

Republic of the Philippines DEPARTMENT OF EDUCATION



K to 12 Basic Education Curriculum Technology and Livelihood Education

Content Standard	Performance Standard
The learner demonstrates understanding of basic concepts, underlying theories and core competencies in computer systems and networks.	The learner independently provides quality and marketable service in computer hardware servicing in terms of computer systems and networks installation and diagnose and trouble shoot computer systems as prescribed in the TESDA Training Regulation.

MODULE 3: INSTALL COMPUTER SYSTEMS AND NETWORKS

Number of Sessions (Time Allotment): 60 Hours (2 Quarters)





Welcome to the next level of your modular training in Computer Hardware Servicing (CHS) under the Information and Communications Technology (ICT) Course. In this module you will have a great deal of understanding of Installing Computer Systems and Networks. At the end of this module you will be able to apply the knowledge and skills on installing computer hardware, operating system, software components and networks. Those skills are essential for you to pass the National Certification II in Computer Hardware Servicing.

In this module, topics will be introduced progressively lesson by lesson for easy understanding. After carefully answering the diagnostic assessment, reading all the lessons, answering all the guide questions, masterfully performing all the activities, showing evidences of learning and finally answering the summative test, then you will have a considerable knowledge and skills in installing computer systems and networks essential to be successful in computer hardware servicing as one of the career option in ICT.

Reminder! Just follow the instructions given in this module. Now let us start exploring new things in this module.





Learning Competencies /Objectives

In this module, there will be three (3) major topics that you will encounter: (1) plan and prepare for installation; (2) install hardware and software components and operating systems; and (3) conduct test on the installed computer system. The three major topics contain sub-topics that discuss the details on *installing computer systems and networks*. This module contains what to KNOW, what to PROCESS, what to REFLECT and UNDERSTAND as well as what to TRANSFER. The competencies for this module are:

LO 1. Plan and prepare for installation

- Observe Occupational Health and Safety policies and procedures in planning for installation activity in accordance with requirements
- Familiarize with computer hardware, software component and other peripherals in accordance with established procedures on correct operation and safety policies
- Consult appropriate/ technical personnel to ensure that work is coordinated with others who are involved in the activity
- Obtain materials necessary to complete the work in accordance with established procedures
- Check the materials received against job requirements

LO 2. Install equipment/devices (hardware, software components and peripherals) and operating systems

- Follow OHS procedures in installing devices, systems, networking devices, and peripherals
- Comply with the requirements in installing devices,/systems, networking devices, and peripherals
- Install computer systems, networking devices and peripherals in accordance with job requirements
- Perform installation of devices and variety of operating systems in accordance with customer/client's requirements
- Obtain approval from appropriate personnel before implementing contingency procedures
- Respond to unplanned events or conditions in accordance to established procedures
- Check the quality of the work undertaken in accordance with the established procedures



LO 3. Conduct test on the installed computer system

- Follow OHS policies and procedures in conducting tests
- Check circuits and systems being isolated using specified testing procedures
- Test devices, systems and/or installation to determine its conformity with the requirements
- Undertake final inspections on the installed devices, systems to ensure conformity with the requirements
- Accomplish technical reports on the tests conducted
- Follow procedures in forwarding documentation to appropriate personnel and/or authority on the test conducted

In order to master the above listed competencies, you must be knowledgeable of the topics under what to KNOW, perform activities required under what to PROCESS, accomplish additional meaningful tasks under what to REFLECT and UNDERSTAND and finally show some evidences of your learning by transferring what you have learned in a different context under what to TRANSFER.



You will be challenged to dig deeper into your prior knowledge and previous experiences about computer hardware servicing.

SKILLS TEST

Direction: Listed below are some of the most important skills that you must gain in order to render quality service when you enter the real world of Computer Hardware Servicing. Read the skills carefully. Write "YES" if you are familiar with the skill and "NO" if not. Feel free to answer each skill. Write your answers in your notebook.

Skills in Computer Hardware Servicing	YES	NO
I can open a computer case.		
I can connect the mouse.		
I can connect the keyboard.		
I can connect the monitor.		
I can apply occupational health and safety precautions while working.		
I can remove the system fan.		
I can detach the power supply from the system unit.		
I know how to remove the RAM from the motherboard.		
I can remove the hard drive from the system unit.		
I can install the power supply.		
I know how to install the motherboard.		
I can install the internal drives in a system unit.		
I know how to attach RAM in the memory socket.		
I can install CD / DVD drives.		



I know how to install an operating system	
I know how to configure a hardware components and its related software	
I know the procedures in testing the installed computer components	



The following topics will enable you to be familiar with planning and preparing for installation, install equipment and devices, and conduct test on the installed computer system. All you need to do is to read carefully all the topics and apply the skills you've gained through the distinct activities provided in this module.

LESSON 1: PLAN AND PREPARE FOR INSTALLATION

This lesson is intended to develop your skills in planning and preparing for installation of computer devices and operating system. At the end of this lesson you are expected to:

- Observe OHS policies and procedures in planning for installation activity in accordance with requirements
- Familiarize with computer peripheral/ devices/systems in accordance with established procedures correct operation and safety
- Consult appropriate/ technical personnel to ensure that work is coordinated with others who are involved in the activity
- Obtain materials necessary to complete the work in accordance with established procedures
- Check the materials received against job requirements



OCCUPATIONAL HEALTH AND SAFETY POLICIES AND PROCEDURES

Occupational Health and Safety (OHS) Policy – An Information and communication technology (ICT) student should know how to behave when working in the computer laboratory, as well as implement a safe way of accomplishing every task. Safety practices should be learned early and always adheres in working with any electrical and electronic device, including personal computers and its peripherals. This is for your protection as well as to the people working with you,



and for the devices that you are using. The basis for this process begins with Occupational Health and Safety Policies.

Occupational safety and health (OSH) is a planned system of working to prevent illness and injury where you work by recognizing and identifying hazards and risks. Health and safety procedure is the responsibility of all persons in the computer and technology industries. You must identify the hazards where you are working and decide how dangerous they are. Eliminate the hazard or modify the risk that it presents.

Occupational Health and Safety standards

Each student has a responsibility to their colleagues and their organization to report and act upon any potential workplace hazard. Students need to be aware of the *type of hazards* that are possibly present in their work environment.

Procedure

- 1. Identify the hazard
- 2. Clear the area close to the hazard

3. Partition the hazard off or clearly identify the area to protect other people from harm

4. If the hazard is easily and safely cleared, then do so

If not...

5. Report the hazard to the appropriate person (such as teacher in charge, principal etc.) to obtain assistance

6. Following clearing of the hazard fill out the correct documentation to assist in identifying improved practice to reduce further incidence of hazards.

All hazards must be reported using *Accidental Report form*. This enables us to track the kinds of hazards we have in our workplace, and take action where necessary to make it safer for all student and clients.

Accident reports

Forms are used to give specific details with regards to the accidents happened in the laboratory during experiments.

Accident reports contain the following details:

- Name of the person injured
- Date and time of the accident
- Type of injury
- First aid given
- Action taken to prevent further accidents



Accident report sample form

Form No:	Date:		
			Rm. No:
Name:			Yr/Sec:
Туре	of Injury	Cause of Injury	Remedy

Hazardous substances

If the workplace hazard appears to be dangerous to staff and clients and professional assistance is required:

A. Call the supervisor or manager and advise them of the problem and the urgency of the matter.

B. Depending on the risk it may be called as an evacuation.

C. Follow the evacuation procedure.

D. The supervisor or manager will call in the fire brigade or specialized personnel who will deal with the spill.

Fire exits

All fire exits should be kept clear of from obstacles. All students have a responsibility to make sure that chairs, empty boxes or any other type of obstacle are not placed in or near fire exit doorways.

All corridors also need to have equipment stored on one side only to ensure that in the event of an emergency there is a clear exit.

Fire Safety Procedure

Each work area has a designated fire warden, who in the event of a fire will take charge. They are recognized by the wearing of a red hard hat.



If you find the fire

- Assess the danger prior to doing anything.
- If it is safe to move assist anyone in the vicinity of the fire away from danger.
- If it is possible close the door to the fire area.
- Call for assistance. Verbally call FIRE, FIRE, in a loud and clear voice.
- Break the glass section of the fire alert call point.
- Call to the switch; ensure you know where the fire is, any other details that may be of assistance to the fire brigade. Details could be size of the fire, cause or type of fire, any people hurt or trapped, has anyone tried to put it out.
- If safe to do so, attack the fire with the correct extinguisher or fire hose.

If the designated fire officer is not present, someone quickly needs to take responsibility and:

- 1. Locate the source of the fire.
- 2. Locate any people.
- 3. Remove all people from the building.
- 4. Once outside do a head count?
- 5. Notify the authorities.

Personal Safety While Working with PC's

Computer equipment can be dangerous, and you or others can be injured or even killed if you don't follow proper safety guidelines when working along with PC's. The following are some precautionary measures to take before working with any computer equipment:

- Wear shoes with non-conductive rubber soles to help reduce the chance of being shocked or seriously injured in an electrical accident.
- Do not work on components that are plugged into their power source.
- Do not remove expansion cards from a computer when it is turned on.
- Remove jewelries when working inside any computer related equipment.
- Be sure not to mix electronic components and water.



Applying OH&S Policies

- 1. Group yourselves into six members.
- 2. Conduct a simulation on: "Applying OHS Policies and Procedures".



3. The performance will be rated according to the following:

Performance Criteria:

- 5 Have shown five OHS policies in different areas
- 4 Have shown four OHS policies in different areas
- **3** Have shown three OH&S policies in different areas
- 2 Have shown two OH&S policies in different areas
- 1 Have not shown any OH&S policies



UNDERSTANDING COMPUTER

A computer is one of the most brilliant inventions of mankind. Thanks to the computer technology, we were able to achieve storage and processing of huge amounts of data; we could rest our brains by employing computer memory capacities for storing information. Due to computers, we have been able to speed up daily work, carry out critical transactions and achieve accuracy and precision in work. Computers of the earlier years were of the size of a large room and were required to consume huge amounts of electric power. However, with the advancing technology, computers have shrunk to the size of a small watch. Depending on the processing power and size of computers, they have been classified under various types. Let us look at the classification of computers.

Different Types of Computers

Based on the operational principle of computers, they are categorized as analog, digital and hybrid computers.

Analog Computers: These 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.





Figure 1. Different Types of Computer

Digital Computers: They use digital circuits and are designed to operate on two states, namely bits 0 and 1. They are analogous to states ON and OFF. Data on these computers is represented as a series of 0s and 1s. Digital computers are suitable for complex computation and have higher processing speeds. They are programmable. Digital computers are either general purpose computers or special purpose ones. Special purpose computers, as their name suggests, are designed for specific types of data processing while general purpose computers are meant for general use.

Hybrid Computers: These 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.

Classification of Computers

The following are the classification of the different types of computers based on their sizes and functionalities:

Mainframe Computers: Large organizations use mainframes for highly critical applications such as bulk data processing and ERP. Most of the mainframe computers have the capacities to host multiple operating systems and operate as a number of virtual machines and can substitute for several small servers.

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.

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.

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.



Figure2. Classification of Computer



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.

Personal computers come in different forms such as desktops, laptops and personal digital assistants (refer to Figure 3). Let us look at each of these types of computers.

Desktops: A desktop is intended to be used on a single location. The spare parts of a desktop computer are readily available at relatively lower costs. Power consumption is not as critical as that in laptops. Desktops are widely popular for daily use in the workplace and households.

Laptops: Similar in operation to desktops, laptop computers are miniaturized and optimized for mobile use. Laptops run on a single battery or an external adapter that charges the computer batteries.



Figure 3. Types of Personal Computer



Netbooks: They fall in the category of laptops, but are inexpensive and relatively smaller in size. They had a smaller feature set and lesser capacities in comparison to regular laptops, at the time they came into the market.

Personal Digital Assistants (PDAs): It is a handheld computer and popularly known as a palmtop. It has a touch screen and a memory card for storage of data. PDAs can also be used as portable audio players, web browsers and smart phones. Most of them can access the Internet by means of Bluetooth or Wi-Fi communication.

Tablet Computers: Tablets are mobile computers that are very handy to use. They use the touch screen technology. Tablets come with an onscreen keyboard or use a stylus or a digital pen. Apple's iPod redefined the class of tablet computers.

Wearable Computers: A record-setting step in the evolution of computers was the creation of wearable computers. These computers can be worn on the body and are often used in the study of behavior modeling and human health. Military and health professionals have incorporated wearable computers into their daily routine, as a part of such studies. When the users' hands and sensory organs are engaged in other activities, wearable computers are of great help in tracking human actions. Wearable computers do not have to be turned on and off and remain in operation without user intervention.



Direction: Identify the type of computer being described in the following sentences and write your answer on a separate sheet of paper.

