Ethiopian TVET-System

INFORMATION TECHNOLOGY SUPPORT SERVICE

Level I

Based on May 2011 Occupational Standards

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Module Title: Connecting Hardware Peripherals
TTLM Code: ICT ITS1 TTLM09 0919 v1
This module includes the following Learning Guides

LG19: Confirm Requirements of Clients
   LG Code: ICT ITS1 L01- LG-19
LG20: Obtain Required Peripherals
   LG Code: ICT ITS1 L02-LG-20
LG21: Connect Hardware Peripherals
   LG Code: ICT ITS1 L03-LG-21
LG22: Connect Workstation to the Internet
   LG Code: ICT ITS1 L04-LG-22

Instruction Sheet	LG19: Confirm Requirements of Clients

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Introduction to computer and connecting peripherals
- Identify client requirements based on organizational standards
- Documenting and reporting client requirements and peripheral
- Taking action to ensure client support expectations

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:–

- Identify and confirm client peripherals requirements in accordance with organizational standards
- Document client requirements and peripherals needed in line with organizational standards and report findings to the appropriate person
- Verify client requirements with appropriate person in line with organizational standards and reporting procedures
- Take action to ensure client support expectations are covered by vendor warranty and support services

Learning Instructions:

1. Read the specific objectives of this Learning Guide.

2. Follow the instructions described below 3 to 6.

3. Read the information written in the information "Sheet 1, Sheet 2, Sheet 3 and Sheet 4, Sheet 5 " in page 3, 22, 29, 33 and 35 respectively.

4. Accomplish the "Self-check 1, Self-check t 2, Self-check 3 and Self-check 4, Self-check 5 in page 16, 27, 32, 34 and 37 respectively.

5. If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1 in page 18.

6. Do the "LAP test" in page 20, 28.

Information Sheet 1	Introduction to Computer and Connecting Peripherals

1.1. Definitions of Peripheral Devices

External or tangible devices which are attached to the external part of the computer system unit. Any device connected internally or externally to a computer system unit and used in the transfer of data as well as processing information. A personal computer or workstation processes information and, strictly speaking, that is all the computer does. Data (unprocessed information) must get into the computer, and the processed information must get out /displayed from the system. Entering and displaying information is carried out on a wide variety of accessory devices called peripherals, also known as input/output (I/O) devices. Any input, output or external storage device connected externally or internally communicate with the computer's processors is termed as peripherals examples, monitor, keyboard, printer, disk, tape, graphics tablet, scanner, joy stick, paddle or mouse etc.

1.2. Categories of Peripherals and Device Drivers

Peripheral devices can be categorized in to three (3), Input device, Output devices and Internal and external storage devices.

1.2.1. **Device drivers: -** It is a small program that tells the computer how to communicate with input/output (peripheral) devices. Every peripheral device needs device driver to communicate with the computer system.

1.2.2. **Input device** - is a device that has been used as a means of input. It is any peripheral (piece of computer hardware equipment) used to provide data and control signals to an information processing system such as a computer or other information appliance. The common input devices are keyboard, mouse, and scanner.

✓ **Keyboard -** The computer key board is used to input, or enter, letters, numbers, symbols, punctuations and commands into the computer. The standard keyboard layout is sometimes called QWERTY layout and it is the most common layout.

How keyboard works**: -** The keys are arranged in rows and columns. When a key is pressed, a unique row-and-column signal is generated and sent to the keyboard interface IC on the keyboard. The keyboard interface then converts the row-and-column signal into single byte code called a Key code or scan code. When the key is released, a second signal is sent to the keyboard interface IC, which generates a break code. The keyboard interface IC then sends the scan codes by means of serial connection through the keyboard interface to the computer. The keyboard controller, located on the motherboard, converts the signals to parallel data and generates an interrupt so that the input can be serviced by the microprocessor.

✓ **Mouse** or a **pointing device** is any human interface device that allows a user to input spatial data to a computer. In the case of mice and touch screens, this is usually achieved by detecting movement across a physical surface. Analog devices, such as 3D mice, joysticks, or pointing sticks, function by reporting their angle of deflection. Movements of the pointing device are echoed on the screen by movements of the cursor, creating a simple, intuitive way to navigate a computer's GUI.

There are three different types of mouse such as:-

✓ **Mechanical mouse**: - The mechanical mouse consists of a ball that rolls one of two wheels inside the mouse. This wheel contains a circle of holes or notches that allow a LED light to be shined through and detected by a sensor, as each wheel spins they represent the X or Y axis for the mouse pointer. This mouse is much more accurate than the traditional mechanical mouse that used only wheels and rollers, however is not as good as an optical mouse.

✓ **Optical mouse -** Computer mouse that utilizes light-emitting diodes (LED) or laser as a method of tracking movement. These mice are more proficient than other computer mice. These mice are easily identified by examining the bottom of the mouse. If the mouse has no ball or has a light emitting from the bottom it's most likely an optical mouse. This mouse is much more accurate than the ordinary optical mechanical mouse that relies on the traction between the mouse ball and the rollers. One drawback to an optical mouse is they can have problems in bright lights.   New optical mice no longer have the disadvantages of earlier mice and are capable of being utilized on any surface. In comparison to the traditional Optical-Mechanical mouse, the Optical is a much better solution for a computer mouse.

• **Scanner** is a device that can scan or digitize images on paper and convert them to data that the computer can use. They can then be stored in a file, displayed on the screen, added to documents, or manipulated.

Other input devices
Composite devices

- **Wii Remote with attached strap**

Input devices, such as buttons and joysticks, can be combined on a single physical device that could be thought of as a composite device. Many gaming devices have controllers like this. Technically mice are composite devices, as they both track movement and provide buttons for clicking, but composite devices are generally considered to have more than two different forms of input.

- ✓ Game controller
- ✓ Gamepad (or joy pad)
- ✓ Paddle (game controller)
- ✓ Wii Remote
- **Imaging and Video input devices**

Video input devices are used to digitize images or video from the outside world into the computer. The information can be stored in a multitude of formats depending on the user's requirement.

- ✓ Digital camera
- ✓ Webcam
- ✓ Image scanner
- ✓ Fingerprint scanner
- ✓ Barcode reader
- ✓ 3D scanner
- ✓ Laser rangefinder

- **Medical Imaging**

- ✓ Computed tomography
- ✓ Magnetic resonance imaging
- ✓ Positron emission tomography

✓ Medical ultrasonography
- **Audio input devices**

In the fashion of video devices, audio devices are used to either capture or create sound. In some cases, an audio output device can be used as an input device, in order to capture produced sound.

✓ Microphone
✓ MIDI keyboard or other digital musical instrument

- **Printer**

In computing, a printer is a peripheral which produces a text and/or graphics of documents stored in electronic form, usually on physical print media such as paper or transparencies. Many printers are primarily used as local peripherals, and are attached by a printer cable or, in most new printers, a USB cable to a computer which serves as a document source. Some printers, commonly known as network printers, have built-in network interfaces, typically wireless and/or Ethernet based, and can serve as a hard copy device for any user on the network. Individual printers are often designed to support both local and network connected users at the same time. In addition, a few modern printers can directly interface to electronic media such as memory cards, or to image capture devices such as digital cameras, scanners; some printers are combined with a scanners and/or fax machines in a single unit, and can function as photocopiers. Printers that include non-printing features are sometimes called multifunction printers (MFP), multi-function devices (MFD), or all-in-one (AIO) printers. Most MFPs include printing, scanning, and copying among their many features.

1.1.2. Output Device

An output device is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) to the outside world. In computing, input/output, or I/O, refers to the communication between an information processing system (such as a computer), and the outside world. Inputs are the signals or data sent to the system, and outputs are the signals or data sent by the system to the outside.

Examples of output devices are:-

- **Speakers**

Computer speakers range widely in quality and in price. The computer speakers typically packaged with computer systems are small, plastic, and have mediocre sound quality. Some computer speakers have equalization features such as bass and treble controls.

- **Headphones**

Headphones are a pair of small loudspeakers, or less commonly a single speaker, held close to a user's ears and connected to a signal source such as an audio amplifier, radio, CD player or portable media player. They are also known as stereo phones, headsets or, colloquially cans. The in-ear versions are known as ear phones or ear buds. In the context of telecommunication, the term headset is used to describe a combination of headphone and microphone used for two-way communication, for example with a telephone.

- **Screen (Monitor):-** A monitor or display (sometimes called a visual display unit) is an electronic visual display for computers. The monitor comprises the display device, circuitry, and an enclosure. The display device in modern monitors is typically a thin film transistor liquid crystal display (TFT-LCD) thin panel, while older monitors use a cathode ray tube about as deep as the screen size.

The first computer monitors used Cathode ray tubes (CRTs), which was the dominant technology until they were replaced by LCD monitors in the 21st Century.

Originally computer monitors were used for data processing while television receivers were used for entertainment. From the 80s onwards, computers have been used for both data processing and entertainment, while televisions have implemented some computer functionality. The common aspect ratio of televisions, and then computer monitors, has also changed from 4:3 to 16:9.

1.1.3. The storage devices

Computer data storage, often called storage or memory, refers to computer components and recording media that retain digital data. Data storage is one of the core functions and fundamental components of computers. There are 3 types of storage devices:

- **Primary Storage** – is also known as the main memory or a temporary storage device. It is fast in nature but can accommodate only few data. Data that has been stored in memory flushes off when you restart your computer, thus called temporary storage device.

  It is the only one directly accessible to the CPU. The CPU continuously reads instructions stored there and executes them as required. Any data actively operated on is also stored there in uniform manner.

- **Secondary Storage** – Secondary storage (also known as external memory or auxiliary storage), differs from primary storage in that it is not directly accessible by the CPU. The computer usually uses its input/output channels to access secondary storage and transfers the desired data using intermediate area in primary storage. Secondary storage does not lose the data when the device is powered down—it is non-volatile. Examples of a secondary storage device are Internal Hard drive, external Hard Drive, Flash Disk, CD/DVD, Floppy disk, Memory card.

- **Tertiary Storage** - Tertiary **storage** or **tertiary memory** provides a third level of storage. Typically it involves a robotic mechanism which will mount (insert) and dismount removable mass storage media into a storage device according to the system's demands; this data is often copied to secondary storage before use.
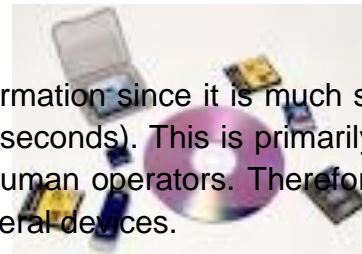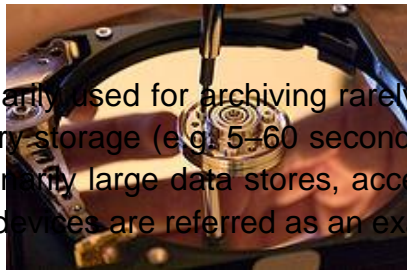
It is primarily used for archiving rarely accessed information since it is much slower than secondary storage (e.g. 5–60 seconds vs. 1–10 milliseconds). This is primarily useful for extraordinarily large data stores, accessed without human operators. Therefore, external storage devices are referred as an example of peripheral devices.

1.1.4. Connectivity devices

The majority of external peripheral devices connect to the back of the computer's system unit with cables and connectors. The computer's system unit has a variety of ports available for use by different peripheral device cables.

A port is a socket that is used to connect the cables from peripheral devices to the computer or the position to plug peripheral devices.

- **Ports**

A port is an interface on a computer to which you can a device. Personal computers have various types of ports. Internally, there are several ports for connecting disk drives, display screens, and keyboards. Externally, Personal computers have ports for connecting modem, printer, mouse, keyboard, and other peripheral devices. The types of ports are:-

- ✓ **Serial ports:** is the oldest technology that is used to connect some types of mouse, keyboard, and other peripherals. As the name indicates, this port sends data serially that is one bit at a time. A serial port is also called male port since it consists of protruding pins. Its transfer rate is close to 10KBS data.

- ✓ **Parallel Ports:** are used primarily for connecting printers to your system. Because of this it is called LPT (line print) port. It is also called female port since it consists of holes. Parallel ports generate speeds of 100KBS and reflect transfers 10 times faster than serial speeds.

- ✓ **USB (Universal Serial Bus):** USB is a high performance-networking standard based on serial bus architecture. Most new computers and associated peripheral devices like printers and scanners support USB. USB ports are used to connect just about any type of peripheral devices speed enhancements have greatly improved performance with USB 1.0 generating speeds at 14 MB/S and USB 2.0 attaining speeds of 480MB/S.
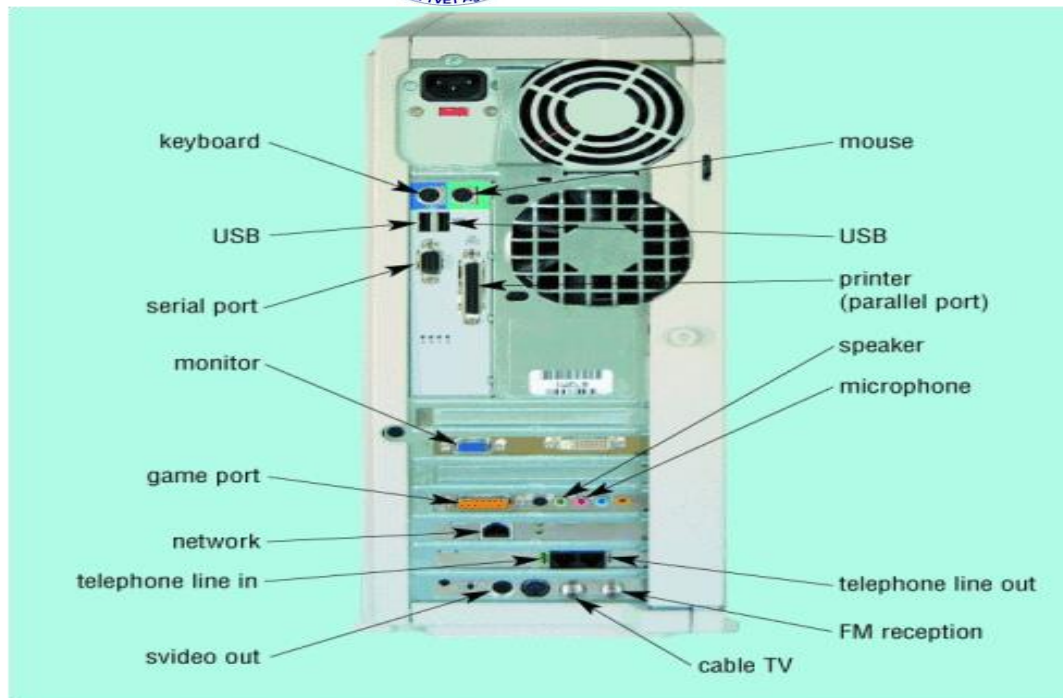
Figure: - Different types of ports at the back of system unit

There are several types of ports like serial port, parallel port, USB port, AGP port, power supply port and so on.

