  - Philips head screwdriver
  - Wire cutter
15. Which tool is used to blow away dust and debris from different computer parts without touching the components?
- Anti-static mat
  - Hex driver
  - Compressed air
  - Wire cutter

# Lesson 1






## Assemble Computer Hardware

This module introduces the design of computer systems from the level of basic hardware through to software. The aim is to give an overview of the layered nature of computer systems and how the use of simple interfaces can make the design of complex and powerful systems possible. Topics covered include diagram of computer system, inside the system unit, CPU and basic software.



### *What's In*

Directions: Identify the following tools, and materials and give their uses. Use a separate sheet of paper in answering.

1.		
2.		
3.		
4.		
5.		



## What's New

**Directions:** Match the following terms to the images. Then state their function.

Motherboard	Video Card	Sound Card
Power Cord	Hard Drive	CPU
Modem Card	Fan	CD/DVD Drive
Cable	Extra Case	Power Supply



**Function:**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_



# What is It

## Use of Tools in PC Hardware Servicing

To complete hardware repairs, it is important to have a toolkit that should contain all of the necessary tools. As you gain experience, you will learn which tools to have available for different types of jobs. Hardware tools are grouped into these four categories:

- **Electro-Static Discharge (ESD) tools** - Static electricity is easily generated by friction on carpets, tile flooring, clothing, hair, fabric, and etc. The friction of moving air alone will charge suspended particles and cause the buildup of static electrical charges on people and objects in the environment.

Examples of ESD Tools:

**Anti-static wrist strap** – Used to prevent ESD damage to computer equipment.

**Anti-static mat** – Used to stand on or place hardware on to prevent static electricity from building up.

- **Hand tools** - A **hand tool** is a device for performing work on a material or a physical system using only hands. Hand tools can be used manually or electrically powered, using electrical current.

Examples of Hand Tools are as follows:

**Flat Head Screwdriver** – Used to loosen or tighten slotted screws.

**Philips Head Screwdriver** – Used to loosen or tighten cross-head screws.

**Torx Screwdriver** - Used to loosen or tighten screws that have a star-like depression on the top, a feature that is mainly found on laptop.

**Hex Driver** – Sometimes called a nut driver, is used to tighten nuts in the same way that a screwdriver tightens screws.

**Needle-Nose Pliers** – Used to hold small parts.

**Wire Cutter** – Used to strip and cut wires.

**Tweezers** – Used to manipulate small parts.

**Part Retriever** – Used to retrieve parts from location that is too small for your hand to fit.

**Flashlight** – Used to light up areas that you cannot see well.

- **Cleaning tools** - Having the appropriate cleaning tools is essential when maintaining or repairing computers. Using these tools ensures that computer components are not damaged during cleaning. Examples:

**Lint-free Cloth** – Used to clean different computer components without scratching or leaving debris.

**Compressed Air** – Used to blow away dust and debris from different computer parts without touching the components.

**Cable Ties** – Used to bundle cables neatly inside and outside of a computer.

**Parts Organizer** – Used to hold screw, jumpers, fasteners and other small parts and prevents them from getting mixed together.

· **Diagnostic tools** - Computers are easier to use and more dependable with each new generation of hardware and operating system update, but that does not mean they are problem-free. Here are the most popular tools for diagnosing your computer problems:

**Multimeter** – Used to test the integrity of circuits and the quality of electricity in computer components.

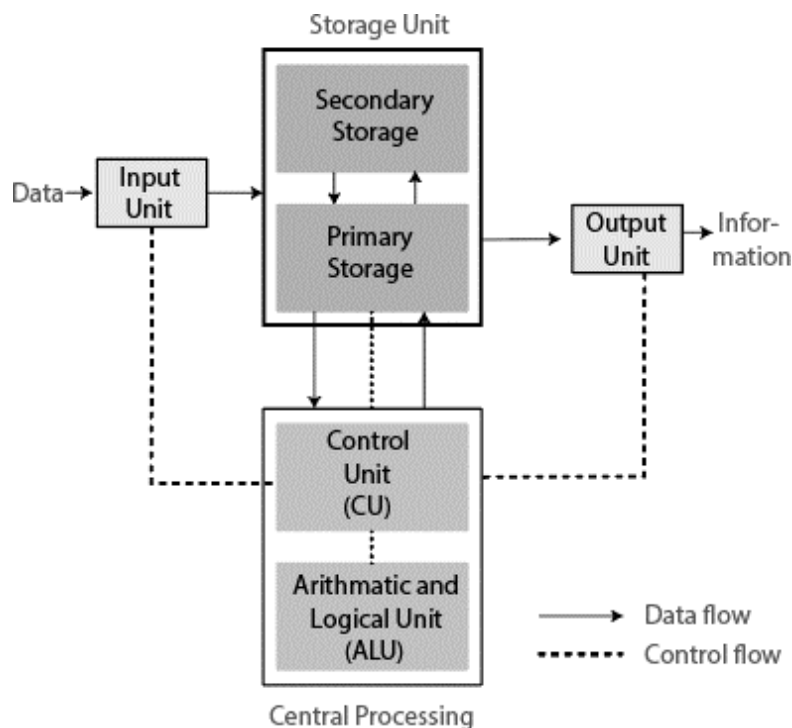
**Loopback Adapter** – Used to test the functionality of computer ports.

### Computer System Design

Computers are made of electronic parts called components. Each component has a specific function. They all work together when a computer is operated. Some of the components can be seen partly from the outside. Some components are inside the computer box where we cannot see them.

A computer system consists of both hardware and software components and these two basic elements need to work in harmony. Operating systems software is needed to run the computer.