- 1. These are mobile computers that are very handy to use.
- 2. They are computers designed to provide services to client machines in a computer network.
- **3.** They are also called mid-range systems or workstations.
- 4. A computer with a microprocessor and its central processing unit.
- **5.** They fall in the category of laptops, but are inexpensive and relatively smaller in size.
- 6. A type of computer which is intended be used on a single location.
- **7.** They use digital circuits and are designed to operate on two states, namely bits 0 and 1.
- 8. Computers that have the capacities to host multiple operating systems and operate as a number of virtual machines and can substitute for several small servers.
- **9.** It is a handheld computer and popularly known as a palmtop.
- **10.** These computers can be worn on the body and are often used in the study of behavior modeling and human health.





COMPUTER SYSTEM, DEVICES AND PERIPHERALS

As an aspiring computer technician, it is very important to know the system that runs your computer and different devices attached to it. Each device plays an important role, without each other computer system will not work properly.

What is an Operating System?



The operating system is the most important program that runs on a computer. Every general-purpose computer must have an operating system to run other programs. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers.

For large systems, the operating system has even greater responsibilities and powers. It is like a

traffic cop -- it makes sure that different program and users running at the same time do not interfere with each other. The operating system is also responsible for *security*, ensuring that unauthorized users do not access the system.

Operating systems can be classified as follows:

- 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.
 - Linux

Unix

Windows 2000

 Multiprocessing : Supports running a program on more than one CPU. Linux

Unix

Windows 2000

 Multitasking : Allows more than one program to run concurrently. Unix

Windows 2000 and Windows multi point

• **Multithreading :** Allows different parts of a single program to run concurrently.



Linux Unix Windows 2000 and Windows 7

• **Real time:** Responds to input instantly. General-purpose operating systems, such as DOS and UNIX, are not real-time.

Operating systems provide a software platform on which other *application programs* can run. The application programs must be written to run on top of a particular operating system. Your choice of operating system, therefore, determines to a great extent the applications you can run. For PCs, the most popular operating systems are DOS, OS/2, and Windows, but others are available, such as Linux.

What are the devices of a computer?

The physical, touchable, electronic and mechanical parts of a computer are called the hardware which is composed of different devices attached to the computer.

The following list represents a basic set of devices found in most Personal Computers.

1. 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.



Figure4. Tower Type System Unit



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



Figure 5. Modern Motherboard

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



Figure 6. Examples of CPU (Intel Core 2 Duo and AMD Athlon)

4. 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

- a. **ROM** (Read Only Memory) ROM is non-volatile, meaning it holds data even when the power is ON or OFF.
- b. **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.



Figure 7. Examples of RAM

5. 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.



Figure 8. Expansion Bus



6. 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.

Figure 9. Adapter (Network Adapter)





7. 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.

Figure 10. Power supply

8. 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.







9. 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).

Figure 12. CD ROM

10. 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.



Figure 13.DVD ROM

What are the input and output devices of a computer?

The devices attached to a personal computer can be classified into two- the input and output devices. **Input Device** is composed of a device that accepts data and instructions from the user or from another computer system. While, **output**



device is any piece of computer hardware that displays results after the computer has processed the input data that has been entered.

Two (2) Types of Input Devices

1. Keyboard Entry – Data is inputted to the computer through a keyboard.

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.



Figure14. Keyboard

2. Direct Entry – A form of input that does not require data to be keyed by someone sitting at a keyboard. Direct-entry devices create machine-readable data on paper, or magnetic media, or feed it directly into the computer's CPU.

Three Categories of Direct Entry Devices

- 1. Pointing Devices An input device used to move the pointer (cursor) on screen.
 - Mouse The most common 'pointing device' used in PCs. Every mouse has two buttons and most have one or two scroll wheels.



Figure15. Mouse

• **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.



Figure 16. Touch Screen Devices



• 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.



Figure17. Light Pen

• **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."





Figure 18. Digitizer Tablet

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





Figure19. Image scanner



Figure20. Bar Code Reader



3. 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.



Figure 21. Microphones

Output Devices

1. 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

a. **CRT Monitors -** 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).



Figure22. Types of Monitor

 LCD Monitors – 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.



- c. **LED Monitors** (Light Emitting **D**iode) 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.
- 2. 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.



FFigure23. LCD Projector

panel covering the screen, which is similar to a touch screen.

3. Smart Board - A type of display screen that has a touch sensitive transparent



Figure24. Smart Board

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

Types of printer

- a) **Ink-Jet or Bubble-Jet Printer -** spays ink at a sheet of paper. Ink-jet printers produce high-quality text and graphics.
- b) Laser Printer Uses the same technology as copy machines. Laser printers produce very high quality text and graphics.
- c) **LCD and LED Printer-** Similar to a laser printer, but uses liquid crystals or lightemitting diodes rather than a laser to produce an image on the drum.
- d) Line Printer Contains a chain of characters or pins that print an entire line at one time. Line printers are very fast, but produce low-quality print.





Figure 28. Types of Printer

(e) **Thermal Printer-** An inexpensive printer that works by pushing heated pins against heat-sensitive paper. Thermal printers are widely used in calculators and fax machines.

5. **Speakers -** Used to play sound. They may be built into the system unit or connected with cables. Speakers allow you to listen to music and hear sound effects from your computer.



Figure 29.Speaker

What is a Storage Device?

Aside from the devices attached on a PC, there are also the so called storage devices that perform a special task in computing system. Storage device is any apparatus for recording computer data in a permanent or semi-permanent form.





Figure 30.Storage Devices

Types of storage devices

Floppy diskette- is a random access, removable data storage medium that can be used with personal computers. The term usually refers to the magnetic medium housed in a rigid plastic cartridge measuring 3.5 inches square and about 2millimeters thick. Also called a "3.5-inch diskette," it can store up to 1.44 megabytes (MB) of data.

Compact disc (CD) – also called optical disc is a nonmagnetic, polished metal disk used to store digital information. The disc is read by the CD- ROM.

Digital Versatile Disc (DVD)- an optical disc technology with a 4.7 gigabyte storage capacity on a single-sided, one-layered disk, which is enough for a 133-minute movie.

Jump drive and USB flash drive- is a plug-and-play portable storage device that uses flash memory and is lightweight enough to attach to a key chain. A USB drive can be used in place of a floppy disk, Zip drive disk, or CD.

Hard drive- is the main, and usually largest, data storage device in a computer. The operating system, software titles and most other files are stored in the hard disk drive.



LS-120- is a drive which supports a special floppy diskette which can store up to 120MB of information as well as being backwards compatible and still supporting the standard 1.44MB floppy diskettes.

Zip drive-is a small, portable disk drive used primarily for backing up and archiving personal computer files.



Direction: In the puzzle below, look for the 10 hidden computer devices and determine whether it belongs to INPUT, OUTPUT or STORAGE DEVICE.

REVEAL THE PARTS OF A COMPUTER SYSTEM

	С	G	М	М	Q	F	Y	L	W	Κ	С	Ρ	А	Η	Κ	Η	G	С	Ν	Н	
	Ρ	0	R	Κ	Ι	R	Х	Ν	А	А	0	А	U	А	Κ	В	М	Ρ	Η	U	
	Ζ	А	М	Ζ	W	G	W	Ρ	Х	W	А	F	V	R	Q	V	Х	U	М	Y	
	Q	U	Ι	Ρ	R	Y	Ρ	Τ	Ε	Х	V	Ι	R	D	В	W	А	0	R	В	
	Ι	R	Т	В	А	R	S	R	U	Y	L	G	R	D	V	J	В	0	С	U	
	Α	0	Ν	R	D	С	S	G	S	Ι	L	Ν	Η	Ι	Q	S	М	Ι	L	Х	
	С	U	Η	L	Q	U	Т	Ζ	G	D	С	J	F	S	Ε	Ε	J	Κ	0	U	
	Ν	Η	Х	S	Ρ	U	Ρ	D	A	Κ	0	Ζ	Х	Κ	М	Т	Y	U	Ζ	S	
	G	Η	L	Ρ	F	Η	G	Ρ	Ι	Ζ	Т	Α	F	D	0	U	U	F	Т	R	
	Α	S	L	W	W	Т	R	Α	0	S	Q	F	A	R	Ε	Η	В	G	М	0	
	R	Y	В	Ε	А	Ε	М	J	Ι	Х	Κ	Ρ	Ι	Ι	Х	Ε	С	F	Η	Т	
	Ε	S	Α	С	М	Ε	Т	S	Y	S	D	D	Ε	V	W	Т	Ι	D	V	I	
	Κ	W	М	Ι	Q	Κ	Κ	Ι	S	Ι	0	R	R	Ε	Ι	L	D	F	F	N	
	L	Ε	Ι	0	М	Ε	Η	Y	А	S	Κ	S	А	Ι	Ι	D	G	Ζ	Κ	0	
	М	Q	U	Ν	D	Η	М	R	W	0	Q	U	Η	0	V	Κ	Т	М	J	Μ	
	W	Ρ	Т	Η	Ε	R	М	Κ	Ζ	W	J	U	В	J	В	Ε	А	Ρ	Q	Ζ	
	Κ	Ζ	Ζ	М	L	Η	М	0	U	S	Ε	С	Κ	Y	С	Y	V	Y	S	D	
	Y	В	Y	V	Х	Ε	W	Ρ	L	Q	Q	Y	0	V	Ν	Η	Ε	Ζ	Η	D	
	R	Ν	F	Η	Т	U	В	U	G	L	S	Ν	Ρ	F	J	W	Ν	Κ	Ν	J	
	М	J	G	Ν	Y	Η	V	J	D	U	G	F	L	U	Х	0	М	Κ	D	A	
1																					
2																					
3																					

3	_	 	
4.			
5.			
6.			
7.			
8.			
9.			
10.			



Matching Type. Match column A with Column B and write your answer on a separate sheet of paper.



What to REFLECT / UNDERSTAND

To deepen your understanding with regard to the different components / devices of a computer, utilize the Internet and the website *www.professormesser.com*, view the video regarding parts of the computer. Use the URLs below:

1. http://www.professormesser.com/free-a-plus-training/220-801/an-overview-ofmotherboard-types/





2. http://www.professormesser.com/free-a-plus-training/220-801/an-overview-ofcpu-socket-types/



3. http://www.professormesser.com/free-a-plus-training/220-801/an-overview-ofcpu-socket-types/



4. http://www.professormesser.com/free-a-plus-training/220-801/an-overview-ofdisplay-device-types/



5. http://www.professormesser.com/free-a-plus-training/220-801/an-overview-ofpc-input-devices/





- After watching the videos, answer the following questions:
 - 1. What are the different types of motherboard shown in the video?
 - 2. What are the different sizes of a motherboard?
 - 3. What are the different types of CPU?
 - 4. Describe the different types of memory cited in the video.
 - 5. What do you think is the most efficient monitor used in our computers nowadays?
 - 6. Give at least 5 input devices featured in the video presentation.



Role Playing

The class will be divided into 5 groups (depending on the class size), each group will have a minimum of 5 members and maximum of 10. Each member should have a special role pertaining to the devices of a computer and their functions. Each group will be tasked to showcase their talents in front of the class. Each presentation will be rated using the following criteria:

PERFORMANCE SCORE CARD

CRITERIA	PERCENTAGE	SCORE
Accuracy (Accurate role and function of a device was accurately shown)	30%	
Presentation (Organization or sequence of the play, appropriate gestures was used)	30%	
Clarity (Clearly delivered each topic)	30%	
Team work (cooperation of each member)	10%	
Per		





NETWORK

A network consists of two or more computers that are linked in order to share resources (such as printers and CD-ROMs), exchange files, or allow electronic communications. The computers on a network may be linked through cables, telephone lines, radio waves, satellites, or infrared light beams.

There are three basic types of networks which includes the following:

- Local Area Network (LAN)
- Wide Area Network (WAN)

Local Area Network

A Local Area Network (LAN) is a network that is confined to a relatively small area. It is generally limited to a geographic area such as a writing lab, school, or building. Rarely are LAN computers more than a mile apart.

In a typical LAN configuration, one computer is designated as the file server. It stores all of the software that controls the network, as well as the software that can be shared by the computers attached to the network. Computers connected to the file server are called workstations. The workstations can be less powerful than the file server, and they may have additional software on their hard drives. On most LANs, cables are used to connect the network interface cards in each computer.

Wide Area Network

Wide Area Networks (WANs) connect larger geographic areas, such as Florida, the United States, or the world. Dedicated transoceanic cabling or satellite uplinks may be used to connect this type of network.

Networking Devices

Consist of, but are not limited to non-local printers, workstations, servers, webcams, data loggers, instruments, dial-in devices, and, in general anything that requires an Ethernet connection. These devices are supported on a best-effort basis limited by the staffing and equipment level available.





Hub is a small, simple, inexpensive device that joins multiple computers together. Many network hubs available today support the Ethernet standard. Other types including USB hubs also exist, but Ethernet is the type traditionally used in home networking.

Ethernet switch is a device that gathers the signals from devices that are connected to it, and then regenerates a new copy of each signal.