As the name suggests, the serial port transfers data serially one bit at a time. As a result, the serial port needs only wire to transmit 8 bits. The disadvantage is that it takes 8 times longer to transmit a byte. Also, it is necessary to send a start bit before each byte of data, a stop bit after the byte to mark the end of byte and a parity bit to help check the integrity of data. Serial ports come in the form of 9-pin or 25-pin male connector. Serial ports are often known as communication ports or RS232C ports. They are typically used to connect devices like old mouse and modem.

Parallel ports can send or receive a byte (8-bit) at a time. Unlike the serial port, these 8-bits are transmitted parallel to each other. Parallel ports come in the form of 25-pin female connector. Parallel ports are popularly used to connect printer, scanner, CD/DVD writer, zip drive, external hard disk drive, tape backup drive, etc.

To spare the user botheration of 8-pin, 25-pin, male, female connectors, the USB has been designed. It gives you a single, standardized, easy-to-use way to connect up to 127 devices to a computer. These devices include printers, scanners, mice, joystick, digital camera, web cameras, speakers, telephones, zip drives, network connections, scientific data acquisition devices, etc.


USB Port

The AGP (Accelerated Graphics Port) port is used to connect to graphic card that provides high-speed video performance typically required in games and other multimedia applications.

Alternatively referred to as an Ethernet port, the LAN port is a port connection that allows a computer to connect to a network using a wired connection. In the picture to the right, is a close up example of what a LAN port looks like for a network cable using an RJ-45 connector. In the case of this example, the two led lights will blink when that port is active and receiving activity.
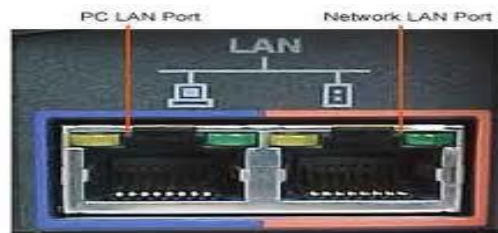

The PS/2 connector is a connector used for keyboards and mice to compatible computer 6-pin Mini-DIN connecting some a PC system. Its name comes from the IBM Personal System/2 series of personal computers, with which it was introduced in 1987. The PS/2 mouse connector generally replaced the older DE-9 RS-232 "serial mouse" connector, while the PS/2 keyboard connector replaced the larger 5-

pin/180° DIN connector used in the IBM PC/AT design. The PS/2 designs on keyboard and mouse interfaces are electrically similar and employ the same communication protocol. However, a given system's keyboard and mouse port may not be interchangeable since the two devices use a different set of commands. Today this connector has all but been replaced by USB.
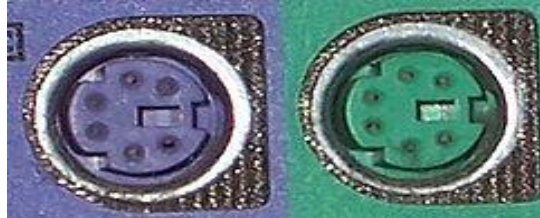
A power supply is a device that supplies electrical energy to one or more electric loads. The term is most commonly applied to devices that convert one form of electrical energy to another, though it may also refer to devices that convert another form of energy (e.g., mechanical, chemical, solar) to electrical energy. A regulated power supply is one that controls the output voltage or current to a specific value; the controlled value is held nearly constant despite variations in either load current or the voltage supplied by the power supply's energy source.

Every power supply must obtain the energy it supplies to its load, as well as any energy it consumes while performing that task, from an energy source.

A Video Graphics Array (VGA) connector is a three-row 15-pin DE-15 connector. The 15-pin VGA connector is found on many video cards, computer monitors, and some television sets. On laptop computers or other small devices, a mini-VGA port is sometimes used in place of the full-sized VGA connector.
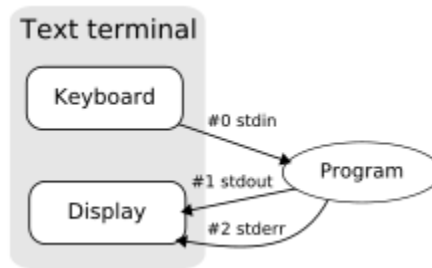
- **Terminals**

    A **computer terminal** is an electronic or electromechanical hardware device that is used for entering data into, and displaying data from, a computer or a computing system.

The function of a terminal is confined to display and input of data; a device with significant local programmable data processing capability may be called a "smart terminal" or fat client. A terminal that depends on the host computer for its processing power is called a dumb terminal or thin client. A personal computer can run software that emulates the function of a terminal, sometimes allowing concurrent use of local programs and access to a distant terminal host system.

✓ **Types of text terminals**

The **System console** is a text terminal used to operate a computer. Modern computers have a built-in keyboard and display for the console. Some Unix-like operating systems such as Linux, FreeBSD and Mac OS X have virtual consoles to provide several text terminals on a single computer.

A **terminal emulator** is a computer program in a graphical windowing system that lets the user operates a text terminal in a window. This lets applications for text terminals run under a modern graphical user interface. Popular terminal emulators include xterm and rxvt.

1.1.5. Connectors

- **CAT5 network cable** - This cable allows the computer to communicate to other computers over a network. It also provides networked computers access to the Internet.

- **VGA cable** - This cable is usually permanently connected to a monitor. Small screws hold the cable in place.

- **USB cable** - Most PC's now have these fast and versatile ports on the front and back. They can be used for portable storage devices, digital cameras, scanners, video cameras, printers, keyboards and mice - just about everything!

- **Power cord** - This is a standard "kettle cord" that connects the computer to the AC outlet on the wall and the power supply of the computer. This MUST be unplugged if you are ever doing any maintenance work inside the computer.

- **Printer cable** - This is a 25-pin "D" shaped connector that connects printers to the parallel port on a computer. (Newer printers may connect with a USB plug.)

- **PS2 cable** - On most computers these days, this connection is used for both the mouse and the keyboard. This plug has 6 pins.

- **Audio cable** – This is used to connect the speaker to the audio port.

Self-Check 1	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. What do you call the external or tangible devices which are attached to the external part of the computer? *(1 point)*
2. What is the small program that tells the computer how to communicate with input/output (peripheral) devices? *(1 point)*
3. Given the different computer peripherals, group them by writing each of it where categories they belong on the table below: *(1 point each)*

   a. Mouse
   b. Monitor
   c. Core i3 chip
   d. Printer Cable

   e. Serial cable
   f. Printer
   g. Scanner
   h. Speaker

   i. LCD Monitor
   j. PS2 cable
   k. Dual Core chip
   l. Keyboard

Input Devices	Output Devices	Internal Storage devices	Internal Storage devices

Note: Satisfactory rating – 12 points above / Unsatisfactory - below 12 points.
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Short Answer Questions

Operation Sheet – 1	Steps to Connect Hardware Peripherals

This procedure provides basic instructions for connecting the computer's external peripheral devices to the system unit. You will use these procedure/steps when interconnecting new computer peripheral device components that you have/had either assembled or purchased. I do not attempt to cover the connection of every conceivable peripheral, but the more common peripherals are as follows:-

1. **Connect power to monitor:** Attach the power cord to the back of the monitor and connect it to your power protection device.

2. **Connect monitor to case:** Attach the video cable to the monitor and to the system case. On modern systems the cable will have a male connector on both ends, each of which has 15 pins. Note that on some monitors, the data cable is integrated into the monitor itself instead of there being a detached cable. Some newer high-end monitors also may use five round BNC connectors to attach to the monitor instead of a D-shell 15-pin connector.

3. **Connect power to case:** Attach the power cord to the back of the PC and plug it into your power protection device.

4. **Connect keyboard:** Attach the keyboard to the back of the system case using the round connector. Depending on your system you will have either a large-diameter five-pin connector or a smaller six-pin connector. The connector is keyed and can only be inserted one way. On ATX systems, make sure you use the correct connector, because the keyboard and mouse connectors are the same size and shape.

5. **Connect mouse:** Attach the mouse to the back of the system case. Depending on your mouse you will have either a D-shaped 9-pin connector (serial mouse) or a small, round, six-pin connector (PS/2 mouse). If using a PS/2 mouse, make sure you use the correct case connector, because the keyboard and mouse connectors are the same size and shape.

6. **Connect phone line to modem (if applicable):** If your system has an internal modem in it, connect the phone cord to the appropriate jack. Most modems have two jacks; one is to connect the modem to the wall and the other is a "pass-through" for you to attach a phone to. You want to attach to the one that is normally labeled "Line" or "Wall" and connect the other end to your phone jack on the wall.

7. **Connect sound devices to sound card (if applicable):** If you have a sound card in your system, you will want to attach either your home stereo or your computer speakers to it, depending on which you are using.

8. **Connect printer (if applicable):** If you have a printer, connect the printer cable to it and then the other end to the parallel port on the back of the PC. This connector is D-shaped and will only go in one way.

9. **Connect other peripherals (if applicable):** Depending on your system you may have other peripherals you will want to hook up as well.

LAP Test	Practical Demonstration

Name: _____   Date: _____

Time started: _____   Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within --- hour.

A. Connecting Hardware Peripherals to System Unit

1. **Set the keyboard** directly in front of where you'll be working and set the mouse to the right if you are right-handed or to the left if you are left-handed. Run the keyboard and mouse cables to the back of the computer and plug them into the PS/2 ports, with the keyboard going into the left port and the mouse going into the right port. If the ports are placed vertically, there will be a keyboard icon and a mouse icon next to each port. If the keyboard and/or mouse are USB, plug them into the USB ports.

2. **Set the monitor** on your desk in front of the keyboard and plug the power cable into an electrical outlet. Plug the monitor cable into your video output port located on the back of your video card. If you have an integrated video card (the video output chip is part of the motherboard), then the video port will be located below the USB and PS/2 ports.

3. **Plug the network cable end into the jack** on the back of your network card, which should be located below your video card. The network cable end looks like a wide telephone line end, and the network port resembles a wide phone jack. The network cable end can only be inserted one way; with the push-to-release tab side going into the same side as the notch on the network jack.

4. **Plug the phone line into your modem, if necessary**:- the modem will have two ports that both fit the phone cable, but one will be marked "PHONE" and one will be marked "LINE." You want to plug the phone line into the "LINE" port. The "PHONE" port enables you to connect a phone into your computer, which you can use when not using the modem to connect to the Internet. If you have an external modem instead of an internal unit, you can plug the external modem cable into the serial port on your computer.

5. **Plug your printer into a free USB port** or, if your printer connects via a parallel plug, insert the parallel plug into the parallel port. The parallel port is a 25-pin trapezoidal plug that will be located near the PS/2 ports and serial port.

6. **Plug your speakers'** power cable into an electrical outlet and plug the sound cable into the speaker-out port on the back of your sound card. There will be up to three sound ports on the back of the sound card. These ports are commonly color coded, with the speaker-out port being green, the headphone or line-out port being orange or yellow, and the microphone input port being pink.

7. **Plug your webcam, camera**, external storage device and other assorted USB-interface peripherals into the USB ports, which will likely be located in several places on the exterior of your computer. USB ports can handle a wide variety of devices and are small and rectangular. The plug for a USB device is flat and rectangular and is about 12 millimeters in length. USB plugs can only be inserted into a USB port one way, so if it can't be inserted in one direction, **flip** the plug over and try again.

Information Sheet 2	Identifying and Confirming Client Peripherals

2.1. System Development Life Cycle

To determine appropriate hardware peripheral devices needed within an organization, it is important to clearly understand what your client needs. Since, the clients don't have a clear idea of what they want until they have been presented with a series of options. Working out clients' needs requires careful planning and organisation. The system development life cycle is a methodology that computer consultants often follow to help them properly investigate the client's information technology needs within the organization. The first three stages of the system development life cycle are:-

- Planning

- Analysing

- Designing

Planning stage involves identifying the client's current technology and taking into account any limitations. During the planning phase it is necessary to find out information including:

- ✓ System specifications

- ✓ Connections available

- ✓ Budget constraints

- ✓ Available timeframe

- ✓ Availability of physical space for work activities

A feasibility study can be performed to provide a preliminary investigation report to the client about benefits, costs and impact to the organisation. Additionally, a project request form allows a client to document their initial request.

System specification is important to find out the specifications of the computer system you are planning to connect the peripheral device to. Many newer types of peripheral devices require a specific amount of memory, CPU speed, hard disk space, and may only be compatible with certain operating systems. You also need to be aware of the peripheral's system requirements. The manual for the peripheral device as well as the manufacturer's website will help you determine the minimum system specifications.

2.2. Computer Peripherals Requirement Considerations

Desktop hardware, such as a desktop computer itself, is the most common type of IT hardware purchased by a small business and/or organization. The cost of hardware depends on its specification, which in turn is determined by some key components. When you buy hardware component of computer system, you will need to decide what the

specification of these key components should be under taken. Among these the basic ones are as follows:-

The processor is the driver of the computer. Processors are usually differentiated by speed, measured in gigahertz (GHz). The higher the GHz, the faster the computer will run. You should buy the fastest processor you can afford, but a 3 GHz processor will normally be enough for most business functions, e.g. word processing and spreadsheets, together with some multimedia.