### Diagram of a Computer System



The data is entered through input devices such as the keyboard, mouse, etc. This set of instruction is processed by the CPU after getting the input by the user, and then the computer system produces the output. The computer can show the output with the help of output devices to the user, such as monitor, printer, etc.

### The Components of the System Unit

The system unit contains the main components such as the:



1. Motherboard
2. CPU Central Processing Unit
3. Internal Storage
  - 3.1 Random Access Memory (RAM)
  - 3.2 Hard Disk Drive (HDD)
4. Power Supply
5. Video Card
6. Sound Card
7. NIC Network Interface Controller

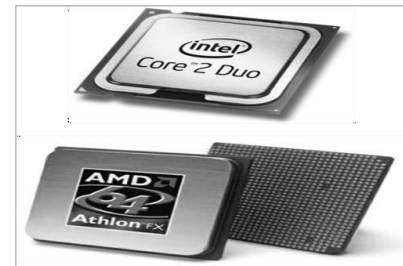
### 1. MOTHERBOARD - The main

circuit board of a computer. It contains all the circuits and components that run the computer.

-Many electronic components attach to the motherboard; others are built into it. Ex: adapter cards, a processor chip, and a memory module.



2. **Central Processing Unit (CPU)** - The processor is the main “brain” or “heart” of a computer system. It performs all the instructions and calculations that are needed and manages the flow of information through a computer.

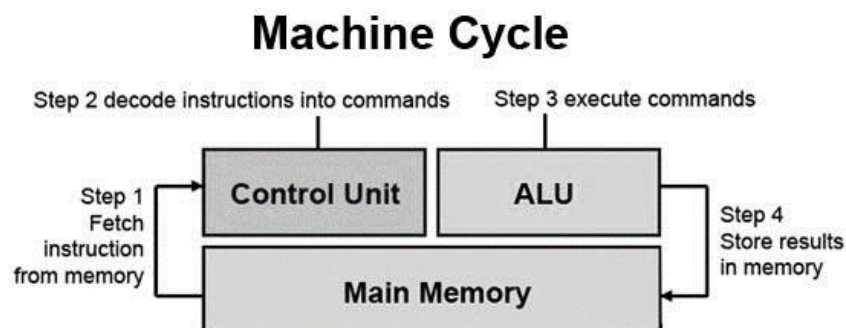


### Components of the CPU

In the CPU, there are two primary components.

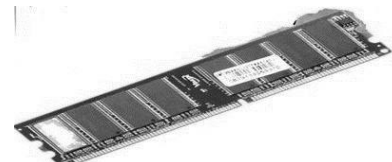
**ALU (arithmetic logic unit)** - performs mathematical, logical, and decision operations.

**CU (control unit)** - directs all the processors operations.



### 3. Internal Storage

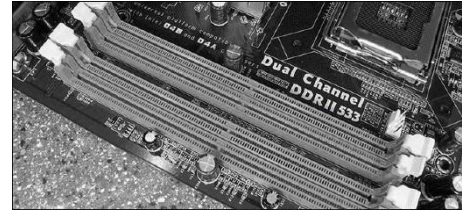
3.1 **Random Access Memory (RAM)** - is volatile, meaning it holds data only when the power is on. When the power is off, RAM's contents are lost.





RAM chips usually reside on a memory module, which is a small circuit board.

**Memory slots** on the motherboard hold memory modules.



32 **Hard Disk Drive (HDD)**- Also known as hard drive, is a magnetic storage device that is installed inside the computer. The hard drive is used as permanent storage for data. In a Windows computer, the hard drive is usually configured as the C: drive and contains the operating system and applications.



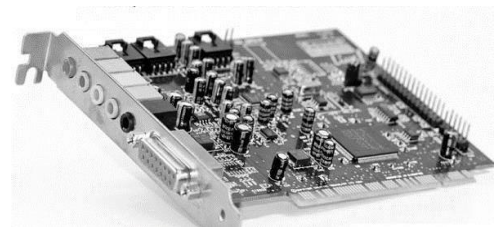
4. **Power Supply Unit (PSU)** - Installed in the back corner of the PC case, next to the motherboard. It converts 120vac (standard house power) into DC voltages that are used by other components in the PC.



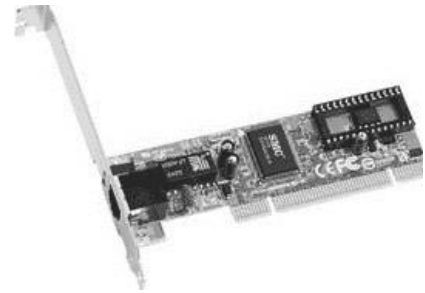
5. **Video Card** - Alternatively known as a display adapter, graphics card, video adapter, video board, or video controller, a video card is an expansion card that connects to a computer motherboard. It is used to create a picture on a display



6. **Sound Card** - Alternatively referred to as an audio output device, sound board, or audio card. A sound card is an expansion card or IC for producing sound on a computer that can be heard through speakers or headphones. Although the computer does not need a sound card, it is included on every machine as either in an expansion slot (shown below) or built into the motherboard (onboard).



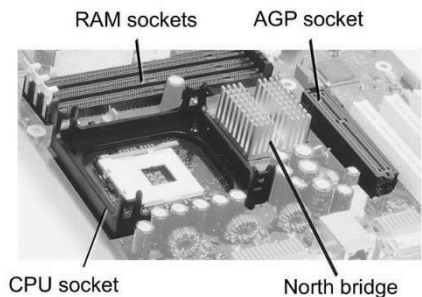
**7. Network Interface Card (NIC)** - Short for network interface card, the NIC is also referred to as an Ethernet card and network adapter. A NIC is a computer expansion card for connecting to a network (e.g., home network or Internet) using an Ethernet cable with an RJ-45 connector.



