

# **NURSING LEVEL-III**

**Based on January, 2022, Curriculum Version I**



**Module Title: Apply Computer and Mobile Health Technology**

**Module Code: HLT NUR3 M02 0322**

**Nominal duration: 40 hours**

**Prepared By: Ministry of Labor and Skill**

**August, 2022  
Addis Ababa, Ethiopia**

## **Acknowledgement**

**Ministry of Labor and Skills and Ministry of Health** wish to extend thanks Jimma University and appreciation to the many representatives of TVET instructors and respective industry experts who donated their time and expertise to the development of this Teaching, Training and Learning Materials (TTLM).

## **Acronyms**

AGP -	Accelerated Graphics Port
CD-ROM-	Compact Disk Read Only Memory
CRT	-Cathode Ray Tube
CPU –	central processing unit
PSU -	power supply unit
RAMDAC -	Random Access Memory Digital-Analog Converter
RAM –	random access memory
HDD -	Hard disk drive
DC -	direct current
HCP	healthcare professionals
HIS	Hospital Information System
PDA	Personal Digital Assistant
EHR	Electronic health Record
CDSS	Clinical decision support system
PACS	picture archiving and communication system
LIS	Laboratory information system
PII	Personal identification information
AI	artificial intelligence

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## **Introduction to the module**

A **computer** is a machine that can be instructed to carry out sequences of arithmetic or logical operations automatically via computer programming. Modern computers have the ability to follow generalized sets of operations, called programs. A "complete" computer including the hardware, the operating system, and peripheral equipment required and used for "full" operation can be referred to as a computer system.

Computers are becoming increasingly popular every passing day amongst a wide section of people. With the advent of microcomputers in late seventies and their subsequent performance enhancement in eighties, computers have reached our homes. Computers have undoubtedly revolutionized our whole life style. Computer techniques have tremendous applications in medical field, where it has the largest amount of social impact. Computers are playing an important role in the running of large hospitals.

Computer facilities are now regarded as integral to much diagnostic equipment. Major uses of computers in medicine include hospital information system, data analysis in medicine, medical imaging laboratory computing, computer assisted medical decision making, care of critically ill patients, computer assisted therapy and so on.

The word computer comes from the word "compute", which means to calculate. Computer can be defined as an electronic device that is designed to automatically accept data, store and process then producing output results. Computers are used to store and process large amount of data and provide information to the user and to perform large number of calculations rapidly and accurately. Charles Babbage is considered to be father of modern computer

## **UNIT ONE: START COMPUTER, SYSTEM INFORMATION AND FEATURES**

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

- Introduction to Computer basics
- Basic computer operation
- Adjusting workspace, furniture and equipment in line with ergonomic requirements.
- Identifying computer components and types.
- Connecting printer with computer and set ready to use

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

- Adjust workspace, furniture and equipment.
- Identify basic computer operation
- Identify computer components and types
- Connect printer with computer and set ready for use.

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”
4. Accomplish the “Self-check 1”
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet

## 1.1. Introduction to Computer basics

A computer is a device that accepts information (in the form of digitalized data) and manipulates it for some result based on a program or sequence of instructions on how the data is to be processed. A programmer is a person who inputs the data into the computer in order to get a desired final result.

The basic parts of a computer are as follows –

- **Input Unit** – Devices like keyboard and mouse that are used to input data and instructions to the computer are called input unit.
- **Output Unit** – Devices like printer and visual display unit that are used to provide information to the user in desired format are called output unit.
- **Control Unit** – As the name suggests, this unit controls all the functions of the computer. All devices or parts of computer interact through the control unit.
- **Arithmetic Logic Unit** – This is the brain of the computer where all arithmetic operations and logical operations take place.
- **Memory** – All input data, instructions and data interim to the processes are stored in the memory. Memory is of two types – **primary memory** and **secondary memory**. Primary memory resides within the CPU whereas secondary memory is external to it.

Control unit, arithmetic logic unit and memory are together called the **central processing unit** or **CPU**. Computer devices like keyboard, mouse, printer, etc. that we can see and touch are the **hardware** components of a computer. The set of instructions or programs that make the computer function using these hardware parts are called **software**. We cannot see or touch software. Both hardware and software are necessary for working of a computer.

- **Arithmetic operations** – Examples include calculations like addition, subtraction, differentials, square root, etc.
- **Logical operations** – Examples include comparison operations like greater than, less than, equal to, opposite, etc.





Fig 1.1: Basic parts of computer

### 1.1.1 Characteristics of Computer

To understand why computers are such an important part of our lives, let us look at some of its characteristics –

**Speed** – typically, a computer can carry out 3-4 million instructions per second.

**Accuracy** – Computers exhibit a very high degree of accuracy. Errors that may occur are usually due to inaccurate data, wrong instructions or bug in chips – all human errors.

**Reliability** – Computers can carry out same type of work repeatedly without throwing up errors due to tiredness or boredom, which are very common among humans.

**Versatility** – Computers can carry out a wide range of work from data entry and ticket booking to complex mathematical calculations and continuous astronomical observations. If you can input the necessary data with correct instructions, computer will do the processing.

**Storage Capacity** – Computers can store a very large amount of data at a fraction of cost of traditional storage of files. Also, data is safe from normal wear and tear associated with paper.

### Booting

Starting a computer or a computer-embedded device is called booting. Booting takes place in following steps –

- ✓ Switching on power supply
- ✓ Loading operating system into computer's main memory
- ✓ Keeping all applications in a state of readiness in case needed by the user

The first program or set of instructions that run when the computer is switched on is called BIOS or Basic Input Output System. BIOS is a firmware, i.e. a piece of software permanently programmed into the hardware.

If a system is already running but needs to be restarted, it is called rebooting. Rebooting may be required if a software or hardware has been installed or system is unusually slow.

### **Input/output devices**

Alternatively referred to as an **I/O device**, an **input/output device** is any [hardware](#) used by a human operator or other systems to communicate with a computer. As the name suggests, input/output devices are capable of sending data ([output](#)) to a computer and receiving data from a computer ([input](#)).

#### **1. Input devices**

Given below is the list of the most common input devices along with brief information about each of them.

### **Keyboard**

- A simple device comprising keys and each key denotes either an alphabet, number or number commands which can be given to a computer for various actions to be performed
- It has a modified version of typewriter keys
- The keyboard is an essential input device and computer and laptops both use keyboards to give commands to the computer

### **Mouse**

- It is also known as a pointing device
- Using mouse we can directly click on the various icons present on the system and open up various files and programs
- A mouse comprises 3 buttons on the top and one trackball at the bottom which helps in selecting and moving the mouse around, respectively
- In case of laptops, the touchpad is given as a replacement of the mouse which helps in the movement of the mouse pointer

### **Joy Stick**

- It is a device which comprises a stick which is attached at an angle to the base so that it can be moved and controlled
- Mostly used to control the movement in video games
- Apart from a computer system, a joystick is also used in the cockpit of an aeroplane, wheelchairs, cranes, trucks, etc. to operate them well

### **Light Pen**

- It is a wand-like looking device which can directly be moved over the device's screen
- It is light-sensitive
- Used in conjunction with computer's cathode ray tube

### **Microphone**

- Using a microphone, sound can be stored in a device in its digital form
- It converts sound into an electrical signal
- To record or reproduce a sound created using a microphone, it needs to be connected with an amplifier

### **Scanner**

- This device can scan images or text and convert it into a digital signal
- When we place any piece of a document on a scanner, it converts it into a digital signal and displays it on the computer screen

### **Barcode Reader**

- It is a kind of an optical scanner
- It can read bar codes
- A source of light is passed through a bar code, and its aspects and details are displayed on the screen

All the devices mentioned above are the most commonly used input devices. Several other such types of equipment are used in different fields which can be counted as an input device.

## **2. Output Device**

The commonly used output devices have been listed below with a brief summary of what their function is and how they can be used.

### **Monitor**

- The device which displays all the icons, text, images, etc. over a screen is called the Monitor
- When we ask the computer to perform an action, the result of that action is displayed on the monitor
- Various types of monitors have also been developed over the years

## **Printer**

- A device which makes a copy of the pictorial or textual content, usually over a paper is called a printer
- For example, an author types the entire book on his/her computer and later gets a print out of it, which is in the form of paper and is later published
- Multiple types of printers are also available in the market, which can serve different purposes

## **Speakers**

- A device through which we can listen to a sound as an outcome of what we command a computer to do is called a speaker
- Speakers are attached with a computer system and also are a hardware device which can be attached separately
- With the advancement in technology, speakers are now available which are wireless and can be connected using BlueTooth or other applications

## **Projector**

- An optical device which presents an image or moving images onto a projection screen is called a projector
- Most commonly these projectors are used in auditoriums and movie theatres for the display of the videos or lighting
- If a projector is connected to a computer, then the image/video displayed on the screen is the same as the one displayed on the computer screen

## **Headphones**

- They perform the same function as a speaker, the only difference is the frequency of sound
- Using speakers, the sound can be heard over a larger area and using headphones, the sound is only audible to the person using them
- Also known as earphones or headset

## 1.2. Adjusting workspace furniture and equipment in line with ergonomic requirements,



**Fig-1 Proper ergonomics**

### 1.1.1. Ergonomics Definitions

- Can be defined as fitting the job to the worker. Not all workers are the same size and everyone has limits
- Ergonomics aims to design workstations, work processes, equipment, and tools to fit you. As a worker, it is important that you know how to adjust your office workstation to suit your needs.

### 1.1.2. Ergonomics Risk Factors

If a job does not fit a worker, the worker is more likely to be exposed to risk factors that may lead to musculoskeletal injury. The main ergonomic risk factors in the office include the following:

- **REPETITION:** tasks or body movements carried out over and over again.
- **AWKWARD POSTURES:** body positions which deviate from neutral such as twisting your neck to view your monitor or reaching to use your mouse.
- **STATIC FORCES:** maintaining a position for a prolonged period of time (e.g. prolonged sitting, viewing the monitor with a bent neck, or reaching for the keyboard)

Every person responds to ergonomic risk factors in different ways. For example, one worker may have symptoms of an injury while another worker performing the same tasks may not have symptoms. Ergonomic risk factors should be identified and reduced to lower the risk of injury for

all workers. Even those workers who are not experiencing pain should take ergonomics seriously to reduce the risk of developing an injury.

### **1.1.3. Purchasing Considerations**

When selecting office products, adjustability is a key feature. Even though a product may claim to be “ergonomic”, it may not suit your needs, therefore, BUYER BEWARE. You can use the information in this handbook to determine what equipment you need to make your office fit you, while learning how to appropriately set up the equipment that is currently in your office.

### **1.1.4. BEFORE YOU BUY OFFICE EQUIPMENT**

- Most office equipment has been designed for the average male who is 5’10” while the average female is 5’4”. This means that some chairs and other office equipment may be too large for some users , or too small for others.
- Try Before You Buy. Arrange to get samples of equipment from your supplier. Have your supplier explain and demonstrate adjustment features.



Fig 2 neutral working posture within the office

### **1.1.5. How should I sit at my computer workstation**

- **Wrists:** Keep the wrists in a straight position. Do not bend them up, down, or from side to side.
- **Elbows:** Keep elbows bent between 90 and 100 degrees (right angle), keep them close to your body, and supported if possible.
- **Shoulders:** Relaxed (not slouched or raised).
- **Neck:** Facing forward and not looking up, down, or to either
- **Side, HIPS:** Bent around 90 degrees with your thighs parallel to the floor.

- **LOW BACK:** Supported to maintain its natural curve.
- **KNEES:** Bent at approximately 90 degrees with enough space between the back of your knees and the chair to place your fist.
- **Feet:** Resting flat on the floor or supported by a footrest.

#### **1.1.6. Take appropriate breaks throughout the day**

- Multiple short duration breaks provide the body with more rest than a single long duration break. These breaks, often called “Micro-Breaks”, last anywhere from 10 to 60 seconds and should be taken throughout the day. During these micro-breaks, look away from the computer screen and focus on objects in the distance, remove your hands from the keyboard and/or gently stretch muscles. An example of an “active micro break” is taking 5 -15 seconds every 5 minutes to rest the eyes and upper body.
1. Try to alternate your computer work with other tasks. For example, rather than typing continuously for an hour, stop and deliver a fax or do some filing. When you break up computer work with other office tasks, your arms, neck and back muscle scanner.
- You may need to schedule breaks into your day until you are used to taking breaks away from the computer. Use the following table and worksheet as an example to help you organize some well needed breaks.
  - Your chair is the most important part of your office workstation. The chair has to fit you and suit the tasks that you do. One style of chair may not suit every worker. For example, the “average” chair is designed in some instances to fit the average male and may not suit other users. When looking for a chair it is important that the users have the option to try several different designs prior to finalizing any purchase. A trial period should be long enough to allow for an opportunity to try the chair (i.e. several weeks) and to provide comments or concerns with the chair.

#### 1.1.6.1. What makes a chair ergonomics

The following features are part of a good office chair. A chair is only “ergonomic” if you can adjust it to fit you. Get to know your chair by experimenting with the controls, so you can make adjustments quickly and confidently.

##### A. General Chair Features

- 5-caster swivel base
  - Armrests
  - Height adjustable seat pan
  - Tilt adjustable back rest
  - Ability to make adjustments easily while sitting in the chair
- Firm padding covered with non-slip, breathable fabric

##### B. Seat Plan

- Rounded front edge
- Wide and deep (long) enough to fit you comfortably
- Adjustable in angle

##### C. Backrest

- Padding for the low back area that is curved to fit the shape of your back
- Height adjustable (separate from seat pan)
- Adjustable angle with locking mechanism
- Wide and high enough to fit your back comfortably





Fig 3-a Chair with adequate lumbar support, Fig 3-b Chair without lumbar support.

#### **D. Armrest**

- Ability to rest the arms as they hang freely by your side
- Should provide height and width adjustability
- Should not interfere with the work surface



Fig 4-a : If armrests are too high, they may cause the user to work with raised shoulders

Fig 4-b: The shoulders should be relaxed and hanging comfortably at your sides

#### **E. How Do I Adjust My Chair?**

In addition to having an adjustable chair, knowing how to properly use its controls is key for ensuring a neutral working posture. The following points are designed to help ensure proper adjustment

- Standing in front of and facing the chair, raise or lower the chair until the front edge of the seat pan is just below your kneecap (Figure 5).
- Sit with your feet resting flat on the floor and legs at a 90-110 degree angle.
- Allow enough space for a closed fist between the edge of the seat pan and the back of your legs
- Adjust the backrest so the lumbar support contacts the curvature in your lower back. You may need to move the backrest up or down as well as towards or away from you (Figure 5).

- Adjust armrests so that your elbows can rest on them while your arms hang freely at your side.



**Figure 5:** Seat pan slightly below knee cap,

The adjustment for the back rest height is usually located on the bottom of the seat pan.

A seat height that is too high can cause unwanted pressure on the thighs and not allow the feet to rest flat on the floor.

#### **F. Chair Height**

- If your keyboard is placed on an adjustable support:
- Lower the seat pan so your feet rest comfortably on the floor.
- Check for pressure points. You should feel even pressure from the seat pan.
- If you feel more pressure near the back of the seat (buttock region), raise the chair.
- If you feel more pressure under your thighs (near the knees), lower the chair.
- If your keyboard is placed on a fixed surface (i.e. desk).
- Adjust your chair height so you can type comfortably with neutral wrist and arm positions.

- Use a footrest if your feet do not rest flat on the floor after you have adjusted your chairs.
- Stand up and place your hand in the small of your back. Notice the inward curve in your lower back. Sit down on your chair while keeping your hand on your lower back. Notice how your curve flattens out. This shows you how easy it is to change the shape of your spine which can contribute to back pain.
- While keeping your hand on the small of your back, ensure that the lumbar support hits the hand.

## **G. Workstation**

### **ADJUSTABLE DESKS**

It is often possible to add adjustable accessories to your desk. If you are purchasing a new desk, you may want one with adjustability built in. There are several methods of achieving adjustability:

- You can purchase a complete workstation that allows for both regular desk work and space for the computer. The computer section should have an adjustable portion for the keyboard and mouse, and a separate adjustable portion for the monitor. The portion designed for the keyboard should have enough space for the mouse and keyboard to be placed side by side.
- You can add attachments to your desk such as keyboard tray or monitor arm.
- You can use a smaller separate computer workstation and continue to use your desk for regular work.
- You can also purchase an L-Shaped workstation that allows for a separate writing and typing area.
- If you have shelves above the workstation, ensure they do not interfere with adjusting the monitor height or block overhead lights.