Memory is used by the processor to run programs. Generally, the more random access memory (RAM) you have, the better your computer will run when using several programs at once. Your computer should have enough memory to make the most of the processor speed. For a 3 GHz processor, for example, you should have around 2-3 gigabytes (GB) of RAM.

The hard disk is used to store the data you create in your business, as well as the programs you use. Its capacity is much greater than the RAM. An office computer with a 3 GHz processor should have at least 200 GB of hard disk space, but if you intend to use a single desktop PC as the main storage location for all your business data, you will need at least 500 GB.

External plug-ins, such as DVD-R/RW, or CD-R/RW drives can be used to supplement your computer.

The monitor is the computer's display screen. Liquid Crystal Display (LCD) or flat screen monitors offer reduced bulk and lower power consumption, relative to cathode ray tube (CRT) monitors. Monitors are normally measured diagonally in inches - typically 19, 22 or 24. Larger or wide-screen monitors allow you to compare two documents on-screen. Many monitors have an aspect ratio - the proportion of image width to height - of 16:10, although screens with a 16:9 ratio are becoming more widely available and offer higher resolution.

Display adapter software requiring a better than average computer graphics display, like graphics editors and high-end games, often define high-end display adapters in the system requirements.

- **Software requirements**

    Software Requirements deal with defining software resource requirements and pre-requisites that need to be installed on a computer to provide optimal functioning of an application. These requirements or pre-requisites are generally not included in the software installation package and need to be installed separately before the software is installed.

- **Platform**

In computing, a platform describes some sort of framework, either in hardware or software, which allows software to run. Typical platforms include a computer's architecture, operating system, or programming languages and their run time libraries.

Operating system is one of the first requirements mentioned when defining system requirements (software). Software may not be compatible with different versions of same line of operating systems, although some measure of backward compatibility is often maintained. For example, most software designed for Microsoft Windows XP does not run on Microsoft Windows 98, although the converse is not always true. Similarly, software designed using newer features of Linux Kernel v2.6 generally does not run or compile properly (or at all) on Linux distributions using Kernel v2.2 or v2.4.

- **Web browser**

Most web applications and software depending heavily on Internet technologies make use of the default browser installed on system. Microsoft Internet Explorer is a frequent choice of software running on Microsoft Windows, which makes use of ActiveX controls, despite their vulnerabilities.

- **Other requirements**

Some software also has other requirements for proper performance. Internet connection (type and speed) and resolution of the display screen are notable examples.
Examples

Following are a few examples of system requirement definitions for popular PC games and trend of ever increasing resource needs:

For instance, while StarCraft (1998) needed:

- ✓ Windows 95 or NT or superior
- ✓ Pentium processor at 90 MHz or higher
- ✓ 16 MB RAM
- ✓ 80 MB available in the hard disk
- ✓ CD-ROM, 2x or higher
- ✓ DirectX 3.0 or higher

As a cost-saving consideration, for a small enterprise, getting the exact client specifications would be a good consideration but for a big enterprise, getting the high end hardware would be of great choice. Considering the future hardware trend would also be a deciding factor. If the price of a specific peripheral remains the same for a long period of time, you could consider buying a high end one since over time the price remains the same while you get a higher hardware performance. Otherwise, choose a medium range

peripherals or just exactly what your organization need since for a short period of time the price lowers so you could have an opportunity of upgrading it to a high end one in the future at a low cost. Another factor is what operating system are you going to use? Below are the hardware requirements for installing Windows XP and Windows 7:

- **Hardware Requirements for Windows 7 system**
    If you want to run Windows 7 on your PC, here's what it takes:

    - ✓ 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor
    - ✓ 1 gigabyte (GB) RAM (32-bit) or 2 GB RAM (64-bit)
    - ✓ 16 GB available hard disk space (32-bit) or 20 GB (64-bit)
    - ✓ DirectX 9 graphics device with WDDM 1.0 or higher driver

After you have determine your organization needs, you can now start documenting your hardware needs, to help you decide on the specifications, canvassing would be a great idea. There were several sites in the net where you can browse and compare the price of the different medium range to high end computer peripherals. One by one you can list down the hardware specs for your client. The list below will help you in documenting your chosen hardware:-

- ✓ Processor
- ✓ RAM or Memory
- ✓ Hard Disk size
- ✓ Video Card
- ✓ LAN Card
- ✓ DVD drive
- ✓ Sound Card
- ✓ Mouse
- ✓ Keyboard
- ✓ Monitor

One deciding factor to consider in buying computer peripherals is the warranty and after sales support service. A cheaper price would vary greatly on the performance, durability and warranty. Mostly, the cheaper it gets, the less durable and less warranty you could expect. Oftentimes, the good warranty and after sales service they provide, the better the quality of the products they have. Do not risk buying the cheaper one if you're not sure of the quality. After you have finalized your hardware specifications, you can now forward it to the right person for budget considerations and finally for procurement.

- **Budget constraints**
    While planning the connection of hardware peripheral devices, it is important to be aware of the client's available budget. A client needs to determine whether the benefits that will be gained from the peripheral device justify the financial

outlay. Factors including the organisation's size, the necessity of the peripheral device to the organisation, number of people requiring the device, will all contribute to the organisation's allocation of a budget. Costs will sometimes prohibit an organisation from proceeding with the purchase of equipment. Another cost to consider is ongoing maintenance. A laser printer, for example, may initially be more expensive to purchase than an inkjet printer. However when you consider that some inkjet cartridges can cost nearly as much as an inkjet printer, it may be more practical to choose a laser printer, where toner costs are more reasonable.

- **Available timeframe**
    The time available to complete a task also needs to be considered when identifying client requirements. If, for example, a peripheral device is needed urgently, it will be necessary to quickly find out which suppliers can immediately provide the peripheral equipment.

- **Physical space restrictions**
    Before considering acquiring any peripheral device, planning needs to be done to work out where and how the peripheral will reside. The following questions need to be considered:
    ✓ What physical space is available to accommodate the device?

    ✓ Are power points in a near proximity if the device needs them?

    ✓ If a peripheral does not have access to a suitable power source, problems may occur including the overloading of power boards and power leads causing dangerous obstructions to users of the equipment.

    ✓ Will the installation of the device mean other equipment needs to be relocated?

    ✓ Could the device cause disruption or impact on the safety of users?

Self-Check 2	Written Test

Name:-_____ Date: - _____

Instruction*:* Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. What are the three (3) stages of the system development life cycle? *(3 points)*
2. In planning phase, what five (5) information is necessary to find out? *(5 points)*
3. The processor's speed has been measured in what? *(1 point)*
4. How many processors speed in Ghz is needed for most business functions, e.g. word processing and spreadsheets, together with some multimedia*? (1 point)*

5. If you have 3 Ghz processor's speed, how much ideal memory (RAM) size you must have? *(1 point)*
6. An office computer with a 3 GHz processor should have at least how many GB of hard disk space? *(1 point)*
7. What can we use to supplement your computer's memory? *(1 point)*
8. Which monitor is better in terms of electric consumption? *(1 point)*
9. What are the 3 Software requirements needed in before buying a PC? *(3 points)*
10. What are the Hardware Requirements for Windows 7 operating systems in terms of: *(4 Point)*
    ✓ Processor
    ✓ RAM or Memory
    ✓ Hard Disk size
    ✓ Video Card

Note: Satisfactory rating – 18 points above / Unsatisfactory - below 18 points
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Short Answer Questions

LAP Test2	Practical Demonstration

Name: _____   Date: _____
Time started: _____   Time finished: _____

Instructions: You are required to perform the following individually with the presence of your teacher.

1. Showing the ports below, demonstrate what peripheral was needed for each port

2. Name 3 ports where mouse can possibly be connected to.
3. Give at least 4 peripherals that can be connected via USB ports.
4. What is the difference between Serial and Parallel ports?

Note: - Your teacher will evaluate your output either satisfactory or unsatisfactory. If Unsatisfactory, your teacher shall advice you on additional work. But if satisfactory, you can proceed to the next topic.

Information Sheet – 3	Documenting and Reporting Client Requirements and Peripherals

3.1. Feasibility study

A feasibility study can be carried out to show the client benefits, approximate costs of the new equipment and the impact on the organisation when documenting and reporting client requirements needs. Several hardware devices can also be recommended to the client. The aim of the feasibility study is to recognise the best solution under the circumstances by identifying the effects of this solution on the organisation. After undertaking a feasibility study, it may be discovered that a simple solution is possible. Take the example of an organisation that would like to update their monitors so that they can have better screen resolution. Changing the monitors' internal settings could be a very simple solution to obtain an improved resolution.

A feasibility study can also reveal that a client's peripheral requirements are not achievable. The requirements may exceed budget, or the requested peripheral devices may not be compatible with the current computer system. The results of a feasibility study can be determine whether or not an organisation proceeds with the purchase and installation of the peripheral devices based on client needs and organizational guidelines and standards.

- **Client Request Form**

  An initial request for hardware peripheral devices can be documented using a project request form. This form documents information from both the client and the computer consultant in order to document preliminary requirements. Typical information requested on a project request form includes:-

  ✓ Project title

  ✓ Date received

  ✓ Completion date

  ✓ Project number

  ✓ Description of problem

  ✓ Objectives

  ✓ Anticipated benefits

  ✓ Person requesting

  ✓ Constraints.

- **Sample Client request form**

Request date: Required

Request information:

First name: **Last name:**

Department or division: **Telephone:**

Email:

Client title:

Client information:

What is the purpose of the proposed client needs?

What are the benefits of the client requirements?

Other information or comments:

3.2. Analyzing

In the analysis phase, the client's requirements are investigated in more depth. It is important to try to gain as much information from the client as possible, in order to obtain an accurate understanding of the situation. Detailed client requirements, such as:-
- ✓ Specific features of the device required

- ✓ The number of people who will need to use device

- ✓ Support expectations

- ✓ Training requirements can all be obtained during this phase through, interviews, questionnaires, checklists and observations are some methods that consultants use to gather information. If a device is to be used by a large group of users, a questionnaire or checklist could be constructed to find out what features are required by the majority of users. Interviewing users can provide a better way of finding out specific information.

- **Interviews**

  A well-prepared interview can help provide you with valuable information about your client requirements. Information that has been collected during the planning stage can also give you some useful background information when preparing questions.

  Questions asked of a client may be specific or open ended. Specific questions generally mean that the client will give a yes/no response or a specific answer. Open-ended questions, however, generally commence with 'how' or 'why'. These types of questions help to discuss and clarify issues and establish a firmer understanding of client requirements. For example, some questions you may want to ask during an interview to replace an existing printer could include:-

  - ✓ How will a new printer solve existing printer issues?

  - ✓ Who will be using the new printer the majority of the time?

  - ✓ What will be the new printer key purposes? Eg. Letters, Advertising brochures, Information from the internet.

- **Questionnaires**

  Questionnaires are helpful when you need to gather information from a number of clients. A number of questions incorporating short answers, multiple choice and true/false choices can help you quickly determine what kinds of features the majority of clients are requiring.

- **Checklists**

  In a similar manner to questionnaires, checklists that ask clients to choose what features they would like from a specific peripheral device can also provide an efficient way to determine a set of popular requirements.

- **Observations**

  Even informal observations of current business procedures can provide another way of determining client needs. Observing users as they go about their day-to-day tasks can confirm, if current peripheral devices are not working properly or assessing the need for a new peripheral devices.

3.3. Designing

The design phase enables you to figure out an effective solution. All the information you have gathered via questionnaires, interviews, observations and during planning can be assessed to determine the best way of satisfying client requirements.

There will often be several peripheral devices that are capable of performing the job satisfactorily. An evaluation grid can be created to show the client each device's functionality.

Table3.1. the example below illustrates an evaluation grid that could be used for appraising scanners.

Specifications	Scanner 1	Scanner 2	Scanner 3
Price			
Optical resolution (dpi)			
Dimensions			
Operating system			
Software included			
Comments			

Once client requirements have been clarified, all requests for hardware peripherals need to be documented clearly in a concise form. An organisation will often have its own organizational standards (for example, report templates, guidelines) to which you will need to adhere. The documentation will also need to be checked and confirmed by the client before a request for purchase in sent to the preferred supplier.

Information Sheet 4	Verifying Client Requirements

4.1. Demonstrate client requirements in line with organizational standards

Verifying client requirements with appropriate person in line with organizational standards, guidelines and reporting procedures when demonstrating client requirement needs of hardware peripheral devices within different organization.

All users can test hardware peripherals, confirm client satisfaction and make amendments as required for client, in line with procedures and guidelines to demonstrate client requirements.

- **Ensure client support expectations**
  When it comes to client support, your clients have certain expectations which they expect you to meet consistently. They see you as a single point of contact for assistance in the utilization of the organization's computing resources, and to provide that assistance in a timely and professional manner. They expect you to provide:-
    - ✓ Connectivity
    - ✓ Hardware and software support
    - ✓ Consultation and training
    - ✓ General information and technology recommendations
    - ✓ Web-accessible information etc.

Your client expects that where equipment become defective that they will be fixed promptly. One way to fulfill this requirement is to know which pieces of equipment are under warranty so that the appropriate action may be taken.

Self-Check – 4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:-

1. Ensure client support expectations when connecting hardware peripherals? (4 points)

2. Demonstrate client requirements while connecting hardware peripherals? (4 points)

Note*:* **Satisfactory rating - 8 points   Unsatisfactory - below 4 points**

You can ask your teacher for the copy of the correct answers.

Information Sheet 5	Taking Action to Ensure Client Support Expectations

5.1. Agreements for Warranties and Support

Before acquiring hardware peripheral devices, it is vital to assess what kind of warranties, service and support, prospective suppliers will provide.

- **Warranties**

    A warranty is an agreed upon term which covers a computer or computer component. Generally, most computers have a 1 or 3 year warranty. This warranty may or may not cover the service, repair and replacement of computer parts.

    An extended warranty is an available option provided by manufacturers or third-party companies that provides additional support and/or repair of a computer or other hardware devices beyond its standard warranty.

