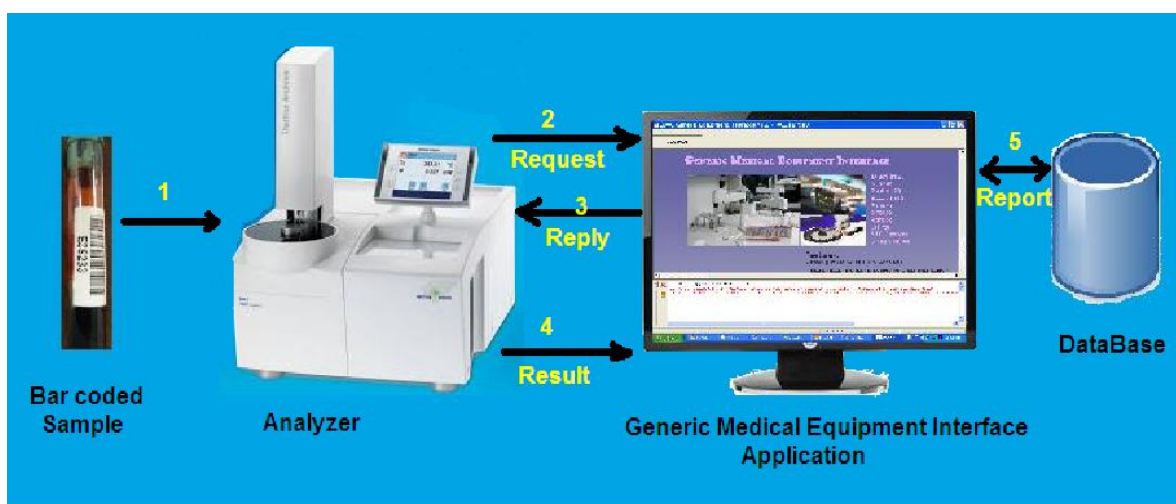


# Biomedical Equipment Servicing

## Level – III

Based on September, 2021, Curriculum Version II



**Module Title:** Computer Technology in Biomedical Equipment

**Module Code:** HLT BES3 M09 0921

**Nominal duration:** 60 hours

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**Addis Ababa, Ethiopia**

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## Acronyms

HCP	Healthcare professionals
HIS	Hospital Information System
PDA	Personal Digital Assistant
PACS	picture archiving and communication system
LIS	Laboratory information system
PII	Personal identification information
AI	Artificial intelligence
CPU	Central processing unit
HDD	Hard disk drive
SSD	Solid-state drive
RAM	Random access memory
ROM	Read only memory
ISP	Internet service provider
MEMIS	Medical Equipment management information system
EDP	Electronic data processing
MDDS	Medical device data system
MMS	Multimedia Messaging Service
SMS	Short Message Service
GSM	Global System for Mobile
CDMA	Code Division Multiple Access

## Acknowledgement

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## Introduction to Computer technology

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

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## Module units

- Basic computer operation
- Medical equipment data and information
- Functions of technology for management of medical device
- Maintenance of computer accessories and systems

## Learning objectives of the Module

At the end of this session, the students will be able to:

- Perform basic computer operation
- Input medical equipment data into computer
- Access medical equipment information using computer system
- Produce output data using computer system
- Maintain computer accessories and systems
- Identify and apply the functions of technology for management of medical device

## Module 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”

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## Unit one: Basic Computer operation

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

- Computer basics
- Hardware and software devices
- Computer accessories

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:

- Understand basics of computer
- Assemble computer accessories
- Identify hardware and software components of a computer

## 1.1 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.

## Computer

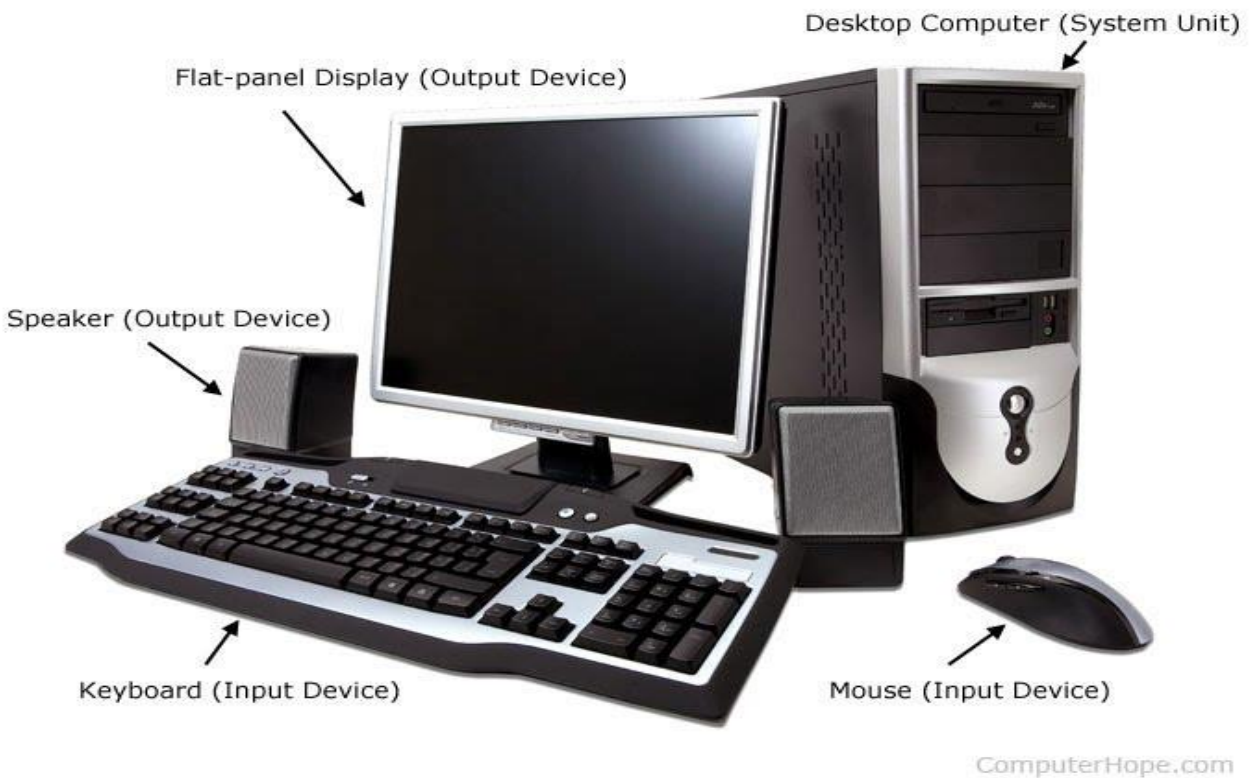


Figure 1.1: Basic parts of computer

### 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.

### 1.1.2 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

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- 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**

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- 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

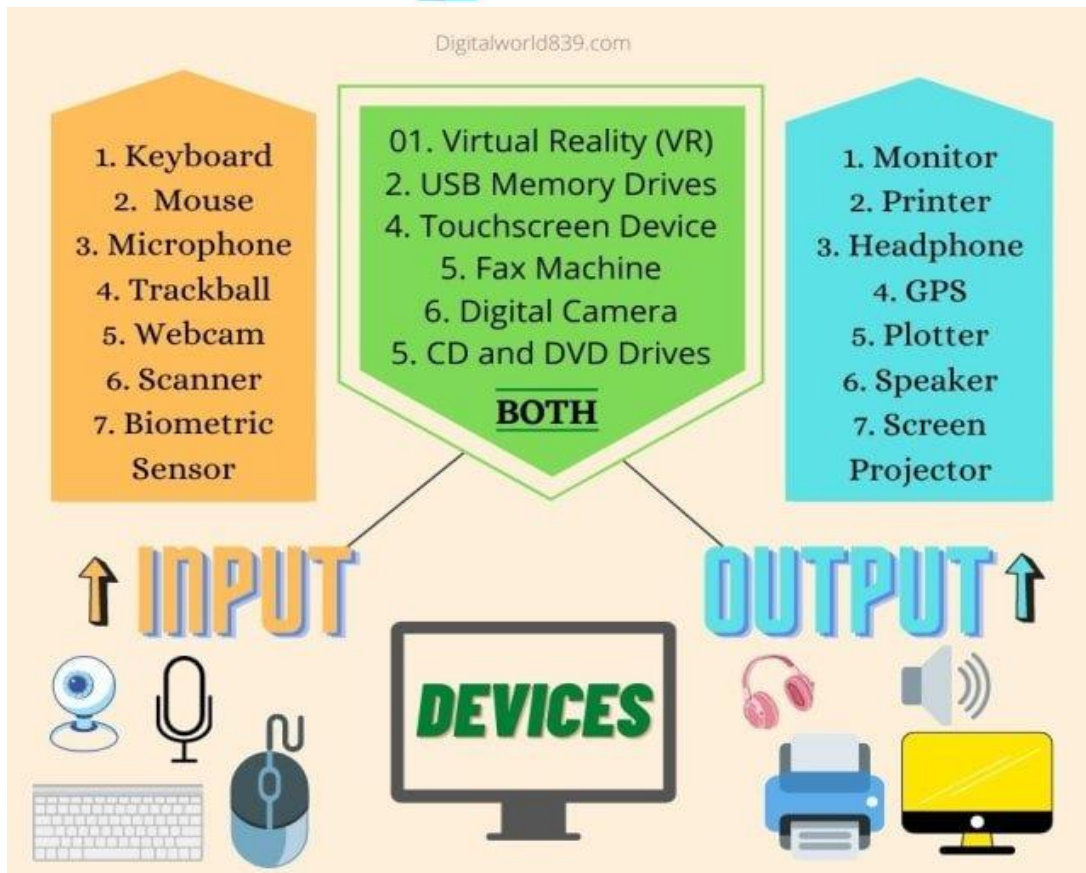


Figure: Input and output devices

## 1.2 Computer Hardware and software Components

Computer Hardware is defined as the physical part or component of a computer system which can be felt, seen, and touched.