Bridge is a device filters data traffic at a network boundary. Bridges reduce the amount of traffic on a LAN by dividing it into two segments.



Routers are small physical devices that join multiple networks together.



Network gateway is an *internetworking* system capable of joining together two networks that use different base protocols. A network gateway can be implemented completely in software, completely in hardware, or as a combination of both.

Modem is a contraction of the terms modulator and demodulator. Modems perform a simple function: They translate digital signals from a computer into analog signals that can travel across conventional phone lines. The modem modulates the signal at the sending end and demodulates at the receiving end.





Network interface is a device that connects a client computer, server, printer or



other component to your network. Most often, a network interface consists of a small electronic circuit board that is inserted into a slot inside a computer or printer. Alternatively, some computers, printers, or other services include network interfaces as part of their main circuit boards (motherboards).

Network firewall protects a computer network from unauthorized access. Network firewalls may be hardware devices, software programs, or a combination of the two. Network firewalls guard an internal computer network (home, school, business intranet) against malicious access from the outside. Network firewalls may also be configured to limit access to the outside from internal users.





Direction: Identify what is being described in the following sentences and write your answer on a separate sheet of paper.

- 1. It protects a computer network from unauthorized access.
- 2. Type of network that connect larger geographic areas, such as Florida, the United States, or the world.
- 3. This is an *internetworking* system capable of joining together two networks that use different base protocols.
- 4. It is consists of two or more computers that are linked in order to share resources (such as printers and CD-ROMs), exchange files, or allow electronic communications.
- 5. They translate digital signals from a computer into analog signals that can travel across conventional phone lines.
- 6. It is a device that connects a client computer, server, printer or other component to your network.
- 7. A device filters data traffic at a network boundary.
- 8. It is a device that gathers the signals from devices that are connected to it, and then regenerates a new copy of each signal.
- 9. It is a small, simple, inexpensive device that joins multiple computers together.
- 10. Type of network that is confined to a relatively small area.





Now, that you are done with the introduction of network as well as the networking devices, to enlighten your understanding and knowledge have some more readings about it thru books and other resources. You should consider the following topics for research:

- 1. Different types of Network Topology
- 2. Common networking tools

After the research, you can also deepen your understanding by watching a video presentation using the URL below:

 http://www.professormesser.com/free-a-plus-training/220-801/networkdevices/_____



 http://www.professormesser.com/free-a-plus-training/220-801/networktopologies-3/



After the video presentation here are your tasks:

- 1. List down all the network devices and their advantages cited in the video.
- 2. List down the different network topologies and their differences.





MATERIALS, TOOLS, EQUIPMENT and TESTING DEVICES

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

Equipment and Accessories	Tools	Materials
LAN Card UPS Server 24 port-hub Modem Fax machine PC Video camera USBExternalCD writer USB scanner USB printers USB Flash Drive	Screwdriver(standard) Screwdriver(Philips) Long nose pliers Mechanical pliers Allen wrench Multitester 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

•	LAN Card – 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.	
•	Server – is a part of a network. It is a special computer that users on the network can access to carry out a particular job.	
•	Port hub /Port – is a connector on the back of a computer or other device. A port is either a serial port or a parallel port.	Network Hub
•	Modem - (Modulator-Demodulator) The modem is a device that allows a given computer to share data or otherwise a device which let computers exchange information	



•	Scanner- it is an input device that read text or illustration printed on paper, translates the information into a form that a computer can use	
•	Flat Screw Driver – is used to drive or fasten negative slotted screws	
•	USB – Universal Serial Bus, a hardware interface for low-speed peripherals such as the keyboard, mouse, joystick, scanner, printer and telephony devices.	
•	Printer - is a piece of hardware that produces a paper copy (also known as 'hardcopy') of the information generated by the computer.	
•	RAM – Random Access Memory, is a primary memory. This memory is used inside the computer to hold programs and data while it is running.	
•	BIOS – Basic Input / Output System, chip that controls the most basic functions of the computer and performs a self-test every time you turn it on.	SST BOSTOZOA DOACONA DAAZOUS-E
•	Flash drive– RAM that can retain data without electrical power. It is widely used for BIOS chips and for digital camera and digital music storage	
•	Video Camera - camera using videotape: a camera that records onto videotape	
•	Long nose Pliers – is used for holding, bending and stretching the lead of electronics component or connecting wire.	
•	Soldering Iron – is used to join two or more metal conductors with the support of soldering lead melted around it.	
•	Desoldering Tool – is used to unsolder unwanted parts or component in the circuit with the support of soldering pencil	



•	Philips Screw Driver - is used to drive or fasten positive slotted screws	
•	LAN Tester - for RJ11,12,45 & BNC w/ Remote Unit This ergonomic tester is designed to test most network cable wiring. You can either conduct an auto or manual test.	
•	UTP – Unshielded Twisted Pair, is a popular type of cable used in computer networking that consists of two shielded wires twisted around each	UNSHIELDED TWISTED-PAIR



Using Testing Tools and Equipment

A. Direction: Identify the following tools and materials, give their uses.



B. Identification.

Direction: Identify the appropriate term described in each sentence. Use a separate sheet for your answers.

___1. It is a connector at the black of a computer or other device.

_____2. A computer circuit board installed in a computer so that it can be connected to a network.

___3.A device that allows a given computer to share a data.

_____4. An input device that read text or illustration printed on paper, translated the information into a form that a computer that can use.

5. The least expensive and most popular network media.



• What to REFLECT / UNDERSTAND

For you to deepen your knowledge and skills and understanding in planning and preparing for installation, you need to determine the location of the devices / systems to be used, obtain materials necessary to complete the work in accordance with established procedures and check the materials received against job requirements . Your task is to have a research, find as well and watch video presentations relating and showing the following:

- 1. Consult appropriate technical personnel to ensure that work is coordinated with others who are involved in the activity;
- 2. Proper location / storage of the devices / systems and materials;
- 3. Correct way of obtaining the necessary materials to complete the work;
- 4. Fill up job order forms, request form and report sheets; and
- 5. Appropriate procedures in in checking the materials received.

After doing the above tasks, make sure that you have a detailed documentation of it. Write your reflections on your notebooks or other sheet of paper.



After reflecting on the task given to you, it's your chance now to transfer what you have learned from the activity by having a presentation in front of the class. You will be grouped with 5 members during the presentation. Make use of your creativity in presenting each topic to awaken the interest of your classmates.




LESSON2. INSTALL EQUIPMENT / DEVICES and SYSTEMS

This lesson is designed to give you the proper procedures used in installing devices and operating system of a personal computer, alongside with it is the basic computer configuration set up. At the end of this lesson you should be able to:

- a) Apply OHS procedures in installing devices, systems, networking devices, and peripherals;
- b) Comply with the requirements in installing devices,/systems, networking devices, and peripherals;
- c) Install computer systems, networking devices and peripherals in accordance with job requirements;
- d) Perform variations in installing devices and systems in accordance with customer/client's requirements;
- e) Obtain approval from appropriate personnel before implementing contingency procedures;
- Respond to unplanned events or conditions in accordance to established procedures; and
- g) Check the quality of the work undertaken in accordance with the established procedures.



SAFETY PRECAUTIONS

Personal Protective Equipment - It refers to protective clothing, helmets, goggles, or other gear designed to protect the wearer's body or clothing from injury by electrical hazards, heat, chemicals, and infection, for job-related occupational safety and health purposes.

PPE can also be used to protect the working environment from pesticide application, pollution or infection from the worker (for example in a microchipfactory).

It is important that students and teachers during their laboratory period should be required to use personal protective equipment. Some of these are:



• Goggles A large spectacles, with shields around the rims, for protecting the eyes from dust, excessive light, wind, etc.	
 Rubber Sole A special type of shoes used to prevent electrical shock and for waterproofing and insulating purposes. 	
• Apron A garment worn over the front of the body as a protection for one's cloth.	
• Face Mask A covering for the face to prevent the inhaling or absorbing dust and other chemicals	
Gloves The covering material with a separate sheath for each finger used for hand protection.	

Anti-Static and Safety Precautions

The little shock you experience while you are walking across a carpeted floor or when you touched a door knob, table, counter or even another person is a result of static electricity. Static electricity is the discharge of electricity between two objects with different electrical potential. Humans can't feel a static shock until it is several thousand volts strong, but it takes less than 30 volts to fry a sensitive computer component, such as a stick of RAM or a processor.

That's why computer technicians and home computer builders have to guard their computers against the deadly ravages of static electricity, as well as take steps to avoid injury.



Safety and Anti-Static Rules

- Always use an anti-static wrist strap when working on a computer (except when working on monitors)
- Always disconnect a computer from the AC power and from any powered peripherals while you are working on it.
- Always grasp a metal part of the computer chassis with your bare hand before you touch anything inside. Do this even if you are wearing an anti-static wristband.
- Always handle electronic components by a non-conducting (non-metallic) edge. Don't touch the pins or other connectors.
- Never plug an ATX power supply into AC power unless it is connected either to a computer's motherboard or to a dummy test load.
- Always use a UL-approved surge protector or an Uninterruptible Power Supply that incorporates surge and spike protection.
- Never eat, drink, or smoke while working on a computer.



True or False

Direction: Write TRUE if the statement is correct and FALSE otherwise.

- 1. Always disconnect a computer from the AC power and from any powered peripherals while you are working on it.
- 2. Always grasp a metal part of the computer chassis with your bare hand before you touch anything inside. Do this even if you are wearing an anti-static wristband.
- 3. Always handle electronic components by a non-conducting (non-metallic) edge. Don't touch the pins or other connectors.
- 4. Always use a UL-approved surge protector or an Uninterruptible Power Supply that incorporates surge and spike protection.
- 5. Never use an anti-static wrist strap when working on a computer (except when working on monitors)
- 6. Everyone is allowed to eat, drink, or smoke while working on a computer.
- 7. Never plug an ATX power supply into AC power unless it is connected either to a computer's motherboard or to a dummy test load.
- 8. Static electricity is the discharge of electricity between two objects with different electrical potential.
- 9. Apron is a garment worn over the front of the body as a protection for one's cloth.
- 10. PPE can also be used to protect the working environment from pesticide application, pollution or infection from the worker.





Directions: The class will be divided into five (5) groups. Each group has its own respective leader. The group will perform a task regarding familiarizing the personal protective equipment. After the activity they will be graded using the given Performance Score Card below:

PERFORMANCE SCORE CARD

Performance Criteria	Percentage	Grade
1. The student clearly identified personal protective equipment.	20%	
2. The student utilized actual tools/device in performing the actual procedures.	15%	
3. The student applied safety precautions during the task.	25%	
4. The task gave students more critical thinking on the personal protective equipment.	30%	
5. The student cooperatively performed the task.	10%	
Performance Rating		





SYSTEM'S SPECIFICATION

Whenever you purchase software or hardware for your computer, you should first make sure your computer supports the system requirements. These are the necessary specifications your computer must have in order to use the software or hardware. For example, a computer game may require your computer to have Windows XP or later, a 2.0 GHz processor, 512 MB of RAM, a 64 MB graphics card, and 500 MB or hard drive space. If your computer does not meet all of these requirements, the game will not run very well or might not run at all.

It is just as important to check system requirements for hardware devices. For example, if you buy a printer, it may require either Windows XP or Mac OS X 10.3 or later. It may also require a USB port and 80 MB of available hard drive space. If your computer does not have any USB ports, you will not be able to physically connect the printer. If your machine does not have Windows XP or Mac OS X 10.3 or later, the printer drivers may be incompatible with your operating system. This means your computer will be unable to recognize the printer.

Most hardware and software products have the system requirements printed on the side or bottom of the product packaging. When you are shopping for computer software or hardware, it is a good idea to first find out exactly what your system's specifications are and write them down on a piece of paper. The important information to record includes:

- 1. Operating System (i.e. Windows XP, SP 2 or Mac OS X 10.3.8)
- 2. Processor Speed (i.e. Pentium 4, 3.2 GHz or Power PC G5, 2.0 GHz)
- 3. Memory, a.k.a. RAM (i.e. 512 MB)
- 4. Graphics Card (i.e. ATI Radeon 9800 w/ 256 MB video memory)
- 5. Hard Disk Space (i.e. 80 GB available)
- 6. I/O Ports (i.e. USB, Firewire, Serial, Parallel, SCSI, VGA, DVI ports)

By recording these specifications from your computer, you will be able to make sure your computer supports the products you are buying. In terms of installation, systems' specification is a big consideration in order for a computer to run and work properly for the most efficient way it could be.

In broad terms, the performance of a computer depends on four factors: the speed and architecture of its processor or "central processing unit" (CPU), how much random access memory (RAM) it has, its graphics system, and its internal hard drive speed and capacity. Also of importance to most users will be the specification of its Internet connection. Most computer users and in particular those working with a lot of photographs, music files or videos should also think about the most suitable storage devices they will need in order to keep and back-up all of their valuable data.