## NORTH BRIDGE

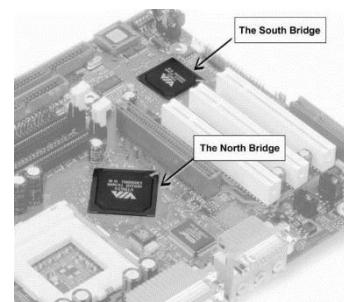
Alternatively referred to as the PAC (PCI/AGP Controller) and nb, the Northbridge is an integrated circuit responsible for communications between the CPU interface, AGP, and the memory.

It acts as a "bridge" for the southbridge chip to communicate with the CPU, RAM, and graphics controller.



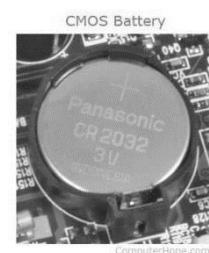
## SOUTH BRIDGE

The southbridge is an IC on the motherboard responsible for the hard drive controller, I/O controller, and integrated hardware. Integrated hardware can include the sound card and video card if on the motherboard, USB, PCI, ISA, IDE, BIOS, and Ethernet.



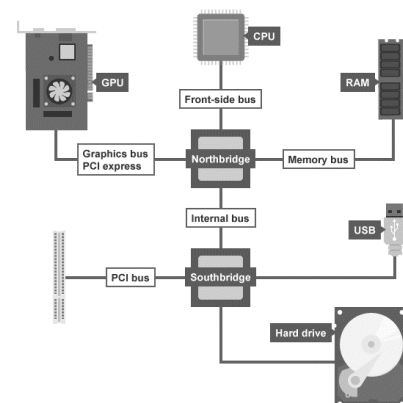
## Complementary Metal Oxide Semiconductor (CMOS)

Alternatively referred to as a RTC (real-time clock), NVRAM (non-volatile RAM) or CMOS RAM, CMOS is short for complementary metal-oxide semiconductor. CMOS is an onboard, battery powered semiconductor chip inside computers that stores information.



## Bridges

Bridges manage how data and instructions are transferred between the CPU, memory, and other devices.



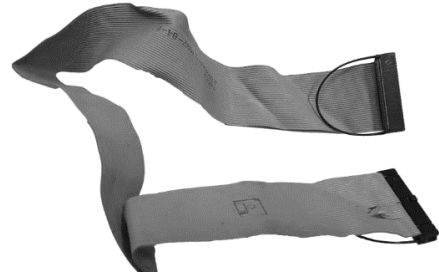
### **OPTICAL DISK DRIVE, CD/DVD DRIVE**

An optical drive is a storage device that uses lasers to read data on the optical media. There are three types of optical drives: Compact Disc (CD), Digital Versatile Disc (DVD) and Blu-ray Disc (BD).



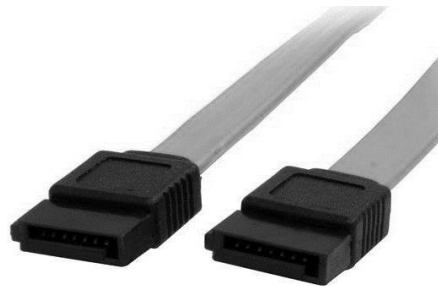
### **INTEGRATED DRIVE ELECTRONICS (IDE)**

Short for Integrated Drive Electronics, IDE is more commonly known as ATA or PATA (parallel ATA). It is a standard interface for IBM computers that was first developed by Western Digital and Compaq in 1986 for compatible hard drives and CD or DVD drives. It is used to connect drives directly into the motherboard.

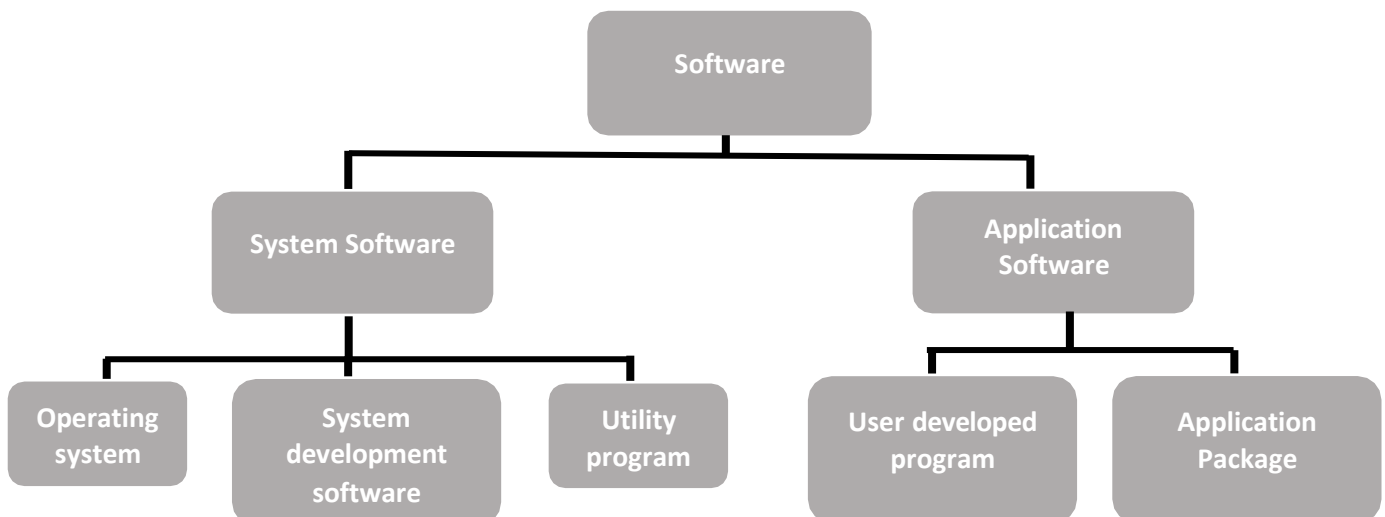


### **SERIAL ADVANCED TECHNOLOGY ATTACHMENT**

Short for serial AT attachment, SATA 1.0 was first released in August 2001 and is a replacement for the parallel ATA interface used in IBM compatible computers. SerialATA can deliver 1.5 Gbps (approximately 187 MBps) of performance to each drive within a disk array.