### **The Non-Adjustable Desk**

- Use the information in the chair and desk sections above to ensure that neutral postures are achieved.

### **If the work surface is too low**

- Raise the desk using a stable support (ie. blocks under desk legs) until the work surface or keyboard is at elbow height.



Figure 6 Providing a chair and keyboard set up

## **H. Keyboard and Mouse**

Some “ergonomic” keyboards are not adjustable and rely on a one-size-fits-all theory. This may not be appropriate for all users since people often have different sized hands.

- Your keyboard and mouse should be slightly below elbow level and close to your body.
- The mouse should be beside the keyboard, and in front of your mousing hand.
- To use your keyboard and your mouse in the “neutral” position, you should adjust your keyboard tray or your chair.
- If you have an adjustable keyboard/mouse tray, move the keyboard and mouse to elbow level. If you do not have an adjustable keyboard/mouse tray,
- Adjust the height of your chair so the keyboard and mouse are at approximately elbow level. The keyboard should be angled so your wrists remain straight.

### **ALTERNATIVE KEYBOARDS**

“Ergonomic” keyboards, such as split keyboards, are designed to help keep your wrists in a neutral (straight) position when typing. First make as many improvements to your workstation as possible before thinking of changing your keyboard. It is important to remember that split keyboards are most effective when used by a “touch” typist. “Hunt and peck” typists tend to find these designs frustrating as they visually search for keys.

Considerations when changing your keyboard:

- The size and shape of the keyboard to ensure that you are using neutral and relaxed positions.
- The force required to depress the keys

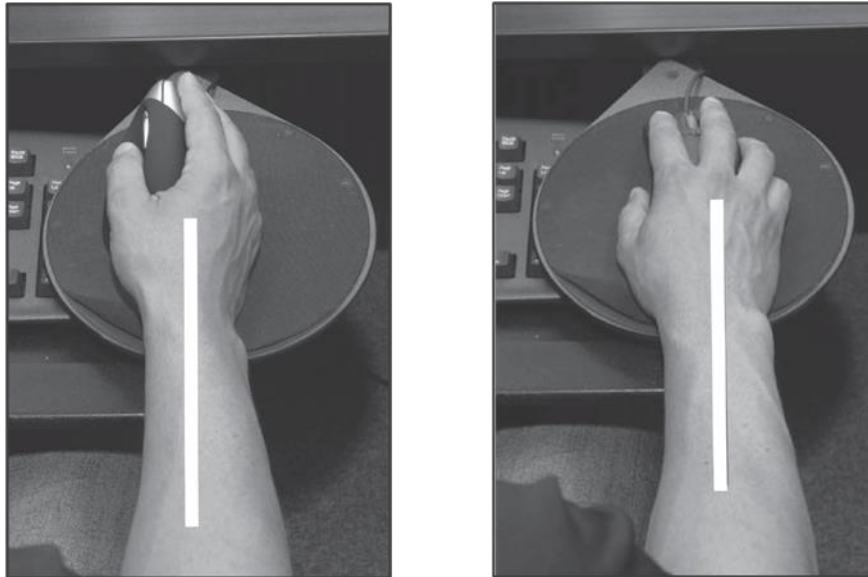


Figure 7 a split keyboard which allows for neutral wrist and arm posture.

### **Adjusting Your Mouse**

Place the mouse in front of your “mouse hand”. You should NOT have to reach away from your body in order to operate the mouse.

Position the mouse at the SAME height as the keyboard. Remember to maintain approximately a 90 degree elbow angle.



**Figure 8**

### **Computer components and types**

A computer is an electronic machine that receives data from an input device, carries out arithmetic and logical processing according to a previously compiled set of instructions, stores the processed data, and sends the processed data to an output device.

#### **1.1.7. Computer Hardware**

The term computer hardware refers to the physical components of a computer – basically, the parts and pieces that can be touched or moved, whether inside or outside of the computer (any part of a computer system you can see or touch). A peripheral is any piece of hardware attached to a computer, such as a printer.

#### **1.1.8. Input Device**

Input devices are parts of the computer that let you input information and data into the computer. The keyboard, mouse, and joystick are examples of input devices. Scanners and cameras are also

input devices, but are not used as often. Disk drives and modems can also be used as input devices

#### **A. Disk Drivers**

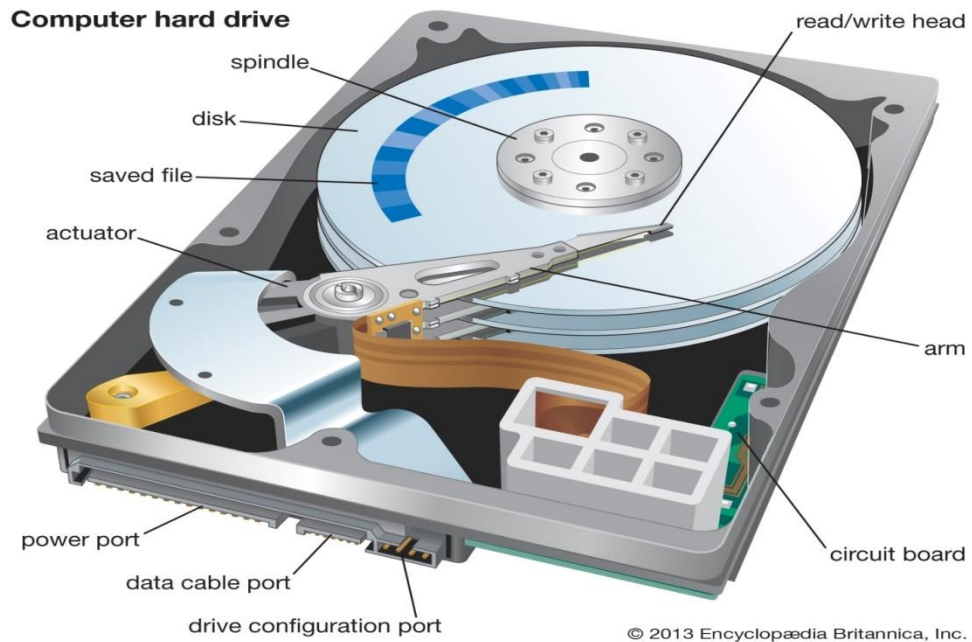


Figure 8 Disk Drives

Disk drives are a very important part of the computer, but choosing them is relatively easy. There are several types of disk drives: Hard drives, Floppy disk drives, CD ROM drives, Tape backups, and Zip drives.

## B. Floppy Drive



**Figure 9 Floppy Drive**

- They are the main way of putting information on to the hard drive
- They also allow you to save information on a disk, which is an easy way to transport files and data between different computers.
- There are two different sizes of floppy drives:
  - ✓ 5.25" floppy disk is not used very often any more.
  - ✓ And replaced by 3.5 disk can hold 1.44 megabytes of data.

### **C. CD ROM Drive**

- Most computers now come standard with a CD ROM drive. Most programs and games now come on CD
- A CD ROM drive reads data from a CD that looks much similar to a music CD, except it holds data rather than music.
- The CD ROM drive comes in several different speeds. Speeds vary from double speed to 52X speed.
- A double speed CD ROM is the minimum. It is still functional but the video and sound are more likely to be a bit jumpy. The faster a CD ROM can read a CD the smoother the video and sound becomes. Faster is better, but for most users an 8X speed will work just fine.
- . CD writers allow you to write information to a CD. You have to buy blank CD's to write to. Once written, these CD's can be read by any CD ROM drive. This may sound like a good solution to your storage problems, but they can be tricky to use. You may waste a few CD's while learning how to use it.



- CD-ROM (Compact Disk Read Only Memory) drives are very popular, and for good reason. The drives have become inexpensive to buy and the disks are cheap to make (figure under two dollars to press a disk). A software maker can put information onto software that looks at the disk and verifies that it is being accessed from the CD. This can be used to prevent software piracy. CD-ROM disks can hold 640 Megabytes of data, more than any application on the market today is likely to need.

#### D. DvD Drive



Figure 10 Dvd Drive

- The latest in mass storage is the DVD drive. DVD stands for digital video disk. The DVD technology is still developing. A dual layer, dual sided version of this disk can hold up to 17 gigabytes. The current version, which is single layer, single sided holds 4.7 gigabytes. Since this technology is still relatively
- new, there are not a lot of products that support it. DVD will soon replace the CD.

## E. Keyboard



Figure 11 Keyboards

- Using the keyboard is the primary way of inputting data into many of your programs. we are sure you know what a keyboard is so I will not go into much detail to describe it, but we will tell you of a few different kinds of keyboards. Keyboards are usually described by the number of keys they have. This keyboard comes standard on most computers. There are also ergonomic keyboards. These keyboards look like they are broken in half, and are supposed to make typing less stressful on your wrists. Some keyboards come with a built in trackball or finger pad. Picking a keyboard is just a matter of preference. For most everybody, the standard 101 keyboard will work just fine.

## F. Mouse



Figure 12 Mouse

- The mouse is a very important input device because it makes getting around in your computer easier. The mouse controls an arrow which can be moved anywhere on the screen. The mouse is good for doing tasks such as moving and pointing to objects on the screen. There are several types of mice, and several input devices similar to mice. Alternatives to the mouse include: the trackball, touchpad, and touch-screen.
- A mouse can have two or three buttons. A two button mouse is usually standard.
- Another thing to note about your mouse is how it plugs into the computer. A serial mouse plugs into a 9 pin serial port in the back of the computer. Most computers now come with an input for a bus mouse, also referred to as a PS/2 mouse. The PS/2 mouse has a round connector similar to that of the keyboard. This mouse is a better choice, because more computers are using it now.
- The trackball is very similar to the mouse, except the ball is on top instead of underneath. You move the ball with your thumb or palm. This is sometimes easier for children to use because they can let go of the ball to click the buttons. This is good because the arrow will not move when you try to click on something. With the mouse, if you let go of it to click a button, it will usually move. Choosing between the mouse and the trackball is just a matter of preference.
- The touch pad and touch screen are very similar. For both you use your finger to move the cursor on the screen. With the touch pad you move your finger on a pad. With the touch screen you move your finger directly on the screen. These may be fun additions to your computer.

#### G. Scanner



Figure 13 Scanner Device

- Scanners are useful if you need to copy written page or pictures directly into your computer. If you are using your computer for business, a scanner could be more useful. There are three basic types of scanners: Hand scanners, Page scanners, and Flatbed scanners. Both types come in black and white or color, with color being more expensive. A hand scanner is held in the hand and dragged across the page being scanned. A page scanner feeds paper through it similar to a printer, but instead of printing, it scans in whatever is on the paper. A flatbed scanner looks and works like a copy machine. You put the object to be scanned in the scanner, and then it scans it into the computer.

#### H. Out Put Device

- MONITORS and VIDEO CARDS

A video display system has 2 major components: a display monitor and a video card.

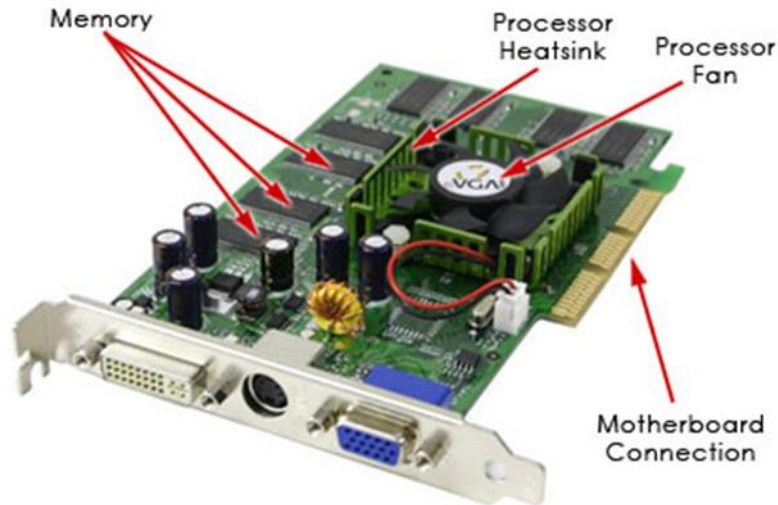


Figure 14 Video Card

- Your system's video card is responsible for what you see on your monitor screen, the video card is the part of the computer that sends the images to the monitor. Video cards are also referred to as video accelerators. Video cards usually contain their own memory chips. This memory helps the computer to load images faster. A video card should contain at least 32 megabyte of memory, but 64 megabytes is becoming standard. 128 megabytes is quite a bit more expensive, but is even better.
- Besides video cards, video may be integrated on the motherboard. Having it included on the motherboard eliminates the possibility of choosing a card to meet your needs. Many have an option by jumper or BIOS setting to disable the on-board video when updating and adding a true video acceleration card. Usually this video does not render high resolution large screen graphics.
- The video processor, along with the system CPU, manipulates this data to change the screen image and the RAMDAC reads it and sends it to the monitor

**RAMDAC (Random Access Memory Digital-Analog Converter):** The screen image information stored in the video memory (RAM) is digital, because computers operate on digital numbers. The patterns of ones and zeros control the color and intensity of every pixel (dot) on the screen. The monitor, however, doesn't use digital information. It is analog. In order to display the

image on the screen, the information in video memory must be converted to analog signals and sent to the monitor. The device that does this is called the RAMDAC.

PCI vs AGP Video Cards:



Figure 15 Video cards

- There are cards for a PCI slot as well as AGP (Accelerated Graphics Port). AGP was designed by Intel in 1997, specifically for the video subsystem. It is a new technology. It is considered a port not a bus. The idea behind AGP is to create a faster, dedicated interface between the video chipset and the system processor. The interface is only between these two devices. It makes it easier to implement the port, makes it easier to increase AGP in speed, and makes it possible to put enhancements into the design that are specific to video. AGP motherboards have a single expansion card slot for the AGP video card, and usually one less PCI slot, and are otherwise quite similar to PCI motherboards.

## **I. The Monitor**



Figure 16 Monitor

- A display monitor is a video output device capable of displaying text and graphics.
- In a very basic Cathode Ray Tube (CRT) a beam of electrons is focused and aimed by electromagnets, then the electron beam strikes a phosphorescent surface at the other end of the tube. Light is given off by the phosphor at the end of the CRT. The entire tube is kept at as close to vacuum as possible so that the electron stream is not deflected.
- This basic CRT would be a mono chrome(one color) monitor. By raising the number of electrons that strike the screen, the display is made brighter. Relate this to a black and white television or an amber or a green screen computer monitor. On a computer monitor, each individual dot is addressed individually to make part of a shape or character. This dot is called a pixel.
- Color CRT type monitors have three kinds of phosphors to produce Red, Green and Blue (RGB) light. All of the colors that humans can see can be produced by some combination of these colors. The first color monitors used only two brightnesses of red, green and blue to produce colors. Red could be off, on or on high. A total of only sixteen colors (to include black) could be displayed because all colors had to match in intensity.
- The VGA monitor can display any color. Any limitation is in the video card used. While early VGA video cards were limited to sixteen colors displayed, they improved on EGA video cards both in resolution and in pallet depth. The sixteen colors were chosen from 256 basic colors.
- Since that time, true color VGA adapters have allowed the VGA and Super VGA monitor to display true color. This is the industry name for 24 bit color. With eight bits per color

per pixel, there are 256 levels of red, green or blue per dot. 1677216 colors to choose from. It would take a 1295 by 1295 pixel monitor to display all of the colors possible! The largest industry standard monitor these days measures 1280 by 1024 pixels.