The computer monitor which we use to view the display is a Hardware Device.

A printer which we use to Produce outputs,a computer memory which is used to store data or programs all are the types of hardware used in computer system for better functionality of computers.

Computer software needs hardware to function properly. For Example Hard disk drive is a hardware device of a computer system which saves or stores information, programs or data in high volumes but it cannot work in absence of software programs.

The software helps hardware to run and vice versa.

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Another example if you have installed a sound card on your computer system which is used for playing sound, videos, and also used for playing games, but you cannot hear any sound without proper driver installation that is software that activates the hardware to function properly.

Drivers are software program which comes with the hardware.

So we can say that to use full features of hardware and software they are dependent on each other both plays vital role in each other functions.

They are independent devices and programs but rely heavily on each other

Hardware is an essential part of the computer system like CPU, Ram, Power supply, Monitors.

We cannot start or use our computer if any part of the devices is missing but speakers, printers, or even mouse are some of the hardware when found missing does not affect the boot process of the computer, these devices are used for additional functions of the computer.

### 1.2.1 Computer Hardware devices

Different and common types of hardware devices and their uses are mentioned below for better understanding

- Cabinet Case
- Motherboard
- Ram
- Hard Disk
- CPU
- SMPS (Switching Mode Power Supply)
- Keyboard
- Mouse

- Monitors
- Printers
- Speaker etc

These are the most used and common hardware devices here mentioned above some of the devices are used for better functionality or used for additional features. Like Speaker and Printers.

They are not used in the boot process of PC as when found missing PC cannot start or boot on its own. They are not responsible for booting computers.

But some of the devices mentioned above are responsible for the booting process of PC, for example, power supply, CPU, and Computer Memory [RAM] are essential hardware devices That are solely responsible for the booting of PC and their better computer functionality.

### **Cabinet Case**

Cabinet case comes in various shapes and sizes but commonly used case is a tower case whose height ranges from 15 to 25 inches. They enable different types of hardware devices to be fit in themselves to make it a whole and all the devices are connected to the case using screws. The Commonly attached hardware devices to the PC case are Power supply, Motherboard CPU , Ram , Hard disk , DVD-RW etc.

### **Motherboard**

The Computer Motherboard or mainboard is nothing but a piece of PCB (printed circuit board) where all the other devices are connected to it using cables & wires. Motherboard generally distributes all the voltages and power received from SMPS or power supply to other parts of the hardware devices attached to the PC.

### **RAM**

RAM [Random Access Memory] is an essential part of the computer system which is used for storing data or program temporarily. It is a volatile memory that tends to lose data when power is missing from a power supply.

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## Hard Disk Drive

Computer Hard disk drives are used to store the data permanently. It is a type of non-volatile memory that does not lose data or programs when there is no power. Nowadays huge volume of data can be stored in a hard disk. Which are also called as secondary storage hardware devices. The hard disk capacity is measured in MB-MEGABYTES, GB-GIGABYTES & TB-TERABYTES

## CPU [Central Processing Unit]

CPU stands for Central Processing Unit which is responsible for almost all the operation computer system performs. CPU performs Arithmetical and logical operation which includes addition, subtraction, division, and multiplication, and logical operations include comparison, less and greater values. Every input which is sent by input devices is first collected in primary memory and later transferred to the CPU for further processing.

## SMPS (Power Supply)

SMPS is known as Switching Mode Power Supply. Which is responsible to give power to the motherboard later this power is distributed among the other hardware devices for better functionality.

## Keyboard

The keyboard is an input device that is primarily used for entering text as input to the CPU.

## Mouse

The mouse is a Pointing device that is used for selecting, pointing, and drag icons, files, and folders from one location to another in hard drives.

## Monitors

Monitors are display units or commonly called as VDU which stands for [visual display unit] they are used to display information received from computers on their screen. They are also called as SOFTCOPY Terminals.

## Printers

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Printers are hardware component of the computer which is often used for producing outputs on papers as a HARDCOPY.

## Speaker

Speakers are used to output digital signals. You can use a speaker for hearing sound, videos and playing games.

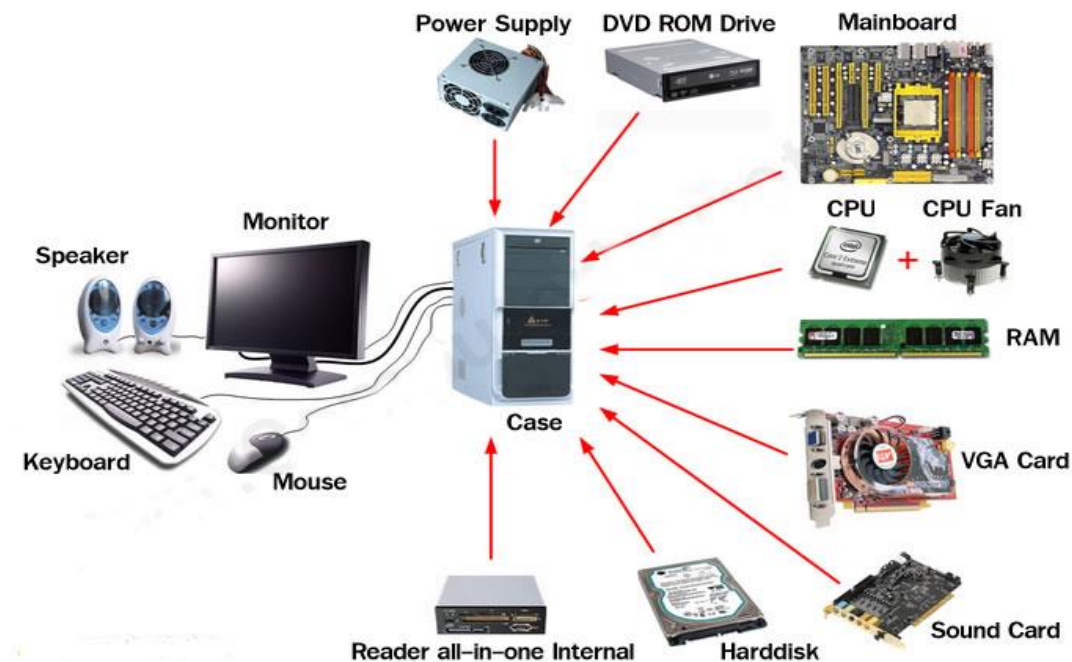


Figure 1.2 Computer hardware components

## 1.2.2 Computer Software

Computer software is a set of instruction or programs which are used for a specific or special task assign to them. You cannot touch or feel the software as they are just a set of instructions which is written by SW programmers for an application.

The user will need both hardware and software for a computer system to work properly. Hardware reads software. Most of the software on our computer system is in the form of programs. The software can be categorized in two types

- ✓ System Software
- ✓ Application Software

## 1. System Software

The system software is any software which controls the hardware so that any application software can run and can be executed to perform various task mentioned by programmers. System software runs and executes programs, they also monitor various other components of a computer system like CPU, primary and secondary storage, and other peripheral devices of PC. They communicate and control peripherals devices like printers, scanners, webcam, sound cards etc.

The primary examples of system software's are operating system such as **Microsoft Windows, Linux, Mac, Unix**, etc

They control the hardware of computer systems so that they can work efficiently and Properly to perform the specific task given to them and also to provide a platform for application to perform and to execute in the overall development of application software. They perform transferring of data to hard disk, It performs text or images or graphics to be seen on display devices,

There are various other system software which is developed for specific tasks, such as device drivers are installed in PC for better functionality of that device, for example:: Device drivers of display cards and sound cards are used in viewing better resolutions on the computer screen and hearing sound from soundcards.

Programming tools, utility software, compiler, the interpreter is also considered to be system software. System software can be operating system and language processors where the operating system acts as the interface between user and computers and language processors are those which convert programming languages i.e.

Assembly language and High-level languages to machine language which is a language that is understood by computers. Compilers & Interpreters are examples of language processors.

The most important features of system software include:

- Closeness to the system
- Fast speed
- Difficult to manipulate

- Written in low level language
- Difficult to design

## System Softwares

- ✓ Translators
- ✓ Device Drivers
- ✓ Utility Programs
- ✓ Operating System

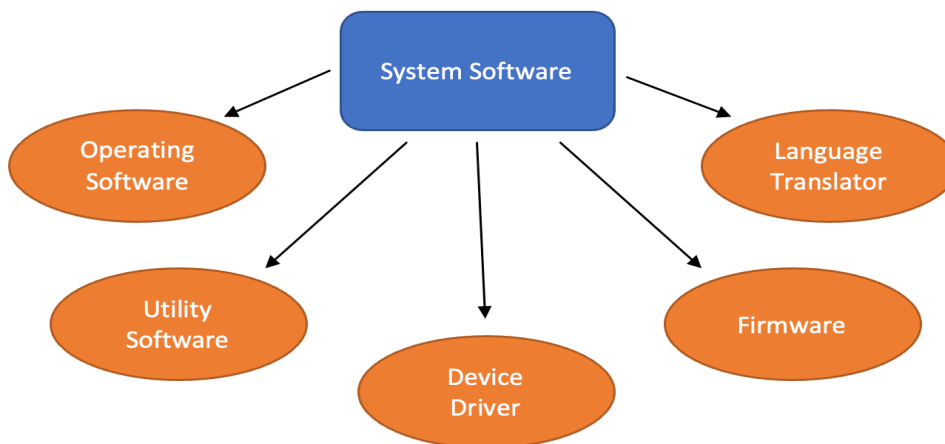


Figure: system software

## Translators

These are those programs that translate codes that are written in high-level or Assembly language into Machine language or that language that is easily understood by the computer.

## Device Drivers

These programs are used to help better functionality of hardware devices. Such as mouse, sound cards, and keyboards.