Processor speed and architecture

The speed of a computer's processor chip (technically known as its "**clock speed**") in measured in gigahertz (GHz), with the fastest modern processors currently running at up to 4.7GHz. However, for most computing tasks, including web browsing, sending e-mails, word processing and spreadsheet work any processor running at 1GHz or more remains perfectly sufficient.

For applications such as video editing, 3D graphics work and (for the majority of "power users") playing computer games, higher processor speeds is highly required. CPU performance is now determined by far more than raw speed alone. Intel made this very clear when it introduced its system of processor numbers. These provide an indication of a processor's "architecture", "cache" and "front side bus (FSB) speed" in addition to its clock speed.

The **architecture** of a processor is the most important factor to determine its performance, and refers to its basic design and complexity. Some processors are simply more sophisticated than others, with Intel (for example) producing "basic" processors called Celerons and Pentiums, as well as more powerful processors under its "Core" processor family. The later include the Core 2, Core i3, Core i5 and Core i7, with the last of these being the most powerful.

In addition to clock speed and architecture, a processor's cache and front side bus (FSB) speed also determine a computer's overall power. C**ache** is a form of very fast memory integrated into the processor chip, and used to store up instructions (work for the processor) so that it has to slow down as little as possible between tasks. Cache is measured in megabytes (MB), with (for example) low-end Celeron processors having as little as 0.25MB of cache (256KB), and high-end Itaniums having up to 24MB. The simple message is, the more cache the better- though high levels of cache still come at a very significant price.

Front side bus (FSB) speed is a measure of how fast a microprocessor communicates with the computer's main circuit board (or "motherboard") into which it is physically connected. Again, the higher the measure the better for overall performance, with FSB speeds currently ranging from 533MHz (still perfectly sufficient for the vast majority of applications) up to 1600 MHz.

RAM

To a large extent, the more RAM a computer has the faster and more effectively it will operate. Computers with little RAM have to keep moving data to and from their hard disks in order to keep running. This tends to make them not just slow in general, but more annoyingly intermittently sluggish.



RAM is measured in megabytes (MB) and gigabytes (GB), as detailed on the storage page. Just how much RAM a computer needs depends on the software it is required to run effectively. A computer running Windows XP will usually function quite happily with 1GB of RAM, whereas twice this amount (ie 2GB) is the realistic minimum for computers running Windows 7.

Graphics system

A computer's graphics system determines how well it can work with visual output. Graphics systems can either be integrated into a computer's motherboard, or plugged into the motherboard as a separate "video card". Graphics systems integrated into the motherboard (also known as "onboard graphics") are now quite powerful, and sufficient for handling the requirements of most software applications aside from games playing, 3D modeling, and some forms of video editing.

Any form of modern computer graphics system can now display highresolution color images on a standard-sized display screen (ie any monitor up to about 19" in size). The more sophisticated graphics cards now determines how well a computer can handle the playback of high definition video, as well as the speed and quality at which 3D scenes can be rendered. Another key feature of separate graphics cards is that most of them now allow more than one display screen to be connected to a computer. Others also permit the recording of video.

As a basic rule, unless a computer is going to be used to handle 3D graphics or to undertake a significant volume of video editing or recording, today there is little point in opting for anything other than onboard graphics (not least because separate graphics cards consume quite a lot of electricity and create quite a lot of heat and noise). Adding a new graphics card to a computer with onboard graphics is also a very easy upgrade if required in the future.

Hard Drive Speed and Capacity

Today 40GB is an absolute minimum hard drive size for a new computer running Windows 7, with a far larger capacity being recommended in any situation where more than office software is going to be installed. Where a computer will frequently be used to edit video, a second internal hard disk dedicated only to video storage is highly recommended for stable operation. Indeed, for professional video editing using a program like Premiere Pro CS5, Adobe now recommend that a PC has at least *three* internal hard disks (one for the operating system and programs, one for video project files, and one for video media).

Two key factors determine the speed of traditional, spinning hard disks. The first is the rotational velocity of the physical disk itself. This can currently be 4200, 5400, 7200, 10000 or 15000 rpm (revolutions per minute). The faster the disk spins,



the quicker data can be read from or written to it, hence the faster the disk the better (although faster disks consumer more power, make more noise, and generate more heat). Most desktop hard disks run at either 5400 or 7200 rpm, whilst most laptop hard disks run at 4200 or 5400.

The second key factor that determines performance of a traditional, internal hard disk is the interface used to connect it to the computer's motherboard. Three types of interface exist: **Serial Advance Technology Attachment (SATA)**, which is the most modern and now pretty much the norm on new PCs; **Integrated Device Electronics (IDE)** (also known as UDMA), which is a slower and older form of interface, and finally **SCSI**, which happens to be the oldest but in it most modern variant is still the fastest disk interface standard.



Now, in order for you to better understand the topics under system's specification, dig deep into your mind and answer the following essential questions:

- 1. In your point of view, describe system specification?
- 2. How does it affect the performance of the computer?
- 3. What is the relevance of understanding system specification in computer hardware servicing?
- 4. Why do you think that system specification is one of the most important considerations during installation?



What to KNOW

INSTALLATION OF HARDWARE COMPONENTS AND OTHER PERIPHERALS

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, 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.

Step1. Unplugging - The first thing you do is to unplug every cable that is plugged in to your computer. That includes the 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 work space.

Step2.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.



Figure 32. Screw at the back of computer chasis

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.





Figure 33. Removing the side panel

NOTICE:

If you are working on a carpet, about every five minutes touch something that is grounded (Sink faucet / pipe, wire coming from the ground part of a wall outlet). This is done so you do not shock your motherboard or other parts.

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 labeled "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.



Figure 34. Removing the system fan

Step4. 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 labeled "CPU FAN1". To remove the fan from the heat sink, remove the four screws securing it in place.





Figure 35. Removing the CPU fan

Step5. 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.



Figure36. Unscrew the power supply

Step6. 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.



Figure 37. Location of CD / DVD Drive



Step7. 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.



Figure 38. Unplugging the Hard Drive connector

To remove the hard drive from the side of the slot, unscrew the four screws securing it in place. You must be very careful not to drop the hard drive, since it is very delicate!



Figure 39. Removing the hard drive from the side of the slot

Step8. 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.



Figure 40. Removing the Memory



Step9. 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.



Figure 41. Removing the Motherboard

Personal Computer Assembly

Now that you have the skills in disassembling a personal computer, Ibelieve 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.



Figure 42. Take inventory of the Different Computer Parts

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. Look at Figure 43 for details.



Figure 43. Wearing the Anti- static Wrist Strap Correctly

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. Copy them to a CD for easy access.

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 (see Figure 45). Remember, you always want to safeguard your components from potentially hazardous static electricity (wear your strap).



Figure 44. Motherboard in an Antistatic Bag

2. Before you secure the motherboard onto the PC case/chassis, inspect it carefully for any visible defects.



3. Next, review the motherboard manual, to make sure you are familiar with the motherboard layout and understand which socket is which. Manuals are extremely helpful, usually easy to read, and include illustrations. Below you can find instructions on how to install the processor, the heat sink and the memory modules on the motherboard. You should not place the motherboard in the computer case until you are told to do so.

Step 3. Install the CPU

- Use the unlocking mechanism to open the CPU socket which is usually a lever.
- 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 Figure & Install CPU into place.



Figure 45. Install CPU

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).



Figure 46. Install CPU Heat Sink



- 3. 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.
- 4. 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 dualchannel 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.



Figure 47. Install RAM Memory

Step 6. Place the motherboard into the case

1. Some PC cases have a removable motherboard tray. If yours does, remove the screws holding it in place and pull it out of the case (Figure 49).



Figure 48. Remove Motherboard Tray

2. Note the pattern of the holes in your motherboard (Figure 50), 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).





Figure 49. Screw Brass Standoffs Into the Motherboard

3. 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.

4. Carefully position the motherboard on top of the brass standoffs (Figure 51), 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.



Figure 50. Case's I /O Shield



Figure 51. Mount the Motherboard



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 (Figure 53) from your power supply into the matching port on your motherboard. Look Figure X for details.

2. Locate the smaller, square processor power connector (Figure 54) (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.



Figure 52. Connect the ATX Power in the Motherboard



Figure 53. Square Processor Power Connector



NOTE:

You are going to be doing work that requires attention to detail and can be quite frustrating if you do not go into it with the right attitude.

4. Attach each of the tiny leads from the power and reset switches (Figure 56), 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.



Figure 54. Connect the different Leads

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) (Figure 55).



Figure 55. Remove the backplane cover

2. Install the graphics board in that slot, and then secure the card with a screw (Figure 56).





Figure 56. Install the Graphics Board

Step 9. Install Internal Drives

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

- Make any necessary changes to jumpers on the drives before mounting them in the case. A two-drive system (one or two SATA (Serial ATA- is a standard hardware interface for connecting hard drives and CD/DVD drives to a computer) hard drives, plus one parallel ATA (Advanced Technology Attachment) optical drive, for example) is easy to set up; the SATA drives are jumper less, and the optical drive can be set as master on its own parallel ATA channel. Many cases have removable drive rails or cages to house drives.
- 2. Use the included screws to attach your drives to the rails or cage, and slide them into the case. For externally accessible drives such as a DVD recorder, you can save time by installing one drive rail and sliding the drive in for a test fitting to make sure that its front is flush with the case (Figure 57).
- 3. When the drives are installed, connect power and data cables to each one. Parallel ATA drives use wide, flat data cables that can be installed only in the correct way. Floppy drives use a similar but smaller cable; SATA drives use a thin, 1cm-wide data cable. SATA drives use a new type of power connector that many power supplies don't come with. Fortunately, many motherboards ship with adapters for converting a standard four-pin power connector to a SATA power connector (Figure 57).





Figure 57. Attach your devices



Figure 58. Connect Power Connector

Step 10. Install the Add- in Cards

- 1. For each add-in card, you must choose a free PCI slot.
- 1. 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 (Figure 59).
- 4. Secure the card with a screw.





Figure 59. Add- in Cards

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.

Connecting Peripherals of a Personal Computer

When attaching hardware and peripherals of the computer, ensure that they are connected to the correct locations or ports. For example, some mouse and keyboard cables use the same type of PS/2 connector. So, you must know first the different ports that can be found in the back panel of the computer.

Keep in mind:

- 1. When attaching cables, never force a connection.
- 2. Plug in the power cable after you have connected all other

Steps in Connecting Peripherals of a PC

Step 1. Attach the monitor cable to the video port.

Step 2.Secure the cable by tightening the screws on the connector.

Step 3. Plug the keyboard cable into the PS/2 keyboard port.

Step 4.Plug the mouse cable into the PS/2 mouse port.

Step 5. Plug the USB cable into a USB port.

Step 6.Plug the network cable into the network port.

Step 7. Plug the power cable into the power supply.





1. Attach the Monitor Cable



2. Plug the Keyboard Cable



3. Plug the Mouse Cable



4. Plug the USB Cable



5. Plug the Network Cable



6. Plug the Power Cable

Figure 60. Steps in Connecting Peripherals of a PC

After connecting all the cables into their proper places, the picture in the next page should be the appearance of the back panel of your PC.



Figure 61. Appearance of the PC's Back Panel





Rearrange the Procedures

Direction: 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

- ____7_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

- ___7_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





Performance Test

Direction: Follow and perform the given procedures on Activity A, B and C. Safety precautions must be observed when working. You will be rated in accordance with the rubrics provided after the activity:

A. PC Disassembly



B. Personal Computer Assembly



Computer Hardware Servicing

C. Connecting PC Peripherals



Rubrics for your performance Test

Criteria	Percentage	Grade
Accuracy	50 %	
Adherence to the procedures	20%	
Workmanship(applied safety precautions)	20%	
Speed	10%	
Pe	rformance Rating	





INSTALLING OPERATINFG SYSTEM

Before the installation process undertake, a technician must be aware of the minimum requirements of a computer hardware that is compatible with the operating system to be installed. Following the systems' requirements means an efficient computer system. The list below shows the windows XP minimum requirements for installation:

- ✓ Pentium 233 Mhz or compatible processor or faster; 300MHZ or faster recommended
- ✓ 64MB of RAM minimum; 128MB or more recommended
- ✓ 4.3GB hard hard disk space or more
- ✓ CD-ROM or DVD-ROM
- ✓ Super VGA (800X600) or higher-resolution monitor
- ✓ Keyboard and mouse

Windows XP Installation

1. Insert the Windows XP CD-ROM and reboot the computer

• If you see a message about press any key to boot the CD, do so now. Otherwise, you will see a message about Setup inspecting your system.



Figure 62. Boot from CD



2. MS-DOS portion of Setup begins

- In the first stage of setup; you will see a series of blue and gray MS-DOSbased screens.
- In the first step, you will be asked to press F6 if you need to install any thirdparty or RAID drivers.



Figure 63. Windows Set-up

3. Welcome to Setup

- Finally, Setup begins. In this step, you can set up XP, launch the Recovery Console (another, more complicated system recovery tool), or quit.
- Press ENTER to continue Setup, and it will examine your hard drives and removable disks.