- Common VGA or SVGA monitors may be capable of 640x480, 800x600, 1024x768 and 1280x1024 pixels. This is horizontal dots by vertical dots. At 640 by 480, the number of pixels is  $(640 \times 480 =)$  307200. The 1280 by 1024 display shows 1,310,720. At 16 colors, each dot has 4 bits of information. At true color, each dot holds 24 bits. So a monitor showing 640x480 dots at 16 colors has  $(640 \times 480 \times 4 =)$  1,228,800 bits of information, while a true color 1280x1024 video card holds 31,457,280 bits of information! This is why the newer, better video adapter cards demand so much memory.
- Screen savers came along because of a problem with cathode ray tubes. Recall from the basic CRT description above, the electrons hitting the phosphor coating on the front of the CRT. As each electron strikes, it may knock loose an atom! This is called sputter. When this happens, the phosphor in that spot being gone, there is less light given off. A display constantly showing the same image will concentrate this effect, producing screen burn.
- In an early solution to this problem, computer input inactivity would shut off the video monitor. Activity would start it right back up. However, thinking the computer off, it often happened that users would mess something up. Someone wanting to use the computer might think that, well, if this switch position is OFF, then that way must be ON. Screen savers, then, must not completely shut off the screen, but minimize the portion in use when the computer is not active. Now any program that starts to change screen characteristics after a period of inactivity may call itself a screen saver.





Figure 17 Lcdand CRT monitors

Monitors as well as television sets. A CRT consists of a glass vacuum tube that contains one electron gun for a monochrome display, or three RGB (red, green, blue) electron guns for a color display. Electron beams from these guns sweep rapidly across the inside of the screen from the upper-left to the lower right of the screen.

The inside of the screen is coated with thousands of phosphor dots that glow when they are struck by this beam. The beams sweep rate is between 43 and 87 times per second (refresh rate) and is measured in Hz (hertz).

Like televisions, screen sizes are measured in diagonal inches, the distance from one corner to the opposite corner diagonally. Several sizes of monitors are available. The most common are the 14 or 15 inch monitor. There are also 17 and 21 inch monitors available.

## J. Sound Cards



Figure 18 Sound Cards

- Most computers comes standard with a sound card. A sound card allows your computer to reproduce music, sounds, and voice. This is a definite necessity if you are going to play multimedia games. If you are just using your computer for business, then you may

not need a sound card. The market standard for sound cards is the Sound Blaster. Be sure to get a computer with a Sound Blaster compatible sound card. There are also different quality of sound cards. Most computers now come with 16 bit sound cards. The next step up would be a 32 bit sound card. Some sound cards have a wave table, which means that it reproduces actual instruments rather than synthesized sound. Most sound cards also have an input for a microphone so that you can record your own voice. My choice would be the Sound Blaster awe32. This is a good quality sound card and it should work with almost all of your games.

#### K. Modems



Figure 19 Modems

- The modem comes standard on most computers. If you want to send faxes or get on the internet, then this is what you need. The modem allows the computer to communicate with other computers through the telephone lines. Most modems come with faxing capabilities. Modems are available in different speeds. The standard speed is 56.6 Kbps. Kbps stands for kilo bauds per second, which is just the speed of the modem. The 56.6 modem is also referred to as V.90. This is the name for the standard on which all 56.6 modems are built. The 56.6 Kbps modem replaced the 33.6 Kbps modem as the standard. 33.6 and 28.8 modems are still widely used, but if you spend a lot of time on the Internet, you'll appreciate the speed of the 56.6. The 14.4 modem is now outdated. It's just too
- slow for most people. Another choice you have with modems is external or internal. If you buy a new computer it should come with an internal modem. Internal means that it goes inside your computer, external means that it plugs into your computer and sits on

the desk. Internal modems are usually less expensive than external modems. The quality between the two is about the same, so it is just a matter of preference.

## L. Printers



Figure 20 Printers

- All printers whether dot matrix, ink-jet or LaserJet accomplish essentially the same task: They create a pattern of dots on a sheet of paper. The dots may be sized differently or composed of different inks that are transferred to the paper by different means, but all of the images for text or graphics are made up of dots. The smaller the dots, the more attractive the printout.

### A. DOTMATRIX PRINTERS

- The dot-matrix printer- noisy, slow, and crude - is a dying technology. Laser printers are faster and produce more attractive documents. Ink-jet printers cost little more than a dot-matrix, but produce beautiful color and resolution. The only thing a dot matrix printer has on its cousins is that it can handle multi-layer forms - carbons - while the others can't. That's because a dot- matrix printer is, like a typewriter, an impact printer. It prints by pounding ink onto paper. But carbons being, themselves, a sort of retry technology, even that advantage is dubious.
- Impact printers with 24 or more pins produce documents that rival the laser printer, and some dot-matrix printers can interpret commands from PostScript or another page description language. But most impact printers are simple things, designed to work with another ancient technology, bitmapped type controlled by ASCII codes sent to the printer from a PC.

## B. LASER JET PRINTERS

- Every time you send a page to your laser printer, you're selling in motion a complex, interlocked series of steps as efficiently organized as a factory and as precisely choreographed as a ballet. At the heart of the printer is the print engine—the mechanism that transfers a black powder to the page, which is a device that owes its ancestry to the photocopier. Its operation includes technologies Gutenberg never imagined, including laser imaging, precise paper movement, and microprocessor control of all its actions.
- To create the nearly typeset-quality output that is characteristic of a laser printer, the printer must control five different operations at the same time:
- It must interpret the signals coming from a computer,
- Translate those signals into instructions that control the firing and movement of a laser beam,
- Control the movement of the paper,
- Sensitize the paper so that it will accept the black toner that makes up the image, and
- Fuse that image to the paper.
- The result is no-compromise printing. Not only does the laser printer produce hard copy faster than most any other type of printer, but the laser printed pages are more sharply detailed. With the introduction of color laser printers, the five-ring circus turns into a 20-ring bazaar. For the foreseeable future, the laser is the standard for high end, day in, day out office printing.

## C. COLOR PRINTING

- There have been two revolutions in computer printing in the last decade. One was the laser printer, which brings typeset quality printing of text and graphics to the masses. The second was the development of inexpensive, fast, high quality color printing.
- The complexity of color printing, of course, means trade-offs. At the low-price end is the color ink-jet printer. It is in some ways a dot-matrix printer

without the impact and with four times the colors. A color ink jet costs barely more than a black and white ink-jet. The visual detail approaches that of laser printers, in some printers surpassing it. But ink-jet technology is relatively slow and you always have to fuss with cleaning and replacing the ink-filled print beads. Color ink jets are the ideal printer for the home, where printing volume is small, a budget maybe nonexistent, and the flash of color in a school report or a greeting card is worth the extra wait.

- For the office there are different color printing solutions that match the budget of a small business or home office and solutions that give the most fussy graphic artists the speed, color-matching, and details they need to create professional results. The crucial difference among color printers is how they get ink on the paper. Because it involves four colors of ink to achieve full color printing, a printer must either make multiple passes over the same sheet of paper-as happens with laser and thermal wax color printers- or it must manage to transfer all of the colors more or less simultaneously, which is what happens with solid-ink printers, whose results are almost photograph-quality.
- A common office color printing device is the color thermal printer. The process provides vivid colors because the inks it uses don't bleed into each other or soak into specially coated paper. But its four-pass method is slow and wastes ink. The color laser printer provides the most precise detail but is slow, complicated, and expensive because it requires four separate print engines that must each take their turn to apply colored toner to the page.
- Two other color-printing methods provide speed and photographic dazzle: dye sublimation-also called dye diffusion thermal transfer (D2T2) - and solid ink. By controlling not only how many dots of color they put on the page but the intensity of the dots, they produce continuous tone printing. The result is virtually indistinguishable from a color photograph even through its actual resolution maybe no more than the 300 dots per inch of the old laser printer. If the results you're trying to get with color printing are really important, these technologies are well worth the cost.

## Installing computer components and setting ready to use.

A computer is made up of a case (or chassis) which houses several important internal components, and provides places to connect the external components, including non-peripherals.

internal parts of computer hardware:

- **Power Supply/PSU** – power supply unit, converts outlet power, which is alternating current (AC), to direct current (DC) which is required by internal components, as well as providing appropriate voltages and currents for these internal components.



Figure 21 power supply

- **Motherboard/main board** – As the name indicates, this is the electronic centerpiece of the computer: everything connects to the motherboard.
- **Processor/CPU** – central processing unit, the "brain" of the computer, most actual computation takes place here.
- **RAM** – random access memory, the "short-term memory" of a computer, used by the CPU to store program instructions and data upon which it is currently operating. Data in RAM is lost when the computer is powered off, thus necessitating a hard drive.
- **Storage** - either HDD (Hard disk drive - slower of the two but less expensive) and/or SSD (solid state drive. Very fast and not always necessary) – the "long-term memory" of the computer, used for persistent storage – i.e. the things stored on it remain even when the computer is powered down. The operating system, and all your programs and data are

stored here. Operating Systems can be booted and use storage from inexpensive USB Drives, although this is only with extremely lightweight systems.

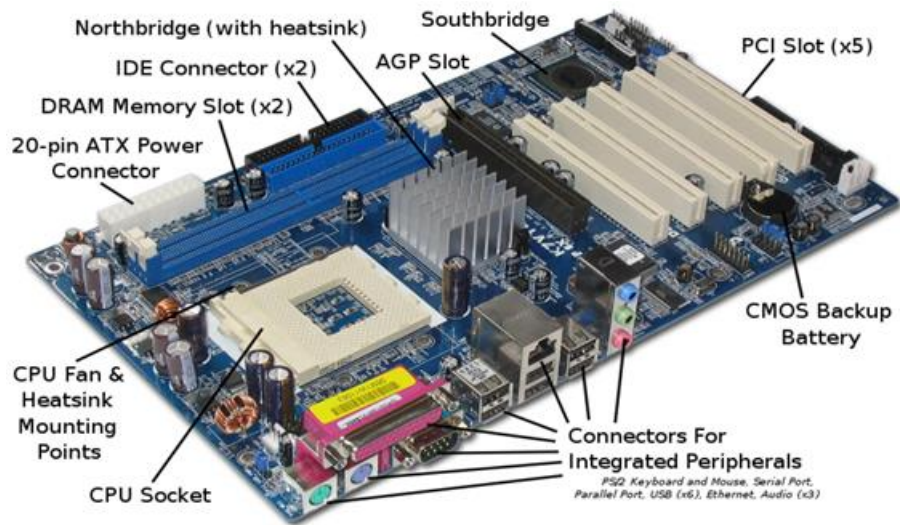


Figure 22 mother board

#### Optional components follow:

- **Optical Drive** – device for reading/writing optical disks. May read CDs, DVDs, or other optical media, depending on the type. It is essential for installing many operating systems and programs, although the vast majority can be run from USB. It may be able to write some of these discs, as well. Some people like to have two such drives for copying disks.
- **GPU/Graphics Card/GPU** – does processing relating to video output. Some motherboards have an "onboard" GPU built in so you don't need (but may add) a separate video card. Otherwise, you will need a video card. These plug into a slot on the motherboard and provide a place to connect a monitor to your computer.
- **Sound card** - Comes with motherboard but may want to be upgraded

On top of the internal components listed above, you will also need these external components:

- **Keyboard** – for typing on. Many motherboards won't even boot without a keyboard attached.
- **Mouse** – for pointing and clicking. Unless you chose a text-based operating system, you will likely want one of these.

- **Monitor** – This is where the pretty pictures go. They come in many forms, the most common being CRT and LCD.

#### Connecting printer with computer and setting ready to use.

Among your puzzle pieces should be a USB cable that connects directly into your computer's tower or your laptop's body. Depending on your computer's operating system, your computer should notify you that a new connection is being made and that a driver will need to be downloaded for it to complete the installation.

If you get this notification, follow your computer's intuitive lead and click the notification. It could do all the heavy lifting for you. If your computer has left you to do all the figuring out by yourself follow these steps.

<b>Self-check 1</b>	<b>Written test</b>
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PART-1: Say true or false

1. Color CRT type monitors have three kinds of phosphors to produce Red, Green and Blue (RGB) light. A.True B.False

Part-2- short answer

1. What do you call the external or tangible devices which are attached to the external part of the computer?

2. Given the different computer peripherals, group them by writing each of it where categories they belong on the table below:

- |                 |                 |                   |
|-----------------|-----------------|-------------------|
| a. Mouse        | e. Serial cable | i. LCD Monitor    |
| b. Monitor      | f. Printer      | j. PS2 cable      |
| c. Core i3 chip | g. Scanner      | k. Dual Core chip |

Printer Cable

h. Speaker

l. Keyboard

Input Devices	Output Devices	Processors	Connectivity Devices



## A. Tools and Equipment's

Basic tools:

- Phillips-head (cross-shaped) screwdriver
- Needle-nose pliers
- Anti-static Wrist Strap
- A large level working space

Optional, but useful tools

- Spring action parts grabber.
- Electrical tape
- Wire or nylon ties
- Flashlight, preferably hands-free
- A second, working computer to swap parts, look for tips, ask for help on-line, download drivers and patches, etc.
- A can of compressed air - useful when working with older parts that have collected dust. A better alternative but also more costly, is a vacuum cleaner designed for cleaning electronics.

Find a dry, well-ventilated place to do your work. You should have plenty of light and if possible, you should choose an area without carpet on the floor, as carpet tends to generate a lot of static. An unfurnished basement is a good work location.

## B. Procedures/Steps/Techniques To Assemble Computer Components

### Step1:

Take Safety precautions

- Static electricity is the biggest danger to the expensive parts you are about to assemble, even a tiny shock, much too small for you to feel, can damage or ruin the delicate electronic traces, many times smaller than a human hair, that make up your CPU, RAM and other chips. It's important to use your anti-static wrist strap
- To prevent damage to these components. Once you have the power supply installed in the case, clip the end of the wrist strap to the outside of the power supply. (Never plug your computer in while you are connected to it by a wrist

strap.) This will ensure that you, the case and the power supply are all connected to a common ground, in other words there will be no inequality of charge that will allow a spark to jump from you to the case. It's also helpful to have an anti-static mat to set the case and other components on.

- Nobody but you is at fault if you shock your components with static electricity. Make sure that you take the precautions in the previous paragraph to ground yourself from static electricity. (Note: if you really must work on a computer and have not got proper anti-static equipment, it is usually OK if you make sure that you do not move about much; are not wearing any static-prone clothing; handle components by the edges; and regularly (once a minute or so), touch a grounded object.). The case metal of your PC's power supply will usually be a suitable grounded object. As noted above, touch it every few minutes while you are working on your PC if you haven't got a wrist strap.
- Turn off your computer and switch off your Power Supply at the wall before installing or removing any components - if power is flowing to components as they are installed or removed, they can be seriously damaged. In order to have a computer properly grounded, you need it plugged in at the wall but turned off at the power supply and at the wall. The neutral line may be earthed
- Never cut the grounding pin off your power cord. This "safety ground" stands between you and potentially lethal voltages inside the power supply.
- Be wary of sharp edges! Many lower-end PC cases have sharp, unfinished edges. This is especially so on interior surfaces, and where the case has been cut or punched-out. Use care and take your time to avoid cutting your hands. If your case has this problem, a little time with some sandpaper before you begin construction can spare you a lot of pain.
- Dismantling discrete electronic components such as your Power Supply or Monitor is dangerous. They contain high voltage capacitors, which can cause a severe electric shock if you touch them. These hold a charge even when the unit is not plugged in and are capable of delivering a fatal shock.

## **Step 2: Construction**

- Start by putting your case down on your work surface, with the case door facing up, and open the case Motherboard
- Find the motherboard standoffs (spacers) that should have come with the case. They are screws, usually brass, with large hexagonal heads that are tapped so you can fasten screws into the top. These hold the motherboard up off the case preventing short-circuits. Set these aside.