### **Classification of Computer Software**



**System software:** System software consists of programs which facilitate the use of computer by the users. These programs perform such standard tasks as organizing and maintaining data files, translating programs written in various languages to a form acceptable to the hardware, scheduling jobs as well as aiding in other areas of computer operations.

**Application Software:** Application program can be developed by the users themselves using suitable programming languages. There are many programming languages which allow us to write compute instructions in a text form.



### ***Notes to the Teacher***

For the following activities you may inform your students to write the answers on their notebook



## ***What's More***

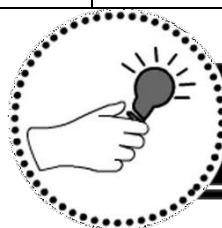
- A. **Directions:** Follow the instructions below. You need to identify how it is to be connected to the processor and what cabling may be needed.
1. Draw a sketch showing all the components and the connections between them.
  2. On your diagram, label each component (such as monitor, printer, modem/router, keyboard, mouse, speakers, microphone)
  3. Label each connection between components and describe the types of connectors (eg USB, serial, parallel)



## What I Have Learned

**Directions:** Fill in the blanks with the correct name of components and function.

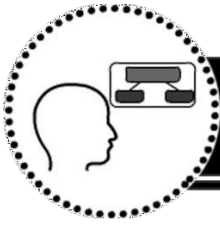
No.	Components	Functions
1.		manage how data and instructions are transferred between the CPU, memory, and other devices.
2.	Video Card	
3.	CPU	
4.		The main circuit board of a computer.
5.		Also known as hard drive, is a magnetic storage device that is installed inside the computer.
6.	ALU	
7.	CU	
8.		Alternatively known as a display adapter, graphics card, video adapter, video board, or video controller
9.	Sound Card	
10.	NIC	



## What I Can Do

**Directions:** Classify the following as Hardware or Software. Write H or S next the word.

Drive	H/S	Drive	H/S
Motherboard		PowerPoint	
Monitor		BIOS	
USB Port		Linux	
Windows		Ubuntu	
Pen drive		Cellphone	
RAM		Printer	
ROM		Quick time Media player	
Internet browser		Speaker	
Keyboard		Microphone	
Hard disk		Web cam	



## Assessment

**Directions:** Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Which tool is used for hardware to stand on to prevent static electricity from building up?
  - a. Anti-static mat
  - b. Hex driver
  - c. Philips head screwdriver
  - d. Wire cutter
2. Which tool is used to loosen or tighten cross-head screws?
  - a. Anti-static mat
  - b. Hex driver
  - c. Philips head screwdriver
  - d. Wire cutter
3. Which tool is used to bundle cables neatly inside and outside of a computer?
  - a. Part Retriever
  - b. Lint-free Cloth
  - c. Cable ties
  - d. Flat head screwdriver
4. Which tool is used to loosen or tighten screws that have a star-like depression on the top, a feature that is mainly found on laptop?
  - a. Anti-static mat
  - b. Torx screwdriver
  - c. Philips head screwdriver
  - d. Wire cutter
5. Which tool is used to blow away dust and debris from different computer parts without touching the components?
  - a. Anti-static mat
  - b. Hex driver
  - c. Compressed air
  - d. Wire cutter
6. What is a computer?
  - a. A programmable electronic device that processes data via instructions to output information for future use.
  - b. Raw facts and figures that has no meaning processed via a set of instructions.
  - c. Meaning attached to data letters, pictures, symbols, or sounds.
  - d. All of the above
7. Hardware is a set of instructions called programs the computer uses to carry out tasks while Software are all the parts of the computer you can see and touch and is also known as peripherals.
  - a. True
  - b. False
  - c. Maybe
  - d. None

8. Tasks the computer usually performs are:
  - a. Drawing a picture, typing a letter and perform calculations.
  - b. Word processors, spreadsheets, and graphic packages.
  - c. Hardware and software used to process data.
  - d. All of the above.
9. To accomplish a task a computer must process data in three stages. They are:
  - a. CPU ---> Processing ---> Output
  - b. Input ---> ALU ---> Hardware
  - c. Hardware ---> CPU ---> Software
  - d. Input ---> Processing ---> Output
10. The CPU is also known as:
  - a. The Brain
  - b. The Processor
  - c. The Central Processing Unit
  - d. All of the above.
11. Which smaller unit of the CPU performs all arithmetic and logic functions in a computer?
  - a. CU
  - b. ALU
  - c. PROCESSOR
  - d. All of the above.
12. Why do users use computers?
  - a. For their data processing speeds, accuracy, storage capacity and ability to work for long periods.
  - b. Computers are very fast and not very accurate.
  - c. Computers work for long periods without the need for maintenance.
  - d. Computers stores large amounts of data.
13. A computer system consists of both hardware and software.
  - a. True
  - b. False
  - c. Maybe
  - d. None
14. The central connection point inside the computer where all hardware connects is:
  - a. CPU
  - b. Northbridge
  - c. Power Supply
  - d. Motherboard
15. RAM (Random Access Memory) is considered which type of storage:
  - a. Secondary non-volatile storage
  - b. Modular
  - c. Motherboard
  - d. volatile storage

**Directions:** Answer the following questions below.

1. What types of internal memory are being used in your computer? How much is installed?
2. Research the Internet to find out how much cache memory is used in several PCs with different specifications.