- **Service and support**

    It is important to know what kind of support services are offered by the prospective suppliers. There are many questions to consider such as:

    ✓ If a device requires repairs does it have to be sent back to the supplier (called 'Return to base') or will they provide on-site visits?

    ✓ What is the average response time if service is required?

    ✓ What kinds of maintenance and repair costs could be incurred during the duration of use of the device?

    ✓ Will the device require regular servicing? If so, how many services will be necessary over a one-year period?

- **Summary**

There are a large variety of peripheral devices that can be connected to a computer for input, output, storage or communication purposes. Before acquiring any hardware peripheral device it is fundamental that you have a clear understanding of what the client requires and/or needs. This requires a considerable amount of planning and analysis of needs. Examining system specifications, checking availability of ports, physical space, and confirming budgets and time frames are just some considerations that need to be taken into account. Methods such as interviewing, questionnaires and observation can all assist gathering this information.

Once client requirements have been clarified, suggested solutions need to be documented to the client in accordance with organisational standards. A solution can comprise a suggested list of products. Once the product has been chosen this needs to be verified by the client. Before proceeding with the purchase, it is also important that the warranty and support agreements of the supplier will be satisfactory for the client's needs.

Self-Check – 5	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:-

Instruction: - Say true or false for the following question

1. It is important to know that support services are offered for the prospective suppliers of the equipments. (4 points)

2. Standard warranty and support services are not necessary for the users of hardware peripherals devices. (4 points)

Note*:* **Satisfactory rating - 8 points**   **Unsatisfactory - below 4 points**

You can ask your teacher for the copy of the correct answers.

List of Reference Materials

- **Winn L Rosch.** The Winn L. Rosch Hardware Bible (6th Edition).
- **Christopher A. Crayton Joel Z. Rosenthal Kevin J. Irwin**. The A+ Certification & PC Repair Handbook (Networking Series).
- **Richard Palmer.** Maintenance Planning and Scheduling Handbook, 2nd Edition (McGraw-Hill Handbooks).
- The A+ e-books and IT Essential Presentation and different URLs resources.

Instruction Sheet	LG20: Obtain Required Peripherals

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:-

- Obtaining peripherals

- Entering peripherals in to equipment inventory

- Delivering components and validating the contents that match the packing list

- Storing peripherals

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:-

- Obtain peripherals under instruction from appropriate person/clients

- Enter peripherals into equipment inventory according to organizational standards and procedures

- Validate that contents of delivered components and physical contents match the packing list and resolve discrepancies, if necessary

- Store peripherals according to vendor/manual guidelines of the organization

Learning Instructions:

1. Read the specific objectives of this Learning Guide.

2. Follow the instructions described below 3 to 6.

3. Read the information written in the information "Sheet 1, Sheet 2, Sheet 3 and Sheet 4 " in page 3, 7, 12 and 14 respectively.

4. Accomplish the "Self-check 1, Self-check t 2, Self-check 3 and Self-check 4 in page 6, 11, 13 and 18 respectively.

5. If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1 in page.

6. Do the "LAP test" in page 20.

Information Sheet 1	Obtaining Hardware Peripherals

1.1. Obtaining a Peripherals Devices

The first step in obtaining a peripheral device is to locate suppliers of that device. Then, there are factors you need to consider about the supplier and the devices on offer, such as support provided and purchase price. This will help you to compare and choose the most appropriate supplier and the exact model of the device according to client requirements. Finally, you are ready to place an order for your organisation or client to purchase the device.

- **Locating a supplier**

  There are many ways to find a supplier of peripheral equipment/devices. Some of the ways includes:-

  ✓ **Searching the Internet**

  The Internet provides different methods for searching for suppliers. Using search engines such as Google or Yahoo can help you find a hardware supplier anywhere in the world. Suppliers will often have their own websites that can provide you with catalogues of available equipment. Other ways to investigate suppliers are to follow links from a website such as a manufacturer's website, or to browse website directories that may be linked to search engine home pages.

  ✓ **PC magazines**

  Computing magazines often contain a large section devoted to advertising current hardware suppliers.

  ✓ **Newspapers**

  Major newspapers have computer/IT sections or classified advertisements which can be a source for finding suppliers.

  ✓ **Brochures/advertising material/ Media system/**

  Many larger hardware suppliers use television, radio or leaflet deliveries to inform potential customers of their latest hardware.

  ✓ **Telephone directory**

  A telephone directory is useful if you need to find a hardware supplier located within your local area.

  ✓ **Contacting the manufacturer directly**

  Manufacturers generally have their own websites. These may list major suppliers in your area. Emailing or telephoning the manufacturer may also be a way to find out names of local suppliers.

1.2. Choosing a supplier

With so many choices of suppliers available, how do you find the right one? There are a few factors to consider:-

- ✓ How long has the supplier been operating? It is a good idea to find a supplier who will still be around for the lifetime of the hardware.

- ✓ Does the supplier offer suitable support and training? If the client will be requiring a lot of additional assistance, training could be a major contributing factor for choosing a particular supplier.

- ✓ Does the supplier offer competitive pricing? Considering the support and stability, it is also important to weigh up these factors in relation to price. For a client with a strict budget, price may be a big issue when determining where to purchase hardware.

- ✓ Is the supplier a preferred supplier for your organization? Some organizations have arrangements that equipment must be purchased from suppliers who are considered to be the preferred provider for the organization. Organisations create these agreements because customer loyalty offers substantial discounts, extended warranties and additional support.

1.3. Selecting a peripheral

Once you have selected suitable suppliers you need to contact each supplier. Information you should find out from the supplier may includes:

- ✓ Model and manufacturer names of peripherals that will satisfy the majority of your clients requirements (including system specifications, physical dimensions, support)
- ✓ Price of each model
- ✓ Availability of each model.

You may find it helpful to keep a record of any details that you collect so you refer to this information quickly and easily.

1.4. Placing an order

Depending on the type of organisation you work for, placing an order for a hardware peripheral device could be done in a variety of ways. In a small organisation you may be responsible for ordering the device yourself. However, in a larger organisation there may be employees who are responsible for purchasing new equipment. You may need to fill out an order form that can be given to the purchasing department.

Before an order is submitted, it could also be necessary to obtain final approval from senior staff. Often an order form might require signatures from the manager or supervisor before it can be processed. A purchasing department might require written quotes from three suppliers, a recommendation and justification for the chosen supplier.

Make sure that you find out from your supervisor or manager what procedures you need to follow when placing an order within your organisation.

Sample of order form but it depends on the organization

From: _____

Date: _____

Code/Model	Quantity	Description	Price	Supplier Name

Delivery point: _____

Budget holder's signature: _____

Please return to the purchasing department

Self-Check 1	Written Test

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. Give the five (5) ways of locating a supplier. (5 points)
2. What are the four (4) factors in choosing a right supplier? (4 points)
3. After choosing the suitable supplier, what three (3) information you should find out from the supplier? (3 points)

Note*: Satisfactory rating – 10 points above / Unsatisfactory - below 10 points. You can ask you teacher for the copy of the correct answers.

Information Sheet 2	Entering Peripherals into Equipment Inventory

2.1. Hardware inventories

The purpose of a hardware inventory (or registry) is to keep detailed information about all the hardware equipment within an organization. Every piece of hardware, including each computer and peripheral device, should be recorded on the inventory. As well as providing an excellent quick reference guide to the organization's hardware, an inventory can be very useful for insurance, warranty and service purposes.

In order for an inventory to be a valuable source of information, it is vital that the information be maintained regularly. New devices need to be entered into the inventory as soon as they have been obtained. You must also adjust the inventory frequently, to delete hardware that is no longer functional or has been removed. Some organizations do random checks or yearly audits of their hardware inventories to ensure that all information is current.

There are a number of tools available to create hardware inventories. Databases and spreadsheets are often used to store the information. There are also software programs that you can purchase, designed specifically for recording hardware and software details. Although these programs are good for keeping a 'soft copy' of the information, it is also essential that you keep a current 'hard copy' (printed version) of the inventory. In this way, if the computer system ever fails you will still have the information.

Details that should be included within a hardware inventory includes:-

- Description of hardware device
- Manufacturer
- Supplier
- Model number
- Serial number
- Warranty or maintenance conditions
- Components
- Location
- Number and identity of authorised users
- Purchase price
- Date of purchase.

2.2. Documenting peripherals used with each computer

If the peripheral is an essential part of the computer system (for example mouse, keyboard or monitor) it is logical to record information about the device within the documentation for the computer to which it is connected. Individual computer inventories will often contain detailed information about the computer's related hardware and software. It may also be more practical to record information about the peripheral inside

the computer's record, if the device is also permanently connected to a computer (for example a printer or scanner).

Table2.1. Details of computer specification for Inventories

Manufacturer:	Dell
Model:	OptiPlex GX280MT Minitower—Power
Operating System:	Windows XP
Serial number:	12345
RAM:	128 Mb
Hard disk space:	160 Gb
Monitor:	Dell Ultra-Sharp™ 1905FP flat panel,
Printer:	HP LaserJet IID
Keyboard:	Dell USB keyboard
Pointing device:	Dell USB 2-button optical mouse with scroll

2.3. Individually documenting each peripheral device

If the device is shared between several computers, it makes more sense to keep information about the peripheral as an individual entry in an inventory. Devices such as digital cameras, data projectors and USB drives would more likely to be used by many computers, thus it would make more sense to record their details separate to the computer details for recording hardware inventory information.

Hardware Inventory Sample

Serial Number	1001
Hardware Device Description	Laser Printer
Manufacturer	Hewlett Packard
Model	Laserjet 1010
Supplier	Harris Technology
Date of Purchase	5/12/2004
Purchase Price	$375.00
Warranty Expiry Date	5/12/2005

2.4.   Checking Contents

When unpacking any peripheral device, an organized and methodical approach needs to be taken. Randomly ripping open boxes and packaging without carefully identifying each component can potentially cause many problems later on. Prepare a suitable work area before you begin unpacking. This should include a large sturdy flat area with no carpet so that small components will not be lost.

Before commencing to open any packaging, find the manual for the device. Check instructions for any precautions or specific unpacking procedures. Most manuals will also contain a section that tells you a list of included components. It is useful to create a checklist based on the component list. You will then be able to use the checklist to mark off the components when they have been identified. A sample checklist for a typical inkjet printer is as follows:-

- Printer
- Cartridge
- Power cable
- USB cable
- Sample paper
- CD driver

2.5. Be attentive when unpacking a peripheral device

Handle the packaging and contents with care, as you do not want to damage your new device. Remove any packing material surrounding and also within the device. Some printers, for example, have soft foam and plastic pieces inside the device to ensure that

parts are locked into the correct position. Make sure that you remove these pieces and foam before installation.

Inspect the equipment for damage that may have occurred during transport. If the equipment has been damaged, report the damage to the supplier immediately. If possible, try to keep all the original packing material that came with your computer and its peripherals. Often this packaging gets thrown out because it is so bulky. It can be very useful; however, if you need to return the item within the warranty period as some manufacturers will request original packaging. It can also be good protection when transporting sensitive peripheral devices. For example, equipment such as digital cameras, video cameras and data projectors have delicate lenses which can break very easily.

Self-Check 2	Written Test

Name: - _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. Explain the appropriate storage place when storing peripheral devices?
2. Explain the effect of unappropriated work place when storing peripheral devices?

Note: **Satisfactory rating - 3 points   Unsatisfactory - below 3 points**

You can ask your teacher for the copy of the correct answers.

Information Sheet – 3	Delivering components and validating the contents that match the packing list

3.1. Preparing peripheral devices that compatible with the system

There are a large variety of peripheral devices that can be connected to a computer system unit as an input, output, storage or communication purposes with different technological standards. Before acquiring any hardware peripheral device it is fundamental that you have a clear understanding of what the client requires and devices compatibility with the system as well as with the current technological era. This requires a considerable amount of planning and analysis of needs of clients by considering and validating the peripheral devices that used by the clients based on the organization standards and guidelines. Examining system specifications, checking availability of the position to plug peripheral devices (ports), physical space, and confirming budgets and time frames are just some considerations that need to be taken into account. Therefore, methods such as interviewing, questionnaires and observation can all assist gathering this information for validating the contents that much the packing list of peripheral devices.

Once client requirements have been clarified, suggested solutions need to be documented to the client in accordance with organisational standards and guideline. A solution can comprise a suggested list of products. Once the product has been chosen this needs to be verified by the client. Before proceeding with the purchase, it is also important that the warranty and support agreements of the supplier will be satisfactory for the client's needs and performing the best task within any organization.

Self-Check 3	Written Test

Name: - _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. What do you need to have to have detailed information about all the hardware equipment within an organization with regarded to the listed/asked peripheral devices? (10 point).

2. Explain the way of validating peripherals that compatible with any computer system that to be used at work place? (5%)

Note*: Satisfactory rating - 3 points**   **Unsatisfactory - below 3 points**

You can ask your teacher for the copy of the correct answers.

Information Sheet – 4	Storing Peripherals

4.1. Storing Peripheral Devices

Peripheral devices need to be located in a suitable environment; otherwise there may be potential problems. It is a good idea to refer to the manufacturer's manual to determine what guidelines should be followed. When storing peripherals it is important to:-

1. Make sure equipment is kept in ideal working conditions

2. Adhere to current occupational health and safety guidelines

3. Ensure the electrical safety of the device

4. Consider security of the device

- **Keeping equipment in ideal working conditions**

  Each manufacturer will have their own recommendations on how to store their peripheral equipment. In order to guarantee that a peripheral will function correctly throughout its life it is important to follow guidelines that have been recommended by the manufacturer. Some common recommendations may include:-

- **Keep equipment in the correct position**: - After unpacking, most devices will usually have a proper resting position. If a device is not kept in its natural position, there could be problems when trying to operate the device later on. For example, when a printer is stored in a vertical position, components such as the ink cartridges could leak or be dislodged.

- **Keep equipment away from weather, dust and other harmful material**- When finding a storage location, consider what kind of elements the device may be subjected to. If, for example, you store a USB drive in a cabinet next to chalk, dust from the chalk could potentially damage the storage device's USB connection.