### **Step 3:**

- Remove the I/O Shield from the back of the case where the ports on the back of the motherboard will fit, and put in the I/O Shield that came with your motherboard. There may be small metal tabs on the inside of this face plate, if so you may have to adjust them to accommodate the ports on the back of the motherboard.
- Note: Some case styles make it difficult to install the motherboard or the CPU with the power supply installed. If the power supply is in your way, take it out and set it aside (we'll put it back in later).
- Now locate the screw holes on your motherboard and find the corresponding holes on the motherboard plate (or tray) in the case. Put a standoff in each of these holes on the tray and position the motherboard so that you can see the holes in the top of the standoffs through the screw holes in the motherboard.
- Now is the time to make sure the ports on the motherboard are mating with the back plate you just installed, and make any necessary adjustments. The small metal tabs are intended to make contact with the metal parts of the connections on the back of the motherboard and ground them, but you may have to bend these tabs a bit to get the ports all properly mounted, this is where those needle-nose pliers may come in handy.
- Now fasten a screw through each of the motherboard screw holes into the standoffs underneath. These screws should be snug but not tight, there is no reason to torque down on them, hand tight is fine otherwise you can damage the motherboard.
- Once the motherboard is installed, it is time to plug the other components.
- Step 4:

## **CPU**

- You should rely on the instructions that are provided with the CPU. The two things that go wrong the most often and most expensively (minimum of a killed CPU, sometimes more) in building one's own computer are both related to the CPU and its cooler:
- Switching the computer on "just to see if it works" before adding any CPU cooling unit.
- Mounting the CPU cooler improperly. Read the instructions that came with your CPU and cooler very carefully and ensure you are using all components in the correct order and correct place.
- If you buy a third party cooling solution for your CPU make sure you get one that is compatible with the CPU you have. Most brands come with multiple mounting brackets that will suit many different chipsets, but it is best to check for compatibility just in case. If using thermal paste, apply it only to the CPU die (the square piece of silicon in the middle of the CPU) and do so sparingly -- most modern CPUs take no more than a dab of thermal paste the size of a grain of rice. Some people do like to wipe some onto the heat-sink's surface and then wipe it smoothly off so that bits of it may get into tiny holes for better heat transfer. If using a thermal pad supplied with your cooler, make sure you remove any protective tape from the die just before installing and do not get it dirty - and do not combine thermal pads with thermal paste, it is either one or the other. Then, check that you
- Install the cooler in the right orientation and that you set it flat on the CPU die without exerting undue pressure on any edges or corners - the latter can make small pieces of the die break off, killing the CPU.
- Tighten the cooler using only the specified holding devices - if you did everything right, they will fit. If they do not fit, check your setup - most likely something is wrong. After mounting the cooler, connect any power cables for the fan that is attached to the cooler.

## **Step 5 Memory slots**

- Now, you will need to install your RAM (random access memory). Find the RAM slots on your motherboard. To install the RAM modules, first push on the levers (white plastic in the picture) on either side of the DIMM socket, so that they move to the sides. Do not force them, they should move fairly easily. Put the RAM module in the socket. Line up the notch in the center of the module with the small bump in the center of the RAM socket, making sure to insert it the right way. Push down on the module until both levers move up into the notches on the sides of the module. There should be a small "snap" when the module is fully seated. Although this does require a fair bit of force, do not overdo it or you may break the RAM module. Start adding RAM at the slot labeled "Bank 0" or "DIMM 1". If you do not have a stick in "Bank 0" or "DIMM 1" the system will think there is no RAM and will not boot. On newer motherboards with 4 slots, you'll see alternating colors. For example, slot 1 is blue, slot 2 is black, slot 3 is blue and slot 4 black.

### **Step 6 Power Supply**

- Installing your power supply is pretty straightforward, if it came with your case it was pre-installed and if you took it out earlier to get the motherboard in, now is the time to put it back. Otherwise a few moments of screwdriver work will get the job done. Generally there will be a bracket on the top of the case where the power supply is mounted and a few screws used to fix it in place. Some power supplies
- come with modular cables, so you can plug in only those you'll be using. Other power supplies have all the cables hardwired in, you'll want to separate out the ones you'll need and neatly coil the remainder somewhere out of the way. If your power supply has a switch to select 115v or 220v make sure it is set properly. Many newer power supplies can automatically select and don't have such a switch. Once you get the power supply installed, make sure of the location of the power sockets. You may then connect the main power, a 20 or 24 pin, plug into the motherboard. There may also be an additional four or eight pin power lead that needs to be plugged in to the motherboard (the CPU power connector) usually located near the processor socket.

### **Step 7 Installing drive jumpers**

- The drive jumpers are in the middle (between the connector for the cable and the power connector) but the location may vary. If you are using SATA drives there is no need to adjust jumpers.
- Before you install IDE/ATA (PATA) drives, you will need to set the drives jumpers. Each IDE/ATA channel can handle two drives, a master and a slave. Consult your drive's instructions on how to set the jumpers. The jumper configurations are usually either printed on the back, or on the top of the drive. Drives can be configured in 2 ways: Drive Select or Cable Select.
- "Cable select": Use this if you have 80-pin cables. Cable select automatically assigns slave/master based on the plug on the IDE cable the drive is plugged into. Put the jumper on CS.
- "Drive select": If you are using a 40 pin cable, you must use "drive select". Master/slave status is determined by the jumper. In this mode, configure the drive on the end connector as the master, and the drive connected to the middle connector as the slave. If the IDE channel has only one drive, check your motherboard documentation for the appropriate setting, which is usually master.

### **Step 8 Installing drives**

- Now install the hard drive and optical drives. How a drive is physically installed will depend on the case. Most new drives are SATA (Serial ATA) which use simple, small cables for a data connection. The ends of the cables are L shaped, just look carefully at the cable ends and the connector on the drive and match them up. Only one drive can be connected to each SATA port on the motherboard. Some SATA drives have two different power ports - make sure you connect ONLY ONE of these ports to the power supply, connecting both can damage the drive. Older drives have PATA (Parallel ATA) connections which use a flat ribbon (IDE) cable for data connection. When using an IDE cable, plug the two connectors that are closer together into the 2 drives and the third to the controller or motherboard. The connector furthest from the board should be attached to the drive set as Master. Make sure the drive that you will install your

OS on is the primary master. This is the master drive on the Primary IDE bus which is usually the IDE 40 pin port on the motherboard labeled “Primary” or “IDE 1”.

- Next, plug a 4 pin Molex power connector into each hard drive and optical drive. If you are installing the power connector to a SATA drive, some drives have the option of using either the SATA power connector (a flat about 1" wide connector) or the standard Molex connector; use one or the other, not both. Connecting both can break your hard drive. For better data transfer, you can purchase heat-protected high-end data cables at your nearest electronics store.

### **Step9 Other Connections**

- In order to turn the computer on, you will need to connect the power button and while you are at it, you might as well do the reset buttons and front panel lights as well. There will be a set of pins, usually near the front edge of the motherboard to which you will attach the cables sometimes already connected to the front of the case, or if needed supplied with the motherboard. Most of the time the plugs will be labeled as the pins they will connect to in the motherboard.

### **Step 10 Prepare for Power Up**

- For this test, you'll want to have the computer open, so that you can see all of the fans, and you'll need to connect a monitor, a keyboard and mouse. Monitors will either have a VGA, DVI, or a new HDMI 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. 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.

### **Step 11 Power up**

- Take a moment to check one more time that everything is as it should be. Make sure you've removed your wrist strap, turn on the monitor, then press the power button, and observe the inside of the open machine. The first thing to look for is that the CPU cooler fan spins up, if it does not, cut the power immediately. The

fan should start up right away; something is wrong if it doesn't and your CPU is in danger of overheating so stop now and trouble shoots.

- If the CPU fan spins up, check that all the other fans that should be spinning – case fans and fans on the power supply and video card (if installed) are also spinning. Some of these fans may not spin up until a temperature threshold is passed, check your documentation if anything is not spinning. If the fans spin, you can turn your attention to the monitor, what you are hoping to see is the motherboard's splash-screen, usually featuring the manufacturer's logo. If this event does not occur, if smoke appears, or if the computer does not do anything, unplug the power cord immediately and check the steps above to make sure you have not missed anything. Give special attention to the cables and power connections. If the computer does appear to come on, but, you hear beeps, listen carefully to the beeps, turn the computer off, and refer to your motherboard's manual for the meaning of the beeps. Some boards have an optional diagnostic device; usually a collection of LEDs, which when properly plugged in will inform you of the nature of the problem. Instructions for installing this as well as the meaning of its display should be in the manual for the motherboard. If the computer turns on but the only thing that comes on is your power supply, turn it off. This probably means something is shorted, and leaving it on could damage the parts.
- Security: After installation is important to have proper security system for your computer. Install an anti-virus program. Turn on firewall. Have a strong password. Physical security is also important in case of damage to system and its parts and theft.

### **C. Procedures/Steps/Techniques To Install and Configure Printer**

#### **Step 1: Open windows setting**

- At the bottom left of your screen, click the Windows icon to reveal your Start Menu



- At the bottom of the left-most column, you should see a gear icon linking to your settings window

### **Step 2: Access devices**

- Within the first row of your Windows settings, find and click the icon labeled “Devices”
- In the left column of the Devices window, select “Printers & Scanners”
- This new window brings up a page where the first option will be to “Add Printer or Scanner”

### **Step 3: Connect your printer**

- Once you’ve clicked “Add Printer or Scanner,” Windows should be able to detect your printer connected via USB cable
- When the name of your printer pops up, click it and complete the installation as per your computer’s instruction

That’s it! Your printer should be connected and running, ready to churn out beautiful pages

## **Connecting a wireless printer:**

### **Step 1: Locate your settings**

- Once turned on and ready for configuration, you’ll need to connect the printer to your home WiFi
- While the steps on installation vary by manufacturer, most modern printers will have an LCD screen that lists the available WiFi networks
- On this screen, click around and locate the setup page that allows you to adjust the Wireless LAN Settings

### **Step 2: Link your WiFi network**

- After accessing your LAN settings, you’ll need to locate your home network service set identifier - better known as your SSID

- You can find your SSID by hovering your mouse over the WiFi icon located at the bottom right of your taskbar
- Your SSID is also located on the bottom or side of your internet service provider's router

### Step 3: Complete connectivity

- With the SSID selected, you're ready to enter your network password
- Once entered, your printer is prepped for all printing activity

### Step 4: Locate your printer settings

- Click the Windows icon at the bottom left of your desktop screen to reveal your Windows Start Menu
- Locate the gear icon link to your settings window and click on the icon labeled "Devices"

### Step 5: Connect the printer to the computer

- Within your "Devices" screen, you should find an option to "Add a Printer or Scanner"
- After clicking this, the name of your printer - generally with the manufacturer name and model number - should appear as available.
- Select "Add Device" and your computer will do the rest to complete the wireless configuration.
- Finally print a test page in order to make sure a printer prints successfully

<b>LAP TEST-1</b>	<b>Performance Test</b>
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Name.....ID.....Date

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

Instructions: Given the necessary templates, tools, and materials you are required to perform the following tasks within 3hr. The project is expected of each student to do it.

Task-1 .Assemble computer system components properly

Task-2 Connect Printer With Computer

## **UNIT-TWO: INSTALL AND ADMINISTER BASIC COMPUTER APPLICATIONS**

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

- Installing basic computer applications.
- Installing required device drivers.
- Creating and administer user accounts

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

- Install basic computer applications.
- Install required device drivers.
- Create and administer user accounts

### **Learning Instructions:**

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

## 2.1. Installing basic computer applications

### What is a Computer?

A computer is an electronic device that can accept, store and process data under the control of a set of instructions.

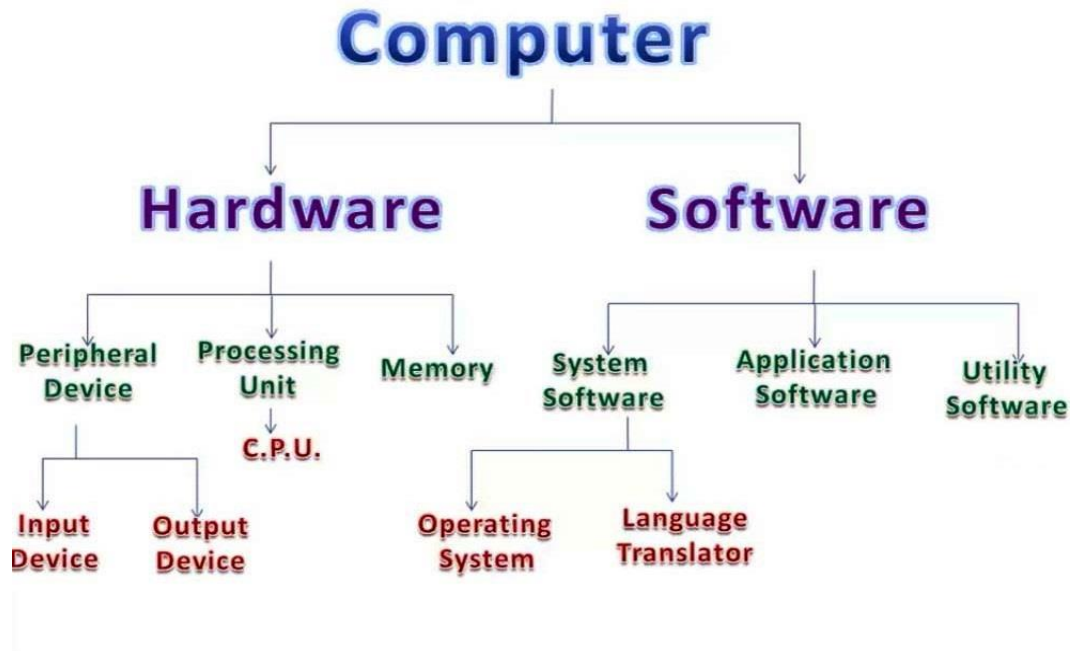


Figure 1 Parts of Computer categories into two categories - Hardware and Software

**Computer software/Application**, or just **software**, is a collection of computer programs and related data that provide the instructions for telling a computer what to do and how to do it.

**Application Software:** Application software is that, which is designed for the end-users and hence known as end-user programs. It employs the capabilities of a computer to execute the tasks that the user wishes to perform on a computer system.

Examples of application software are:

- Word Processing Software
- Presentation Software
- Spreadsheet Software
- Desktop Publishing Software
- Database Management Software

**System Software:** It is computer software that manages and controls hardware in order to enable application software to perform its tasks. System software performs the functions like transferring data from memory to the disk or delivering text onto a display device.

**E.g.** Operating systems (Like Windows, Linux. etc)

### **What is Utility Software?**

System utility software is a set of tools that helps configure, analyze and optimize computer resources to help users perform multiple tasks efficiently.

The best Utility Software provides key functionality such as data compression, data recovery, disk defragmentation, computer resources and files management, system diagnosis, and more.

Most of the operating systems have input built-in utility tools, but additional software like antivirus tools, disk tools and data backup tools further ensure improved functionality. Utility software focuses on computer components such as hardware, software, operating system, and storage parts.

- Backup Utilities
- Antivirus
- Backup Software
- Data Synchronization Tools
- File Management System
- Disk Management Tools
- Disk Clean-Up Tool
- Debuggers
- Screen Savers
- Clipboard Managers
- Disk Space Analyzers
- Network Utilities
- System Monitors
- Cryptographic Utilities
- Registry Cleaners

### **Software Requirements**

To be used efficiently, all computer software needs certain hardware components or other software resources to be present on a computer.

With increasing demand for higher processing power and resources in newer versions of software, system requirements tend to increase over time.

## **Recommended system requirements**

Often times manufacturers of games will provide the consumer with a set of requirements that are different than those that are needed to run software. These requirements are usually called the

## **Recommended Requirements**

These requirements are almost always of a significantly higher level than the **minimum requirements**, and represent the ideal situation in which to run the software.

- **Hardware requirements**

The most common set of requirements defined by any operating system or software application is the hardware. A hardware requirements list is often accompanied by a hardware compatibility list (HCL)

**Architecture (Structural design)** All computer operating systems are designed for a particular computer architecture. Most software applications are limited to particular operating systems running on particular architectures.

## **Processing power**

The power of the central processing unit (CPU) is a fundamental system requirement for any software. Most software running on x86 architecture define processing power as the model and the clock speed of the CPU.

## **Memory**

All software, when run, resides in the Random-Access Memory (RAM) of a computer. Memory requirements are defined after considering demands of the application, operating system, supporting software and files, and other running processes.

## **Secondary storage**

Hard-disk requirements vary, depending on the size of software installation, temporary files created and maintained while installing or running the software, and possible use of swap space (if RAM is insufficient).

## **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.

## **Peripherals**

Some software applications need to make extensive and/or special use of some peripherals, demanding the higher performance or functionality of such peripherals. Such peripherals include CD-ROM drives, keyboards, pointing devices, network devices, etc.

- **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.