Figure 64. Welcome to Set-up



4. Read the license agreement

- Next, you'll have to agree to Microsoft's complex licensing agreement. Among the highlights: You don't actually own Windows XP and you can only install it on one PC.
- Hit F8 to continue.



Figure 65. License and Agreement

5. Choose an installation partition

- This crucial step lets you choose where to install XP.
- On a clean install, you will typically install to the C: drive, but you might have other ideas, especially if you plan to dual-boot with 9x.
- Setup will show you all of your available disks (in this case, just one) and let you create and delete partitions as needed. So, for example, if you have one disk, but would like to create two partitions, one for XP and one for your data, you can do that here.



Figure 66. Choose an Installation Partition



6. Select the file system

- If you created a new partition, or wish to change the file system of an existing partition, you can do so in the next step. NTFS (New Technology File System) file system is more secured than FAT (File Allocation System).
- Regardless of which file system you choose, be sure to select one of the "quick" format options (the top two choices), if you do need to format, since these will work much more quickly than a full format.

Setum will install Windows XP o	e partition
Destation (DATES)	1000 HD / 1000 HD / 1000
- Pareleson (PHIJE)	16377 R8 X 16374 R8 17007
on 16379 ME Dick B at Id B on B	auz 8 on atapi [MBR].
ise the UP and DOWN ARROW Meys you want, and then press ENTER. Sufferent partition for Windows	to select the file system . If you want to select a . XP, press ESC.
Format the partition using th	e HIFS file system (Quick)
Format the partition using the	e Fill File system (Wilck)
Format the partition using th	e FAI file system
General the most it is a STOC	

Figure 67. Select the File System

7. Optionally format the partition

- If you did choose to change or format the file system, this will occur next. First, you'll be asked to verify the format. If you're installing XP on a system with more than one partition, especially one that still holds your data on one of the partitions, be sure you're formatting the correct partition.
- Hit F to continue, and a yellow progress bar will indicate the status of the format. When this is complete, Setup will again examine your disks, and create a list of files to copy.



Figure 68. Optionally Format the Partition



8. Setup folder copy phase and reboot

- Setup will now copy system files to the system/boot partition(s) you just created. This will allow the PC to boot from the C: drive and continue Setup in GUI mode.
- When the file copy is complete, Setup will initialize and save your XP configuration.
- It will then reboot your PC.When the system reboots, you will probably see the "Press any key to boot from CD" message again. If this happens, do not press a key: Setup will now boot from your C: drive. In the event that you cannot prevent the CD-based Setup from reloading, eject the CD and reboot. Setup will ask for the CD when needed.

Windows XP Professional Setup	
Please wait while Setup copies files to the Windows installation folders.	
This night take several minutes to complete.	
Setup is copying files 27%	

Figure 69. Setup Folder Copy Phase

9. GUI Setup begins

- Once the system reboots, you will be presented with the GUI Setup phase, which is much more attractive than the DOS-mode phase. As you progress through GUI Setup, you can read promotional information on the right side of the screen about XP.
- Next, your hardware devices are detected. This could take several minutes.



Figure 70. GUI Setup



10. Regional and language Options

- In the first interactive portion of GUI Setup, you can choose to customize the regional and language settings that will be used by XP, as well as the text input language you'd like. Users in the United States will not normally need to change anything here.
- Click Next to continue.



Figure 71. Regional and Language Options

11. Personalize your software

- Now, enter your name and your company. The name you enter is not the same as your user name, incidentally, so you should enter your real name here (i.e. *Rosalie Lujero* or whatever).
- Click *Next* to continue.

2 Windows**	
 Callecting information Dynamic Update Preparing installation Preparing installation President installation President installation Setup will complete approximately 33 minutes 	
	C BAOK Bend

Figure 72. Software Personalization



12. Enter your product key

- Now you must enter the 25-character product key that is located on the orange sticker found on the back of the CD holder that came with Windows XP. You cannot install XP without a valid product key. Later on, you will be asked to activate and optionally register your copy of Windows XP. A product key can be used to install XP on only one PC.
- Click *Next* to continue.

2 Windows**	
 Collecting information Dynamic Update 	Ministeres XP Product Schop XI Your Product Key XI Your Product Key uniquely Identifies your copy of Windows 2P. Image: Comparison of Windows 2P.
Property Installation Product Product Product Product	The 25 character Product Key appears on the yellow stoker on the tests of your Windows C3 fidder Type the Product Key below:
Setup will complete approximately: 33 minutes	BodestKey
	(Back Bage



13. Enter a computer name and administrator password

 In the next phase of Setup, you can create a name for your computer (which is used to identify it on a network) and, optionally in Pro Edition only, a password for the system Administrator, the person who controls the PC (this will generally be you, of course).

👫 Windows**	
Collecting information Dynamic Update	Mindows XP Professional Sciup Science and Administrator Pacaword You must provide a name and an Administrator paceword for your computer.
Constantion Constantion	Solve has suggested a more for your computer. If your computer is on a network, your network administrator can bell you what meme to use Computer name. V/ND/0w/1+C2X2AW Solve creaters a user account called Administrator. You use the account retem province to your computer. Type anAdministrator paravoid Administrator paravoid.
	Coview passward Coview

Figure 74. Enter Computer Name and Administrator Password



14. Supply your date and time settings

- Next, you can supply the date and time, which are auto-set based on information in your BIOS, and the time zone, which is irritatingly set to PST, which is where Microsoft is. Change these as appropriate.
- Click *Next* to continue.

Nindows**	
Cellecting Information Dynamic Update	Mackets XP Professional Setup XI Date and Time Settings Set the cosect date and line for your Windows computer.
Preparing Installation Programs Programs Programs Programs Programs Programs	Date & Time Wednesday, August 29, 2001 C 239,13 PM 25 21
Setup will complete opproximately: 33 minutes	Time Zone Item 20ne Item 14080001 Paceho Time (US & Canada); Tiquana Item 20ne Item 20ne Item 20ne Item 20ne
	< Back. New?>

Figure 75. Enter Date and Time Settings

15. Network setup

 If you have a networking card or modem, Setup now install the networking components, which include the client for Microsoft networks, File and Print Sharing, the Quality of Service (QoS) Packet Scheduler, and the TCP/IP networking protocol by default.



Figure 76. Network Set-Up



16a. Choose networking settings

 In this phase, you can choose to keep the default settings (recommended) or enter custom settings.

Note that XP doesn't include the legacy NetBEUI protocol out of the box. If you want to use this protocol, you will need to install it later from the XP

• Click Next to continue.



Figure 77. Choose Networking Settings

Windows XP Professional only:

16b. Enter workgroup or domain information

- In Windows XP Professional only, you will be able to select a workgroup or domain name next. Home Edition doesn't work with Windows domains, however, and Setup will automatically supply the workgroup name *MSHOME*, which you can change later. The default workgroup name in XP Pro is, imaginatively, *WORKGROUP*.
- Click *Next* to continue.

0.000	madows XP Professional Setup
 Conecting information 	Workgroup or Computer Domain
Dynamic Update	A workgroup is a collection of computers that have the same workgroup hane. A domain a a collection of computers defined by a network administrator.
Preparing Installation	Do you want this concuter to be a member of a domain?
	(You may need to obtain this information from your network, administrator.)
Windows	No, this computer is not on a network, or is on a network without a domain. Multiplication of a manufact of the following produces or:
 Photony instalation 	WORKGEOLP
Setup will complete	
30 minutes	C Yes, make this computer a member of the following domain:
	(Back, New)

Figure 78. Enter Workgroup or Domain Information



17. Set-up completion

- From this point on, Setup will continue to completion without any further need for interaction. Setup will now copy files, complete installation, install your Start Menu items, register system components, save settings, remove any temporary files needed by Setup, and then reboot.
- Again, you will probably see the "Press any key to boot from CD" message on reboot. If this happens, do not press a key, and your new XP install will boot up. You can remove the XP Setup CD now.

Nindows**	
Completing metallation	Get support for the latest hardware and software

Figure 79. Set- Up Completion

18. First boot

• You'll be greeted by the XP splash screen on first boot (this actually appears briefly when you rebooted into GUI Setup as well). The splash screens for XP Pro and Home are subtly different.



Figure 80. First Boot


19. Change display settings

- Users with CRT monitors and some LCDs (such as laptops and flat panel displays) will see a Display Settings dialog appear, which asks whether you'd like XP to automatically set the resolution. This will generally change the resolution from 800 x 600 to 1024 x 768 on a CRT monitor, or to the native resolution of an LCD display.
- Click *OK* and let XP change the resolution. Then, accept the settings if the screen display changes and can be read. If you can't see the display, it will time out after 30 seconds and return to the sub-optimal 800 x 600 resolution.
- Click OK to accept the screen resolution change.

Display Settings	X
To incrove the appearance of visual elements, Window adjust your screen resolution.	s will automatically
oc	

Figure 81. Change Display Settings

20. Welcome to Microsoft Windows

- Now, you are presented with XP's "Out of Box Experience," or OOBE, which presents a silly wizard to guide you through the final set up of your PC.
- Click *Next* to continue.

🏘 ₩indows™	
Welcome to Microsoft Windo	ows
This was not for procedure and the count that choose 3.4 Early separate a time mendious and ray up your computer	
	(Vekare & Windows XP)
	0
To contrary and faset	1 million
	Rael 😂

Figure 82. Welcome to Microsoft Windows



21. Network setup

- In the opening OOBE phase, you are asked to set up your network/Internet connection, which is required for activation and registration. If you selected the default networking configuration during Setup and know it will work (because you're connected directly to a cable modem, perhaps, or are on a local area network), then select Yes (the default). Otherwise, you can select *No* and then *Skip*.
- We'll assume that your network is up and running and select Yes.
- Click *Next* to continue.



Figure 83. Network Set- up

22. Optionally activate and register Windows

 If you selected Yes in the previous step, you are asked if you'd like to activate Windows XP. This will tie your copy of XP to the current PC semipermanently. Activation requires a connection to the Internet, but you can perform this step later if you want (and don't worry, XP will annoyingly remind you of this fact every time you boot the machine until you do so).



Figure 84. Windows Activation



23. Set up users

- Now, you can set up the user names of the people who will be using the PC. You will want at least one user (for you), since you shouldn't be logging on as Administrator. Curiously, each user you do create here has administrative privileges, however, and no password. You should set up your users correctly with passwords as soon as possible.
- This phase lets you create up to five users. You can create more later, or manage users, using the User Accounts tool in Control Panel.
- Click *Finish* when done creating users. At this point, OOBE ends and you're reading to go.
- Click *Finish* again.

Street Windows®		
Who will us	e this computer?	
Type De parte d'authours d'authourse Las partes daba de records a s construction de Catalons	and the second	en de la cere a colonad des anal 1 par sons con pers L'accur des anticonomy des anticipes, esc
	(Paul	
253.058	Supt:	
Professor	Wark.	
en Caer	1	
Striktur	line in the second s	and a second
The start cannot be all approved on the specific sectors the The The work construction of the sector Start manual and the sector bits	la Martina (1997), "general de la desta de la combina (1997) na subre de la general de la combina (1997), a portante de la combina de la combina (1997), a combina (1997), en desta combina (1997), a combina (19 en desta combina (1997), a combina (19	ed Miller Const., sa angela 14 gi sanana silari sa Pgil Indulari Pasanat an Par
		Firster Br (B.K. 1999) of prysic F1.
20 0 × 4		tari 👀

Figure 85. Set-up Users

24. Logon to Windows XP for the first time

Click your name, that account will logon and you'll be presented with the XP desktop. After you create passwords, however, you'll be asked to enter a password before you can logon.

Windows To begin, click your user name	Mark Paul Steph
🔯 Turn off computer	After you top on, you can self or therein action to. Not go to Contro Familiand disc Use Action to:

Figure 86. Set-up Users





Multiple Choice: Read each question carefully and choose the letter of the best answer. Write your answer on a separate sheet of paper.