- **Do not expose equipment to extreme temperatures and high humidity**:- Sudden changes in temperature can cause condensation in many peripheral devices. For instance, if a video camera is taken from a cold place to a warm place, condensation may form on the lens and internal parts.

- **Avoid storing the device in direct sunlight**:- Exposure to direct sunlight could damage many of the external components of a device as well as subject the device to high temperatures.

- **Do not expose equipment to water or moisture**: - If water gets inside many peripheral devices there is a risk of electric shock.

- **Adhering to OH & S guidelines**

When positioning peripherals in their permanent locations it is important to take into account many OH&S considerations as follows
.
- **Positioning of the monitor**

  It is essential to position a monitor correctly to ensure it will suit the needs of the user. Tips include:-
  - ✓ Try to make sure that monitor is in a position away from the glare of sunlight.

  - ✓ Check that the brightness and contrast controls of the screen have been adjusted to suit lighting conditions in the room.

  - ✓ The top of the screen should be the same level as the user's eye level.

- **Positioning of the keyboard**

  A keyboard also needs to be positioned carefully to be of adequate comfort and safety for the user. Some tips include:
  - ✓ Position the keyboard directly in front of the monitor and at the same height as the mouse.

  - ✓ The keyboard should allow the user's forearms to be parallel to the floor.

  - ✓ Allow space for the computer user to rest their wrists.

- **Positioning of other equipment**

  Some general Occupational Health and Safety guidelines to consider when positioning other peripheral equipment/devices are:
  - ✓ Make sure that you can reach the peripheral device and its components without having to strain your back.

  - ✓ Place equipment such as scanners and printers at a suitable height so a user is easily able to reach paper trays, open scanner lids, etc.

  - ✓ Make sure that equipment such as speakers is easily accessible if settings such as volume control need to be changed.

- **Ensuring electrical safety**

  Some tips to ensure electrical safety are:-
  - ✓ Do not be tempted to add too many extension cables or double socket adapters to your existing electrical sockets.
  - ✓ Never use damaged plugs or leads.

  - ✓ If possible, ask an electrician to check the safety of your system.

  - ✓ Position electrical leads where they will not cause tripping hazards to people.

- **Physical security of devices**

In many situations it is important to consider the physical security of the peripheral devices. Some devices, such as digital cameras, data projectors and USB drives, may not

be permanently connected to a computer so it will be necessary to find a secure location to store the device. Make sure that these kinds of devices are secured in a lockable storage cupboard, cabinet or safe when not required. Some organisations install security devices onto desks to guarantee that computers are secure and will not be able to be taken from their position unless unlocked.

- **Storing consumables**

The term 'consumables' refers to a product that is used once and then replaced. Examples of consumables include printer cartridges, CDs, paper and simple computer accessories. As well as for computer equipment, consideration also needs to be given to the way consumables for peripheral devices are stored.

- **Ink cartridges and toner**

Make sure to store cartridges/toner in a cool dry place, away from sparks and open flames, with adequate ventilation and do not expose the device to high temperatures. Also ensure that the cartridges are not taken out of their packaging until they will be used within the printer, as the ink will dry out before use.

- **CD/DVDs**

When possible, make sure that CDs are kept in their protective case, to minimise the chances of being scratched. Also keep them out of direct sunlight and extreme temperatures**.**

- **Summary**

There are several steps that you must go through when you obtain a peripheral device. The first step involves working out where to obtain the device, whether it is from a supplier who regularly provides equipment to the organization, or a supplier found from searching the Internet, magazines or telephone directory.

Depending on the organization, placing an order for a device may be done in different ways. Some smaller organizations may not have strict guidelines, while larger organizations may have strict procedures that need to be followed.

Once the device has arrived it is always a good idea to keep a record of the device in a hardware inventory. Recording details such as manufacturer, supplier, model, date of purchase and purchase price, can be very useful — especially if you need to send a device back within the warranty period.

It is also a good idea to unpack the contents in an organized manner. Find a clear space to unpack contents and create a checklist of equipment that should be supplied.

Once the device has been unpacked, storage is another consideration. Make sure to look at the manufacturer's guidelines, consider the security of the device and any occupational health and safety issues.

Self-Check 4	Written Test

Name: - _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. What do you need to have to have detailed information about all the hardware equipment within an organization? **(1 point)**
2. What are the two (2) common tools to create a hardware inventories? **(2 points)**
3. Give at least six (6) details that should be included in hardware inventory. **(6 points)**
4. What are the four (4) important considerations when storing the hardware? **(4 points)**
5. What are the five (5) steps in obtaining a peripheral device? **(5 points**

Note: Satisfactory rating – 17 points above / Unsatisfactory - below 17 points. You can ask you teacher for the copy of the correct answers.

Answer Sheet

<div style="border: 1px solid black; display: inline-block; padding: 10px;">

Score = _____

Rating: _____

</div>

Name: _____   Date: _____

Short Answer Questions

LAP Test	Practical Demonstration

Name: - _____ Date: - _____

Time started: - _____ Time finished: - _____

Instructions: You are required to perform the following individually with the presence of your teacher.

Scenario: You have already selected a supplier of computer peripherals. You are going to place an order of the peripherals per piece. It will be assembled later by the company technician. You can decide on the specs of it.

Fill up an order form below

From: _____

Date: - _____

Code/Model/Serial number	Quantity	Description	Price	Supplier Name

Delivery point: - _____

Budget holder's signature: - _____

Make an inventory of all the delivered items. (Just choose one item for the purpose of this activity)

Details for an Office Computer

Manufacturer:	
Model:	
Operating System:	
Serial number:	
RAM:	
Hard disk space:	
Monitor:	
Printer:	
Keyboard:	
Pointing device:	

Note: - Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory, you can proceed to the next topic.

Instruction Sheet	**LG21: Connect Hardware Peripherals**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Verifying timeframe for installation, environmental consideration and OH&S standard
- Removing and replacing old peripherals
- Connecting and configuring computers to accept the new peripherals
- Testing and confirming hardware peripherals

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to –

- Verify timeframe for installation schedule with the client in accordance with the organization requirements
- Remove and/or replace old peripherals with minimum disruption to clients taking into account environmental considerations and OHS standards
- Connect new peripherals with minimum disruption to clients and taking into account the operating system procedures
- Configure the computer to accept the new peripherals
- Test hardware peripherals and confirm client satisfaction, particular attention must be paid to possible impact on other systems and adjustments are made as required.

Learning Instructions:

7. Read the specific objectives of this Learning Guide.

8. Follow the instructions described below 3 to 6.

9. Read the information written in the information "Sheet 1, Sheet 2, Sheet 3 and Sheet 4 " in page 3, 7, 11 and 18 respectively.

10. Accomplish the "Self-check 1, Self-check t 2, Self-check 3 and Self-check 4 in page 6, 10, 17 and 21 respectively.

11. If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1 in page 11.

12. Do the "LAP test" in page 17.

Information Sheet 1	Verifying timeframe for installation, Environmental Consideration and OH&S standard

3.1. Installing hardware peripherals based on timeframe, environmental consideration and OH&S standard

One of the most important considerations when installing a new hardware peripheral is to try and install the device with the least amount of timeframe for installation, environmental consideration and OH&S standards. A client may not be very happy if you install a piece of hardware equipment while they are creating an urgent report, if may take time to install it the peripheral devices and also the interconnection of the devices create un-proper/un-safe/ working condition at the work place within any organization. It is important to schedule installation time and OHS standards that are:-

- Also suitable to the client's or computer user's
- Sufficient length to install and thoroughly test the hardware device and
- Create attractive working place for the clients

To achieve this, make sure that you are aware of:-

- Common organizational procedures/guideline/ that regularly need to be performed on the computer (for example, end of month processing or weekly backups) and plan installations outside these periods and the way to create save work place.
- Current working condition, deadlines and schedules of the client/user. Therefore, the installations and the OHS standards should be scheduled for the times such as:
  - ✓ Quiet periods (for example, during holiday periods)
  - ✓ Before or after normal office hours
  - ✓ While the client/user is out of the office
  - ✓ When the client will not need their computer.

3.2. Environmental Consideration

It can be difficult to work out how long it will take to install a peripheral device. It will vary according to the type of device, current environmental consideration, problems requiring troubleshooting and the experience of the installer/technicians/. If you will be regularly performing installations, keeping a log of installations, nothing that create disruption to the users are required and problems experienced, could help to estimate the time spent on future installations and create safely work place at any organization.

Once you have arranged a suitable time, make sure you adhere to it or give advanced notice if you will be delayed. Remember that clients may have scheduled their daily workload around the installation.

Also consider the timeframe expected by client when installing new hardware peripherals. If you work for a busy organization it may be necessary to work out a daily to-do list. Order tasks with priority given to installations that perform critical functions or have been waiting to be done for the longest amount of time for installation.

3.3. User Safety and OH&S standard Consideration

The user safety and OH&S standard consideration is most important issues when removing/installing peripheral devices to the system unit. Some of the following safety issues are as follows:-

- **Electrical Safety**
  - ✓ connected to 240V mains supply
  - ✓ Always turn off power at point and disconnect the power connection
  - ✓ Avoid over loading power board/point
  - ✓ Make sure power boards have safety switches
  - ✓ Make sure no fluid around where peripheral device is stored, installed used

- **User Safety when handling/removing peripherals**
  - ✓ Make sure sufficient room for unpacking
  - ✓ Ensure enough lighting to see what doing, read manual
  - ✓ Check weight before lifting to safe lifting procedures
  - ✓ Clear space to put peripheral down

- **User Safety when placing/storing peripherals**
  - ✓ E.g. monitor can't be placed in a place reflecting light
  - ✓ Route cables and power leads so they
  - ✓ Can reach connection point wont being danger of trod on/rolled over by chairs
  - ✓ Consider HOW USER will use frequency placement

- **Care of Peripherals – handling/moving**
  - ✓ Read manual for any special precautions e.g. temp, stance
  - ✓ Things that can damage a peripheral: sudden shock, fluid spills, humid/dusty environs, power turned on/off quickly.

- ✓ Electrostatic Discharge: wear earth strap: static builds in body e.g. from walking across carpet on dry day – high voltage discharge can occur if touch earthed device

- **Peripheral care when placing and storing peripherals**
  - ✓ Consult MANUAL
  - ✓ Enough ventilation? Free from fluid? Is this area subject to sunlight any other time? Are people likely to store things on top of peripherals such as vibrations/ventilation problems
  - ✓ Cables placed so user doesn't trip?
  - ✓ Any consumables required e.g. toner

Self-Check – 1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. When is the best time to schedule hardware installation? Give four (4). (4points)
2. What must be done after the installation of hardware peripherals? (4 point)
3. Advantages of applying OHS at work place when installing peripheral devices? (4 point)

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____
Short Answer Questions

Note: Satisfactory rating - 3 points   **Unsatisfactory - below 3 points**

You can ask your teacher for the copy of the correct answers.

Information Sheet 2	Removing and Replacing Old Peripherals

3.2. Removing and connecting /installing/ old peripheral devices

All computer users important to understand safely connect hardware peripherals devices according to vendor instructions with a minimum of down time to the system and ensure that you adhere to the OH&S regulations relating to working with electrical equipments as well as environmental consideration like dust, temperature, humidity, electric system, working tables and so on.

- **Connecting Peripherals**
  - ✓ Connect the hardware
  - ✓ Install the software drivers
  - ✓ Test the peripheral

- **Peripheral Software Drivers**
  - ✓ Driver software: allows computer to recognize new hardware
  - ✓ windows has it for common hardware e.g. modem
  - ✓ if comes with 'disk' use it as it is more recent
  - ✓ if on internet check 'readme.txt' file first – latest drivers
  - ✓ peripheral manual guides to installation process OR 'control panel'

- **Installing the Drivers for Peripheral Configurations**
  Drivers for monitors on windows drivers otherwise you wouldn't be able to see. But if specific, install by:-
  - ✓ **Plug and Play**
    Computer will recognize new device when turned on and connected → on-screen wizard – choose between automatic/manual installation.
  - ✓ **Automatic detection**
    If monitor not plug and play compatible → **Control panel**
    Double click on 'install new hardware.
  - ✓ **Manual Detection**
    If select 'no' to automatic detection, you will be asked to choose type of device, If have a software driver click 'have disk' , Installation will proceed, then **backup** any system files changed during installation 'readme.txt/ file contains.

Operation Sheet – 1	Removing or replacing old peripheral devices

Table 3.2. You will be assessed using the checklist below either removing or replacing old peripheral devices

Student Name:	Device 1	Device 2	Device 3	Device 4	Device 5 etc.
List the name of each device under each heading:					
Did the students:					
• Verify the timeframe for installation schedule with the client					
• Remove old peripherals if they are being replaced with minimal disruption to clients, taking into account environmental considerations and OH&S standards					
• Connect new peripherals with minimum disruption to clients, taking into account operating system procedures					
• Configure the computer to accept the new peripherals					
• Test hardware peripherals and confirm client satisfaction, pay particular attention to possible impact on other systems and make adjustments as required					
• Safely connect hardware peripherals according to vendor instructions with a minimum of down time to the system.					
• Competency is required in the connection of five different peripherals.					
• Interpret vendor manuals in relation to the storage and connection of hardware peripherals					
• Adhere to OH&S regulations relating to working with electrical equipment					
• Decision making in a limited range of options					

• Literacy for general workplace documentation					
• Problem solving skills for a defined range of predictable problems					
• Plain English literacy and communication skills in relation to analysis, evaluation and presentation of information					
• Facilitation and presentation skills in relation to transferring and collecting information					
• Negotiation skills in relation to other team members and applied to a defined range of predictable problems					

Self-Check – 2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:-

Part I: - Say true of false for the following questions

1. Plug and play peripheral devices needs automatic configuration.(2 points)
2. Optical mouse and keyboard is PnP devices. .(2 points)
3. PS/2 ports are used to plug wireless mouse and keyboards. .(2 points)

4. A device driver supports installing and configuring peripheral devices. .(2 points)
5. Testing is the basic tasks in peripheral device connection. .(2 points)

<div align="center">

Answer Sheet

</div>

Score = _____
Rating: _____

Name: _____   Date: _____

Short Answer Questions

Note*:* **Satisfactory rating – 10 points   Unsatisfactory - below 5 points**

You can ask your teacher for the copy of the correct answers.