# References

## Printed Materials

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## Online Resources

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[computer/](https://www.tutorialandexample.com/block-diagram-of-a-computer/) (updated last September 20, 2019)

"Various Classification of Computer Software" [www.bankofinfo.com](http://www.bankofinfo.com)

<http://bankofinfo.com/classification-of-computer-software/> (updated last March 16, 2014)



## ***What I Need to Know***

This module was designed and written with you in mind. It is here to help you master the nature of Computer System Design. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module mainly focuses on one lesson:

Lesson 1: Assemble Computer Hardware / TLE\_IACSS9- 12ICCS-Ia-e-28

After going through this module, you are expected to:

1. Assemble computer hardware in accordance with established procedures and system requirements
2. Perform BIOS configuration in accordance with hardware requirements



## ***What I Know***

**Directions:** Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. If you want to disassembly your computer what is the first step that you must do?
  - a. unplug every cable that is plugged in to your computer.
  - b. clean the parts first
  - c. open it, unscrew the four screws at the back of the computer
  - d. unplug the fan from the motherboard.
2. How to disassembly a RAM?
  - a. First, unplug the ribbon from the back of the drive. Once that is completed, pull on the tab securing the drive in place, and then push it out from the inside.
  - b. You must disconnect the motherboard (very large connector/plug),
  - c. You should be able to lift the fan out of the PC.
  - d. Push down on both tabs holding the RAM in place, which are located at both ends of the RAM
3. Enrique disassembled a motherboard and he put it in antistatic bag. Why do he need to put a motherboard in an antistatic bag?
  - a. to safeguard your components from potentially hazardous static electricity
  - b. to always make sure that the components are clean.
  - c. for the components to look nice.
  - d. none of the above
4. What is the first thing that you need to do before disassembling a personal computer?
  - a. Open the outer shell / case
  - b. Unplug all the peripherals.
  - c. Prepare all the tools to be needed.
  - d. Take inventory.
5. Where is the CPU fan located?
  - a. At the top of the CPU heat sink.
  - b. Attach directly on the motherboard.
  - c. Below the CPU heat sink.
  - d. Outside the system unit.
6. What is the first step in removing hard drive?
  - a. Unplug the data cable from the motherboard and the hard drive.
  - b. Unscrew the four screws securing it in place.
  - c. Slide the hard disk slot out.
  - d. None of the above



## Lesson

# 1

# Assemble Computer Hardware

In this module, you will be assembling a functional computer system with the minimum number of hardware. You need to have all the tools and parts needed in the assembling process.



## *What's In*

**Directions:** Identify what is being asked. Write your answer in your notebook

1. What is the first step in computer disassembly?
2. What is the last step in computer disassembly?
3. What should be the first cable to be unplugged?
4. What is the standard color of a PS/2 port for the keyboard?
5. What is the standard color of a PS/2 port for the mouse?
6. What does VGA stands for?
7. What is the first step in computer assembly?
8. What is the last step in computer assembly?
9. How many screws does a motherboard have by default?
10. How many screws does a power supply have by default?



## What's New

**Directions:** Utilizing the internet, watch video presentations about choosing PC parts to broaden your ideas and skills. You can use the following URLs for your reference.

1. <https://www.youtube.com/watch?v=34vFyKWC7cE>
2. <https://www.youtube.com/watch?v=5Tkgac1W79Q>

List down all the helpful tips and techniques given in the video about choosing the right PC parts as many as you can.



## What is It

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

### INSTALLATION OF HARDWARE COMPONENTS AND OTHER PERIPHERALS

#### **Step 1. Prepare your workplace**

- Take Inventory
- Make Space, Make Time
- Prepare Grounding Protection and hand tools to be needed
- Have the Drivers Ready



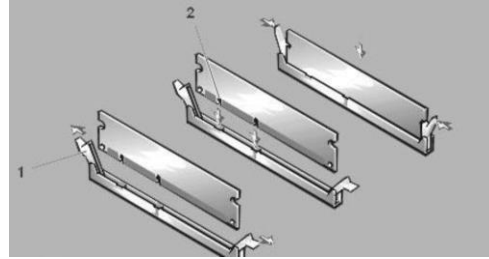
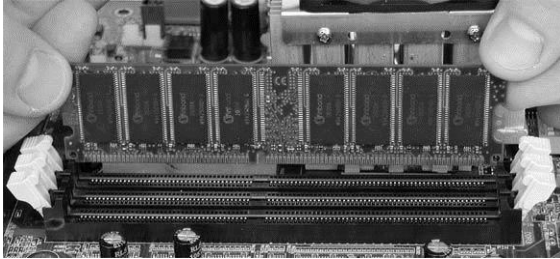
#### **Step 2. Prepare the Motherboard**

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 (if new) Remember, you always want to safeguard your components from potentially hazardous static electricity (wear your strap).



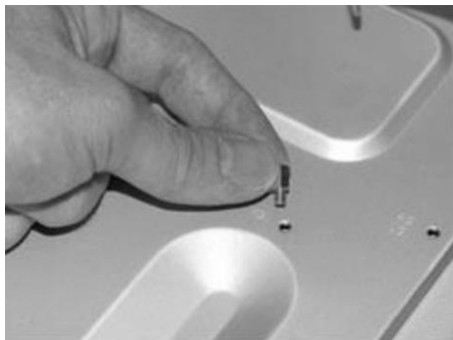
### **Step 3. Install Memory (RAM)**

In order to install the memory modules, insert them into the proper sockets and push down firmly but evenly until the clips on both sides of the socket pop into place.