- 1. Which of the following is not a Windows XP minimum requirement?
 - a. 128MB RAM or higher c. Lower resolution monitor
 - b. CD- ROM or DVD ROM
- d. 4.3 GB hard disk space or more
- 2. If you see a message to press any key to boot the CD and you fail to do so, what do you think will happen?
 - a. The computer will restart
 - b. Set up inspecting your system will appear
 - c. It will be prompted to BIOS setup
 - d. It will return to boot menu
- 3. What key should you press if you need to install any third- party or RAID drivers?
 - a. F2
 - b. F6 d. F12
- 4. After reading the license agreement, what function key will press in order to start the installation?
 - a. F6

b. F8

- c. F9 d. F12

c. F2

- 5. Where do we typically install the operating system?
 - a. Drive C b. DVD

- c. External Drive
- 6. What file system is usually used during installation?
 - c. NTFS

b. FAT32

a. FAT

- d. NTFS32
- 7. Suppose that you will install Windows XP on a system with more than one partition, what important process should be done?
 - a. Change the file system
 - b. Delete the data and files on the different partition
 - c. Examine the partition
 - d. Format the correct partition
- 8. When the folder copy phase is complete your system will reboot, what are you going to do if see the message "Press any key to boot from CD"?
 - a. Press any key

- c. Reboot the system
- b. Do not press a key d. Eject the CD 9. What is the next phase after the set up folder copy phase and reboot?
 - a. GUI set up

- c. Username setup
- d. Software personalization
- 10. What phase will immediately follow after the first boot phase?
 - a. Welcome to Windows

b. Software

b. Network Setup

- c. Change display setting d. Set up users
- **Computer Hardware Servicing**

- d. Floppy Drive



For you to have a profound knowledge on the overview of what windows XP is, utilize the internet and watch the following video presentations:

- 1. Overview of Windows XP
 - http://www.professormesser.com/free-a-plus-training/220-802/anoverview-of-windows-xp/



- 2. Planning for installation
 - http://www.professormesser.com/free-a-plus-training/220-802/planning-a-windows-installation-2/



3. Windows XP installation

http://www.professormesser.com/free-a-plus-training/220-802/installing-windows-xp-3/

After watching the videos, have a documentation containing the overview of Windows Xp and salient procedures in Planning for installation and Windows XP installation. Use a short white bond paper and be creative for the documentation.





Windows XP Installation

Equipment:

Computer unit with CD or DVD drive

AVR / UPS

Materials:

Windows XP Installer

Procedure:

- 1. Work in triads or quartet (depending on the no. of computer available)
- 2. Install the Operating System (OS), Windows XP.
- 3. Take turns in doing the above task.

You will be assessed using the criteria in the score card below.

PERFORMANCE SCORE CARD

Evaluation:	Percentage	Score
CRITERIA		
1. Operating System is installed with no errors.	40%	
2. Proper disk partitioning and partition is performed.	40%	
3. Proper use of equipment and materials is observed.	10%	
4. Observance of Safety Precautions.	10%	
Performa	ance Criteria	





Windows 7 Installation

As a technician you must be able to know the variations or options in installing an operating system that is compatible with the hardware requirement of a personal computer. Another operating system available in the market now is the Windows 7 version. Now, take a tour through the procedures in installing a Windows 7 operating system. I believe, the procedures will be very easy for you.

- 1. Turn your computer on then press Del or F2 (depend on your computer's mainboard) to enter the system BIOS.
- 2. Go to Boot menu and choose Boot from CD/DVD.



Figure 87. Boot Menu

3. Press F10 to save the configuration and exit BIOS then reset your computer.



Figure 88. Save configuration settings



4. Insert Windows 7 DVD into your DVD drive then start up your computer, Windows 7 will be loading files.



Figure 89. Windows 7 loading files and Start up

5. Select your language, time & currency format, keyboard or input method and click **Next**.



Figure 90. Language, Time and Currency Set- up

6. Click Install now.



Figure 91. Install Now



7. Check I accept the license terms and click Next.



Figure 92. License Terms Agreement

8. Click **Upgrade** if you already have a previous Windows version or **Custom (advanced)** if you don't have a previous Windows version or want to install a fresh copy of **Windows 7**.



Figure 93. Windows 7 Options for Installation



 (Skip this step if you chose Upgrade and have only one partition) Select the drive where you want to install Windows 7 and click Next. If you want to make any partitions, click Drive options (advanced), make the partitions and then click Next.

Name	Total Size	Free Space Type	
Disk 0 Unallocated Space	20.0 GB	20.0 GB	
Refresh		Drive options (advanced)	
load Driver		Stille Spitolis (gereilees)	
0-			

Figure 94. Drive Options

10. It will now start installing **Windows 7**. The first step, (i.e. **Copying Windows files**) was already done when you booted the **Windows 7 DVD** so it will complete instantly.



Figure 95. Windows 7 Starts Installation



11. After completing the first step, it will expand (decompress) the files that it has been copied.



Figure 96. Expanding Windows Files

12. The third and fourth step will also complete instantly like the first step.



Figure 97. Installing Features and Updates



13. After that it will automatically restart after 15 seconds and continue the setup. You can also click **Restart now** to restart without any delays.



Figure 98. Restart to Continue Installation

14. After restarting for the first time, it will continue the setup. This is the last step so it will take the most time than the previous steps.



Figure 99.Completing Installation



15. It will now automatically restart again and continue the setup. You can click **Restart now** to restart without any delays.

	Install Windows				
w	Vindows needs to restart to continue				
Re	estarting in 5 seconds				
				Starting Windows	
		Betat now		& Microsoft Corporation	
1 Collecting informat	tion 2 Installing Windows				
				Setup is checking video perfo	ormance
	Setup is prep	aring your computer for first	t use		
		-			

Figure 100.First Start Up

16. Type your desired user name in the text-box and click *Next*. It will automatically fill up the computer name.

	💐 Windows [:] 7 Ultimate	
Choose	a user name for your <u>account</u> and name your computer to distinguish it on the network.	
	Type a user name (for example, John): Kishan Type a <u>computer name</u> :	
	NDIBI-FC	

Figure 101.Software Personalization



17. If you want to set a password, type it in the text-boxes and click Next.

🍚 🧃 Set Up Windows	
Set a password for your account Creating a password is a smart security precaution that helps protect your user account from unwanted users. Be sure to remember your password or keep it in a safe place.	
Type a password (recommended):	
Type a password hint:	×
Choose a word or phrase that helps you remember your password. If you forget your password, Windows will show you your hint.	
Next	

Figure 102.Password Set- up

18. Type your product key in the text-box and click **Next**. You can also skip this step and simply click **Next** if you want to type the product key later. Windows will run only for 30 days if you do that.

📀 🤞	Set Up Windows
т	vpe vour Windows product kev
	, - ,
Y yı p	ou can find your Windows product key on a label included with the package that came with our copy of Windows. The label might also be on your computer case. Activation pairs your roduct key with your computer.
т	he product key looks similar to this:
P	RODUCT KEY: XXXXX-XXXXX-XXXXX-XXXXX-XXXXX
(0	dashes will be added automatically)
	Automatically activate Windows when I'm online
<u>W</u>	/hat is activation?
Ke	ead our privacy statement
	Next N

Figure 103. Type Windows Product Key



19. Select your desired option for Windows Updates



Figure 104. Windows Update

20. Select your time and click Next.

6	🇿 👩 Set Up Windows		
	Review your time and date s	ettings	
	Time zone:		
	(UTC-08:00) Pacific Time (US & Cana	ada) 🔹	
	Automatically adjust clock for Day	light Saving Time	
	Date:	Time:	
	Jecember, 2010 Junc Su Mo Tu We Th Fr Sa 28 29 30 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 03 31 1 2 3 4 5 6 7 8		*
		12.00.00 FM 💌	

Figure 105. Time and Date Settings



21. If you are connected to any network, it will ask you to set the network's location.



Figure 106. Windows 7 Set- up Complete



Figure 107. Preparing Desktop





Hands- on Activity:

You are tasked to reformat / install an operating system particularly Windows 7, however, during the process of installation a problem occurred the machine / computer did not boot from CD. What do you think might be the reason for this unplanned incident? Your task now is to demonstrate the correct procedures to solve and respond to this unplanned event in accordance to the established procedures.

You will work in quartet or triads (depending on the number of computers) to solve this problem. Your output will be rated according to the following criteria:

CRITERIA	PERCENTAGE	SCORE
Accuracy	50 %	
(Adherence to the correct procedure)		
Workmanship	30 %	
(Adherence to OHS policy, neatness and		
organization of materials used)		
Speed	20 %	
PERFORMANCE RATING	100%	

SKILLS SCORE CARD



Before implementing any contingency procedures in any unplanned events you must have a deeper understanding in obtaining approval from appropriate personnel. Your task now is to do the following:

- 1. Watch video presentation on the said topic and have a proper documentation of the procedures in obtaining approval from the appropriate personnel.
- 2. Interview a person in the field to acquire the knowledge (procedures) and skills on the said competency.





Windows 7 Installation

Equipment:

Computer unit with CD or DVD drive

AVR / UPS

Materials:

Windows 7 Installer

Procedure:

- 1. Work in triads or quartet (depending on the no. of computer available)
- 2. Install the Operating System (OS), Windows 7.
- 3. Take turns in doing the above task.

You will be assessed using the criteria in the score card below.

FERFORMANCE SCORE CARD					
CRITERIA	Percentage	Score			
1. Operating System is installed with no errors.	40%				
2. Proper disk partitioning and partition is performed.	40%				
3. Proper use of equipment and materials is observed.	10%				
4. Observance of Safety Precautions.	10%				
PERFORMAN	NCE RATING				

PERFORMANCE SCORE CARD





BASIC COMPUTER CONFIGURATION SETUP

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.

Basic Input / Output System (BIOS)

The Basic Input Output System, usually referred to as BIOS, is software stored on a small memory chip on the motherboard.

BIOS instruct the computer on how to perform a number of basic functions such as booting and keyboard control. BIOS is also used to identify and configure the hardware in a computer such as the hard drive, optical drive, CPU, memory, etc.

lain Advanced	Power	BIOS SET	IUP UTILITY Security	Exit	
AMIBIOS Version : BIOS Build Date :		08.00 07/17/	.02 ⁄02		
System Memory :		511MB			
System Time System Date		[10:5] [Mon (L:42] 04/10/2006]		
				+- †, +- Ta F': F': ES	 Select Screen Select Item Change Field Select Field General Help Save and Exit SC Exit
v02.10 (C)Copyright 1985-2001, American Megatrends, Inc.					

Figure 108. BIOS Set- up

The BIOS is accessed and configured through the BIOS Setup Utility. The BIOS Setup Utility is, for all reasonable purposes, the BIOS itself. All available options in BIOS are configurable via the BIOS Setup Utility. The BIOS Setup Utility is accessed in various ways depending on your computer or motherboard make and model.



BIOS access and configuration on PC systems is independent of any operating systembecause the BIOS is part of the motherboard hardware. It doesn't matter if a computer is running Windows 7, Windows Vista, Windows XP, Linux, Unix, or no operating system at all - BIOS functions outside of the operating system environment and is no way dependent upon it.

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. The following list shows the things you can do in most BIOS systems:

- 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
- Change the Boot Up NumLock Status

- 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

Device Drivers

Now that you successfully installed the operating system, you'll need to configure the devices such as Video Cards, Network Interface Cards, Sound Cards, etc by installing the device drivers of each. In many cases, if Windows recognizes the device, drivers will be installed automatically. In some cases, generic drivers are installed so that the devices will work properly.

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.

The procedures listed below describe how to obtain and install drivers for hardware devices on a Microsoft Windows 2000-based computer.

Step 1: Determine the Hardware Manufacturer

If you do not know the manufacturer of the device for which you want to install the driver, follow these steps to determine the manufacturer:



1. On the desktop, right-click **My Computer**, and then click **Manage**.



Figure 109. Manage My Computer

2. Under System Tools, click Device Manager.

The devices that are installed on the computer are listed in the right pane.



Figure 110. Device Manager



3. In the right pane, expand the category of the device that you want to configure. For example, expand **Display adapters**.



Figure 111. Expanded Device Category

4. Right-click the device for which you want to install the driver, and then click **Properties**.

NOTE: The device may appear as **Unknown device** or as a generic device.

🗢 🔿 🖄 📰 🔛 🕯	Q	
A Computer Management (Local	a 🚔 rosalie-PC	Actions
System Tools	🛛 🍻 Batteries	Device Manager
Task Scheduler	Bluetooth Radios	Man Antines
Event Viewer	A 📲 Computer	More Actions
Shared Folders	ACPI x64-based PC	
Local Users and Groups	a 👝 Disk drives	
Performance		
Bevice Manager	WDC WD3200BEVT-22ZCT0 ATA Device	
Storage	Display adapters	
Disk Management	NVIDIA GeForce G105M	
Services and Applications	DVD/CD-ROM drives	
	Optiarc DVD RW AD-7580S ATA Device	
	》·切詞 Human Interface Devices	
	DE ATA/ATAPI controllers	
	Imaging devices	
	Keyboards	
	Mice and other pointing devices	
	A 🔤 Monitors	
	Generic PnP Monitor	
	Network adapter	
	11b/g Wire Scan for nardware changes	
	Atheros AR Properties	
	- 😰 Bluetooth 🗋	
	Bluetooth Device (RFCOMM Protocol TDI)	

Figure 112. Device Properties



5. Click the **General** tab. Make a note of the manufacturer and model of the device.



Figure 113. General Tab

6. Click **Cancel**, and then quit Computer Management.

NOTE: If the device is not displayed in Device Manager, or the device is listed as an "Unknown device," contact the computer or device manufacturer to obtain more information about the device.

Step 2: Obtain the Driver

To obtain the latest driver, use the following list of possible sources for the driver, in the order in which they are presented.