Information Sheet 3	**Connecting and configuring computers to accept the new peripherals**

3.3. Connecting and configuring hardware peripheral devices

With the large variety of computer systems, operating systems, peripheral device types and features, and manufacturers, each peripheral device will have its own individual installation procedures. It is important to refer to manufacturer guidelines and manuals when installing any hardware device to ensure that all procedures are correctly followed.

Procedures which are generally followed when installing any new peripheral device include:

- Plugging in the cables between the device and computer system
- Installing driver software for configuration
- Troubleshooting device installation when necessary
- Customising the device and updating drivers
- Testing the device for satisfying required conditions of clients

Whenever you install a hardware peripheral device, you may also have to install a driver depending on types of devices. A device driver is a software program that allows the hardware device to talk to the operating system and create an interface between users and devices.

Generally, device driver software will be included within the packaging of a new device. Sometimes operating systems, such as Windows XP, Windows 7, automatically provide their own drivers if you don't provide one. At times it may be necessary to find a newer version of a driver than the one that has been provided by the manufacturer. It is a good idea to regularly check the manufacturer's website to see if any new drivers have been developed for the specific peripheral devices.

Plug and play is a hardware technology that enables many operating systems to automatically recognise new hardware devices and configure them automatically. Most USB devices support plug and play (PnP devices).

✓ **Plugging in the cables between the device and computer system**

To make your computer work, you need to connect all the hardware peripherals to the ports at the back of the system unit case. Before connecting all the peripherals to its corresponding ports, check it that the power cord was unplug into the power source to prevent electrical related injury. You should be able to connect the Mouse, Keyboard, Monitor, Printer, Scanner, Speaker and power up your computer by connecting the power cord to the power supply.   After doing so, you can now start using your computer. Some examples as follows:-

✓   Before powering up your PC, make sure that the power cable was connected to the power supply

To do it, you connect the monitor by using the VGA cord connector to the port
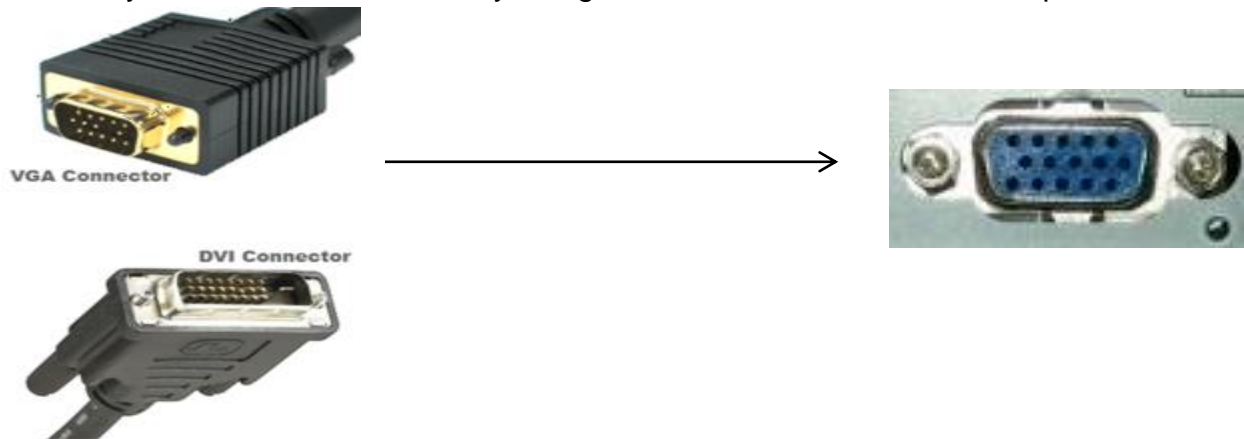
**Comparison of VGA and DVI connectors**

Monitors will either have a VGA or a newer DVI plug (see picture, as they are a lot less apparent than PS/2 / USB by comparison). Most monitors use VGA connectors, and so most graphics cards have VGA output. If you have one type of plug and the graphics card has another, you can easily buy an adapter. Some cards even come with one.
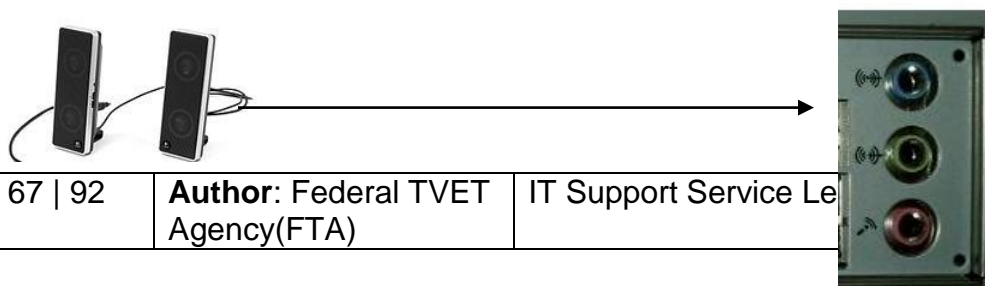
✓ **Connecting Mouse and Keyboard**

There are two standard connectors for mice and keyboards; PS/2 connectors and the more modern USB connectors. Plug the mouse and keyboard in the appropriate slot.

PS2 Cable

✓ To connect the scanner to the PC, you will use also use the USB cable.
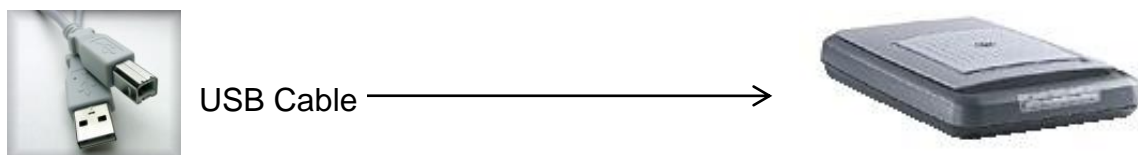
USB Cable ⟶

✓ For audio devices such as speaker or headset, you can connect it o and Mic

Speaker/headset

Mic ────────────────────────►

✓ To connect the Printer to the PC, you will use the cable below via printer port. A USB able is now also being use to connect the new printer to the computer especially the colored and laser printer.

- **Steps to installing and configuring a printer**

   Printer cable

Step1. Obtain the correct printer cable

In many cases a printer won't automatically have a cable included with the original purchase. Check the printer specifications; you will probably need to buy either a parallel or USB cable.

Step2. Plug in the cable

✓ Turn off the power of both printer and computer system

✓ Plug the printer cable into the correct port of the computer but depending on the type of printer the port will most likely to be either a USB or a parallel port located on the back of the computer system. If you are plugging the cable into a parallel port connection you will need to secure the cable by either tightening small screws or snapping in wire connectors.

Steps3. Install ink cartridges of printers

Depending on the printer you have you may need to install an ink cartridge (for inkjet printers) or toner cartridge (for laser printers). Turn the computer's power on and follow the manufacturer's guidelines to install a new cartridge.

Steps4. Install the printer driver

At some point the computer will either recognise that new hardware has been installed (for example if the operating system is plug and play compatible) or you will need to tell the computer that a new device has been added. In other case, you will work at some stage be asked for the printer model and a printer driver. Make sure you install the printer driver at this stage. Sometimes the installation CD will automatically run, installing the printer driver at the same time.

Steps5. Print a test page

Often at the end of the driver installation you will be asked if you would like to print a test page. This is a good idea because you can quickly determine if the printer is working correctly. If not you can troubleshoot the installation.

Steps6. Troubleshoot printer installation (when necessary depends on its type)

If a page is not able to print it is necessary to go back and determine why the printer is not working. There are a number of factors that can contribute to printer problems including these:-
- ✓ Cables between printer and computer are not properly connected
- ✓ Printer driver is not suitable for the current operating system
- ✓ Paper is loaded incorrectly
- ✓ Ink cartridge or toner is not correctly installed
- ✓ Printer power switch is off and so on

- **Suggested solutions for common printer problems**
  A blank page is coming out of the printer
    - ✓ You may have run out of ink or toner. Replace ink cartridge or toner.
    - ✓ Make sure that your printer has been set to the default setting.

- **The document is printing on the wrong part of the page**
    - ✓ Check that you have aligned printer to the correct orientation (portrait or landscape).
    - ✓ Make sure the margins have been set correctly in the software program you are using (eg the word processor or desktop publishing package).
    - ✓ Make sure that the paper has been loaded correctly.

- **The quality of the printout is poor**
    - ✓ If the printer is an inkjet the heads of the ink cartridge may need to be cleaned.
    - ✓ Some printers have software that allows you to change the quality of the printout from draft to best quality.

- **Customizing the printer**
  Depending on your client's needs, there may be a need to alter the default printer settings. Some settings that may be customised include:
    - ✓ Changing the page layout: - a page may need to be printed in either landscape or portrait orientation.
    - ✓ Changing the paper source/size/:- depending on the complexity of the printer there may be a variety of trays the printer has available to use.
    - ✓ Changing the print quality:- depending on the printer use, a client may require best, normal or draft quality of print.

✓ Setting the default printer:- if there is more than one printer attached to a computer, you may need to change the settings so that the newer model is considered the default model.

- **Installing a scanner**

Scanners can attach to a computer generally via a USB or a parallel port connection.

Steps1. **Turn off the computer and position the scanner**

Before commencing installation, turn of power to the computer and place the scanner on a level surface, close enough to the computer so that the cable will be able to attach to both devices.

Steps2. Unlock the scanner

Many scanners have a lock on the bottom to make sure that components are not dislodged when transporting. Make sure that you unlock the scanner before commencing installation.

Steps3. Plug in the cable

Plug the cable into either the USB or parallel port connection, depending on the type of scanner.

Steps4. Turn on the scanner

Some scanners will have a power cord that will need to be plugged into a power outlet. Other scanners are dependent on power from the computer. Some scanners will also have an on/off switch, which will also need to be turned on.

Steps5. Turn on the PC

When you turn on your computer, most operating systems will recognise that new hardware has been added (eg it is plug and play compatible). If it hasn't recognised the new scanner you may need to tell your computer that a new device has been added.

Steps6. Insert the scanner driver

At some point you will be asked if you have a disk for your scanner. This generally means the computer is requesting you provide it with the disk containing the driver software.

Steps7. Scan a test image

✓ Ensure that the scanner is working by performing a scan of a book or magazine page.

Steps8.Troubleshoot scanner installation (if necessary), suggested solutions for common scanner problems are:-
  ✓ Scanner making a clicking sound
  Check that the scanner lock is in the unlock position.
  ✓ Unable to scan anything
  Make sure that the scanner is plugged in and all cables are connected properly.
  ✓ Customize the scanner

Many scanners will also have extra software you can use for scanning. Check the scanner manual to see whether your scanner has additional software. Install the additional software and it will probably be useful for scanning text and performing basic image editing functions. The software may also allow you ability to adjust settings such as dpi (dots per inch), colour, black and white or greyscale. Make sure you modify settings for normal scanning requirements.

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: You are required to perform the following individually with the presence of your teacher.
1. Installing and configuring peripheral devices of computer system and make the computer to works and connect the peripherals listed below to its corresponding ports and make sure that it will all work properly. (Apply safety procedure) (5 points)
   - Monitor
   - Mouse
   - Keyboard
   - Printer
   - Scanner
   - Speaker
   - Power Cord
2. Why is it necessary to make minimal disruption to the client when replacing hardware peripherals? (5 points)
3. Explain the difference between installing and configuring peripheral devices? (5 points)

Information Sheet – 4	Testing and Confirming Hardware Peripherals

4.1. Testing hardware peripherals

In addition to ensuring a device is able to perform a basic task (such as printing a test page or scanning an image) it is also necessary that all functionality required by the client is tested. When new peripheral equipment is not tested for critical functions before being used, it can lead to malfunction, causing large disruptions to clients and potentially damage other parts of a computer system. If, for example, a new external zip drive has not been tested to check it will be capable of making backups of specific files, it could mean that vital information of the client's could be destroyed if those backups were not successful.

Ensure that all new installations are thoroughly tested after initial setup and prior to use by the client. Depending on the device, different functions will need to be tested. Devices that have components that are known to degrade with time, especially printers, should also be tested periodically. Printers need to be routinely tested, as components such as the ink cartridges and toner can cause deterioration of print quality and may require maintenance and/or cleaning.

4.2. All tests should be completed according to a documented test plan.

Note*:* **Satisfactory rating - 3 points   Unsatisfactory - below 3 points**

Some suggestions of functions that may be tested for a printer, scanner and digital camera devices are included as follows:-

You can ask your teacher for the copy of the correct answers.

- **Printer: -** Printer functions that may be tested are:-

- ✓ Can the printer handle different paper types (for example A4, A5, foolscap, thick, thin, overhead transparencies)?

- ✓ Will the printer work successfully on different computers?

- ✓ Will the printer work successfully with different software packages (for example, word processing, spreadsheets and desktop publishing)?

- ✓ Is black and white print quality acceptable to clients?

- ✓ Is colour print quality acceptable to clients?

- **Scanner: -** Scanner functions that may be tested are:-

  - ✓ Is the resolution of a scanned image an acceptable quality?

  - ✓ Does the scanner work correctly with different software packages (e.g. a word processor or desktop publishing package)?

  - ✓ Can the scanner handle items of unusual size and thickness (e.g. a large book or cardboard poster)?

  - ✓ Does the OCR software scan a document successfully?

  - ✓ Will the scanner work successfully on other computers?

4.3. What is a test plan?

A test plan is used to work out a structured process to ensure that a new device will work under all expected circumstances. It logically describes:-

- ✓ Functions that need to be tested

- ✓ An example test case scenario

- ✓ Expected results for each scenario

- ✓ What actually happened once the test has been performed?