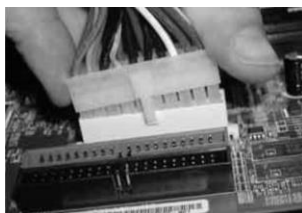
### **Step 4. Place the motherboard into the case**

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. 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.



### **Step 5. Connect the Power Supply**

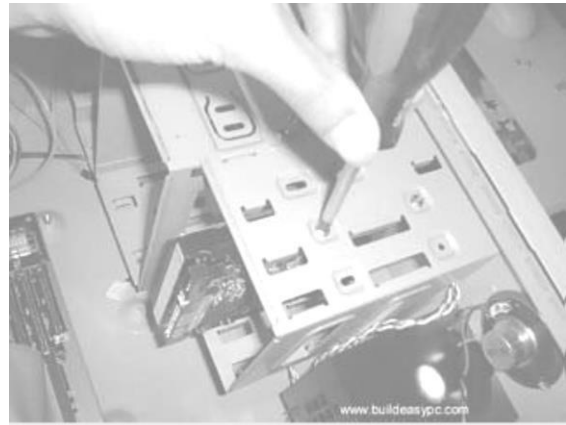
- First, plug the large ATX power connector from your power supply into the matching port on your motherboard.
- Locate the smaller, square processor power connector **(you cannot miss it - it is the one sprouting the yellow and black wires)** and attach it to the motherboard.
- Attach each of the tiny leads(power, reset, hard-disk activity lights, PC speaker, and front-panel USB) to the corresponding pin on your motherboard.



### **Step 6. Install Internal Drives**

- Install the CD/DVD drive, connect the data and power cable.
- Install the hard disk drive. Same with the CD//DVD drive, connect the data and power cable.

**Note: don't forget to screw both devices**



### **Step 7. Connect/Plug-in the Peripherals**

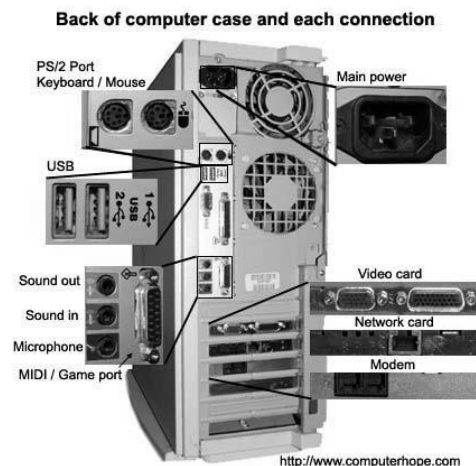
- Attach the monitor cable to the video port. Secure the cable by tightening the screws on the connector.
- Plug the keyboard cable into the PS/2 keyboard port.
- Plug the mouse cable into the PS/2 mouse port.
- Plug the USB cable into a USB port.
- Plug the network cable into the network port.
- Plug the power cable into the power supply.

### **Personal Computer Disassembly**

Steps:

Step 1. Unplugging

Unplug every cable that is plugged in to your computer. That includes the cables such as power, USB, mouse, keyboard, internet, monitor, etc. Just unplug all the cables for safety purposes.



### **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 screw driver 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.





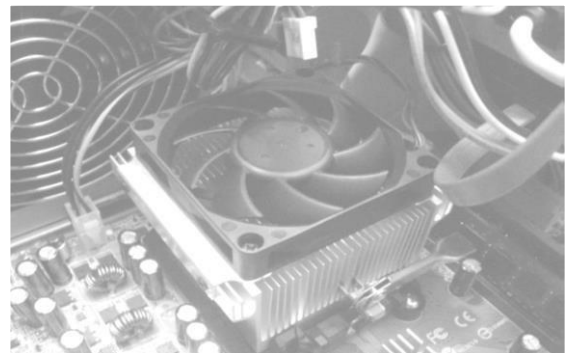
### ***Step 3. Removing the System Fan***

First, unplug the fan from the motherboard. You can find the plug by following the wire from the fan. Next, you will have to unscrew the fan from the outside. You should now be able to lift the fan out of the PC.



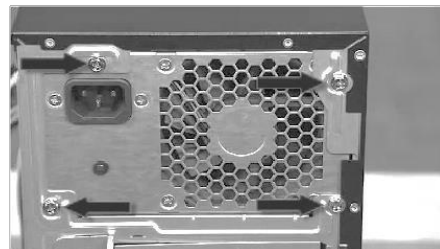
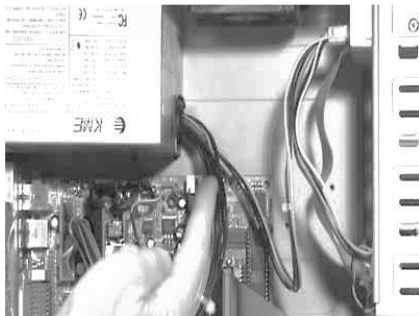
### ***Step 4. Removing the CPU Fan***

The CPU fan is located 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, just follow the wires and you should easily find it. To remove the fan from the heat sink, remove the four screws securing it in place.



### ***Step 5. Removing the Power Supply***

The first thing to do is unplug every wire coming from the power supply. 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.