## **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 runtime libraries.

## **APIs and Drivers**

Software making extensive use of special hardware devices, like high-end display adapters, needs special API or newer device drivers. A good example is DirectX, which is a collection of APIs for handling tasks related to multimedia, especially game programming, on Microsoft platforms.

## **Web browser**

Most web applications and software depending heavily on Internet technologies Make use of the default browser installed on system.

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.

## **Installing application**

## **Computer Program (Application software) Installation**

Some software can be executed by simply copying it to a computer and executing it with no further ado; no installation procedure as such is required. Other programs are supplied in a form not suitable for immediate execution, and require an installation procedure. Installation may include unpacking of files supplied in a compressed form, copying them to suitable locations, tailoring the software to suit the hardware and the user's preferences, providing information about the program to the operating system, and so on. The installer may test for system suitability and available mass storage space.

Installation usually implies that once installed, the program can be executed again and again, without the need to reinstall before each execution. Some software does not need installation at all. There is server-based software that mimics locally-installed software, and can be run inside of a web browser, using only the local system's cache. This allows portability among computers with access to the server. This technique is often referred to as cloud computing.

**Common operations performed during software installations include creation or modification of:**

- Shared and non-shared program files
- Folders/directories
- Windows registry entries
- Configuration file entries
- Environment variables
- Links or shortcuts

### **Type of Installations**

- **Silent installation**

Installation that does not display messages or windows during its progress. "Silent installation" is not the same as "unattended installation", though it is often improperly used as such.

- **Unattended installation**



Installation that is performed without user interaction during its progress or, in a stricter sense, with no user present at all, except eventually for the initial launch of the process. An installation process usually requires a user who "attends" it to make choices at request: accepting an EULA, specifying preferences and passwords, etc. In graphical environments, installers that offer a wizard-based interface are common. However, these installers may also provide command line switches that allow performing unattended installations.

### **Answer file**

Some unattended installations can be driven by a script providing answers to the various choices such as the answer file which can be used when installing Microsoft Windows on a large number of machines.

- **Self-installation**

Unattended installation, without the need of initial launch of the process (i.e. Vodafone Mobile Connect USB Modem or Huawei E220's Mobile Partner software that self-installs from the USB port).

- **Clean installation**

Given the complexity of a typical installation there are many factors that may interfere with its successful completion. In particular files that are left over from old installations of the same program or an unstable situation of the operating system may all act to prevent a given program from installing and working correctly. An installation performed in absence of such interfering factors (which may vary from program to program) is called a clean installation. In particular, a clean operating system installation can be performed by formatting its destination partition before the actual installation process.

- **Flat installation**

An installation of a program performed from a copy (called a *flat copy*) of its original media contents (mostly CDs or DVDs) to a hard drive, rather than directly from the media. This may help in some situations where the target machine isn't able to cope with random access reads from CD/DVD at the same time as performing the CPU-intensive

tasks often required by an installation, or where the target machine does not have an appropriate physical drive.

- **Network Installation**

An installation of a program from a shared network drive. This may simply be a copy of the original media (as in a Flat Installation), but frequently, software publishers which offer site licenses for institutional customers provide a version intended for installation over a network.

## **2.2. Computer Software Installation**

The operating system of your computer is an important factor to be considered when you install any software. The operating system is the program that is contrived to run the computer software on your computer. The operating system is responsible for managing the computer software and hardware. Before you install a computer software, the first important step is to check the configuration of your computer. Also, check the hardware and software requirement of the software you are installing. The configuration of your computer must match the requirements of the software to be installed. Sometimes, the software to be installed is compressed in a .RAR or .ZIP file. In these cases, before you install the software you have to decompress all the installation files and folders. To decompress the files and folders, ensure that you have a decompression software application installed on your computer. Every computer software comes with a 'Read me' file. This 'Read me' file contains all the instructions that are required to install the software on your computer. Sometimes, when you install a software, the software may ask you to install another program that is required for the proper execution of the software to be installed. The computer may even prompt you to install the supporting software after you complete the installation. When you install any software program on the computer, it is advisable to close all other programs and utilities. Some antivirus software applications may require you to turn off the firewall and disable the antivirus in order to install the software.

**Note!** When installing software applications related to computer networking or web browsing, it is recommended to disable the antivirus and the firewall. Finally, to complete the installation, restart your computer system.

## What means Upgrading?

The term **upgrade** refers to the replacement of a product with a newer version of the same product. Common hardware upgrades include (for example) installing additional memory (RAM), adding larger hard disks, replacing microprocessor cards or graphics cards, and installing new versions of software.

## What are upgrading Risks?

Although developers produce upgrades in order to improve a product, there are risks involved including the possibility that the upgrade will worsen the product.

**Upgrades of hardware** involve a risk that **new hardware will not be compatible with other pieces of hardware in a system**. For example, an upgrade of RAM may not be compatible with existing RAM in a computer.

**Upgrades of software** introduce the risk that the **new version (or patch) will contain a bug, causing the program to malfunction** in some way or not to function at all. Upgrades can also worsen a product subjectively. A user may prefer an older version even if a newer version functions perfectly as designed.

## When Should You Upgrade Your PC Software?

With new versions of the software we use being released regularly; one of the questions we get often is how someone should decide whether they should upgrade their software to the current version.

We generally separate software upgrades into two categories:

- 1) Service releases or bug fixes and
- 2) New software versions.

**For service releases or bug fixes**, we tend to upgrade **as soon as they are released** since they usually make the software more stable and reliable.

**For new software versions**, we should use four criteria to determine whether we want to upgrade:

## **Installing required device drivers.**

Driver is software that a device uses to work with your PC. When your device isn't working properly, you can check if the driver is installed correctly. Faulty driver could always be the cause. To fix the problem, you need to update the driver. For some devices, Windows can update the driver automatically. For some devices especially external devices, you need to install the updated drivers yourself, then you need to download the driver manually.

### **Download the driver manually**

To download new drivers, go to PC manufacturer's website or device manufacturer's website. Driver updates are often available in the Support section of their website. If you are using a branded computer, it is recommended that you go to the PC manufacturer's website to check for the latest driver first, as they may customize the driver. You are required to use the **PC model** and the **operating system** that you are using to download the correct driver. Usually, the PC model can be found on the machine. See [How to Get Operating System](#). If you need to download the driver from device manufacturer, then you are required to know the device model.

### **How to install the driver**

The downloaded driver file will be an executable file (File name ends in ".exe".) or a zip file (File name ends in ".zip").

For executable file, to install the driver, you just need to double-click on the file and follow the on-screen instructions.

For zip file, you need to unzip it and find the executable file in the archive. If you cannot find an executable file, you need to install the driver step by step using the ".inf" file. Following steps are for your reference how to install the driver in this way.

## **Creating and administering user accounts**

If you wanted to, you could have a **single account** on your computer that everyone could use. But having **multiple accounts** has some advantages. If each user has his or her own account,

then each person will have his or her own desktop for organizing files and folders. Each person also will be able to choose a specific **desktop background**, along with other personalization features. In addition, parents will be able to set **Parental Controls** for each child's account.

### **Standard vs. administrator accounts**

Before you start making new user accounts, it's important to understand the two types of accounts:

- **Standard:** Standard accounts are the basic accounts you use for normal, everyday tasks. As a Standard user, you can do just about anything you would need to do, such as running software or personalizing your desktop. Also, Parental Controls can be placed on Standard accounts.
- **Administrator:** Administrator accounts are special accounts that are used for making certain changes to system settings or managing other people's accounts. They have full access to every setting on the computer. Every computer will have at least one Administrator account. As you can see, Administrator accounts are more powerful. But for the same reason, Standard accounts are safer, so they are generally better for everyday use. In fact, you can make **Administrator-level changes** while logged into a **Standard account**; you will just need to provide an **Administrator password** when making the changes.

To go to your user accounts:

1. Go to the **Control Panel** from the **Start Menu**.
2. Click **Add or remove user accounts**.



Figure 2 control panel interface 1

3. The **Manage Accounts** pane will appear. You will see all of the user accounts here, and you can add more accounts or manage existing ones.



Figure 3 control panel user accounts interface 2

#### To create a new account:

1. From the **Manage Accounts** pane, click **Create a new account**.
2. Type an **account name**.



Figure 4 control panel interface to select account type

3. Select **Standard user** or **Administrator**.
4. Click **Create Account**.

### Changing an account's settings

Once you've created a new account, you may want to add a **password** or make other changes to the account's settings.

#### To create a password:

1. From the **Manage Accounts** pane, click the account name or picture.

2. Click **Create a password**.



Figure 5 Control panel interface create password

3. Type a password in the **New password** field, and retype it in the **Confirm new**

A screenshot of the Windows password creation dialog box. The text at the top says "You are creating a password for Will Jr." followed by a warning: "If you do this, Will Jr will lose all EFS-encrypted files, personal certificates and stored passwords for Web sites or network resources." Below this is a note: "To avoid losing data in the future, ask Will Jr to make a password reset floppy disk." There are three input fields: "New password", "Confirm new password", and "Type a password hint". Below the "Confirm new password" field, there is text: "If the password contains capital letters, they must be typed the same way every time." and a link "How to create a strong password". Below the "Type a password hint" field, there is text: "The password hint will be visible to everyone who uses this computer." and a link "What is a password hint?". At the bottom right, there are two buttons: "Create password" and "Cancel".

password field.

Figure 6 control panel interface confirm password

4. If you want, you can type a password hint to help you remember your password.



5. Click **Create password**.
6. To go back to the Manage Accounts pane, click **Manage another account**.

Account passwords are **case sensitive**, which means capital and lowercase letters are treated as different characters. For example, **aBc1** is not the same as **abc1**.

To change your account picture:

You can also **change the picture** for any account. This picture appears next to the account name and helps you easily identify the account.

1. From the **Manage Accounts** pane, click the account name or picture.
2. Click **Change the picture**.

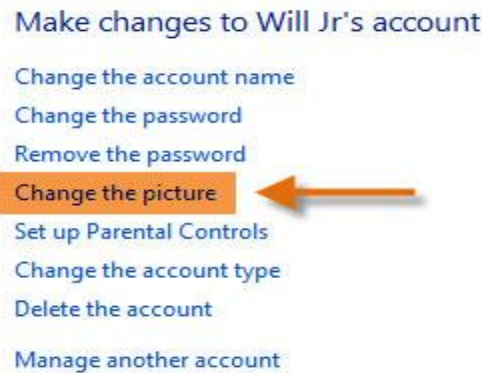


Figure 7 change picture

3. Select a picture, or click **Browse for more pictures** to select one of your own.



Figure 8 control panel interface set picture

#### 4. Click **Change Picture**.

Self-Check – 2	Written test
----------------	--------------

Name..... ID..... Date.....

**Directions:** Answer all the questions listed below.

#### Test 1: say true or false

1. Installation that does not display messages or windows during its progress. A.True B. False

#### Test 2: Short Answer Questions

1. Explain the difference between Administrator and Standard User?
2. What is a Driver and importance of it ?
3. Discuss and describe at least 3 types of software installations

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

## Operation Sheet -2

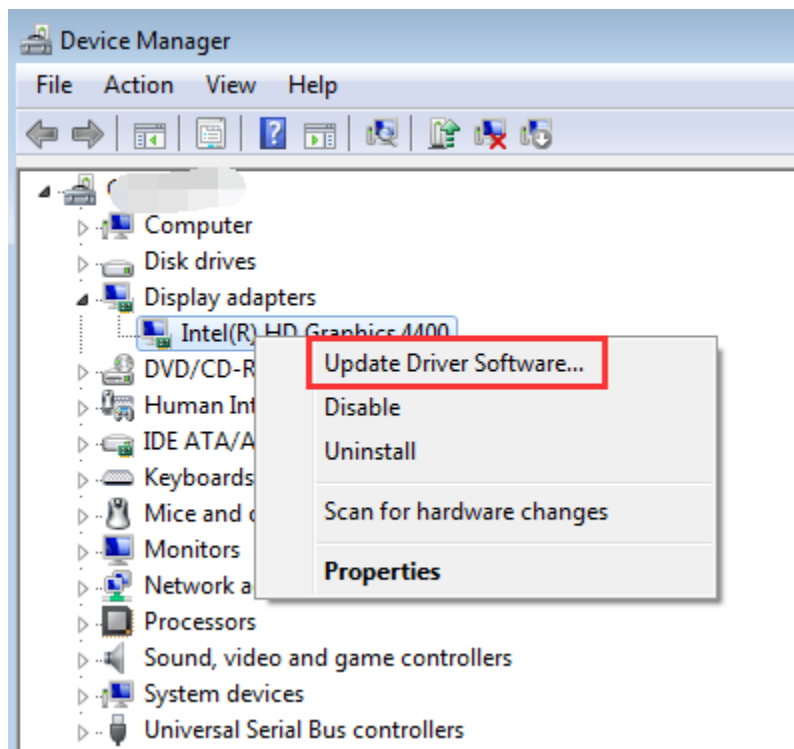
### Operation Name: Updating Driver

#### A. Tools and equipment

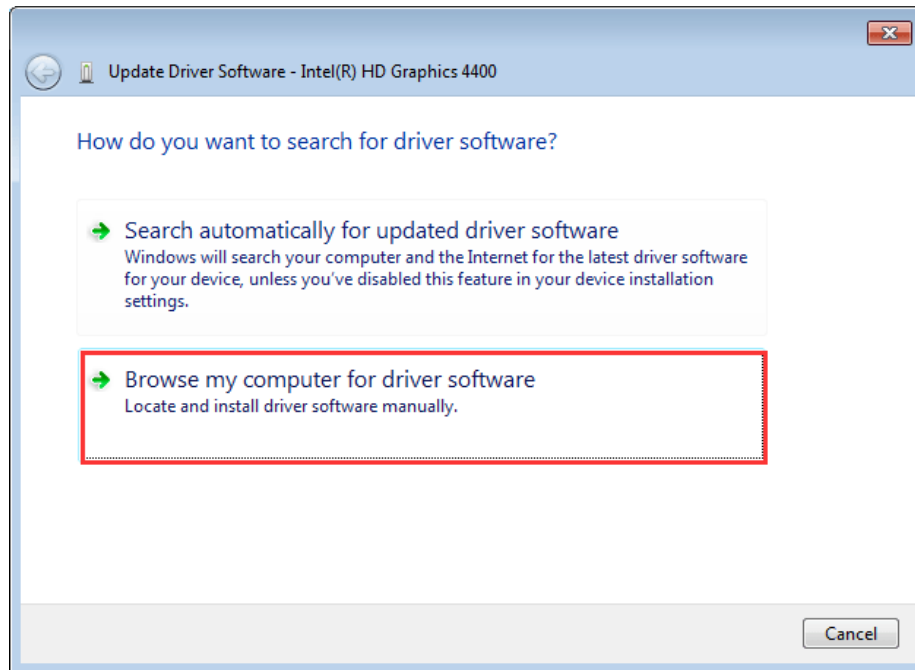
- I. Computer: Desktop, Laptop
- II. Operating System: Windows

#### B. Procedures/Steps/Techniques

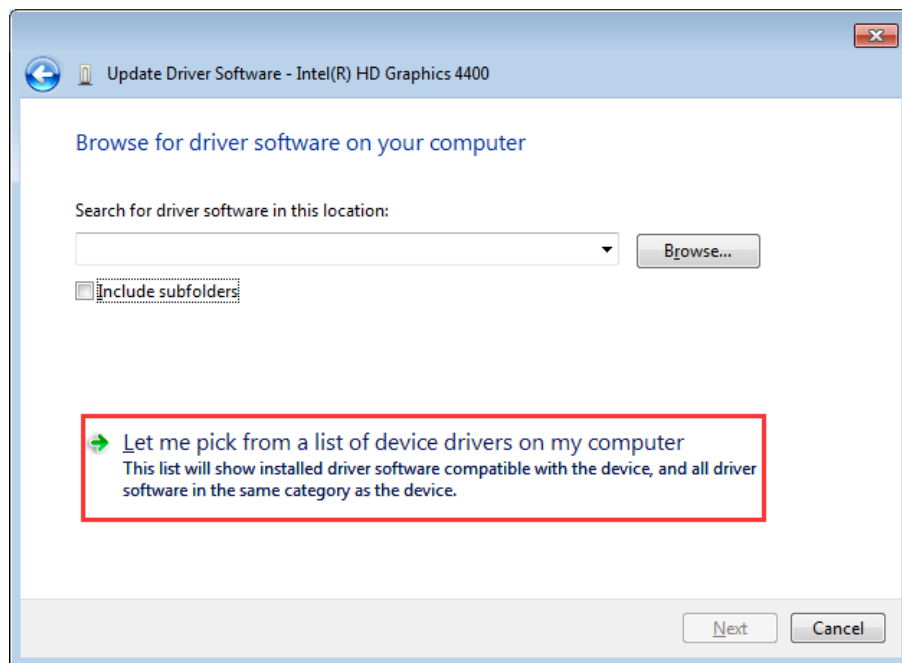
1. Go to Device Manager.
2. Find the device that needs to install a driver. (Here let's take video card for example.)
3. Right-click on the device and select **Update Driver Software...**