## Utility Programs

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Format, Defragmentation, cleaning of hard disk space & installing and removing application programs from computer. These utility programs help the user to better communicate and interact with software and hardware.

## Operating System

This acts as the primary interface between a user and computer hardware. It presents the user with a GUI stands for Graphical User Interface where the user can directly communicate or interact with hardware and software used in computer systems. The system software manages and controls hardware and user inputs. They are also used in providing an interface for the development of application SW.



Figure 1.3 System software

The most important tasks performed by the operating system are

1. **Memory Management:** The OS keeps track of the primary memory and allocates the memory when a process requests it.
2. **Processor Management:** Allocates the main memory (RAM) to a process and de-allocates it when it is no longer required.
3. **File Management:** Allocates and de-allocates the resources and decides who gets the resources.

4. **Security:** Prevents unauthorized access to programs and data by means of passwords.

5. **Error-detecting** Aids: Production of dumps, traces, error messages, and other debugging and error-detecting methods.

6. **Scheduling:** The OS schedules process through its scheduling algorithms.

**Compiler :** A compiler is a software that translates the code written in one language to some other language without changing the meaning of the program. The compiler is also said to make the target code efficient and optimized in terms of time and space.

A compiler performs almost all of the following operations during compilation: preprocessing, lexical analysis, parsing, semantic analysis (syntax-directed translation), conversion of input programs to an intermediate representation, code optimization and code generation. Examples of compiler may include gcc(C compiler), g++ (C++ Compiler ), javac (Java Compiler) etc.

**Interpreter :** An interpreter is a computer program that directly executes, i.e. it performs instructions written in a programming or scripting language. Interpreter do not require the program to be previously compiled into a machine language program. An interpreter translates high-level instructions into an intermediate form, which is then executes.

Interpreters are fast as it does not need to go through the compilation stage during which machine instructions are generated. Interpreter continuously translates the program until the first error is met. If an error comes it stops executing. Hence debugging is easy. Examples may include Ruby, Python, PHP etc.

**Assembler :** An assembler is a program that converts assembly language into machine code. It takes the basic commands and operations and converts them into binary code specific to a type of processor.

Assemblers produce executable code that similar to compilers. However, assemblers are more simplistic since they only convert low-level code (assembly language) to machine code. Since each assembly language is designed for a specific processor, assembling a program is performed using a simple one-to-one mapping from assembly code to machine code. On the other hand,

compilers must convert generic high-level source code into machine code for a specific processor.

## 2. Application Software

Application Software is a program that is designed and developed for specific purposes and for a special task that is directly used by the users. In other words, it can be described as an interface between user and system software, which helps the user to perform a given specific task.

Common Application software is a word processor and spreadsheets.

Some of the applications SW are bind in together with other application software such as MS-OFFICE SUITE comes with MS Word, Excel, PowerPoint & Access and Adobe include Adobe Photoshop and Image ready together.

Pre-Installed Application Software which is installed automatically or in other words we can say that they come as a package includes in Popular Operating system such as MICROSOFT Windows.

For Example:: Paint & Windows Media Player

User Written or Customized Software's

They are designed and developed as well as customized as per the requirements of the clients. Software Developer which uses a high-level language such as Visual Basic (VB) for Front End and SQL(Structural Query Language) server for the development of the application software which fulfills the needs of their clients.

They are developed to perform a special and specific task as the user needs. The developer or the programmer has the privileges to change or update or add or delete the source code of the software any time when found necessary.

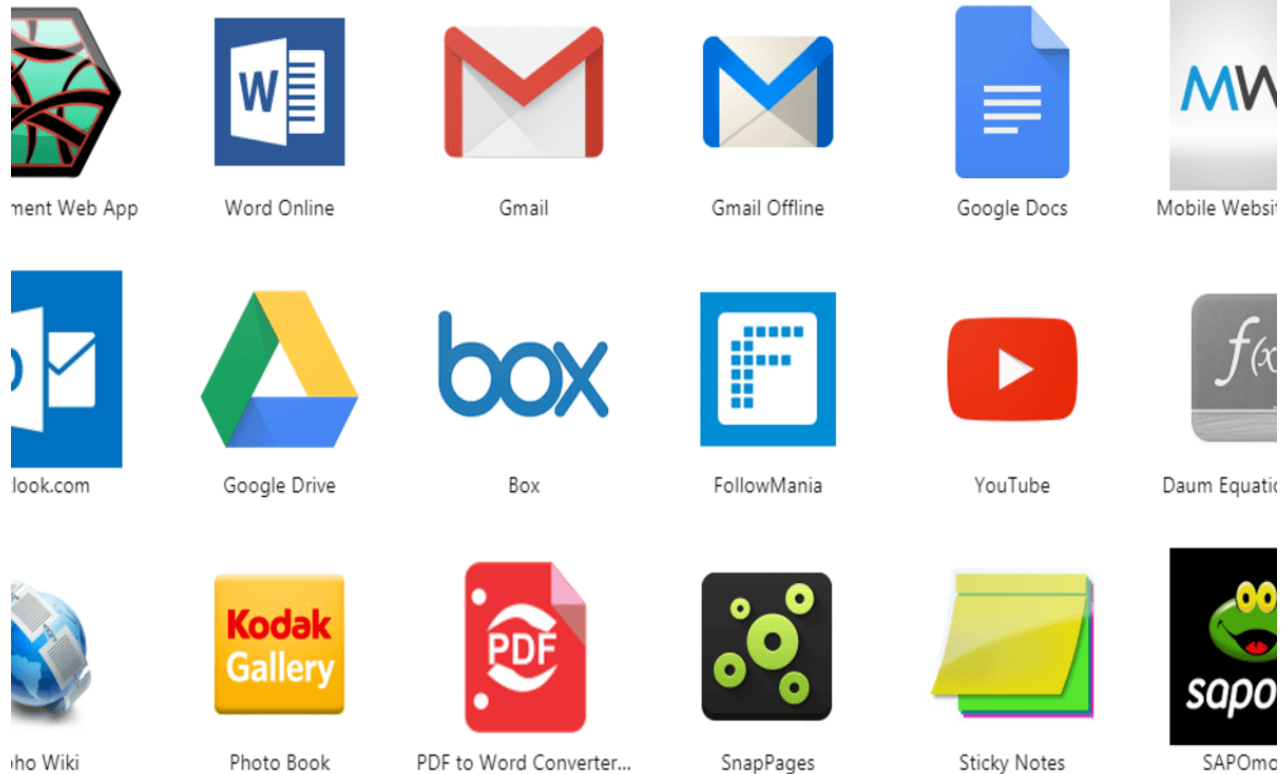


Figure 1.4 Application software

### 1.3 Assembling Computer accessories

Computer assembly is the process of building a computer from scratch by integrating multiple hardware devices into one working system.

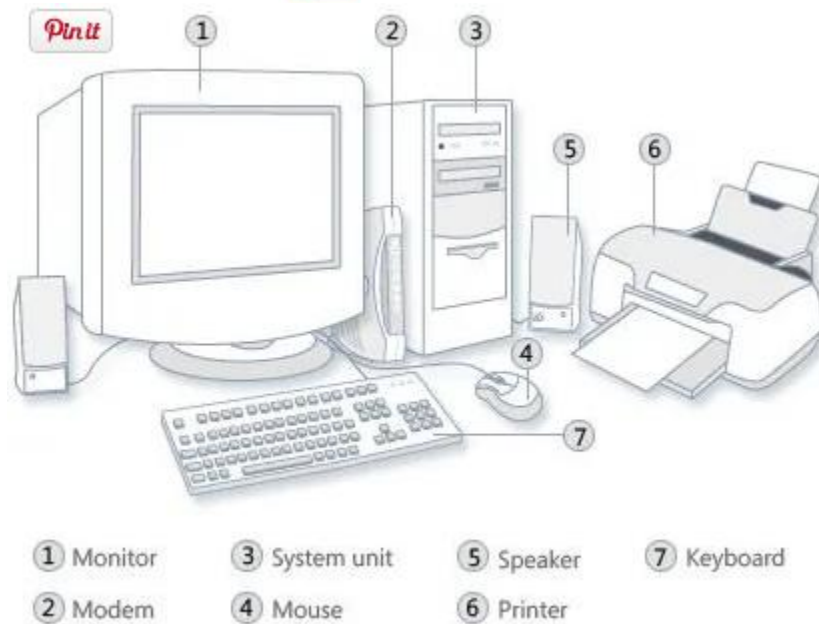


Figure1.5 Computer system

### 1.3.1 Setting up a desktop computer

#### Step 1

Unpack the **monitor** and **computer case** from the box. Remove any plastic covering or protective tape. Place the monitor and computer case on a desk or work area.

Be sure to place your computer case in an area that is **well ventilated** and has good air flow. This will help to prevent the computer from overheating.

#### Step 2

Locate the **monitor cable**. There are several types of monitor cables, so the one for your computer may not look like the one in the image below.

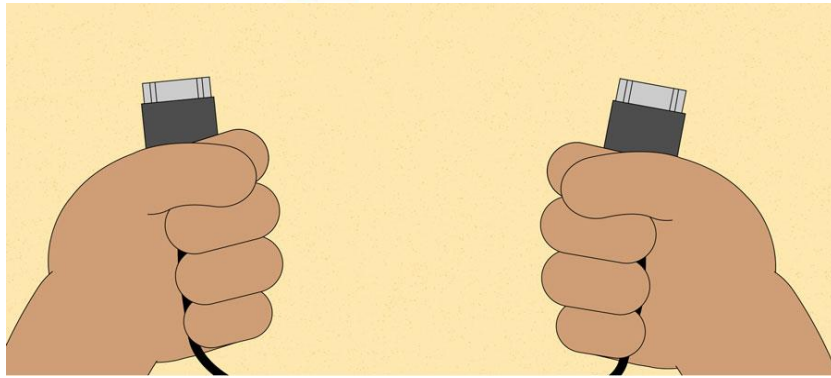


Figure1.6: Monitor cable

If you're having trouble finding your monitor cable, refer to the instruction manual for your computer. (If you have an **all-in-one** computer that's built into the monitor, you can skip to **Step 4**).