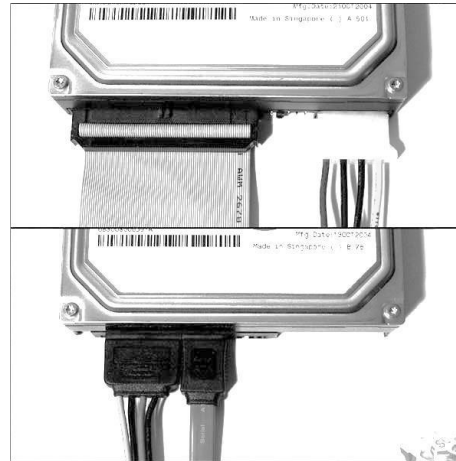
### ***Step 6. Removing CD/ DVD Drive***

First, unplug the cable (IDE or SATA) from the back of the drive and the motherboard. Once that is completed, pull on the tab securing the drive in place, then push it out from the inside.



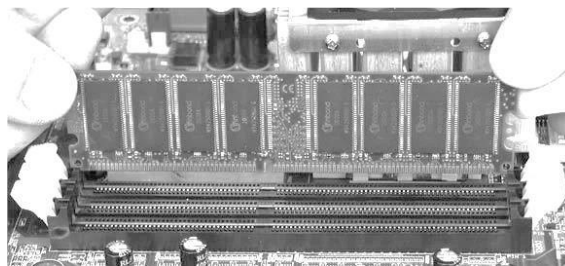
### ***Step 7. Removing the Hard Drive***

First, also unplug the cable (IDE or SATA) from the hard drive and the motherboard. 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.



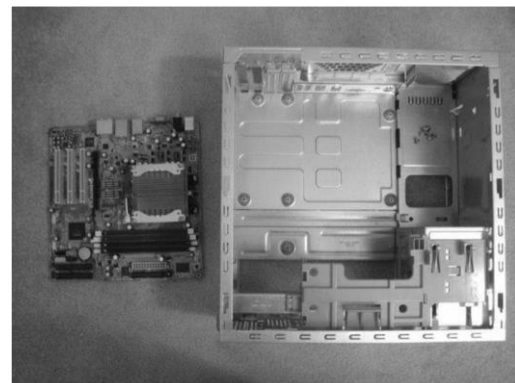
### ***Step 8. Removing the Memory (RAM)***

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. Removing the Motherboard***

Before removing the motherboard unplug the tiny leads (power, reset, hard-disk activity lights, PC speaker, and any front-panel USB) into the 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.



## BASIC COMPUTER CONFIGURATION SETUP

### Configuration

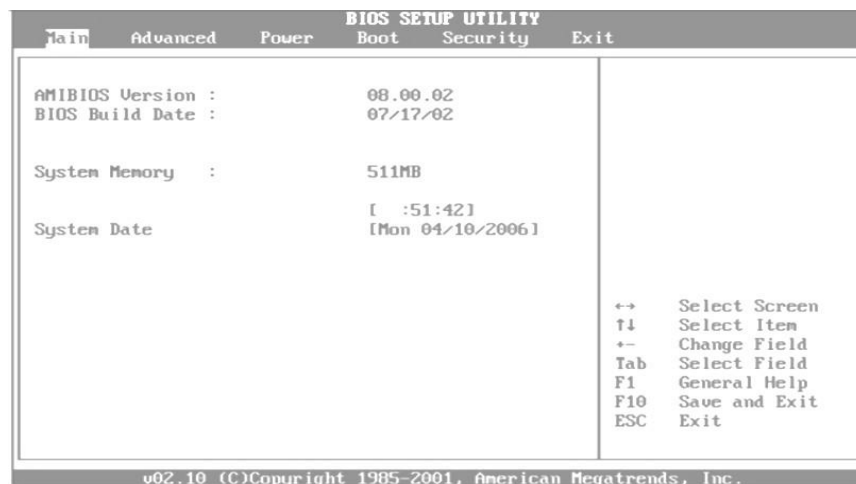
- Configuration is the way a system is set up, or the assortment of components that make up the system
- Configuration can refer to either hardware or software, or the combination of both.

### Device Drivers

- Drivers are small software programs that help the operating system use or "drive" the device. Whenever a device doesn't work properly, ask if the proper driver has been installed.

### BIOS

- Usually referred to as BIOS, is software stored on a small memory chip on the motherboard.



The BIOS is the place which houses the settings for your computer's CPU, RAM, storage and ports. In years gone by you'd be prompted during the PC boot up sequence to 'Press F1 to Enter Setup' or words to that effect.

BIOS contain a number of hardware configuration options that can be changed through the setup utility. Saving these changes and restarting the computer applies the changes to the BIOS and alters the way BIOS instructs the hardware to function.

### Function

- Change the Boot Order
- Load BIOS Setup Defaults
- Remove a BIOS Password
- Create a BIOS Password
- Change the Date and Time
- Change Floppy Drive Settings
- Change Hard Drive Settings
- Change CD/DVD/BD Drive Settings
- View Amount of Memory Installed
- Enable or Disable the Computer Logo
- Enable or Disable the Quick Power On Self-Test (POST)
- Enable or Disable the CPU Internal Cache
- Enable or Disable the Caching of BIOS
- Change CPU Settings
- Change Memory Settings
- Change System Voltages
- Change the Boot Up NumLock
- Status



## ***What's More***

**Directions:** Determine the Hardware Manufacturer

1. On the desktop, right-click My Computer, and then click Manage
2. Under System Tools, click Device Manager. The devices that are installed on the computer are listed in the right pane.
3. In the right pane, expand the category of the device that you want to configure. For example, expand Display adapters.
4. Right-click the device for which you want to install the driver, and then click Properties
5. Click the General tab. Make a note of the manufacturer and model of the device
6. Click Cancel, and then quit Computer Management



### ***Notes to the Teacher***

For the following activities you may inform your students to write the answers on a separate sheet



## ***What I Have Learned***

**Directions:** Rearrange the following procedures in their proper order. Use numbers to indicate their order of precedence. The first number is done for you.