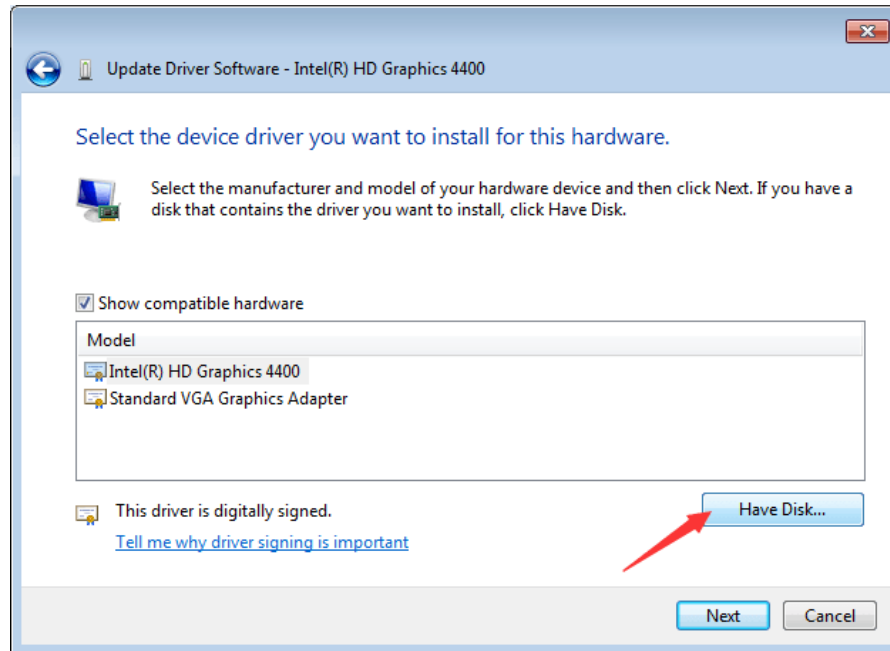
4. Select **Browse my computer for driver software.**



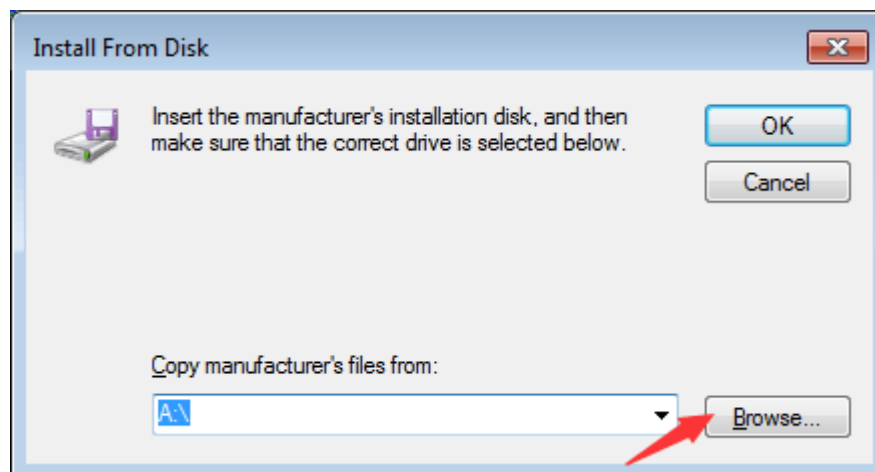
5. Select **Let me pick from a list of device drivers on my computer.**



6. Click **Have Disk...** button.



7. Click **Browse...** button. Navigate to the folder where you saved the downloaded driver file and browse the .inf driver file.



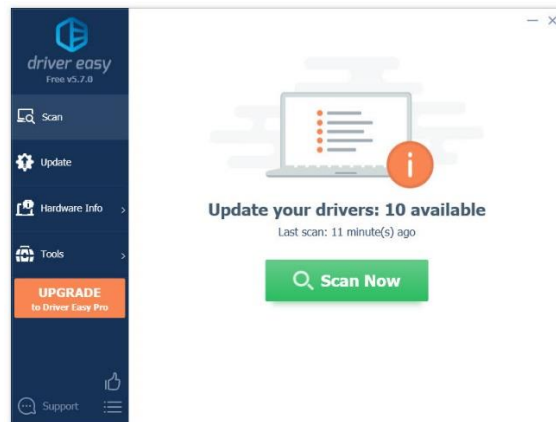
8. Click **OK** button then **Next** button to finish the installation. You might be asked for an admin password or to confirm your choice.

If you have difficulty in downloading and installing drivers manually, or if you want to save more time in updating drivers, you can use **Driver Easy**.

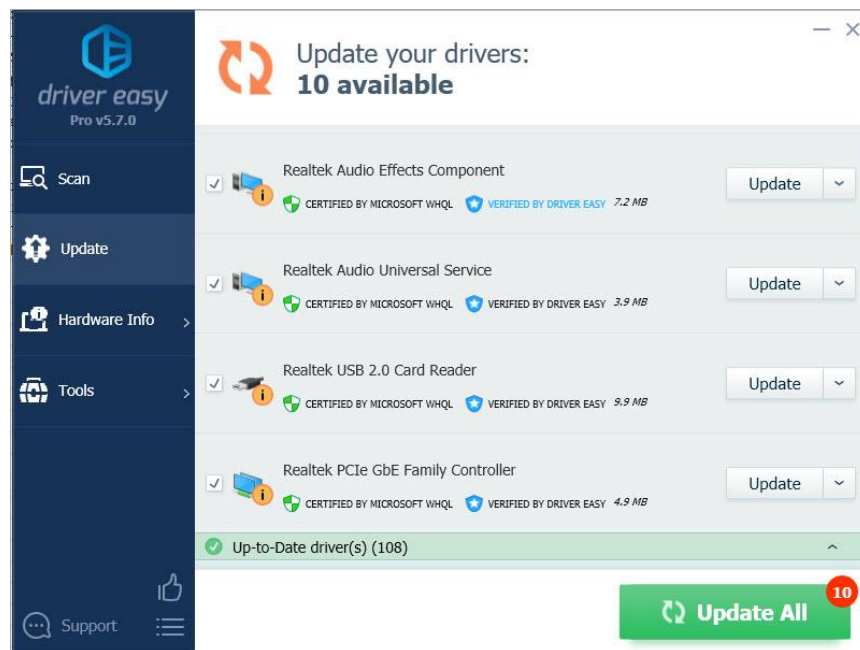
**Driver Easy** will scan your computer to detect all problem drivers in several seconds, then give you new drivers. It has Free version and Paid version. You can use the Free version to update

drivers one at a time. With Paid version, to update drivers, all you need to do is click your mouse 2 times.

1. Click **Scan Now** button. Then Driver Easy will scan your computer quickly and provide you with new drivers instantly.



2. Click **Update All** button. Then all drivers will be downloaded and installed automatically.



LAP TEST	Performance Test
----------	------------------

Name.....

ID.....

Date.....

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:** Given necessary tools and materials you are required to perform the following tasks within **1** hour. The project is expected from each student to do it.

**Task:**

1. Update the Graphics/Video Driver of your computer

## **UNIT THREE: IDENTIFY THE EXISTING HEALTH TECHNOLOGIES**

- This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –
  - Introduction to computers operating system
  - Internet browsers
  - Existing new technology
- 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
  - Apply the existing knowledge and techniques to technology
  - Utilize computer operating systems.
  - Open and manipulate Internet browsers to search for, send and receive information
  - Identify situations where existing knowledge can be used as the basis for developing new skills.
  - Acquire mobile technology skills to enhance learning and provision of standard health care
  - Use M health techniques to enhance efficient utilization of resources and avoid duplication of efforts
  - Identify, classify and use New and/or upgraded equipment's, where appropriate, for the benefit of customers as well as the health care system



### 3.1. Introduction to computers operating system

An Operating system is software that creates a relation between the User, Software and Hardware. It is an interface between the all. All the computers need basic software known as an Operating System (OS) to function. The OS acts as an interface between the User, Application Programs, Hardware and the System Peripherals. The OS is the first software to be loaded when a computers starts up. The entire application programs are loaded after the OS. Whenever an application needs information it requests the OS which in turn queries the System clock on the motherboard. User interacts with the computer through the OS then OS interprets inputs given by a user through the Keyboard, Mouse or other input device and takes appropriate actions.

### 3.2. Types of computers operating system

An	Operating	System	can	be	of	Three	Types:
Single	User	MS-Dos,	MS-Win	95-98,	Win-ME		
Multi	User	UNIX,	Linux,	XENIX			
Network	Novel	Netware,	Win-NT,	Win-2000-2003			

1. **Single User:** If the single user os is loaded in computer's memory; the computer would be able to handle one user at a time.
2. **Multi user:** If the multi-user os is loaded in computer's memory; the computer would be able to handle more than one user at a time.
3. **Network:** If the network os is loaded in computer's memory; the computer would be able to handle more than one computer at a time.

### 3.3. Purpose of computers operating system

The purpose of the OS is provided an environment in which the user can execute programs. The primary goal of an OS is thus to make the computer convenient to use.

A secondary goal is to use the computer hardware in an efficient manner.

**Computer Hardware – CPU, memory, I/O devices provide basic computing resources. System and Application Programs – Compilers, database systems, games, business programs, etc. define the ways the computing resources are used to solve the users problems.**

**Operating System – Controls and coordinates the computing resources among the system and application programs for the users.**

### 3.4. Operating System Components

**Main components are process, memory, file, I/O system, and secondary storage management.**

### 3.5. Responsibilities of operating system

#### **Process Management responsibilities.**

- Creation and Deletion of user and system processes
- Suspension and resumption of processes
- Provision of mechanisms for process synchronization
- Provision of mechanisms for process communication
- Provision of mechanisms for deadlock handling

#### **Main Memory Management responsibilities**

- Keep track of which parts of memory are being used and by what processes.
- Decide which processes are to be loaded into memory when memory space becomes available.
- Allocate and de-allocate memory as needed.

#### **File Management responsibilities**

- Creation and deletion of files.
- Creation and deletion of directories
- The support of primitives for manipulating files and directories
- Mapping of files onto secondary storage
- Backup of files onto stable storage media.

I/O System Management – hides the peculiarities of specific hardware devices from the user.

### **Internet browsers**

The Internet is a worldwide network of computers, and the World Wide Web is the most popular way of using the Internet to organize and link information. The Web uses hypertext to link documents with a graphical "point-and-click" interface. Other ways of using the Internet include e-mail, file transfer protocol (FTP), Telnet, and Usenet.

At the center of the Internet are the servers. Servers are computers that store lots of information for other computers to download and view. When you look at a Web page, you are a client and

the computer you look at is the server, sending its Web page to you over a tangle of wires, routers, and switches.

Today's Internet is a web of connectivity including telephone service providers, regional Internet Service Providers (ISPs), local ISPs, and millions of end users who access the information or post sites on the Internet via an ISP. The telephone companies or other large providers sell connectivity.

### **Concepts in internet browser**

- **Browser** (short for web Browser) you may get questions about the difference in a web browser and a search engine. A type of software program that allows users to find and connect to Web pages. Two of the most popular browsers are Netscape Navigator and Microsoft Internet Explorer. These allow the user to move back and forth between pages through links.
- **E-mail** (short for Electronic Mail) the transmission of messages electronically E-mail can be limited to a single computer system or network, or can allow much broader connectivity. Most e-mail systems allow you to send the same message to one or many people.
- **FTP** (File Transfer Protocol) A standard protocol used to send files from one computer to another on the Internet.
- **Home Page** The opening page of either a personal, commercial, or institutional Web site

### **The purpose of web browser**

- Web browser is used to run the software application that allows retrieving, presenting and traversing the information from one place to another.
- Web browser provides the resources using the WWW (World Wide Web) this can be identified by URI (Uniform Resource Identifier).
- Web browser fetches the data like web page, image, video or other piece of content from the server and displays it accordingly.
- Web browser uses hyperlinks to display the resources and allow the users to navigate their browsers according to the resources.
- Web browser defines the application software that is designed for the user to access and retrieve the documents using the Internet.

### **Health as existing new technology in health care**

Ethiopia is at a pivotal moment in its efforts to improve the health status of its people

and address health inequities. As the country has made progress in reaching the health-related Millennium Development Goals, the government realizes that these advances need to be accelerated if targets in the areas of maternal and child mortality and infectious diseases are to be achieved. Health is one potential existing new technology in Ethiopia to keep this progress. Health generally is defined as the use of ICT for health and in a broader sense the World Health Organization (WHO) defines Health as —a method concerned with improving the flow of information, through electronic means, to support the delivery of health services and the management of health systems.

For national healthcare systems it is used to improve the timeliness and accuracy of public health data reporting and to facilitate disease monitoring and surveillance activities as well as supporting sector-wide planning by improving the ability to plan, budget and deliver services.

### **Situations to use new technologies**

The use of information and communication technology (ICT) to support healthcare services is rapidly increasing. Public healthcare organizations, in most developing countries, are becoming increasingly reliant upon ICT to support healthcare services by improving the ability to collect, manage, analyze and report information in all areas of health care.

### **Components of electronic health record system**

There are many types of electronic health record systems used in healthcare facilities. However, in all EHR systems, there are two major components of the system:

Administrative and clinical applications. The administrative modules support patient registration, scheduling/ appointment, admission /discharge, financial and other management processes whereas, the clinical modules enable the users to collect store and display clinical information related to preventive and curative healthcare services.

### **Benefits of EMR**

EMRs can help streamline current procedures and assist with reducing medical error, improving office efficiency, and improving documentation. They can also facilitate techniques, such as patient-populations comparisons, which would be difficult using hardcopy based record systems. Potential benefits gained from the implementation and use of an EMR may be summarized into four categories:

### Examples of electronic health record

Smart Care is a computerized electronic health record system used to record/store, process, retrieve and report patient's health information. The system is developed based on the new HMIS implementation. This computerized health record system has different components (modules) that includes: registration module, OPD module, Inpatient module, Tuberculosis module, Paediatrics module, HIV/AIDS module, ANC module, Postpartum module, Labour Delivery module, Pharmacy module, Drug Stock control, Laboratory module, Finance module and also eHMIS used to pool all data elements of the health management information system from the Smart Care server that is entered by all the different clinics and generate monthly, quarterly, annual reports.

### **Online training**

Training is the giving of information and knowledge, through speech, the written word or other methods of demonstration in a manner that instructs the trainee. Training usually means the act of being prepared for something, of being taught or learning a particular skill and practicing it until the required standard is reached.

### **Referral linkages**

Referral is a process by which a health worker transfers the responsibility of care temporarily or permanently to another health professional or social worker or to the community in response to its inability or limitation to provide the necessary care. Referral is a two way process and ensures that a continuum of care is maintained to patients or clients. It is done from the community to the primary care health service and to hospitals and within hospitals and vice versa. It also involves not only direct patient care but support services such as transport and communication.

A referral may be for temporary, permanent or partial transfer of responsibility for the care of a patient. It entails the interrelationships and coordination of patient care services from one health care facility to another. The referral process begins by the referring health professional communicating to the receiving health professional or specialist relevant patient information. The receiving health professional communicates back to the referring health professional with information and plan for continuum of care thereby completing the referral process.

Referral can be vertical as in the hierarchical arrangement of the health services from the lower end of the health tier system to the higher ones. It also can be horizontal between similar levels of facilities in the interest of patients for cost, location and other reasons. Referrals can also be

diagonal when a lower level health facility directly refers patients to a specialized facility without necessarily passing through the hierarchical system. Referrals can be among public, private,

community based and other traditional and alternative medicine practitioners and sometimes social services are also included.