Example test case scenarios should simulate realistic work patterns, i.e the scenario should realistically demonstrate if a function will be satisfactory after implementation. Because testing is so critical to the successful implementation of the new device, it is important that a test plan is comprehensive and considers every way a device will need to function after implementation. It is useful to refer back to the client requirements so that you will remember functions that will regularly be expected by the client. On the next page is a test plan, with selected scenarios, to ensure that a printer is working to acceptable client requirements.

Table 1: Sample test plan for a printer

Function	Scenarios	Expected results	Actual results
Printer can produce acceptable quality prints of word processing, spreadsheet and desktop publishing pages	1 Print word processing document 'Policies' 2 Print spreadsheet 'Budget' 3 Print desktop publishing document 'Promotions'	1 Printout of 'Policies' with correct company margin size, acceptable print quality, correct fonts produced 2 Printout of 'Budget' in landscape format, correct margin size, correct fonts produced 3 Printout of 'Promotions' with acceptable image quality, margin size and font display	
Printer handles irregular sized paper	1 Print business card 'Manager' 2 Print A5 poster 'Warehouse sale'	1 'Manager' prints successfully on a business card 2 'Warehouse sale' prints successfully on A5 size paper	
Photos and colour are acceptable quality	1 Print colour photo 'Picnic' 2 Print black and white photo 'Portrait'	1 'Picnic' photo is acceptable quality, correct colour, size 2 'Portrait' photo is acceptable quality, black and white format and size	
Displays appropriate error message when problem occurs	1 Attempt printout without ink cartridge 2 Attempt printout while USB connection is disabled	1 Message 'No cartridge' will display 2 Message 'Printer not attached' will display	

P a g e 74	92	**Author**: Federal TVET Agency(FTA)	IT Support Service Level 1	Date: Oct 2019 Version: 1

Self-Check 4	**Written Test**

Name:-_____ Date:-_____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. It is used to work out a structured process to ensure that a new device will work under all expected circumstances. (1 point)

2. What does the test plan logically describes? (4 point)

Note*:* **Satisfactory rating - 10 points   Unsatisfactory - below 5 points**

You can ask your teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____   Date: _____

Short Answer Questions

Instruction sheet	**LG22: Connect Workstation to the Internet**

P a g e 75	92	**Author**: Federal TVET Agency(FTA)	IT Support Service Level 1	Date: Oct 2019
			Version: 1

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:-

- Connecting workstations to the internet and confirming its functionality
- Launching internet browser software to access the internet

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:-

- Connect workstations to the internet through the existing internet connection and functionality confirmed
- Launch internet browser software is launched to enable access to the internet and functionality confirmed

Learning Instructions:

13. Read the specific objectives of this Learning Guide.
14. Follow the instructions described below 3 to 6.
15. Read the information written in the information "Sheet 1, Sheet 2, in page 3 and 8 respectively.
16. Accomplish the "Self-check 1, Self-check 2, in page 7 and 9 respectively.
17. If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1 in page 10.
18. Do the "LAP test" in page 16.

Information sheet 1	**Connecting Workstations to the Internet and Confirming Its Functionality**

4.1. Connecting computer to the Internet

To connecting computers to the internet connection for accessing information over a network either by using connection based or connectionless internet infrastructure the user must be connected to the internet access through internet service providers (ISP). There are three types of connection such as:-

4.1.1. Dialup connection
- Dial-up internet access is a form of Internet access that uses the facilities of the public switched telephone network (PSTN) to establish a dialed connection to an Internet service provider (ISP) via telephone lines. allows you to connect to the internet via a local server using a standard 56k modem
- Your PC literally dials (hence the name) a phone number (provided by your ISP) and connects to the server and therefore the internet
- Internet service providers charge by the minute for your dial-up connection

- **Advantages of dial up internet connection**
  - ✓ Very economic and widely available
  - ✓ Hardware cost are minimal since it uses a standard modem
  - ✓ Easy configuration
  - ✓ Convenient for one computer or small network

- **Disadvantages of dial up internet connection**
  - ✓ The slowest connection
  - ✓ Since it uses a 56k modem, it transfers 56 kilo bits a second(7 kB) of data
  - ✓ The average webpage size is about 50Kbyte
  - ✓ So it takes 7 seconds to load a webpage
  - ✓ Your telephone line will be busy when connected

4.1.2. Leased connection
- Use a dedicated line to connect to the internet
- We will have a direct internet connection to the internet
- Always on
- Leased internet connection can be found in many forms the popular two are:-
  - ✓ ADSL

  - ✓ Cable

✓ **ADSL connection**

ADSL (Asymmetric Digital Subscriber Line or DSL for short) is a high-speed Internet access service that utilizes existing copper telephones lines to send and receive data at speeds that far exceed conventional dial-up modems. The fastest dial-up modems are rated at 57 kilobits per second (Kbps), and usually operate at about 53 Kbps under good

conditions. By comparison, ADSL allows data stream speeds from 1.5 to 8 megabits per second (Mbps), depending on the grade of ADSL service purchased.

ADSL uses standard telephone lines to transmit upstream and downstream data on a digital frequency, which sets these data streams apart from the analog signals telephones and fax machines use. Because the ADSL signal is operating on a different frequency, the telephone can be used normally, even when surfing the Web with ADSL service. The only requirement will probably be inexpensive DSL filters on each phone or fax line, to remove any "white noise" on the line that might be generated from ADSL service.

The "asymmetric" in ADSL refers to the fact that the downstream data rate, or the data coming to your computer from the Internet, is traveling faster than upstream data, or the data traveling from your computer to the Internet. Upstream data rates are slower because Web page requests are fairly miniscule data strings that do not require much bandwidth to handle efficiently. Some businesses, however, may require matching upstream rates for uploading large files. SDSL, or Symmetric Digital Subscriber Line is an option. "Symmetric" indicates that both data streams are operating at the same speed of 1.5 to 7 Mbps, depending on the grade purchased. SDSL service requires a dedicated telephone line because, unlike ADSL, telephone and fax services cannot share a line with SDSL service. ADSL service requires an Internet service provider (ISP), and ADSL modem. The modem is often provided free of charge, and most ISPs that offer ADSL service require subscriber contracts of one year. ADSL is also more expensive than economical dial-up service, which can cost less than US$10 per month.

ADSL is an "always on" service, meaning that as long as your computer is powered on, it will automatically stay connected to the Internet unless you manually disconnect via software or hardware. ADSL is especially suited for gamers, CAD use, streaming multimedia and downloading large files. Family members can share ADSL accounts, with a basic monthly fee covering several mailboxes. Unlike dial-up service, which stipulates only one session be instigated at a time, multiple members can be using ADSL service simultaneously on various computers in the house without violating policy. ADSL is not available to everyone. DSL providers, or even your local phone company, can tell you if service is available in your locale. Speeds will vary depending upon your physical distance from local hubs. Some customers with close proximity may be able to take advantage of newer varieties of ADSL, called ADSL2 and ADSL2+, which have even greater throughput rates, from 12 to 24 Mbps downstream and 1 to 3.5 Mbps upstream.

- **Digital Subscriber Line (DSL)**
  An "always-on" technology; there is no need to dial up each time to connect to the Internet. Uses the existing copper telephone lines to provide high-speed data communication between end users and telephone companies.
  Asymmetric DSL (ADSL) is currently the most commonly used DSL technology.
  - ✓ Has a fast downstream speed, typically 1.5 Mbps.

✓ Upload rate of ADSL is slower.

✓ Not the best solution for hosting a web server or FTP server.

DSL Types

No.	Type	Description
1	ADSL	Asymmetric DSL is most common. Downstream speed from 384 Kbps to 6 Mbps. Upstream speeds lower than downstream speeds
2	HDSL	High Data Rate DSL provides equal bandwidth in both directions.
3	SDSL	Symmetric DSL provides the same speed, up to 3 Mbps, for uploads and downloads
4	VDSL	Very High Data Rate DSL is capable of bandwidths between 13 and 52 Mbps downstream, and 16 Mbps upstream
5	IDSL	ISDN DSL is DSL over ISDN lines. Uses ordinary phone lines. Requires ISDN adapters

- **To generalize ADSL**
    - ✓ It stands for Asymmetric Digital Subscriber Line
    - ✓ Uses phone line
    - ✓ The connections work by splitting your phone line into two separate channels, one for data (internet) and one for voice (phone calls), which means you can talk on the phone and be connected to the internet at the same time.
    - ✓ Have incredible performance compared to dial up
    - ✓ Have a flat monthly fee
    - ✓ Come in different speeds specification
        - – 256Kbps/128Kbps
        - – 512Kbps/128Kbps
        - – 1Mbps/256Kbps
        - – 2Mbps/512Kbps
        - – 8Mbps/1024Kbps

The first number shows the download speed and the second the upload speed

- **Advantage of ADSL**
    - ✓ Always on
    - ✓ Transfer data and voice at the same time
    - ✓ Fast

- **Disadvantages of ADSL**
    - ✓ Does not available everywhere
    - ✓ Additional hardware cost, since it needs a special modem called ADSL modem

- **Cable Connection**

In [telecommunications](#), cable Internet access, often called simply cable Internet, is a form of [broadband Internet access](#) that uses the [cable television](#) infrastructure. Like [digital subscriber line](#), cable Internet access provides network edge connectivity ([last mile](#) access) from the [Internet service provider](#) to an end user. It is integrated into the [cable television](#) infrastructure analogously to DSL which uses the existing [telephone](#) network. Cable TV networks and telecommunications networks are the two predominant forms of [residential](#) Internet access. Recently, both have seen increased competition from [fiber deployments](#), [wireless](#), and [mobile](#) networks.

Cable connection has the following characteristics

- ✓ It uses a separate cable than phone line to transfer data
- ✓ Very fast and reliable
- ✓ Fixed monthly fee

- **Advantage of cable connection**
  - ✓ Very fast
  - ✓ Always on
  - ✓ Doesn't affect to make/receive a phone call, since it uses a separate cable

- **Disadvantages of cable connection**
  - ✓ Doesn't available everywhere
  - ✓ It needs a special modem called cable modem

4.1.3 Wireless connection (Wi-Fi network Connection)

Wireless connection (Wi-Fi) is non connection based /unbounded network connection/ that used to access information.

Self-Check 1	Written Test

Name:-_____ Date:-_____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. What are the three types of internet connections? (3 points)
2. What facilities does, the dial-up connection is used to establish a dialled connection to an (ISP) for users/clients? (1 point)
3. What does ISP stands for? (1 point)
4. Give at least 2 advantages of using a dial-up connection? (2 points)
5. Give the 2 disadvantages of using a dial-up connection? (2 points)
6. Give at least 2 advantages of using a leased/ADSL connection? (2 points)
7. Give the 2 disadvantages of using a leased/ADSL connection? (2 points)
8. What type of connection made use of a dedicated line to connect to the internet? (1 point)
9. What does ADSL stands for? (1 point)
10. Give at least 2 advantages of using a cable connection? (2 points)
11. Give the 2 disadvantages of using a cable connection? (2 points)
12. In telecommunications explain cable Internet access and Wi-Fi internet connection? (1point)

Answer Sheet

Score = _____

Rating: _____

Name: _____   Date: _____

Short Answer Questions

Note*:* Satisfactory rating - 20 points   Unsatisfactory - below 10 points

You can ask your teacher for the copy of the correct answers.

4.2. Installing internet browser software to access information on the internet

Now a time there are so many different types of internet browsers that used to access different information on the internet. From time to time all users to access information from the internet, any client install and updating the internet browsers that to be uses. But all users/clients make sure that the modem is switched on and connected to a live internet line connection.

Make sure your connection software is configured properly. If necessary, refer to the original setup instructions, or call your provider's customer service number. While, adequate for voice communications, these extenders usually do not provide a connection that is clean enough (noise-free) for digital transmissions. The problem might not be on your end, but might lie with the service provider. Often, if too many users are logged on to a provider's system, the provider will not permit additional connections. Also, the provider might be performing system maintenance (though most providers try to do such work during "off" hours to minimize disruption).

Some access providers maintain their own archives (caches) of web sites in order to speed up internet access. Sometimes, this archiving process will inadvertently disable certain web functions, making some pages difficult or impossible to access properly. Also, this archiving process can prevent you from loading the most current version of a page.

Your access provider may maintain firewalls that prevent you from accessing certain Internet resources for security reasons and contact your service provider if you believe this to be the case. Your access software may contain a monitoring application that blocks access to Internet resources considered inappropriate for users. Disable this application if necessary; if you need help, ask your service provider. If the server containing the site is overloaded or "down," you will not be able to access the site.

Self-Check 2	**Written Test**

Name: - _____ Date: -_____

Instruction*: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

1. Explain the advantages of ISP? (3 points)
2. Explain the function of internet browsers? (3 points)
3. Write at least five internet browsers that used to access information on the internet? (3 points)

Operation Sheet 1	Connecting Computer to the Internet to Access Information

1. How to use internet connection for information sharing

To use Internet Connection Sharing to share your Internet connection, the host computer must have one network adapter that is configured to connect to the internal network and one network adapter or modem that is configured to connect to the Internet. On the host computer, follow these steps to share the internet connection:-

1. Log on to the host computer as Administrator or as Owner.
2. Click **Start**, and then click **Control Panel**.
3. Click **Network and Internet Connections**.
4. Click **Network Connections**.
5. Right-click the connection that you use to connect to the Internet. For example, if you connect to the Internet by using a modem, right-click the connection that you want under **Dial-up**.
6. Click **Properties**.
7. Click the **Advanced** tab.
8. Under **Internet Connection Sharing**, select the **Allow other network users to connect through this computer's Internet connection** check box.
9. If you are sharing a dial-up Internet connection, select the **Establish a dial-up connection whenever a computer on my network attempts to access the Internet** check box if you want to permit your computer to automatically connect to the Internet.
10. Click **OK**. You receive the following message:

When Internet Connection Sharing is enabled, your LAN adapter will be set to use IP address 192.168.0.1. Your computer may lose connectivity with other computers on your network. If these other computers have static IP addresses, it is a good idea to set them to obtain their IP addresses automatically. Are you sure you want to enable Internet Connection Sharing?