✓ Original Computer Manufacturer

If the device was installed by your computer manufacturer, contact the manufacturer of your computer to find out how to obtain, download, and install the latest drivers for the device.

✓ Device Manufacturer

Contact the manufacturer of the device to inquire about how to obtain, download, and install the latest drivers for the device.



✓ Chipset Manufacturer

Contact the chipset manufacturer of the device to find out how to obtain, download, and install the latest drivers for the device. It is best to first contact the manufacturer of the device for the drivers before you contact the chipset manufacturer.

For example, if your display adapter uses a NVIDIA chipset, first contact the manufacturer of the display adapter. If you cannot contact the display adapter manufacturer or if the manufacturer does not have a driver, contact NVIDIA.

Some examples of chipset manufacturers (and their Web sites) include:

- NVIDIA (display adapters)
- PCTEL, Inc. (modems)

✓ Installation CD or Floppy Disks

If you have the original driver CD or floppy disks that were included with the computer or device, and if no other source for the drivers is available, use the original driver that is included with the computer or device.

NOTE: Whenever possible, try to first contact the Original Equipment Manufacturer (OEM), device manufacturer, or chipset manufacturer to obtain the latest version of the driver.

Step 3: Install the Driver

- The driver files that you download from the OEM, device manufacturer, or chipset manufacturer differ depending on how the driver is packaged by the manufacturer.
- If the file is an executable program, run the program to extract the files. If the file is in .zip format, you can use a third-party utility such as WinZip to extract the files. For more information about how to extract the driver files, see the instructions that are provided by the manufacturer of the driver.
- The driver may use a setup program. The driver package may contain raw driver files, or it may contain only raw driver files. Some examples include .inf files, and .sys files. To install the driver, use one of the following methods as appropriate to your situation.

✓ Driver with a Setup or Installation Program

If the driver uses a setup or installation program, run the program to install the driver. For more information about how to do this, see the documentation or contact the driver manufacturer.



✓ Device Is Displayed in Device Manager

- 1. On the desktop, right-click **My Computer**, and then click **Manage**.
- Under System Tools, click Device Manager.
 The devices that are installed on the computer are listed in the right pane.
- 3. Expand the category of the device that you want to configure. For example, expand **Modems**.

NOTE: The device may be listed under **Other devices**.

Right-click the device for which you want to install the driver, and then click **Properties**.
 NOTE: The device may be displayed as **Unknown device**, or as a gen

NOTE: The device may be displayed as **Unknown device**, or as a generic device.

5. Click the **Driver** tab, and then click **Update Driver**.

The Upgrade Device Driver wizard starts.

- 6. Click Next.
- 7. Do one of the following:
 - Click Search for a suitable driver for my device (recommended), and then click Next.

-or-

- Click Display a list of the known devices for this device so that I can choose a specific driver, and then clickNext. Click Have Disk, click Browse, locate the .inf files that you downloaded in Step 2: Obtain the Driver, click an .inf file, and then click Open.
- 8. Follow the wizard instructions to install the driver.
- 9. Restart the computer.

✓ Device Is Not Displayed in Device Manager

Use the Add New Hardware wizard in Control Panel to install drivers for non-Plug and Play devices. You may have to use this method to install certain modems, serial ports, or printer ports.

- 1. Click Start, point to Settings, and then click Control Panel.
- 2. Double-click Add/Remove Hardware.
- 3. Click Next.
- 4. Click Add/Troubleshoot a device, and then click Next.
- 5. Do one of the following:
 - Click Yes, search for new hardware, and then click Next.
 -or-
 - Click No, I want to select the hardware from a list, and then click Next.
- 6. Follow the wizard instructions to install the driver.
- 7. Restart the computer.





Installing Device Drivers

Material: Installation CD

Direction: Given an installation CD, perform installation of a device driver.

Check the quality of your work undertaken in accordance with the established procedures thru the Performance Score Card below.

Performance Criteria	Criteria	Grade
1. The system is correctly started.	20%	
2. The Installation CD is properly inserted.	20%	
3. Handling and safekeeping of installation CD is observed.	20%	
4. The instructions how to install device drivers are accurately followed.	20%	
5. The device drivers are successfully installed	20%	
PERFORMANCE RATIING		

PERFORMANCE SCORE CARD





Lesson3. CONDUCT TEST ON THE INSTALLED COMPUTER SYSTEM

In the previous lesson, you were introduced with all the necessary knowledge and skills on installation of computer devices and operating system. Now, after executing the correct procedures I am sure that installation is a very easy task for you. Those skills will be very essential for the next lesson.

In the next phase of your learning it will focus in conducting test on the installed computer components. After reading all the required topics and performing the essential skills you must be able to:

- Follow OHS policies and procedures in conducting tests;
- Check circuits and systems being isolated using specified testing procedures;
- Test devices, systems and/or installation to determine its conformity with the requirements;
- Undertake final inspections on the installed devices, systems to ensure conformity with the requirements;
- Accomplish technical reports on the tests conducted; and
- Follow procedures in forwarding documentation to appropriate personnel and/or authority on the test conducted.



TESTING INSTALLED EQUIPMENT / DEVICES (COMPONENTS)

As computer technician you will need a good understanding of the health and safety regulations from early on in your career, so that you understand the good practices demanded by law. In particular, you need to:

- report any accidents
- take reasonable care of your own health and safety when moving heavy components
- not cause any electrical hazards
- make sure that workstations meet safety requirements.

You need to adhere to health and safety regulations as they will help to protect you and others and will avoid any unnecessary legal action for reckless and unsafe working practices. If you identify any health and safety problems, you should tell your line manager or the health and safety representative immediately. The most basic test is to switch the system on to check it starts without errors. ICT professionals are also likely to use tools and utilities to check that all is well with the system after an installation.

The Use of Diagnostic Tools in testing installed hardware components and other peripherals

Diagnostic tools are used to test and diagnose equipment. Diagnostic tools include the following:

- *Digital multimeter* is a device that can take many types of measurements. It tests the integrity of circuits and the quality of electricity in computer components. A digital multimeter displays the information on an LCD or LED.
- A *loopback adapter*, also called a loopback plug, tests the basic functionality of computer ports. The adapter is specific to the port that you want to test.
- The *toner probe*, is a two-part tool. The toner part is connected to a cable at one end using specific adapters, such as an RJ-45, coaxial, or metal clips. The toner generates a tone that travels the length of the cable. The probe part traces the cable. When the probe is in near proximity to the cable to which the toner is attached, the tone can be heard through a speaker in the probe.



Figure 114. Diagnostic Tools

Software Tools

Like hardware tools, there are a variety of software tools that can be used to help technicians pinpoint and troubleshoot problems. Many of these tools are free and several come with the Windows operating system.

Disk Management Tools

Software tools help diagnose computer and network problems and determine which computer device is not functioning correctly. A technician must be able to use a range of software tools to diagnose problems, maintain hardware, and protect the data stored on a computer.



You must be able to identify which software to use in different situations. *Disk management tools* help detect and correct disk errors, prepare a disk for data storage, and remove unwanted files.

The following are some disk management tools:

- **FDISK:** A command-line tool that creates and deletes partitions on a hard drive. The FDISK tool is not available in Windows XP, Vista, or 7. It has been replaced with the Disk Management tool.
- **Disk Management Tool:** Initializes disks, creates partitions, and formats partitions.
- *Format*: Prepares a hard drive to store information.
- **ScanDisk or CHKDSK:** Checks the integrity of files and folders on a hard drive by scanning the file system. These tools might also check the disk surface for physical errors.
- **Defrag:** Optimizes space on a hard drive to allow faster access to programs and data.
- **Disk Cleanup:** Clears space on a hard drive by searching for files that can be safely deleted.
- **System File Checker (SFC):** A command-line tool that scans the operating system critical files and replaces files that are corrupted.

Use the Windows 7 boot disk for troubleshooting and repairing corrupted files. The Windows 7 boot disk repairs Windows system files, restores damaged or lost files, and reinstalls the operating system.

Test procedures

A test procedure is a set of steps to guide you through what needs to be done to thoroughly test the installation. It is designed to help you work more effectively and to make sure you test everything that needs testing.

Test procedures are created in-house and could include these steps:

1. **Gathering test information**. The first step is to run the tests required by the procedure and find out what happens. You should record all the results of your tests in a log so that you know which pass and which fail, thereby requiring further action.

2. **Validating the test information**. The next step is to check the data you gathered from the tests to make sure it is correct. This is usually done by running the tests again.

3. **Responding to test information**. This step is important because you need to be able to recognize when a test shows problems or is successful. For example, if ping is used to test a network connection then 'Request timed out' shows the test was not successful.

4. **Checking specification**. The final step is an important end to testing. You need to check the specification for the installation to make sure that it has been met. For example, if a user requested an upgrade to make their display run at 1920 x 1200, then the ICT professionalshould check that the graphics card and screen can do this.

External Visual Inspection

The external visual inspection consists of a quick inspection of the exterior of the computer, the monitor, the keyboard, any peripherals, and cables. While performing the visual inspection, make any necessary corrections. To perform the external visual inspection, perform the following steps:

- 1. Turn off the computer, the monitor, and all peripherals.
- 2. Verify that all power cables are properly connected to the computer, the monitor and peripherals, and their power sources.
- 3. Verify that the keyboard and mouse interface cables are firmly attached to the proper connectors on the back of the computer.
 - For a PS/2-compatible mouse, the keyboard and mouse interface cable connectors are identical except for their labels.
 - For a serial mouse, the mouse interface cable must be firmly attached to one of the serial port connectors, and its captive screws must be secure enough to ensure a firm connection.
- 4. Verify that network cables (if present) are properly attached.
- 5. Verify that any devices attached to the serial and parallel port connectors are properly connected.
 - Each of the serial and parallel port interface cables must be firmly attached to an appropriate connector on the back of the computer as well as to the interface connector on the device. The captive screws that secure these connectors at each end of the interface cable must be secure enough to ensure a firm connection.
- 6. Verify that the video interface cable is firmly attached to the video connector on the back panel or to a video expansion card, and also to the connector on the back of the monitor. For proper connection of the video monitor, see the documentation for the monitor.
- 7. Inspect all external monitor controls for any obvious damage or improper settings. For proper settings of the video monitor controls, see the documentation for the monitor.
- 8. Inspect the keyboard to ensure that no keys are sticking. If one or more keys are sticking, it may be necessary to replace the keyboard.
- 9. Inspect the exterior of the computer, including all controls and indicators, and all user-accessible data storage devices for any signs of physical damage.

Does the inspection reveal any problems?

Yes. Proceed to the appropriate procedure in "Removing and Replacing Parts."



No. Proceed to "Observing the Boot Routine."

Observing the Boot Routine

After you have performed an external visual inspection as described in the previous section, you should boot the system and, while the boot routine is running, observe the system for any indications of problems.

NOTE: Most of the steps in this procedure require observation of system functions and indications, some of which can occur simultaneously. It may be necessary to reboot the system several times to complete all of these steps.

To observe problem indications during the boot routine, perform the following steps:

- 1. If the system is off, turn on all peripherals and the computer.
- 2. Check the power supply fan.

Does the fan run normally?

- **Yes**. Proceed to step 3.
- **No**. Troubleshoot the system power supply.
- 3. Watch the <Num Lock>, <Caps Lock>, and <Scroll Lock> indicators on the upper-right corner of the keyboard. After all three indicators flash momentarily, and following a long pause (approximately 30 seconds), the Num Lock indicator should light up and remain on (unless the **Num Lock** option is set to **Off** in the System Setup program).

Do these indicators flash on and off within approximately 10 seconds after the boot routine starts?

- **Yes**. Proceed to step 4.
- No. Troubleshoot the system power supply. If the troubleshooting procedure indicates that the system power supply is operational, troubleshoot the memory.
- 4. During the boot routine, observe the system for any of the following indications:
 - Beep codes A beep code is a series of beeps that indicates an error condition.
 - System error messages these messages can indicate problems or provide status information.
 - Diskette-drive and hard-disk drive access indicators These indicators light up in response to data being transferred to or from the drives. If either of these indicators fails to light up during the boot

routine, troubleshoot the diskette drive or hard-disk drive subsystem, as appropriate.

5. Observe the monitor screen for the **Diagnostics** menu.

Internal Visual Inspection

NOTICE: Before you proceed with the internal visual inspection described in this section, ensure that the user has saved all open files and exited all open application programs if possible.

A simple visual inspection of a computer's interior hardware can often lead to the source of a problem, such as a loose expansion card, cable connector, or mounting screw. To perform the internal visual inspection, perform the following steps:

- 1. Turn off the system, including any attached peripherals, and disconnect all the AC power cables from electrical outlets.
- CAUTION: Before beginning to work inside the computer, disconnect the power supply from the power source and the power supply cables from the power supply.
- 2. Remove the computer's right side cover.

CAUTION: The heat sink assembly can get extremely hot during system operations. Be sure that it has had sufficient time to cool before touching it.

CAUTION: When handling the heat sink assembly, take care to avoid sharp edges on the heat sink.