Referring unit is a health service organization that initiates the referral process. A facility can be both a referring and receiving unit depending on circumstances.

Receiving unit is a health service organization that receives patients or clients from referring units and ensures that required care is given to the client and returns the patient with feedback.

### **Rationale for Referrals**

The rationale for referrals is the promotion of continuity of services.

Benefits of a good referral system

A good referral system increases the efficiency of the health system by maximizing the appropriate use of health care facilities. It strengthens the peripheral health facilities and improves the decision making capacity of professionals at the lower level of the referral network. It also creates opportunities for balanced distribution of funds, services and professionals while at the same time improving the effectiveness of the health system. In addition, a good referral system helps to promote cooperation among primary, secondary and tertiary levels of care.

- **Essential elements of a referral system**

- ┌ A group of organizations that in aggregate provide comprehensive health care services in a defined geographic area
- ┌ A unit that coordinates and oversees referral activities
- ┌ Designated referral focal persons at each health facility
- ┌ Directory of services and organizations within a defined territory

### **Standardized referral format**

- ┌ Feedback loop to track referral
- ┌ Documentation of referral

Therefore, a good referral system:

- ┌ Will have a defined package of services provided at different levels of care
- ┌ Encourages an environment in which the core referral hospital is viewed as a community resource

- ‖ Should be responsive to local situation
- ‖ Should include a properly functioning communication and transport system
- ‖ It should also be inclusive of the private sector, non-governmental organizations and community based care including social services

### **Reasons for Referral**

The criteria for referral should be medical, objective and in the best interest of the patient or client. The following are considered good reasons for referrals:

- ✓ When a patient needs an expert advice as determined by the attending health professional
- ✓ When technical examination is required that is not available at the referring facility
- ✓ When a technical intervention that is beyond the capabilities of the facility is required
- ✓ When patients require inpatient care that cannot be given at the referring facility
- ✓ When the referring facility cannot no more accept patients due to shortage of beds and unavailability of professionals
- ✓ Referrals are also made to the lower level health facilities and community based organizations in the best interest of the patient depending on:
  - The condition of the patient
  - The capacity of the lower level health facility /community based organization

### **The New Health Tier System**

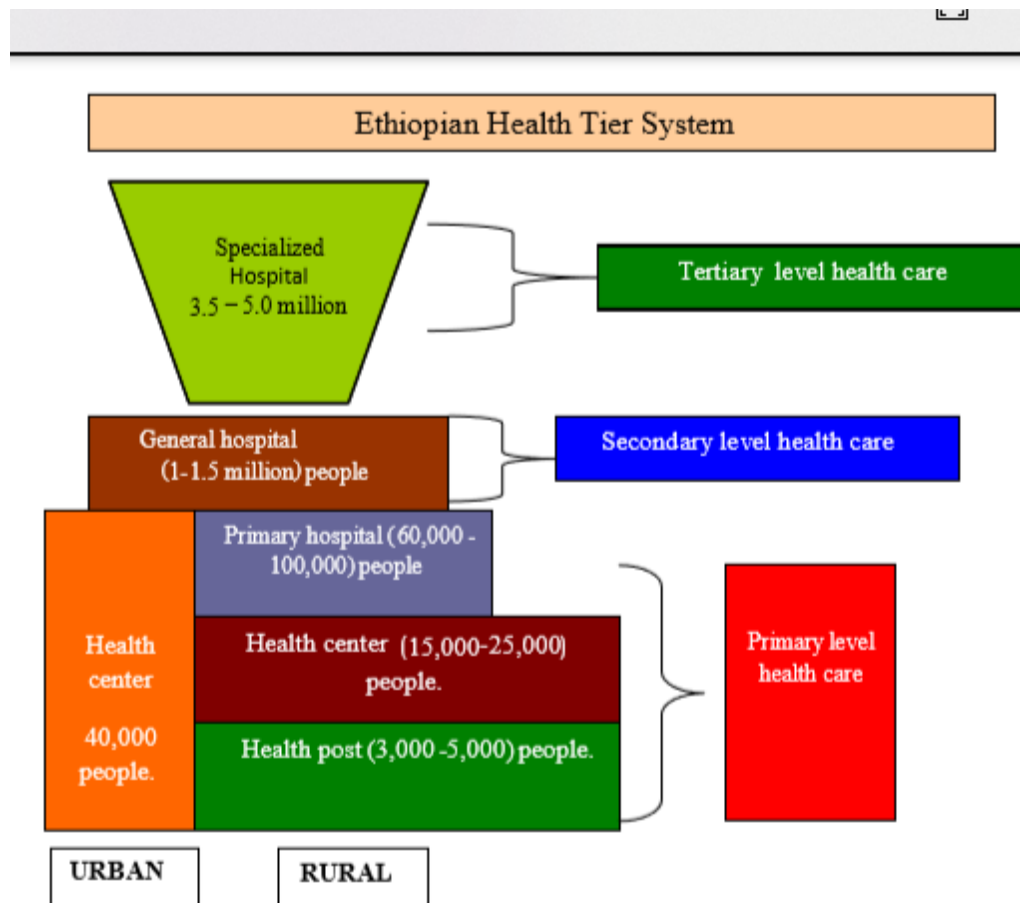


fig 2: The New Health Tier System showing reporting relation ship



## **Roles and responsibilities in referral linkage**

### **1. Roles and responsibilities of the referring health professional**

- Should know what, whom, when and where to refer
- Should fill the referral form with all the necessary information and attach relevant documents
- Explains to the patient the rationale, reasons for choice of doctor or facility, preparation, expected cost, and possible outcome of referral
- Should be available to answer queries from the referral coordinator or receiving facility about the referral if necessary
- Secures result of the referral

### **2. Roles and responsibilities of the referral coordinator**

- └ Responsible for both referrals out and received referrals
- └ Facilitates scheduling based on the level of priority for consultation, i.e. emergency, urgent and routine cases Utilizes the following communication methods: letter, telephone, email, photocopied reports sending, personal contacts, etc.
- └ Ensures the availability of service or professionals at the receiving health facility before referral
- └ Facilitates transportation for emergency cases

### **3. Roles and responsibilities of the referring facility**

- └ Performs a situation analysis regarding the process of referral in the facility
- └ Ensures that staff are well aware of the referral system
- └ Ensures continuous supply of standardized referral forms are available
- └ Keeps directory of health services and facilities in the defined geographic area
- └ Ensures proper recording of all referral activities Devises mechanisms to track referrals Provides transportation in emergency conditions Assigns referral coordinator with clear roles and responsibilities

### **4. Roles and responsibilities of receiving health professional**

- └ Responds promptly to consultation requests
- └ Reports in detail all pertinent findings and recommendations to the referring

health worker and may outline opinion to the patient (feedback with all required information and recommendation)

- ‖ Communicate with the patient or family
- ‖ Does not attempt by word or deed to undermine the role of the referring health worker

#### **5. Responsibilities of the receiving facility**

- ‖ Conducts situation analysis of the current referral process to identify gaps and strengths
  - ‖ Assigns referral coordinator with clear roles and responsibilities
  - ‖ Devises follow up plans and ensures the plans are communicated to the referring facility /professional
  - ‖ Ensures staff at points of entry clearly understand the referral process
  - ‖ Provides continuing education about the referral process to staff and the community
  - ‖ Ensures referred patients are seen by appropriate professionals
  - ‖ All investigations and documents attached with the referral form from the referring facility should be considered to protect patients from unnecessary cost
  - ‖ Ensures that all prescheduled referrals are attended without undue delay
- Mobile health technology mHealth or mobile health is a medical and public health practice supported by mobile

devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices. It involves the use and capitalization on a mobile phone's core utility of voice and short messaging service (SMS) as well as more complex functionalities and applications including general packet radio service (GPRS), third and fourth generation mobile telecommunications (3G and 4G systems), global positioning system (GPS), and Bluetooth technology.

The goal of mhealth is to improve the delivery of healthcare through quality and access, Care-coordination, Lower rehospitalizations, Improve outcomes, Lower infection rates and Monitor patient status in real time.

**Mhealth** Includes the use of mobile devices in:

- Collecting aggregate and patient-level health data
- Providing healthcare information to practitioners, researchers, and patients via Short

Message Services (SMS) platforms such as mHero

- Real-time monitoring of patient vital signs and direct provision of care

### **mHealth Applications**

- Rapid collection/sharing of current data via mobile phones
- Public health and lifestyle messages over mobile phones
- Medication alerts using mobile phones

Self-check 3	Written test
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**Part-1** say true or false

1. The purpose of the OS is provided an environment in which the user can execute programs      A.True B.False

**Part-2:** MCQ

- 1.A software that creates a relation between the User, Software and Hardware
  - a. Operating system b. application software c. utility software
2. If the single user os is loaded in computer's memory; the computer would be able to handle
  - a. One user at a time b. more than one user at a time c. more than one

computer at time d. none

3. \_\_\_\_\_ not included under computers operating system

a. Single User b. Multi User c. Networked user operating system d. none

4. Main components of operating system include all of the following except

a. Process and memory b. file c. input output system D. storage

management E.all

**Part 3: short answer**

1. Discuss Types of computers operating system

**Self check 1**

Operation sheet-3

Techniques of using computer applications

Step 1- set up your computer

Step 2- create a user account

Step 3- get familiar with the desktop/access your installed programs and setting

Step 4- navigate mouse and use keyboard short cut

Step 5- select file and text

Step 6- copy and paste

Step 7- save and open file

Step 6- find and sort your fil

**Operation sheet-1**

**Techniques for using computer software Step**

1- install your first program

**Step 2-** launch some pre-installed application/microsoft office

**Step 3-** create office excel file

**Step 4-** inser some data on ms excel

**Step 5-** perform common calculation on ms excel

**Step 6-** create tables and figures on excel

**Operation Sheet-3**

Techniques for using computer software

Step 1- install your first program

Step 2- launch some pre-installed application/microsoft office

Step 3- create office excel file

- Step 4- insert some data on ms excel  
 Step 5- perform common calculation on m

## UNIT- FOUR: APPLY THE FUNCTIONS OF TECHNOLOGY

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

- ☐ Mobile/smart phones and tablets
- ☐ Functions of technology
- ☐ Features of new/ upgraded equipment's
- ☐ Online search of information

This unit will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- ☐ Use Mobile/Smart phones and tablets for solving organizational problems
- ☐ Apply the functions of technology to assist in solving the health and related data collection, organization, analysis and interpretation.
- ☐ Test new or upgraded equipment according to the specification manual.
- ☐ Apply features of new or upgraded equipment within the organization
- ☐ Access, use and interpret sources of information relating to new or upgraded equipment

### 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 ---, ---, --- and --- respectively.
4. Accomplish the —Self-check 1, Self-check t 2, Self-check 3 and Self-check 4|| ,---|| in page ---, ---, --- and --- respectively

#### **4.1. Introduction to Mobile/smart phones and tablets**

In the past, mobile phones were mostly about making phone calls. They had a number pad, a digital phone book and a pick-up/hang-up button and not much more. Now smart phones offer so much more – they're really fully-fledged computers that you can fit in your pocket. They can run programs and games; access the internet, send email and much more.

Nearly all smart phones now use touch screen controls. Instead of having hardware buttons like before, one side of the phone is taken up mostly by a touch screen that you control using taps and gestures. There aren't even any number buttons; when you want to make a call, a number pad will pop up on the touch screen. Becoming familiar with a Smartphone can take a little bit of practice. But when you do become familiar with it, you'll find that a Smartphone can do more than you ever thought possible on a mobile phone.

#### **4.2. Mobile/smart phones and tablets function**

A smart phone can: Make voice calls (of course!) Make video calls Access the internet and browse the web Take photos, and upload them to the web Navigate with GPS if the phone has GPS built-in Play back music and video stored on the phone (and connect to a PC to copy media to it) Manage your contacts and appointments Send emails Play in-built games Run new applications and games downloaded for the internet.

#### **4.3. Utilizing mobile phone plans**

Many mobile phone plans – pre-paid and post-paid – now include a data component. For example, an Every Day Connect plan from Telstra will also include data as part of the plan. In addition, on many post-paid services you can purchase a data pack as an add-on to your basic mobile plan. The data component of the plan will be limited to a set amount of downloads each month (listed in megabytes/MB or gigabytes/GB). This works very much like your home internet plan. One important thing to note is that on most mobile data plans, you will be charged extra if you go over your limit. So you need to read the mobile agreement carefully and check your usage levels regularly. Many mobile providers also allow casual data usage on a pay-as-you go basis if you don't have an explicit

monthly quota on the plan. This is usually charged at a higher rate than if you have a data component built into the plan.

#### **4.4. Identifying Phone Model Differences**

Just because two phones might run the same operating system, doesn't mean the phones are identical: There are physical differences: the weight and the screen size There are performance differences: the speed of the processor and the amount of memory (much like on computers) There are software differences, with different manufacturers loading different programs onto phones.

#### **4.5. Mobile/smart phones and tablets utilization in health service provision**

##### **4.5.1. Tablets**

Maximize portable technology in the patient encounter by supporting Point of Care documentation, Real-time care coordination, Labs & Imaging, Patient education, Therapy benefits, Access to past medical history and Countless additional benefits.



##### **4.5.2. Smartphones**

Smartphones are ubiquitous in healthcare and supports Care coordination, External device connection for testing and diagnostics, Blood pressure monitoring, Blood glucose levels and Use of smart apps



**Fig.3 smarphone**



#### 4.6. Introduction to technology

Technology is wide-ranging term used to describe not just the computers you have, but also the software, printers and other devices that you use to support your business. This can also extend to include online services and websites, such as Facebook and YouTube and other application specific websites.

#### 4.7. Functions of technology in organizations business Technology,

when used to support business needs, should be considered as an asset to be invested in, not a cost to be borne. When implemented properly, good technology investments result in a measurable return on investment (ROI). That ROI might well be achieved through lower running costs, better productivity, better customer service or simply increased sales due to increased capacity. When we came to healthcare, healthcare industry is experiencing a steady and stable transformation across the world. And Information Technology (IT) is playing a core role in every aspect of healthcare.



Fig-2-ICT health care model

#### 4.8. Functions of Information Technology in health care includes

- ☐ Automated Operations to make monthly calls and feed information to maternal women  
Seamless interfacing with third-party databases manage voice recording with ease
- ☐ Ability to obtain real time and updated information to provide reliable service Improve productivity with comprehensive reports
- ☐ ensuring faster adaptability of advanced technologies
- ☐ Reduction of service costs and
- ☐ Provision of quality healthcare at affordable prices

<b>Self-Check -4</b>	<b>Written test</b>
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**Part1- say true or false**

1. Mobile/Smart phones and tablets are used for solving organizational
2. Tablets technology are not applied to assist in solving the health and related data collection, organization, analysis and interpretation.
3. If two phone runs the same operating system then they are identical
4. All mobile phone plan includes a data component
5. Mobile/smart phones and tablets are fully fledged computers
6. Technology is just the term used to describe the computers you have
7. Face book and You Tube are application Specific websites
8. Technology, when used to support business needs, should be considered as a cost to be borne
9. Information Technology (IT) is playing a core role in every aspect of healthcare

## **Part-2 MCQ**

1. Which one is the Function of Information Technology in health care
  - A. ensuring faster adaptability of advanced technologies
  - B. Reduction of service costs and
  - C.Provision of quality health care at affordable prices
  - D.All

## **Part3- short answer**

1. What does mean Technology?

## UNIT FIVE :EVALUATE NEW OR UPGRADED TECHNOLOGY PERFORMANCE

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

- ☐ Testing and evaluation of new/upgraded equipment's
- ☐ Mobiles/smart phones and tablets evaluation
- ☐ Environmental consideration from new/upgraded equipment's
- ☐ Feedback from performance evaluation

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 –**

1. Evaluate and determine new or upgraded technology performance by introduced technology (mobile/ Mhealth, tablets)
2. Evaluate mobiles/Smart phones and tablets for the performance, usability and against the OHS standards
3. Determine environmental considerations from new or upgraded equipment
4. use feedback from appropriate performance evaluation

### **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 ---, ---, --- and ---** respectively.
4. Accomplish the —Self-check 1, Self-check t 2, Self-check 3 and Self-check 4|| ,---|| **in page ---, ---, --- and ---** respectively

5. If you earned a satisfactory evaluation from the —Self-check— proceed to —Operation Sheet 1, Operation Sheet 2 and Operation Sheet 3 | in page ---.?