11. Click **Yes**.

The connection to the Internet is shared to other computers on the local area network (LAN). The network adapter that is connected to the LAN is configured with a static IP address of 192.168.0.1 and a subnet mask of 255.255.255.0 on the client computer, to connect to the Internet by using the shared connection, you must confirm the LAN adapter IP configuration, and then configure the client computer. To confirm the LAN adapter IP configuration, follow these steps:-

1. Log on to the client computer as Administrator or as Owner.

2. Click **Start**, and then click **Control Panel**.
3. Click **Network and Internet Connections**.
4. Click **Network Connections**.
5. Right-click **Local Area Connection**, and then click **Properties**.
6. Click the **General** tab, click **Internet Protocol (TCP/IP)** in this **connection uses the following items** list, and then click **Properties**.
7. In the **Internet Protocol (TCP/IP) Properties** dialog box, click **Obtain an IP address automatically** (if it is not already selected), and then click **OK**.

Note:- You can also assign a unique static IP address in the range of 192.168.0.2 to 192.168.0.254. For example, you can assign the following static IP address, subnet mask, and default gateway:

8.　　IP Address　192.168.0.2
9.　　Subnet mask　255.255.255.0
10.　　Default gateway 192.168.0.1
11. In the **Local Area Connection Properties** dialog box, click **OK**.
12. Quit Control Panel.

To configure the client computer to use the shared Internet connection, follow these steps:

1. Click Start, and then click Control Panel.
2. Click **Network and Internet Connections**.
3. Click Internet Options.
4. In the Internet Properties dialog box, click the Connections tab.
5. Click the Setup button. The New Connection Wizard starts.
6. On the **Welcome to the New Connection Wizard** page, click Next.
7. Click **Connect to the Internet**, and then click Next.
8. Click **Set up my connection manually**, and then click Next.
9. Click **Connect using a broadband connection that is always on**, and then click Next.
10. On the **Completing the New Connection Wizard** page, click Finish.
11. Quit Control Panel.

When you now start Microsoft Internet Explorer, the client computer will try to connect to the Internet by using the host computer's shared Internet connection.

2. **Troubleshooting Internet Connection Problems**

When you turn on Internet Connection Sharing on the host computer, the host computer's LAN adapter is automatically assigned the IP address of 192.168.0.1. Therefore, one of the following situations may occur:-

- **IP address conflict**: - Each computer on the LAN must have a unique IP address. If more than one computer has the same IP address, an IP conflict occurs, and one of the network adapters turns off until the conflict is resolved. To resolve this conflict, configure the client computer to automatically obtain an IP address, or assign it a unique IP address.

- **Loss of network connectivity: -** If your network is configured with a different IP address range than Internet Connection Sharing uses, you will lose network connectivity with the host computer. To resolve this issue, configure the client computers to automatically obtain an IP address, or assign each client computer a unique IP address in the range of 192.168.0.2 to 192.168.0.254.
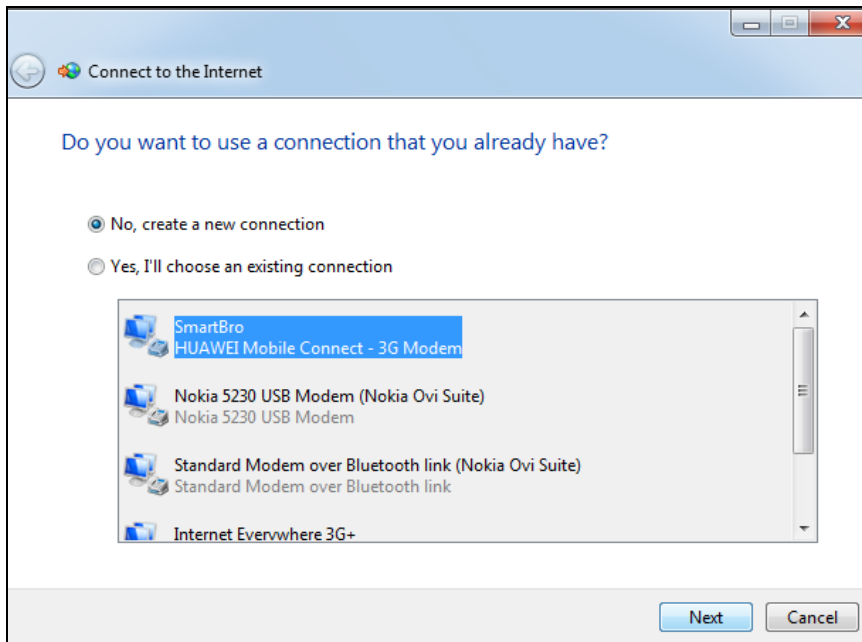
### ↓ Connecting to the internet using DSL in Windows 7
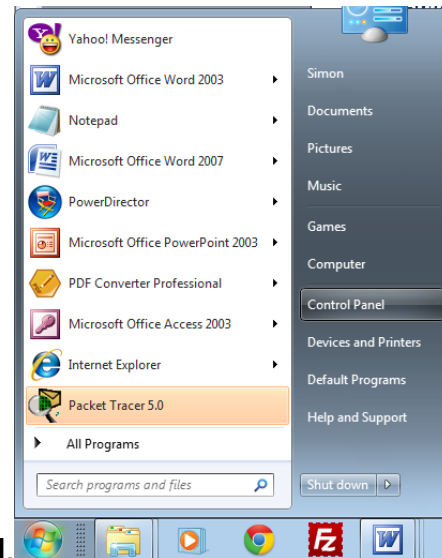
- From the **Start** menu, choose **Control Panel**.
- On the **Control Panel**, click on **Connect to the Internet** on the Network and Internet.

- A dialog box will appear asking if "Do you want to use a connection that you already have?
- Choose **No, create a new connection**.

- Then click **next button**.
- It will again prompt you on **How do you want to connect?**
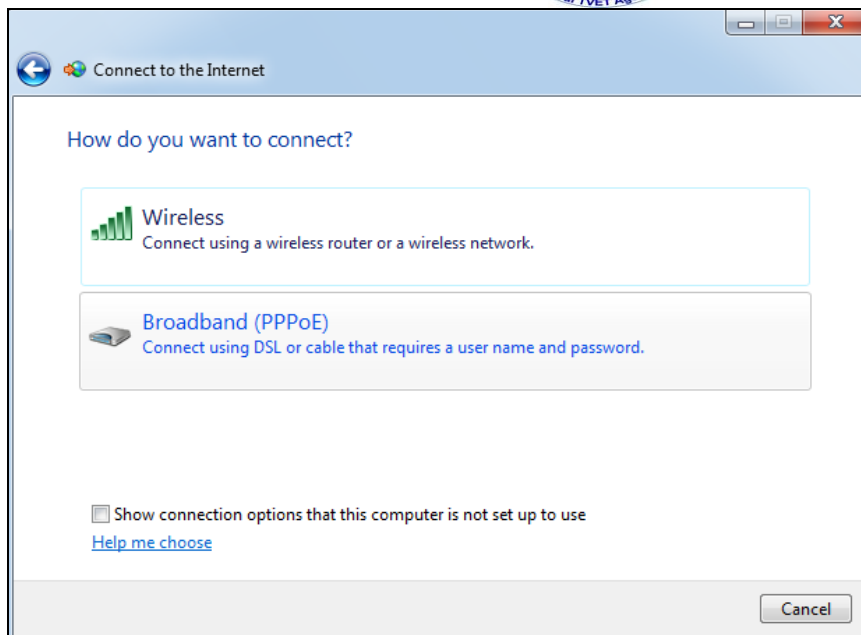
- Click on **Broadband (PPPoE)**
  Connect using DSL or cable that require a user name and password.
- Type the **username** and **password** that your internet provider gave you
- Then type what **broadband connection name** you want for your DSL connection
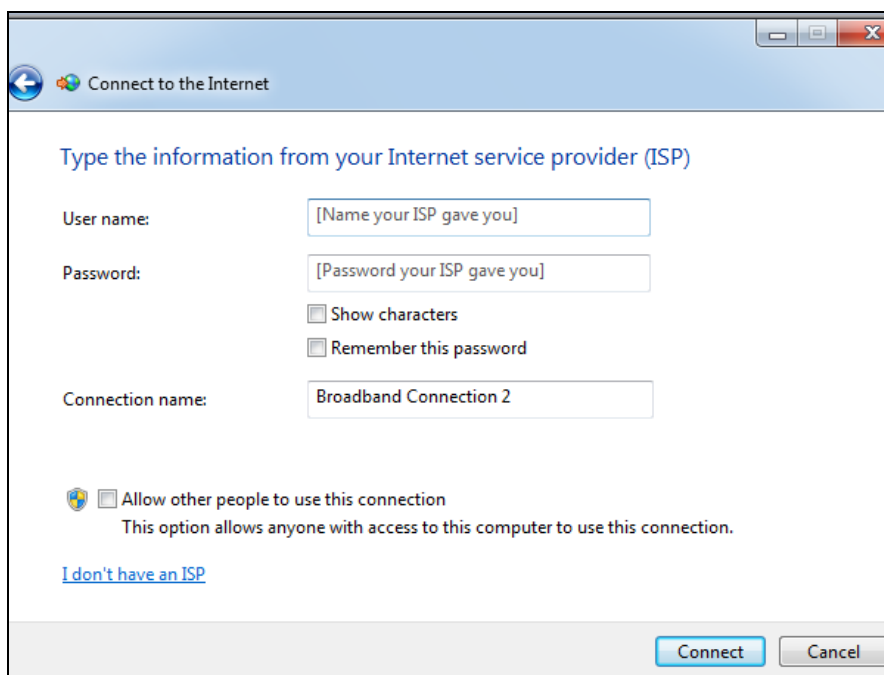
- Then click **Connect.**

- You have just set-up a DSL connection. You can now start browsing the web using any of the internet browsers. You may any of the common browser like Internet Explorer or Mozilla Firefox.
- To launch it, click on the **start menu** then click **Internet explorer**
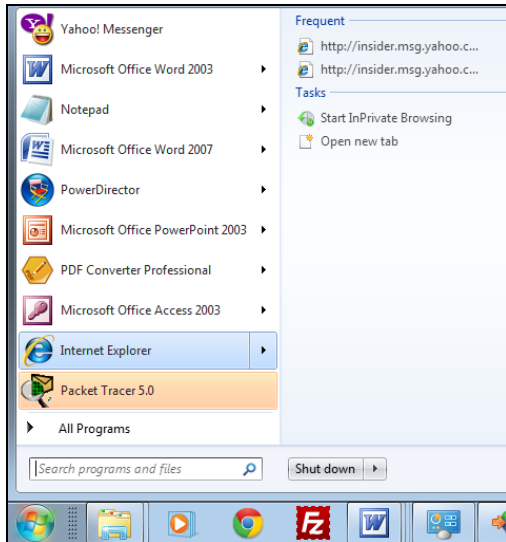
- You are now ready to browse the web
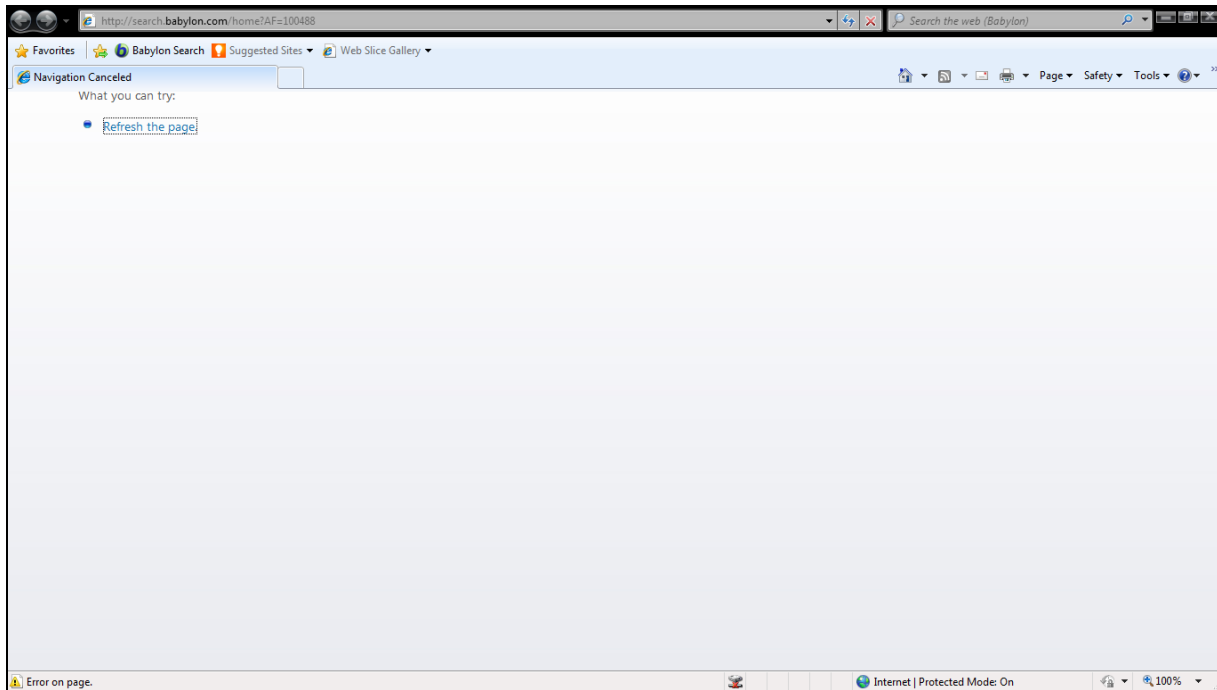
LAP Test	**Practical Demonstration**

Name: - _____   Date: - _____

Time started: _____   Time finished: - _____

1. You are required to create a new connection and needs to be able to connect to the internet and access any types of resources on the Internet? (3% points)

2. Create dialup connection? (3% points)

3. Create broadband connection and assign IP Address, configure it manually and automatically? (3% points)

4. Configure and connect to the Wi-Fi Internet connection that installed within your organization? (3% points)

Note*:* **Satisfactory rating - 9 points   5 Unsatisfactory - below 5 points**

You can ask your teacher for the copy of the correct answers.

Experts

The development of this Learning Gide for the TVET Program Information technology support service Level I.

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