### Step 3

Connect one end of the cable to the **monitor port** on the back of the **computer case** and the other end to the **monitor**.



Figure 1.7: Monitor port

Many computer cables will only fit a specific way. If the cable doesn't fit, don't force it or you might damage the connectors. Make sure the plug aligns with the port, then connect it. To figure out which cables belong in which ports, try our **Connecting Cables** interactive.

### Step 4

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Unpack the **keyboard** and determine whether it uses a **USB** (rectangular) connector or a **PS/2** (round) connector. If it uses a USB connector, plug it into any of the USB ports on the back of the computer. If it uses a PS/2 connector, plug it into the **purple** keyboard port on the back of the computer.

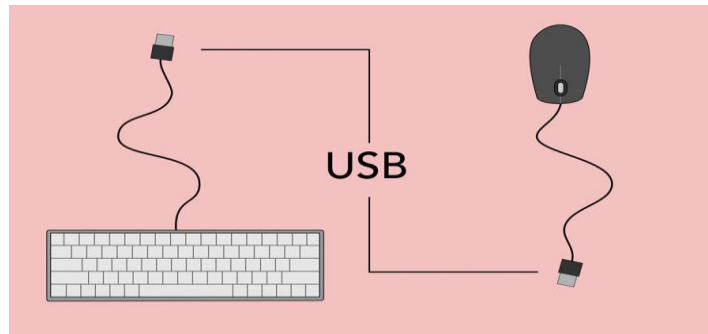


Figure 1.8: Keyboard and mouse

### Step 5

Unpack the **mouse** and determine whether it uses a **USB** or **PS/2** connector. If it uses a USB connector, plug it into any of the USB ports on the back of the computer. If it uses a PS/2 connector, plug it into the **green** mouse port on the back of the computer.

If your keyboard has a **USB port**, you can connect your mouse to the keyboard instead of connecting it directly to your computer.

If you have a **wireless** mouse or keyboard, you may need to connect a Bluetooth **dongle** (USB adapter) to your computer. However, many computers have built-in Bluetooth, so an adapter may not be necessary.

### Step 6

If you have **external speakers** or **headphones**, you can connect them to your computer's **audio port** (either on the front or back of the computer case). Many computers have color-coded ports. **Speakers** or **headphones** connect to the **green** port, and **microphones** connect to the **pink** port. The **blue** port is the **line in**, which can be used with other types of devices.

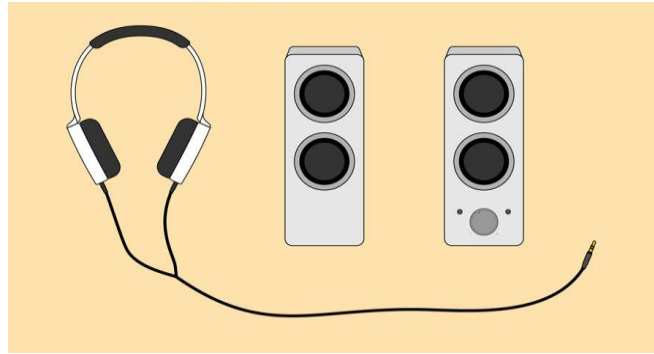


Figure 1.9: Speaker and headphone

Some speakers, headphones, and microphones have **USB connectors** instead of the usual audio plug. These can be connected to any USB port. In addition, many computers have speakers or microphones built into the monitor.

### Step 7

Locate the two **power supply cables** that came with your computer. Plug the first power supply cable into the back of the **computer case** and then into a **surge protector**. Then, using the other cable, connect the **monitor** to the **surge protector**.

You can also use an **uninterruptable power supply (UPS)**, which acts as a surge protector and provides temporary power if there is a power outage.

### Step 8

Finally, plug the **surge protector** into a wall outlet. You may also need to turn on the **surge protector** if it has a power switch.

If you don't have a surge protector, you can plug the computer directly into the wall. However, this is **not recommended** because electrical surges can damage your computer.

### Step 9

If you have a **printer, scanner, webcam**, or other **peripherals**, you can connect them at this point. Many peripherals are **plug and play**, which means they will be recognized by your computer as soon as they are plugged in.

Other peripherals may include **software** that needs to be installed before you can begin using them. Use the instructions included with the device to install it if necessary.

Generally, peripherals are **optional**, and you can add new ones at any time; you don't have to add all peripherals during the initial setup of your computer.

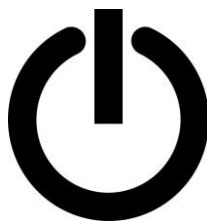
### 1.3.2 Getting started with your first computer

A computer is more than just another household appliance. The vast amount of information and possibilities can be overwhelming. But you can accomplish a lot with a computer, and using one can be a good experience. Let's walk through getting started with your first computer. Turning on a computer for the first time can be different from one computer to the next. Your experience could be different from this lesson. It's OK to ask someone for help.

If you're using a desktop computer, you'll need to make sure that the keyboard, mouse, and monitor are plugged into the computer case before you continue. Review our lesson on **Setting Up a Computer** to learn how.

#### Turning on a computer

The very first step is to **turn on** the computer. To do this, locate and press the **power** button. It's in a different place on every computer, but it will have the universal power button symbol (shown below).



Figureure: power button

Once turned on, your computer takes time before it's ready to use. You may see a few different displays flash on the screen. This process is called **booting up**, and it can take anywhere from 15 seconds to several minutes.

Once the computer has **booted up**, it may be ready to use, or it may require you to **log in**. This means identifying yourself by typing your user name or selecting your profile, then typing your password. If you've never logged in to your computer before, you may need to **create an account**.

The main screen you'll start from is the **desktop**. This is sort of like a main menu or a table of contents. From here, you can access the programs and features you need to use your computer.

**Icons** are used to represent the different files, applications, and commands on your computer. An icon is a small image that's intended to give you an idea at a glance of what it represents, like a logo. Double-clicking an icon on the desktop will open that application or file.



Figure 1.10: Desk top icon

A **button** is a command that performs a specific function within an application. The most commonly used commands in a program will be represented by buttons.

**Menus** are organized collections of commands and shortcuts. Click a **menu** to open it and display the commands and shortcuts within. Then click an item in the **menu** to execute it.



Figure 1.11: Menu

When you open an application or folder, it is displayed in its own **window**. A **window** is a contained area—like a picture within a picture—with its own menus and buttons specific to that program. You can rearrange multiple **windows** on the desktop and switch between them.

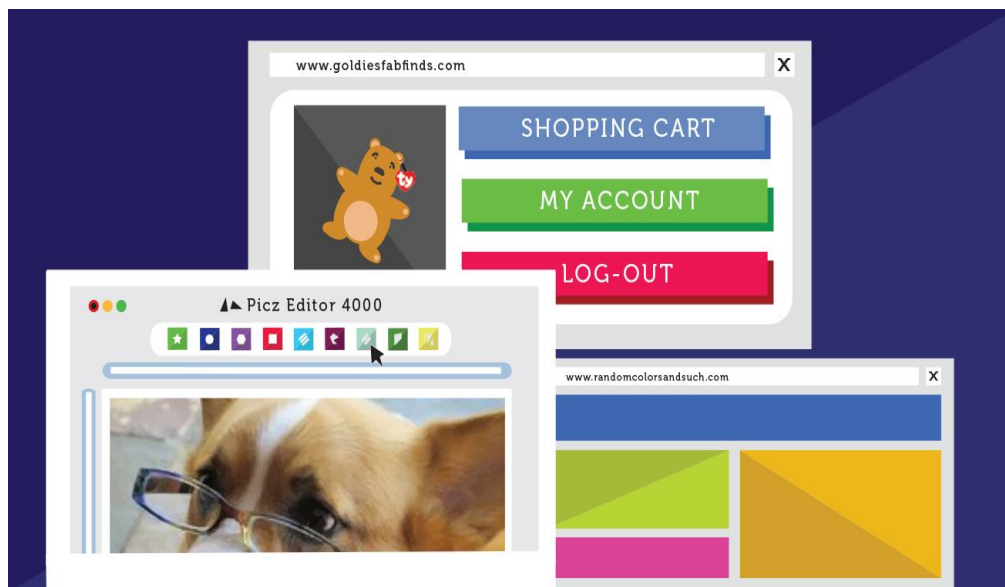


Figure 1.12: Window

### Getting to know the interface

Both PCs and Macs use a **graphical user interface** (GUI), and they each have their own look and feel. The interactives below will introduce you to the Windows and Mac interfaces.

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Click the buttons in the interactive below to learn more about the Windows interface.