A. Personal Computer Disassembly

- \_\_\_ 1. Detaching the Hard Drive
- \_\_\_ 2. Detaching the power supply
- \_\_\_ 3. Opening the outer shell / case
- \_\_\_ 4. Pull Out the Motherboard
- \_\_\_ 5. Removing the CD / DVD Drives

- \_\_\_6. Removing the CPU fan
- \_\_\_7. Removing the system fan
- \_\_\_8. Unplugging all the cables and wires

### **B. Personal Computer Assembly**

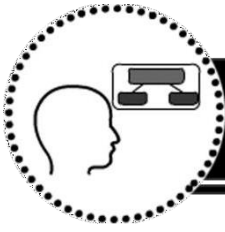
- \_\_\_1. Connect the Power Supply
- \_\_\_2. Install Graphics / Video Cards
- \_\_\_3. Install Internal Drives
- \_\_\_4. Install Memory (RAM Modules)
- \_\_\_5. Install the Add- in Cards
- \_\_\_6. Install the CPU
- \_\_\_7. Install the CPU Heat Sink
- \_\_\_8. Place the motherboard into the case
- \_\_\_9. Prepare the Motherboard
- \_\_\_10. Prepare your workplace



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

**Directions:** Answer the essential questions below according to your experience in connecting hardware and peripherals of a computer.

1. What is the essence of following the correct procedures in connecting the PC parts?
2. What do you think is the main reason why we should never exert too much force when attaching the cables of PC parts? Explain your answer.
3. What is your perspective why the power cable should always be the last on the procedure of attaching parts?
4. What do you feel when you are doing the activity?5. As a computer technician, why do think skills is a crucial factor?



## Assessment

**Directions:** Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

1. Connectors and ports for connecting the computer to external devices. What part of system unit is being described?
  - a. I/O ports
  - b. Motherboard
  - c. Northbridge
  - d. Southbridge
2. If you want to upgrade your graphics card what part of system unit will you attach it?
  - a. Peripheral Component Interconnect
  - b. CPU socket
  - c. Memory Slot
  - d. Ports
3. You've tried to solve your computer issues by using the system restore and sadly it didn't help to resolve the problem. What is the next step for you to do?
  - a. Reformat your computer
  - b. Undo the system restore
  - c. Try to registry edit
  - d. Click another restore point
4. Most PCs give a single beep on boot up to indicate they are OK hardware wise, if we boot PC and doesn't get any beep, we have to check
  - a. system board
  - b. RAM
  - c. Microprocessor
  - d. speaker
5. From where can the boot option be selected?
  - a. Advanced BIOS Features
  - b. Advanced Chipset Features
  - c. CPU Soft menu
  - d. Power management Setup
6. What is the first step in removing hard drive?
  - a. Unplug the data cable from the motherboard and the hard drive.
  - b. Unscrew the four screws securing it in place.
  - c. Slide the hard disk slot out.
  - d. None of the above
7. Arrange the following computer disassembly procedures in proper order. Use no. 1-5
  - \_\_\_\_ Detaching the power supply
  - \_\_\_\_ Opening the outer shell / case
  - \_\_\_\_ Pull out the Motherboard
  - \_\_\_\_ Removing the system fan
  - \_\_\_\_ Unplugging all the cables and wires
  - a. 4 2 5 3 1
  - b. 2 5 3 1 4
  - c. 1 4 2 3 5
  - d. 3 5 1 4 2

8. If you want to assemble a personal computer, what is the first thing that you're going to do?
  - a. Prepare the motherboard.
  - b. Connect/Plug-in the Peripherals.
  - c. Place the motherboard into the case.
  - d. Prepare the workplace.
9. Also known as the main circuit board where all the electronic parts of the computer are attached. What part of system unit is being described?
  - a. CPU
  - b. Graphics card
  - c. Motherboard
  - d. RAM
10. Which chip contains the system BIOS and can hold data permanently, even without electricity?
  - a. Flash ROM
  - b. NVRAM
  - c. RAM
  - d. ROM
11. If you want to disassembly your computer what is the first step that you must do?
  - a. unplug every cable that is plugged in to your computer.
  - b. clean the parts first
  - c. open it, unscrew the four screws at the back of the computer
  - d. unplug the fan from the motherboard.
12. How to disassembly a RAM?
  - a. First, unplug the ribbon from the back of the drive. Once that is completed, pull on the tab securing the drive in place, and then push it out from the inside.
  - b. You must disconnect the motherboard (very large connector/plug),
  - c. You should be able to lift the fan out of the PC.
  - d. Push down on both tabs holding the RAM in place, which are located at both ends of the RAM
13. Enrique disassembled a motherboard and he put it in antistatic bag. Why do he need to put a motherboard in an antistatic bag?
  - a. to safeguard your components from potentially hazardous static electricity
  - b. to always make sure that the components are clean.
  - c. for the components to look nice.
  - d. none of the above
14. What is the first thing that you need to do before disassembling a personal computer?
  - a. Open the outer shell / case
  - b. Unplug all the peripherals.
  - c. Prepare all the tools to be needed.
  - d. Take inventory.
15. Where is the CPU fan located?
  - a. At the top of the CPU heat sink.
  - b. Attach directly on the motherboard.
  - c. Below the CPU heat sink.
  - d. Outside the system unit.



This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



## ***References***

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