- 3. Verify that the chips, expansion cards, and SEC cartridge and heat sink assembly or assemblies are fully seated in their sockets or connectors.
- 4. To ensure that the chips are fully seated in their sockets, press firmly on the top of each chip.
- 5. Verify that all jumpers are set correctly.
- 6. Check all cable connectors inside the computer to verify that they are firmly attached to their appropriate connectors.
- 7. Reinstall the computer cover.
- 8. Reconnect the computer and any attached peripherals to their power sources, and turn them on.





Suppose that you are in the workshop carrying out hardware installations, the owner are very impressed with you. There has been a lot of telephone time spent recently explaining to customers how to test installed components of their computer systems. The shop has decided to create their own video that will be uploaded to the website and YouTube. You have been asked to create this video.

1. Create a video to demonstrate how to install the hardware components. Make sure you include everything you need to do to work safely.

- 2. Show how to configure any device installed in the computer.
- 3. Create another video on the following:
 - **a.** Undertake final inspection on the assembled computer system for functionality. This will be to test that the newly installed hardware components work without problems;
 - **b.** Accomplish technical reports on the tests conducted; and
 - **c.** Follow procedures in forwarding documentation to appropriate personnel or authority





Test I. Identification

Direction: Identify the terms being described in the following sentences.

- 1. These are mobile computers that are very handy to use.
- **2.** They are computers designed to provide services to client machines in a computer network.
- 3. They are also called mid-range systems or workstations.
- 4. A computer with a microprocessor and its central processing unit it.
- **5.** They fall in the category of laptops, but are inexpensive and relatively smaller in size.
- 6. A type of computer which is intended be used on a single location.
- **7.** They use digital circuits and are designed to operate on two states, namely bits 0 and 1.
- 8. Computers that have the capacities to host multiple operating systems and operate as a number of virtual machines and can substitute for several small servers.
- **9.** It is a handheld computer and popularly known as a palmtop.
- **10.** These computers can be worn on the body and are often used in the study of behavior modeling and human health.
- **11.** It is considered as the most important program that runs on a computer.
- **12.** It is composed of a device that accepts data and instructions from the user or from another computer system.
- **13.** Any piece of computer hardware that displays results after the computer has processed the input data that has been entered.
- **14.** Any apparatus for recording computer data in a permanent or semi-permanent form.
- **15.** It protects a computer network from unauthorized access.
- **16.**Type of network that connect larger geographic areas, such as Florida, the United States, or the world.
- **17.** This is an *internetworking* system capable of joining together two networks that use different base protocols.
- **18.** It is consists of two or more computers that are linked in order to share resources (such as printers and CD-ROMs), exchange files, or allow electronic communications.
- **19.** It is a small, simple, inexpensive device that joins multiple computers together.
- **20.** A device filters data traffic at a network boundary.

Test II. True or false

Direction: Write TRUE if the statement is correct and FALSE otherwise.

1. Always use an anti-static wrist strap when working on a computer (except when working on monitors)



- 2. Always disconnect a computer from the AC power and from any powered peripherals while you are working on it.
- 3. Always grasp a metal part of the computer chassis with your bare hand before you touch anything inside. Do this even if you are wearing an anti-static wristband.
- 4. Always handle electronic components by a non-conducting (non-metallic) edge. Don't touch the pins or other connectors.
- 5. Always use a UL-approved surge protector or an Uninterruptible Power Supply that incorporates surge and spike protection
- 6. Never eat, drink, or smoke while working on a computer.
- 7. Whenever you purchase software or hardware for your computer, you should first make sure your computer supports the system requirements.
- 8. The speed of a computer's processor chip (technically known as its "clock **speed**") in measured in gigahertz (GHz).
- 9. A computer's graphics system determines how well it can work with visual output.
- 10. Today 40GB is an absolute minimum hard drive size for a new computer running Windows 7.
- 11. When attaching cables, never force a connection.
- 12. BIOS instruct the computer on how to perform a number of basic functions such as booting and keyboard control.
- 13. The external visual inspection consists of a quick inspection of the interior of the computer.
- 14. Disk management *tools* help detect and correct disk errors.
- 15. The most basic test is to switch the system on to check it starts without errors.

Test III. Multiple Choices

Direction: Read each questions carefully and write the letter of the best answer.

- 1. These are small software programs that help the operating system use the device.
 - a. Application
 - b. Driver
- 2. Which of the following is software shared on a small memory chip on the motherboard?
 - a. Installer c. Driver
 - b. Application
- d. BIOS 3. It is the way to set up a system or the assortment of components that make up the system.
 - a. Configuration

c. Driver

b. Set up

- d. Installation
- 4. Which of the following is not a Windows XP minimum requirement?
 - a. 128MB RAM or higher
 - b. CD- ROM or DVD ROM
 - c. Lower resolution monitor
 - d. 4.3 GB hard disk space or more

- 5. If you see a message to press any key to boot the CD and you fail to do so, what do you think will happen?
 - a. The computer will restart
 - b. Set up inspecting your system will appear
 - c. It will be prompted to BIOS setup
 - d. It will return to boot menu
- 6. What key should you press if you need to install any third- party or RAID drivers?
 - a. F2 c. F9 b. F6 d. F12
- 7. Where do we typically install the operating system?
 - a. Drive C
 - b. DVD
 - c. External Drive
 - d. Floppy Drive
- 8. Suppose that you will install Windows XP on a system with more than one partition, what important process should be done?
 - a. Change the file system
 - b. Delete the data and files on the different partition
 - c. Examine the partition
 - d. Format the correct partition
- 9. What file system is usually used during installation?
 - a. FAT
 - b. FAT32
 - c. NTFS
 - d. NTFS32
- 10. Which of the following is a connector on the back of a computer or other device?
 - a. Modem
 - b. Port hub
 - c. Router
 - d. Network Gateway


Test IV. Matching Type

Direction: Match column A with Column B and write your answer on a separate sheet of paper.

	Α.	
/) It serves as the brain of computer.	
) Printed-circuit boards (also called interface	
	cards) that enable the computer to use a	
	peripheral device	
	Also called read/write memory	
	Small portable disk drive usually used for	
	backing up files	
	i) Main board of a computer	
) Also called diskette	
) Acts as a pointing device	
) Device that makes sounds, clips and any	
	audio materials be heard.	
) Component that reads and record data in	
	CDs and DVDs.	
	0)It is a visual device that displays the	
	information	
	1)Plug- and play portable storage device	
	2)Prints text and illustrations in paper	
	3)Converts AC into DC	
	4)Allows more than one program to run	
	concurrently	
\backslash	5)Handheld computer	
\setminus	, , ,	

В.

- a) Adapter
- b) CD-ROM
- c) CPU
- d) Flash Drive
- e) Floppy disk
- f) Microphone
- g) Monitor
- h) Motherboard
- i) Mouse
- j) Multitasking
- k) Optical Discs
- I) PDA
- m) Power supply
- n) Printer
- o) RAM
- p) Register
- q) ROM
- r) Speaker
- s) Tablet
- t) Zip Drive



SKILLS TEST

Direction: Listed below are some of the most important skills that you must gain in order to render quality service when you enter the real world of Computer Hardware Servicing. Read the skills carefully. Write "YES" if you are familiar with the skill and "NO" if not. Feel free to answer each skill. Write your answers in your notebook.

Skills in Computer Hardware Servicing		
I can open a computer case.		
I can connect the mouse.		
I can connect the keyboard.		
I can connect the monitor.		
I can apply occupational health and safety precautions while working.		
I can remove the system fan.		
I can detach the power supply from the system unit.		
I know how to remove the RAM from the motherboard.		
I can remove the hard drive from the system unit.		
I can install the power supply.		
I know how to install the motherboard.		
I can install the internal drives in a system unit.		
I know how to attach RAM in the memory socket.		
I can install CD / DVD drives.		
I know how to install an operating system		
I know how to configure a hardware components		
I know the procedures in inspecting operating systems and software components		





adapters - These are printed-circuit boards that enables the computer to use a peripheral device for which it does not have the necessary connections or circuit boards.

Analog Computers- It uses continuous variables for mathematical operations and utilizes mechanical or electrical energy.

Bridge is a device filters data traffic at a network boundary

Digital Computers- They use digital circuits and are designed to operate on two states, namely bits 0 and 1

Digital multimeter is a device that can take many types of measurements. It tests the integrity

Drivers- are small software programs that help the operating system use or "drive" the device

Ethernet switch is a device that gathers the signals from devices that are connected to it

hard disk drive- Is a magnetic storage device that is installed inside the computer.

hardware- These are the tangible component of a computer system.

hazard- Is a situation in the workplace that has the potential to harm the health and safety of people or to damage plant and equipment.

Hub- is a small, simple, inexpensive device that joins multiple computers together

Hybrid Computers- a combination of both digital and analog computers

Loopback adapter- is also called a loopback plug, tests the basic functionality of computer ports

Mainframe Computers- these are computers have the capacities to host multiple operating systems and operate as a number of virtual machines and can substitute for several small servers

Microcomputers- A computer with a microprocessor and its central processing unit it is known as a microcomputer

Minicomputers- are also called mid-range systems or workstations



motherboard- The main circuit board of a computer containing all the essential parts of a PC.

Network firewall - protects a computer network from unauthorized access

Personal Digital Assistants (PDAs)- is a handheld computer and popularly known as a palmtop

smart board - Type of display screen that has a touch sensitive transparent panel covering the screen.

static electricity - An accumulation of electric charge on an insulated body.

Servers- They are computers designed to provide services to client machines in a computer network





- ATA- Advance Technology Attachment
- BIOS- Basic Input Output System
- **CD-** Compact Disc
- **CHS** Computer Hardware Servicing
- CRT- Cathode Ray Tube
- ESD- Electro Static Discharge
- **DVD-** Digital Versatile Disc
- FAT- File Allocation Table
- **GB-** Giga Byte
- HDD- Hard Disk Drive
- LAN- Local Area Networking
- LCD- Liquid Crystal Display
- LED- Light Emitting Diode
- MB- Mega Byte
- NTFS- New Technology File System
- OHS- Occupational Health and Safety
- **OS-** Operating System
- PDA- Personal Digital Assistant
- **PPE-** Personal Protective Equipment
- **RAM-** Random Access Memory



ROM- Read Only Memory

SATA- Serial Advance Technology Attachment

USB- Universal Serial Bus

- **WAN-** Wide Area Network
- VGA- Video Graphic Array





Books and Articles and Printed Materials:

- 1. Barry Press, Marcia Press, PC Upgrade and Repair Bible,
 - a. Desktop Edition., Wiley Publishing Inc., 10475 Crosspoint
 - b. Boulevard, Indianapolis, IN 46256
- 2. Ron Gilster, **PC Repair Bench Book.**, Wiley Publishing Inc., 10475
 - a. Crosspoint Boulevard, Indianapolis, IN 46256
- 3. Barry Press, Marcia Press, PC Upgrade and Repair Bible, Desktop
 - a. **Edition**., Wiley Publishing Inc., 10475 Crosspoint Boulevard, Indianapolis,
 - b. IN 46256
- 4. K to 12 Basic Education Curriculum- Technology and Livelihood Education
 - a. Learning Module –Computer Hardware Serviciing- RONALDO V. RAMILO and
 - b. DEOVER M. PASCO
- Technology and Livelihood Education- Information and Communications Technology Learners Manual – Grade 7 & 8 - Marigen N. Leosala, Bobby P. Caoagdan, Ronaldo V. Ramilo, and Rosalie P. Lujero

Electronic Resources:

- 1. http://www.buzzle.com/articles/computer-memory-types.html Computer Memory Types
- 2. http://www.athropolis.com/popup/c-comp2.htm Measurements for Memory & Storage
- 3. http://www.ustudy.in/ce/hard/u1 Fundamentals of PC repair
- http://danreb.com/sites/default/files/CHS-NC2%20Reviewer%20-%20With%20Oral%20Questioning_0.pdf
 Occupational Health and Safety Precautions
- 5. http://puzzlemaker.discoveryeducation.com/CrissCrossSetupForm.asp **Puzzles for Activities**



- http://info.psu.edu.sa/psu/cis/kalmustafa/CISCO/Lecture%20Slides/ITE_PC_ v40_Chapter2.pdf
 Occupational Safety Precautions
- 7. http://www.youtube.com/watch?v=6N7bqBsFL0w-Computer Hardware Basics
- 8. http://www.wikihow.com/Install-Computer-Hardware-How to install Computer Hardware
- 9. http://www.directron.com/howtoupsys.html-How to install Computer components
- 10.http://www.bechtel.com/assets/files/Environmental/ToolboxSafetyTopics/20 10/ProperToolSelection.pdf **Tool Selection**
- 11.http://www.iml.uts.edu.au/assessment-futures/designing/assembling.html
- 12.http://www.instructables.com/id/Disassemble-a-Computer/- Computer Basics
- 13. www.professormesser.com PC Hardware, Networking ,Operating Systems and Troubleshooting