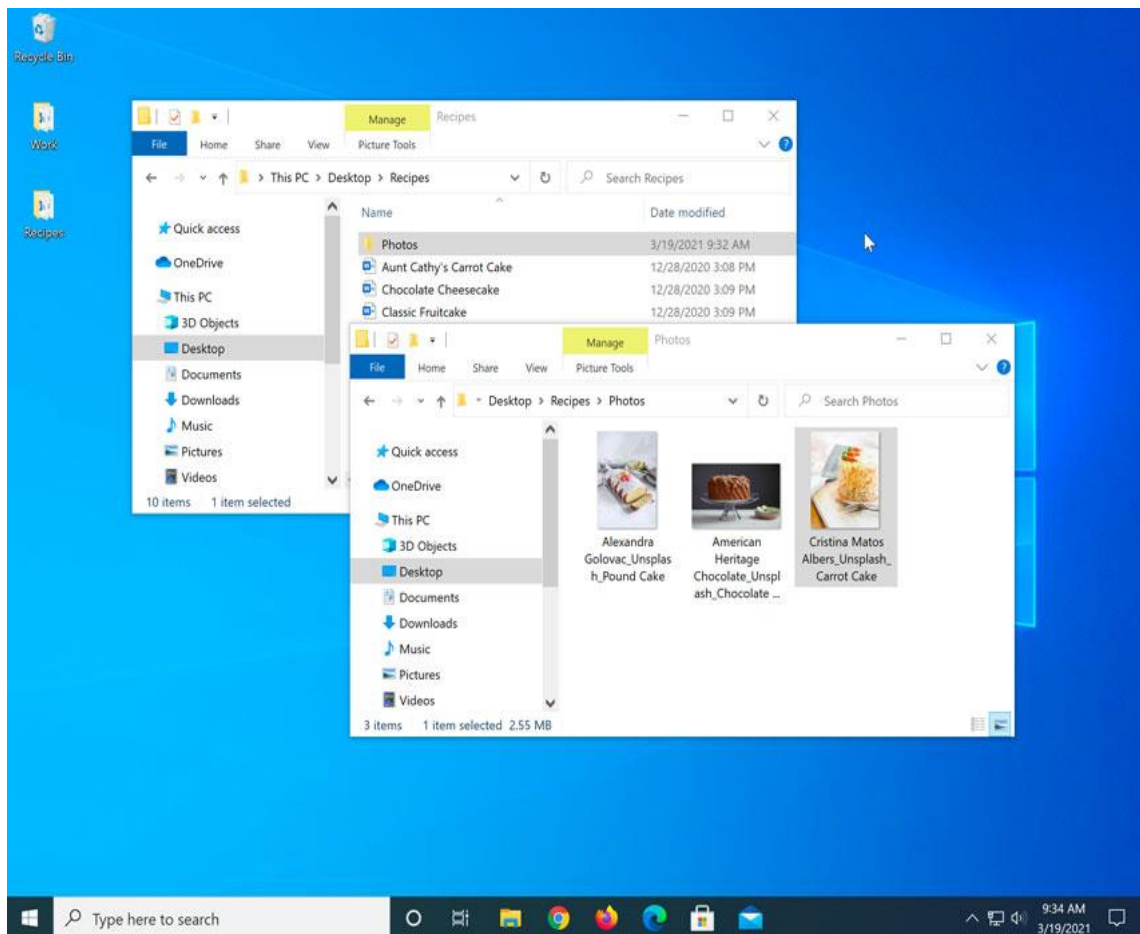


Figure 1.13: Windows interface

Click the buttons in the interactive below to learn more about the macOS interface.

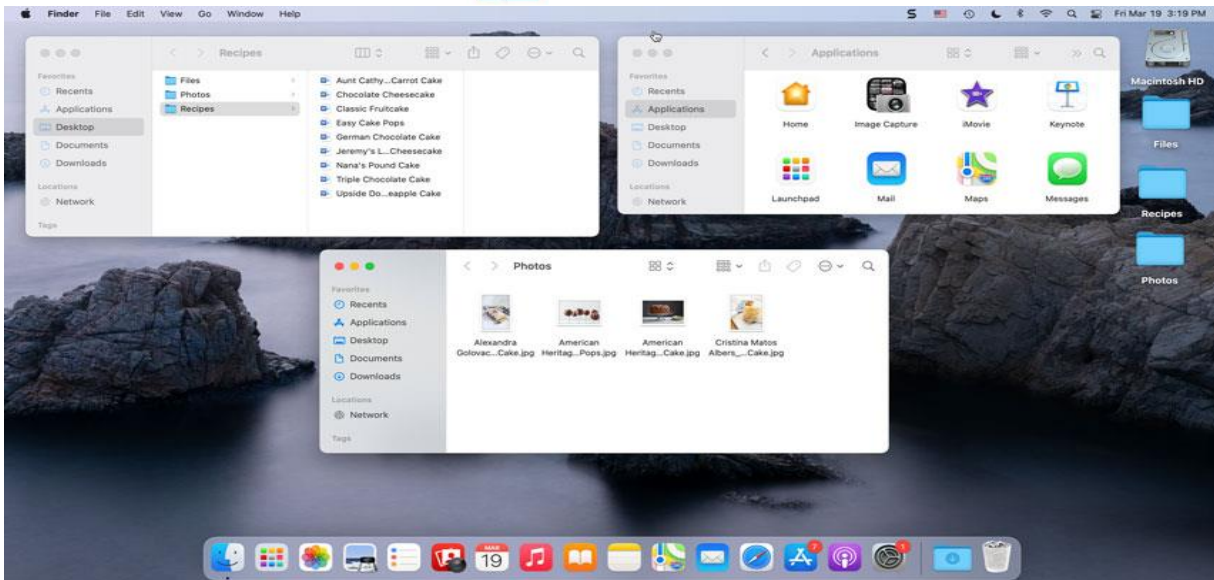


Figure 1.14: MACOS interface

If you have difficulty seeing or hearing—or if you have trouble manipulating the mouse or keyboard—there are many settings that can help make your computer easier to use. To learn more, check out our lesson on **Using Accessibility Features**.

### All about your computer's file system

No matter which operating system you use, your computer uses **folders** to organize all of the different files and applications it contains. **Folder icons** on your computer are designed to look like file folders full of documents or pictures.

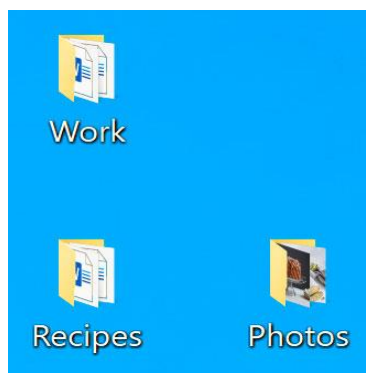


Figure 1.15: Folder

Each operating system has its own file system, which helps you find your folders and files. If you have a Windows PC, you'll use the **File Explorer** (also known as **Windows Explorer**). If you have a Mac, you'll use **Finder**. Here, we'll talk about the basic functions that are common to all computer file systems.

## Opening your computer's file system

Whether you're using a PC or a Mac, the file system icon will be on the toolbar. On a PC, the **File Explorer icon** looks like a folder, as in the image below.

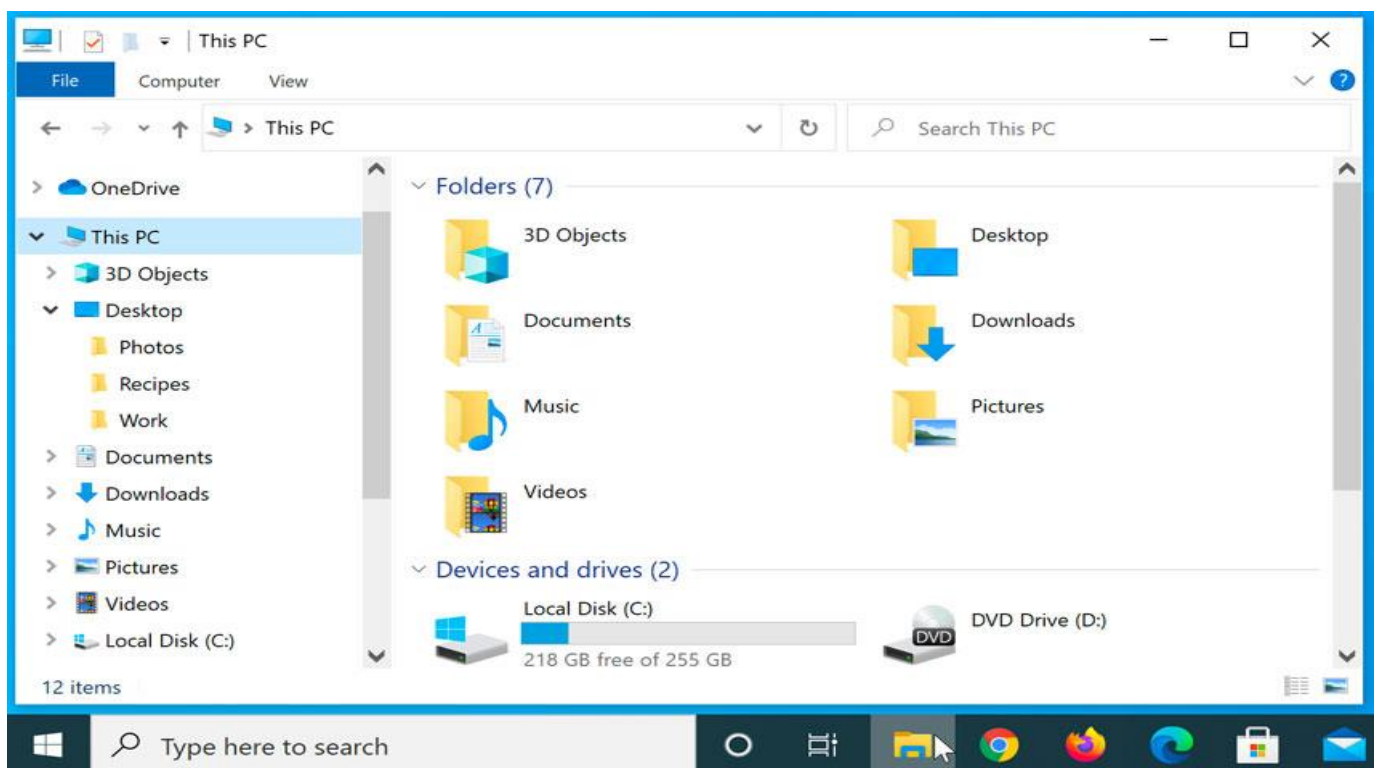


Figure 1.16: File explorer

In both operating systems, you can also open the file system by **clicking a folder** from your **desktop**.

## Basic navigation

Whether you're using File Explorer or Finder, basic navigation will work the same way. If you see the file you want, you can double-click it with your mouse. Otherwise, you can use the **Navigation pane** on the left side of the window to select a different location.