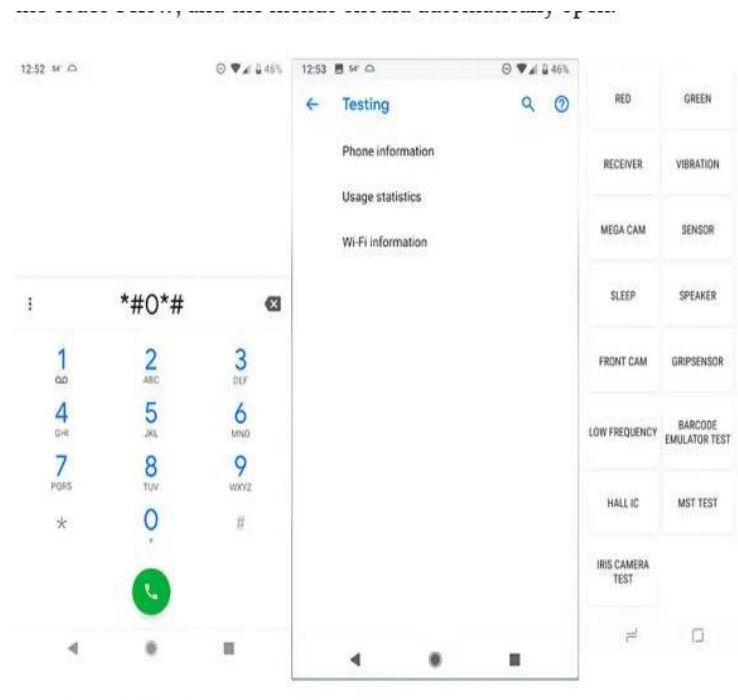
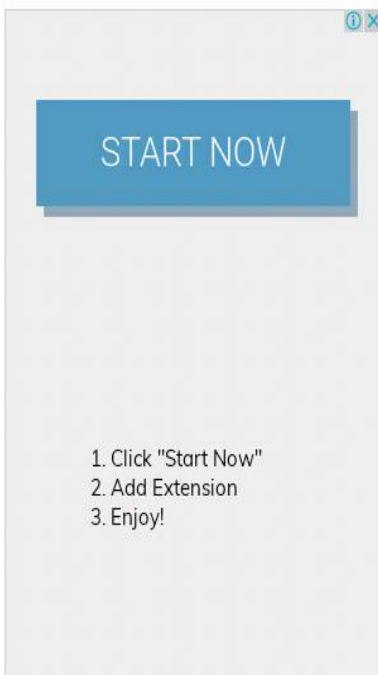
6. Do the —LAP test— in page – ??

### **Introduction to diagnostic tools for new/upgraded equipment's**

If you've never run a diagnostics test on your own smart phone, it's worth doing especially as your phone starts to show its age, or if you purchased a "new" smart phone secondhand and want to get a feel for its condition. Diagnostic tools are also helpful for when your device becomes less efficient, but you can't quite pin down why. Instead of using guesswork to troubleshoot the various features on your phone until you stumble on a solution, a diagnostics scan can highlight exactly what's wrong with your phone, or at least provide enough data to point you in the right direction. Unfortunately, finding the built-in diagnostics tools on Android smart phones and iPhones can be difficult, and some devices don't even have very good diagnostic options to begin with (if at all). But you can always turn to third-party apps for help.

### **Built-in diagnostics tools**

#### **Android**



Most Android phones have a few simple diagnostics tools hidden in the OS, but they vary between devices. The tools are found by typing codes into your phone app's dialer—kinda like inputting cheat codes in a video game. Type in the codes below, and the menus should automatically open.

### **The two main codes usable on most Android devices:**

1. **\*#0\*# hidden diagnostics menu:** Some Android phones come with a full diagnostics menu. You'll be able to run a check-up for at least some of the phone's hardware. However, this code isn't available on all phones—nothing happened when I tried the code on a Pixel XL, for example, though the menu appeared on a Samsung Galaxy S9. For those that do have access, it's a handy trick. The menu offers a number of standalone tests to check the performance of your phone's various parts, such as your screen (touch recognition, color accuracy), your cameras, sensor, and physical buttons like the power and volume controls.

2. **\*\*\*#4636\*\*\* usage information menu:** This menu will show up on more devices than the hidden diagnostics menu, but the information shared will be different between devices. At the very least, you should be able to see app usage history; real-time wifi and cellular network connection stats; and basic phone information like the current service carrier, phone number, et cetera.

You don't have to press the call button or anything else to open the hidden menus, they'll just open automatically. If nothing happens when you type in the code, then your phone doesn't have the feature. Similarly, some devices don't provide very helpful information, like the aforementioned Google Pixel (which relies on Google collecting diagnostic information from your phone in the background). If that's the case, then jump on down to the next section for some recommendations for third-party diagnostics apps.

## **2. iPhone**

Apple is notorious for its products being —walled gardens,<sup>1</sup> which makes it hard for users to perform check-ups and DIY fixes for their devices. Unsurprisingly, you won't find any built-in diagnostics tests that you can run on an iPhone. That said, the iPhone settings *do* include detailed readouts on battery performance and history. To find this data, go to **Settings > Battery**.

You'll find a number of different options and categories that contain your device's battery performance data—but nothing else beyond that, unfortunately.

## **Running diagnostics scans with third-party apps**

With limited options available in iOS, the only real option for running diagnostics on your iPhone or iPad is to use a third-party app. These apps are also helpful for Android phones that don't have built-in diagnostics tools—or if you want a more detailed (and less cumbersome) way to test your phone's hardware.

### **1. TestM (Android and iOS)**

This app lets you run both quick appraisals and full hardware diagnostics on iPhone and Android devices. The full scan performs simple actions that test each of your phone's major hardware functions, including the cameras; battery and charging; onboard sensors; and the performance of location, Bluetooth, and cellular connections.

### **2. Phone Check and Test (Android)**

Phone Check and Test is a plain-looking app, but it's capable of much more than just checking that your phone's hardware —works. A full scan includes deep CPU, storage, and battery diagnostics, and the test readouts are highly detailed. This makes Phone Check and Test a little less user-friendly than TestM, but it's an excellent troubleshooting tool that provides you with tons of data. While the free version does contain ads, they're minimal, and you can upgrade to Plus for just \$2 to remove them. The Plus version also adds a few more testing tools and lets you run standalone tests for each piece of hardware separately, which saves you time over a full system scan.

### **3. Phone Diagnostics (iOS)**

Like the TestM app for Android phone, Phone Diagnostics can be an ad-ridden mess at times, but hidden behind all that is a reliable set of hardware function tests. The full test takes you through all the major hardware features based on the iPhone model you're using.

Unlike the other apps we've listed, Phone Diagnostics allows users to perform immediate standalone tests of any hardware function your iPhone carries without

### **5.1. Introduction to new/ upgraded equipment's**

There are many reasons why you need to continue investing in your technology – and consider regular upgrades and essential part of your strategic toolkit. Here we focus on just some of them. Each of these points will impact individual business in a different manner, and each can play a role in helping you be more efficient and to focus on what is important.

### **5.2. The features of upgraded technologies**

The features of upgraded technology are they speed your work load/faster, allow communicating smarter, introducing efficiencies, more secure, evolving and growing with new features, access vendor support, supported when things go wrong, benefit from a current warranty, keep up with business growth and streamline your training.

#### **1. SPEED UP YOUR WORKLOADS**

In this fast-paced world, everyone wants things faster. With technology, it's no different. We have faster CPUs, more processors, faster hard drives, the list goes on. These resources make processing of any given workload also run faster. This translates directly into better productivity for the users, the ability to service more clients. Put simply, older systems simply do not run things as fast as newer systems can do. You might upgrade the software to later versions, but they will typically require more resources (i.e. RAM and CPU) and therefore run slower on older computers, if at all.

#### **2. COMMUNICATE SMARTER**

Newer technology helps companies to have greater flexibility when communicating with clients - and higher business potential when doing so. From simple things such as being able to email clients from mobile phones (which was not possible not all that long ago), through to technology that permits integration between business systems and social media.

**3. INTRODUCE EFFICIENCIES THROUGH MOBILE WORKING:** Simply put, newer technology permits you to do things that you could not previously do. The ability to do stock lookups from your accounting system using a mobile device means a sales rep on the road can quickly take orders, knowing that he can deliver within a specific timeframe. This is just one of many examples of the convenience truly mobile work systems can deliver.



4. FOCUS ON SECURITY: Many people feel that Windows XP may do just fine for their needs, but if it gets hacked... then what is the risk for you and your information? Older systems such as Windows XP are not being actively checked for security vulnerabilities, therefore your information and your customers' information is at risk of being compromised, stolen or even corrupted. Other ageing systems face the same vulnerabilities; the Windows example is just one of many.

#### 5. EVOLVE AND GROW WITH NEW FEATURES

Software vendors are taking advantage of features in new operating systems to provide enhancements that are simply not possible in older operating systems. Many older computers now cannot be upgraded to work with the newer operating system – limiting the functionality available to you.

6. ACCESS VENDOR SUPPORT Software vendors are typically only testing their applications on the current version and just-prior version of a given operating system. They simply won't be investing the time in testing on systems that are say 10 years old and, as a result, can't support them if there are issues. In addition, hardware vendors such as HP and Fujitsu do not provide drivers to allow their newer computers to work with older operating systems, resulting in reliability problems with those machines.

#### 7. BE WELL SUPPORTED WHEN THINGS GO WRONG

Similar to vendor support, if the technology gets too old, us as IT professionals can't support it. The knowledge we have may be limited and the tips and tricks that used to work with old systems are different to those needed in newer environments. In short – we simply don't know it all, but most IT guys won't tell you that. It can take us time to find answers, which is often linked to higher support costs.

#### 8. BENEFIT FROM A CURRENT WARRANTY

While a system is under warranty, if something fails you can quickly get it replaced and up and running again. When it falls out of warranty, you're at the mercy of the vendor and whatever they may have laying around. We've seen systems that are 5+ years old that don't have any warranty or maintenance on them fail and immediately put the business into a disaster recovery situation – having to source a new server and then restore from backups. If the system had maintenance on it, parts would be readily available and fixed within a much shorter timeframe. The business risks often go unnoticed as many people don't monitor warranty expirations.

## 9. KEEP UP WITH BUSINESS GROWTH

Your systems might be designed to support a certain number of people and, over time, you add one more, then one more... and so on. Before long, the system designed to support 5 people is supporting 25 people and has slowed to a crawl. The same limitation can also apply to the number of orders you process, the volume of stock you have on hand, etc. Having systems sized correctly for your business operations has a direct link to the productivity and performance of the technology solution.

10. STREAMLINE YOUR TRAINING Having older systems and technology can be a frustration for new/younger staff who simply doesn't know how to use them. Training up younger staff on how to use older text based systems (as an example) when they are used to the point and click of today's world can be fraught with issues - not only in the time it takes, but also due to the potential for errors during the entire process. Compare Windows XP to Windows 10 as an example of how much things have changed in the last 10 years alone and you get an idea of the challenges faced by some of your younger team members.

**Introduction to information searching:** Most information is found on the Internet by utilizing search engines. A search engine is a web service that uses web robots to query millions of pages on the Internet and creates an index of those web pages. Internet users can then use these services to find information on the Internet. If you have a general idea of the subject in which you're interested, but are not sure exactly what you're looking for, a directory is a great place to start. If you already know exactly what you're looking for, a search engine is the best way to find it. Search engines use keywords or phrases you choose to determine which web pages have relevant information. Think of a search engine as an index for the web.

### ✓ Way of searching for information online

#### 1. Searching of information by using Directories

Directories like Yahoo! use human editors to organize information in broad categories, such as finance, sports, or travel. Think of them as giant card catalogs. By starting with these categories and then moving down through subcategories, you can narrow your search until you find the information you need.

#### 2. searching of information by choosing keywords

For the best results from a search engine, it's important to choose your keywords wisely. Keep these tips in mind: Try the obvious first. If you're looking for information on Picasso, enter "Picasso" rather than "painters". Use words likely to appear on a site with the information you want. "Luxury hotel Dubuque" gets better results than "really nice places to spend the night in Dubuque". Make keywords as specific to your topic as possible. "Antique lead soldiers" gets more relevant results than "old metal toys". Use a directory to find keywords related to your topic, and then enter those words in a search engine.

**Reading Search Results:** Search engines put the most relevant results first, so if what you want is not in the top listings, try again with more specific keywords. Or, narrow your search by adding more keywords. Google returns only pages containing all the keywords you use, so adding more keywords eliminates less relevant pages. To get more results, use more general keywords or include fewer search terms.

Google's "cached" link shows you a snapshot of a web page so you can see it even if the actual site is not accessible.

Seeing where your keywords appear on a web page prior to clicking a result link can save you time. That's why Google displays an excerpt from each returned result page showing your query terms in bold type. These snippets let you see the context in which your search terms appear on the page, so you can determine if the site is worth visiting. To find more pages like a particular result, click on the "Similar Pages" link. This service automatically scouts the web for pages with content related to the link you select. To begin your search, type [www.google.com](http://www.google.com) into your browser's "Address" field and hit enter.



The most relevant results appear at the top of the screen.  
Click the results link to go directly to the site listed.

Fig:3 Reading for search information on Google search

Directories arrange information by topic. Click through categories and subcategories until you find what you want.



Fig 4: Order of search information on Google search

Google looks simple, but searches more than a billion pages. Enter what you're looking for, and then click "Google Search".



**Fig 5: Keyword searching on Google search**

### **Performance evaluation**

In the context of an industrial organization, performance evaluation is a systematic evaluation of personnel by supervisors or those familiar with their performance. In other words,

**Performance appraisal** is a systematic and objective way of judging the relative worth or ability of an employee in performing his/her task.

### **Smart Phones and tablets Skills Expectations**

Always answers telephone calls with a positive, inviting, and enthusiastic tone. Talks in a steady speed rate, not so fast and not so slow. Speaks in a very clear enunciation and is well understood by the other person on the other end. Has a clear knowledge of the audience and does not use complex vocabularies and jargons. Greets the other person on the line with great sincerity and does not sound authentic and artificial. Gives the other person on the line time to ask before responding accordingly. Exhibits excellent listening skills and attentiveness while on the call. Always seeks clarification whenever the other person on the line is not clear. Ends telephone conversations professionally and ensures that the other person on the line is satisfied. Empathizes with other person and try to be as personable as possible.

### **Smart Phone and Tablet Skills Evaluation feedback point**

- ☐ how well can you rate the way you handle your phone call conversations?
- ☐ how do you handle irate and upset callers during a phone conversation?
- ☐ Give an instance you were called by an irate caller and explain how you handled it?

- ☐ Have you ever interrupted someone while talking over the phone? How did the conversation turn out?
- ☐ Have you ever made a call while drinking or eating? How can you rate the conversation?
- ☐ Give an instance you had to talk to someone on the phone while in a loud place? How well did the conversation go?
- ☐ Do you typically take charge of the phone calls you make and how do you ensure to have everything under control?
- ☐ What is the best solution you have ever given to someone over the phone and was the caller satisfied?
- ☐ Do you usually call back when you promise to do so and have you ever failed to do so at any given point?
- ☐ How well do you close conversations and do you feel you leave the callers in a satisfied position?

<b>Self-Check -5</b>	<b>Written test</b>
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**Part1;** say true or false

1. New and upgraded equipment can play a role in helping you be more efficient to focus on what is important.
2. Newer technology helps companies to have greater flexibility when communicating with clients
3. Upgraded technologies are unsecure most of the time
4. The features of upgraded technology are they speed your work load/faster only
5. Vendor supports even an outdated technology

**Part:2** MCQ

1. One is the features of upgraded technologies
  - A. introducing efficiencies, more secure,
  - B.evolving and growing with new features,
  - C.access vendor support
  - D.All

Part 3: short answer

1. Discus features of upgraded technologies

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