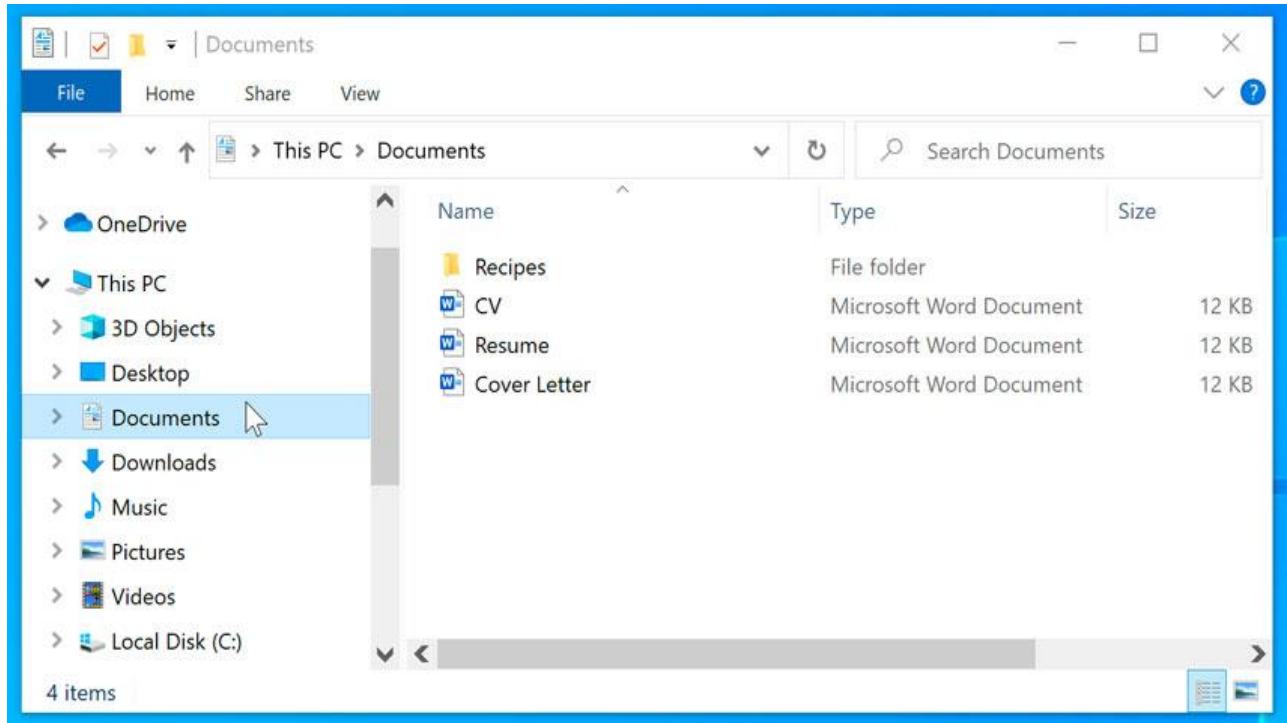


Figure 1.17: Navigation pane

## Deleting files

macOS and Windows use a **Trash can**—or **Recycle Bin**—to prevent you from accidentally deleting files. When you delete a file, it is moved to the Trash can. If you change your mind, you can move the file back to its original location.

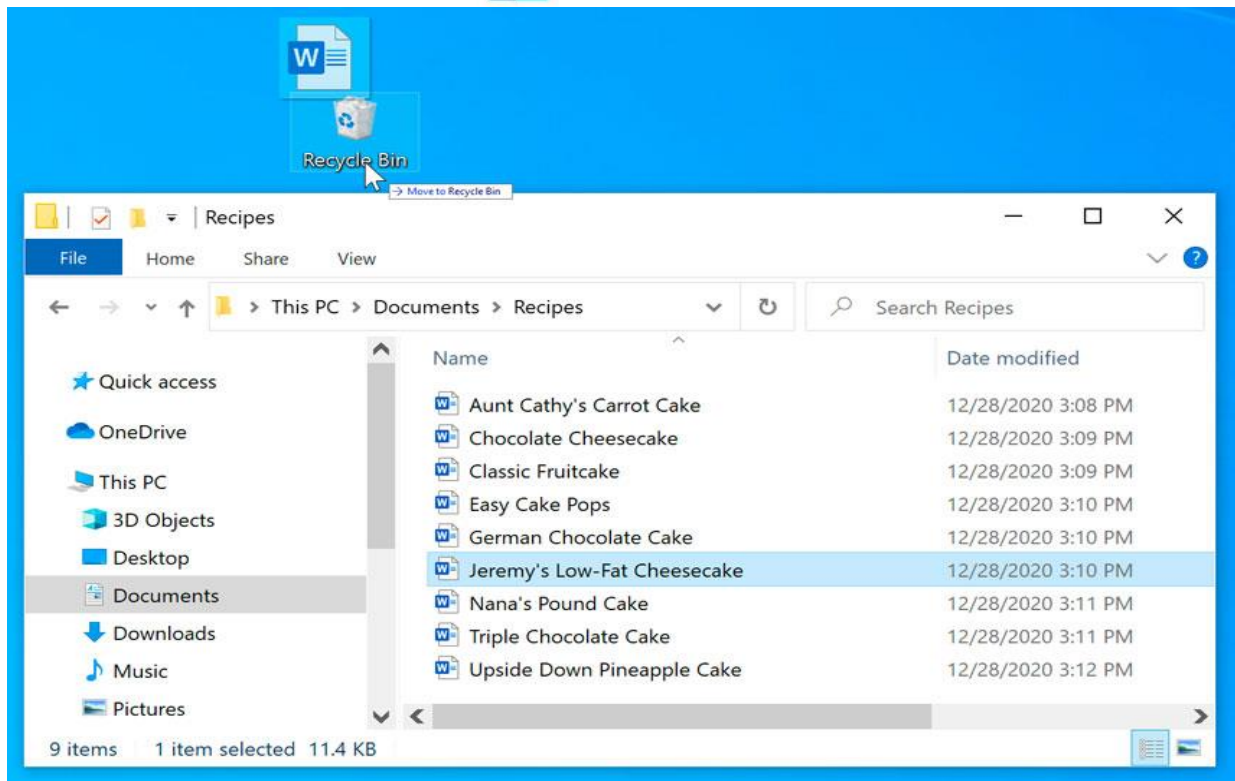


Figure 1.18: Recycle bin

If you want to permanently delete the file, you will need to **empty the Trash or Recycle Bin**. To do this, right-click the icon and select **Empty**.

## Opening files and applications

Each application on your computer has a group of **file types**—or **formats**—it is able to open. When you **double-click** a file, your computer will automatically use the correct application to open it. In our example, we're opening a Microsoft Word document (**Cover Letter**), which will open in **Microsoft Word**.

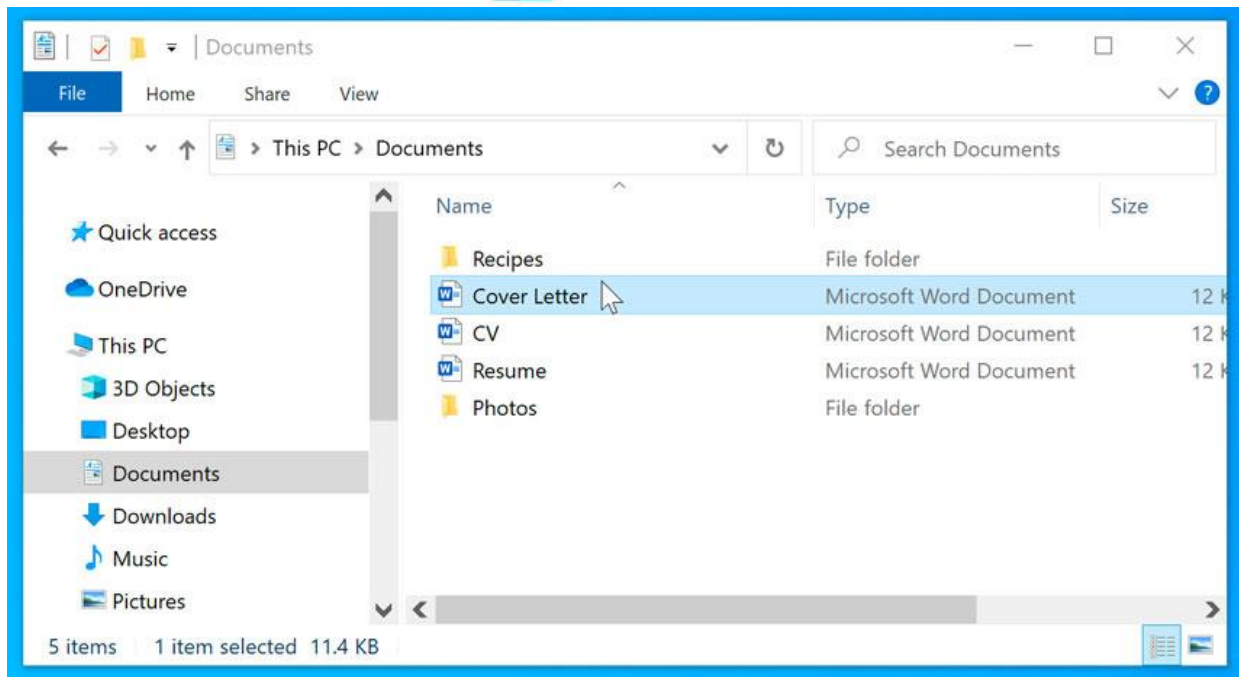


Figure 1.19: Opening Ms word

However, there may be times you may want to open an application directly, instead of just opening a file.

- To open an application in **Windows**, click the **Start** button, then select the desired application. If you don't see the one you want, you can click **All Programs/All Apps** to see a full list, scroll through the application list in Windows 10, or simply **type the name of the application** on your keyboard to search for it. In the example below, we're opening **Microsoft Edge** from the tiles.

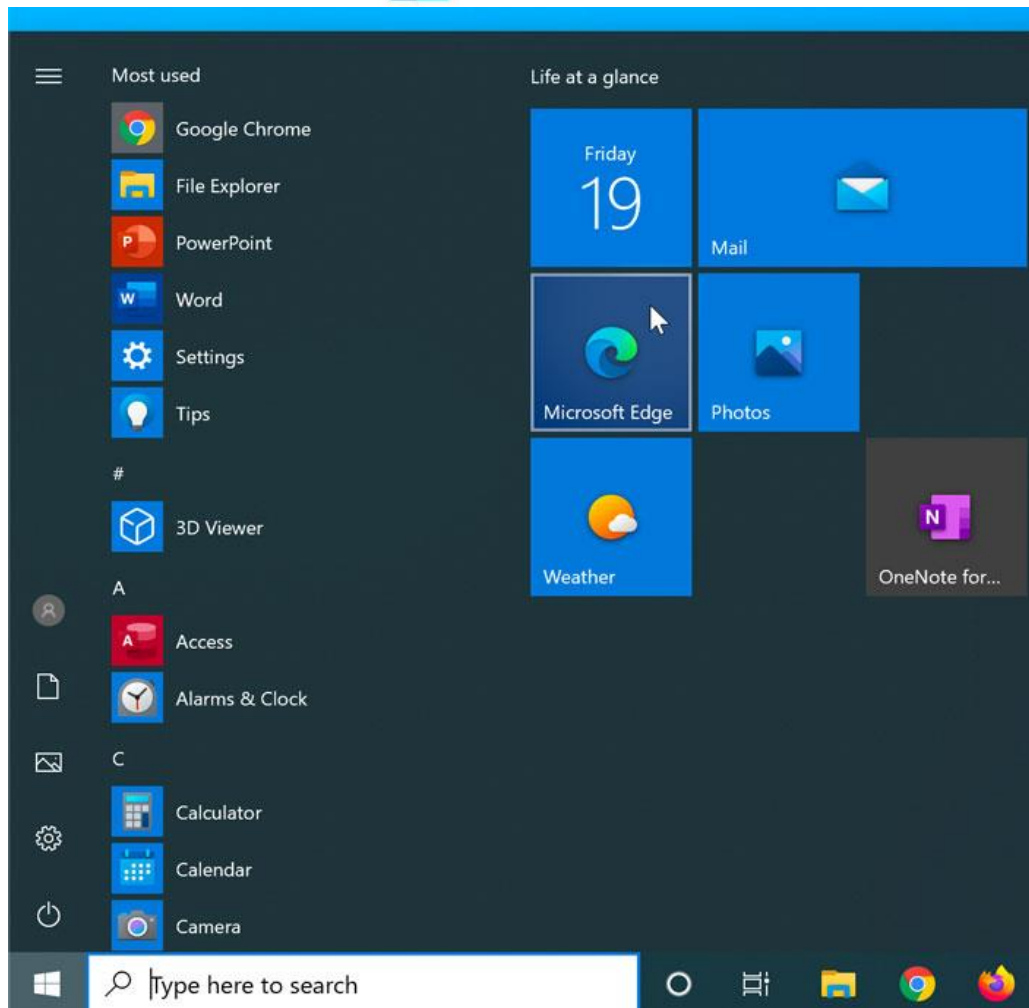


Figure 1.20: Opening applications on windows 10

### Adjusting your computer's settings

When you start using a new computer, you may want to begin by adjusting the computer's settings. Adjusting your settings can range from simple tasks such as changing your **desktop background** to more advanced tasks like adjusting your **security** or **keyboard settings**.

- In **Windows 10**, click the **Start** button, then select **Settings**.

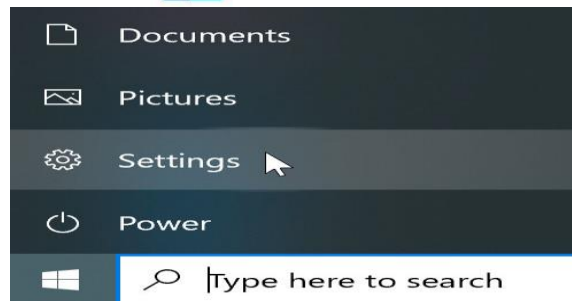


Figure: computer setting

- In **Windows 8.1** and earlier, click the **Start** button, then locate and select the **Control Panel**. Check out the **Adjusting Your Settings** lesson in our **Windows Basics** tutorial to learn more about the Control Panel.

### Shutting down your computer

When you're done using your computer, it's important to **shut it down properly**.

- To shut down **Windows**, click the **Start** button, then select **Shut down** from the menu (in some versions, this may say **Turn Off Computer** or look like the power symbol).

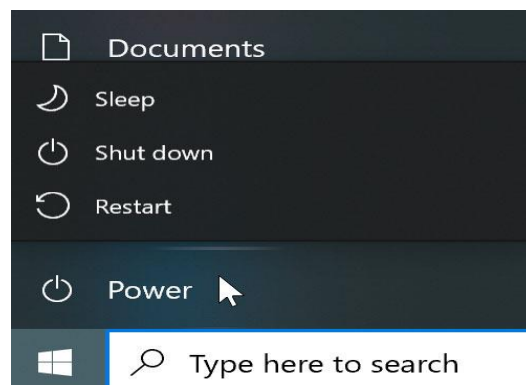


Figure: Shutting down your computer

### Connecting to the Internet

Once you've set up your computer, you may want to purchase **home Internet access** so you can send and receive email, browse the Web, stream videos, and more. You may even want to set up a **home wireless network**, commonly known as **Wi-Fi**, so you can connect multiple devices to the Internet at the same time.

## Types of Internet service

The type of Internet service you choose will largely depend on which **Internet service providers** (ISPs) serve your area, along with the types of service they offer. Here are some common types of Internet service.

- **Dial-up:** This is generally the slowest type of Internet connection, and you should probably avoid it unless it is the only service available in your area. Dial-up Internet uses your **phone line**, so unless you have multiple phone lines you will not be able to use your landline and the Internet at the same time.
- **DSL:** DSL service uses a **broadband connection**, which makes it much faster than dial-up. DSL connects to the Internet **via a phone line** but does not require you to have a landline at home. And unlike dial-up, you'll be able to use the Internet and your phone line at the same time.
- **Cable:** Cable service connects to the Internet **via cable TV**, although you do not necessarily need to have cable TV in order to get it. It uses a broadband connection and can be faster than both dial-up and DSL service; however, it is only available where cable TV is available.
- **Satellite:** A satellite connection uses broadband but does not require cable or phone lines; it connects to the Internet **through satellites orbiting the Earth**. As a result, it can be used almost anywhere in the world, but the connection may be affected by weather patterns. Satellite connections are also usually slower than DSL or cable.
- **3G and 4G:** 3G and 4G service is most commonly used with mobile phones, and it connects **wirelessly** through your ISP's network. However, these types of connections aren't always as fast as DSL or cable. They will also **limit the amount of data** you can use each month, which isn't the case with most broadband plans.

## Choosing an Internet service provider

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Now that you know about the different types of Internet service, you can do some research to find out what ISPs are available in your area. If you're having trouble getting started, we recommend talking to friends, family members, and neighbors about the ISPs they use. This will usually give you a good idea of the types of Internet service available in your area.

Most ISPs offer several tiers of service with different Internet speeds, usually measured in **Mbps** (short for **megabits per second**). If you mainly want to use the Internet for **email** and **social networking**, a slower connection (around 2 to 5 Mbps) might be all you need. However, if you want to **download music** or **stream videos**, you'll want a faster connection (at least 5 Mbps or higher).

You'll also want to **consider the cost** of the service, including installation charges and monthly fees. Generally speaking, the faster the connection, the more expensive it will be per month.

Although **dial-up** has traditionally been the **least expensive** option, many ISPs have raised dial-up prices to be the **same as broadband**. This is intended to encourage people to switch to broadband. We do not recommend dial-up Internet unless it's your only option.

## Hardware needed for internet service

### Modem

Once you have your computer, you really don't need much additional hardware to connect to the Internet. The primary piece of hardware you need is a **modem**.

The type of Internet access you choose will determine the type of modem you need. **Dial-up** access uses a **telephone modem**, **DSL** service uses a **DSL modem**, **cable** access uses a **cable modem**, and **satellite** service uses a **satellite adapter**. Your ISP may give you a modem—often for a fee—when you sign a contract, which helps ensure that you have the **right type** of modem. However, if you would prefer to shop for a **better** or **less expensive** modem, you can choose to buy one separately.

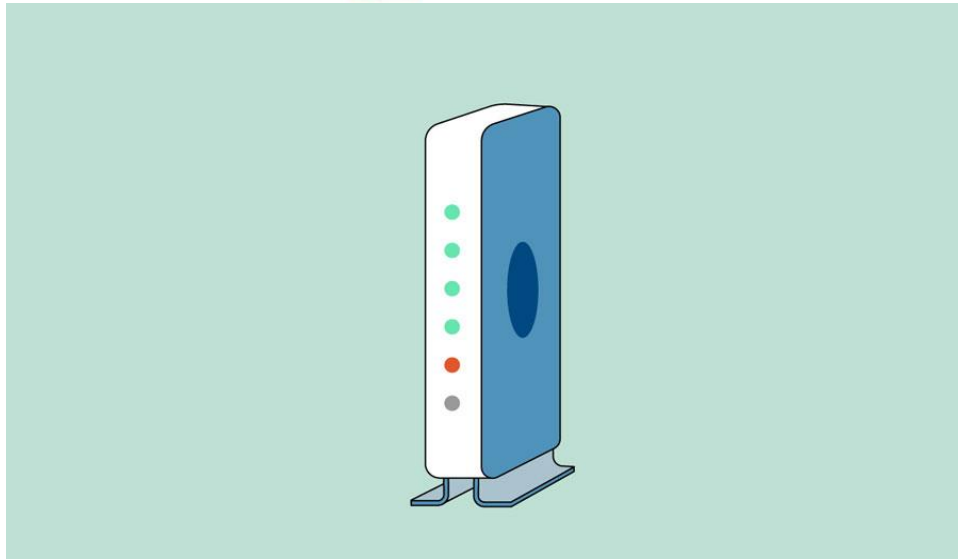


Figure 1.21: Modem

### 3. Router

A **router** is a hardware device that allows you to connect **several computers** and **other devices** to a single Internet connection, which is known as a **home network**. Many routers are **wireless**, which allows you to create a **home wireless network**, commonly known as a **Wi-Fi network**.

You **don't necessarily need to buy a router** to connect to the Internet. It's possible to connect your computer directly to your modem using an Ethernet cable. Also, many modems include a **built-in router**, so you have the option of creating a Wi-Fi network without buying extra hardware.

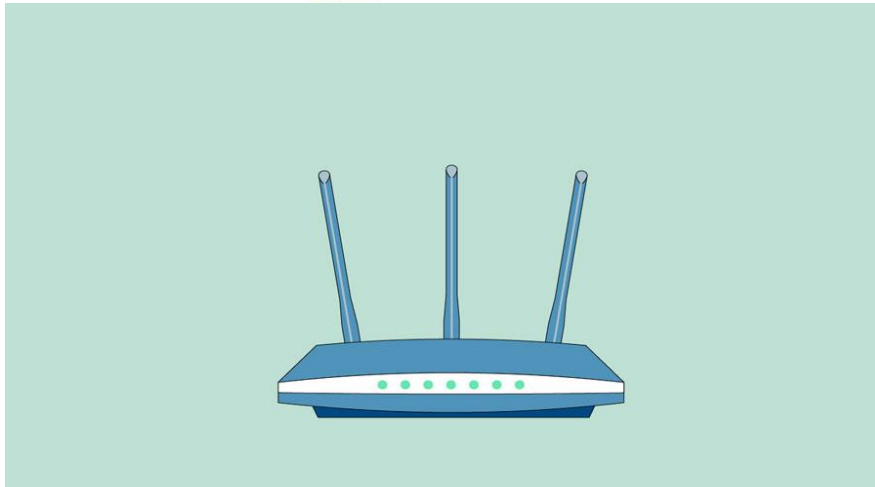


Figure 1.22: Router

<b>Self-check 1</b>	<b>Written test</b>
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**Direction: answer the following question**

**Test 1: say true or false**

1. Hardware is defined as the physical part or component of a computer system which can be felt, seen, and touched.
2. The computer monitor which we use to view the display is a software Device.
3. Operating System acts as the primary interface between a user and computer hardware.
4. A compiler is a software that translates the code written in one language to some other language without changing the meaning of the program.
5. Computer Hard disk drives are used to store the data permanently.

**Test 2: matching**

Answer	A	B
	1. Input devices	A. Windows Os, MACOS, LINUX
	2. Output devices	B. keyboard, mouth
	3. System software	C. Store data temporarily
	4. Application software	D. Monitor, speaker, Printer
	5. RAM	E. MS office, browsers

**Test 3: short answer**

1. List most important features of system software?
2. What are the most important tasks performed by the operating system?
3. Describe main parts of computers?

**Note: Satisfactory rating – 10 points**

**Unsatisfactory - below 5 points**

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Operation Sheet - 1

**Operation Title:** Setting up and connecting a desktop computer

**Instructions:** collect all computer accessories for setting up a computer

**Purpose:** To make the desktop computer ready for use

**Required tools and equipment:** Divider, UPS, all computer accessories

**Precautions:**

- ✓ Observe power requirement of the computer
- ✓ Place the computer in safe and ventilated area
- ✓ Never touch the inside of the computer to avoid electric shock
- ✓ Do not expose the monitor to water

### Procedures

**Step 1:** Unpack the monitor and computer case from the box

**Step 2:** Locate the monitor cable. There are several types of monitor cables

**Step 3:** Connect one end of the cable to the monitor port on the back of the computer **case** and the other end to the monitor.

**Step 4:** Unpack the keyboard and determine whether it uses a USB (rectangular) connector or a **PS/2** (round) connector. If it uses a USB connector, plug it into any of the USB ports on the back of the computer. If it uses a PS/2 connector, plug it into the purple keyboard port on the back of the computer

**Step 5:** Unpack the mouse and determine whether it uses a USB or PS/2 connector. If it uses a USB connector, plug it into any of the USB ports on the back of the computer. If it uses a PS/2 connector, plug it into the green mouse port on the back of the computer.

**Step 6:** If you have external speakers or headphones, you can connect them to your computer's audio port (either on the front or back of the computer case). Many computers have color-coded ports. Speakers or headphones connect to the green port, and microphones connect to the pink port. The blue port is the line in, which can be used with other types of devices.

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**Step 7:** Locate the two power supply cables that came with your computer. Plug the first power supply cable into the back of the computer case and then into a surge protector. Then, using the other cable, connect the monitor to the surge protector.

**Step 8:** Finally, plug the surge protector into a wall outlet. You may also need to turn on the surge protector if it has a power switch.

**Step 9:** If you have a printer, scanner, webcam, or other peripherals, you can connect them at this point. Many peripherals are plug and play, which means they will be recognized by your computer as soon as they are plugged in.

### Quality criteria

- Safety
- handling
- Identification of computer accessories
- Connecting method

## Unit two: Medical equipment data and information

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

- Entering medical equipment data into computer
- Accessing medical equipment information
- Producing output data
- Ergonomic guidelines

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:

- Enter medical equipment data into the computer using program/application
- Store input data in the storage media
- Access medical equipment information
- Produce output data
- Perform the work within ergonomic guidelines

## 2.1 Entering medical equipment data into computer

Medical Device Data Systems (MDDS) are hardware or software products intended to transfer, store, convert formats, and display medical device data. A MDDS does not modify the data or modify the display of the data, and it does not by itself control the functions or parameters of any other medical device

A medical device data system (MDDS) is a device that is intended to provide one or more of the following uses, without controlling or altering the functions or parameters of any connected medical devices:

The electronic transfer of medical device data;

The electronic conversion of medical device data from one format to another format in accordance with a preset specification; or

The electronic display of medical device data.

An MDDS may include software, electronic or electrical hardware such as a physical communications medium (including wireless hardware), modems, interfaces, and a communications protocol. This identification does not include devices intended to be used in connection with active patient monitoring.

In practice, a medical device data system (MDDS) is a medical device intended to provide one or more of the following functions:

- The electronic transfer or exchange of medical device data from a medical device, without altering the function or parameters of any connected devices. For example, this would include software that collects output from a ventilator about a patient's CO2 level and transmits the information to a central patient data repository
- The electronic storage and retrieval of medical device data, without altering the function or parameters of connected devices. For example, software that stores historical blood pressure information for later review by a healthcare provider.
- The electronic conversion of medical device data from one format to another in accordance with a preset specification. For example, software that converts digital data generated by a pulse oximeter into a digital format that can be printed.
- The electronic display of medical device data, without altering the function or parameters of connected devices. For example, software that displays the previously stored electrocardiogram for a particular patient.

### 2.2.1 Storage media

In computers, a storage medium is a physical device that receives and retains electronic data for applications and users and makes the data available for retrieval. The storage medium might be inside a computer or other device or attached to a system externally, either directly or over a network. The plural form of this term is storage media.

A storage medium may be internal to a computing device, such as a computer's SSD, or a removable device such as an external HDD or universal serial bus (USB) flash drive. There are also other types of storage media, including magnetic tape, compact discs (CDs) and non-volatile memory (NVM) cards.

An organization's storage is often classified as primary and secondary. Originally, primary storage referred to data that is kept in memory for fast retrieval by a computer's processor, and secondary storage referred to data stored on non-volatile devices such as SSDs and HDDs.

#### Hard disk drives

An HDD provides a high-capacity alternative to magnetic storage media such as tape or floppy disks. It contains metal platters coated with a magnetic layer. The platters usually spin continuously when a computer is on, storing data in different sectors on the magnetic disk.

Hard disks continue to be the dominant media for backup storage appliances, active archives and long-term retention. A disk-based backup appliance might also include interfaces to replicate data copies, such as clones and snapshots, to tertiary devices or a hybrid cloud.

#### Flash memory

Flash memory does not depend on moving mechanical parts. Instead, data is written to microchips, making storage operations much faster than traditional disks. However, data must be erased and rewritten in entire blocks, which can affect a device's overall endurance.

There are two main types of flash SSDs: NAND and NOR. The names are defined by their respective logic gates, which determine the fundamental architecture underlying digital circuits.

#### USB flash drives

A USB flash drive is a type of removable storage medium that attaches to a server or other device through a USB port. A USB flash drive seldom connects continuously to a device, which can make it less susceptible to Trojan horses, viruses or worms.

The term USB flash drive refers to the device in its entirety, including the USB connector, whereas the storage medium is the internal flash chip. USB flash drives can vary in size, but they're generally about the size of a thumb, with a design similar to SSDs but on a smaller scale. USB flash drives attach to devices by sliding into compatible USB ports, making it possible to quickly transfer or copy data. The drives are variously called memory sticks, keychain drives, thumb drives and jump drives.



Figure 2.1: Flash drive

### Optical disc

Optical disc technology uses lasers to write and read data. Many optical discs support write once, read many (WORM) operations only. When first introduced, optical discs could store more data than magnetic HDDs, but that has since changed, and optical discs are now used primarily for prerecorded audio and video recordings or for backup and archival purposes. Types of optical storage media include Blu-ray discs, DVDs, CDs and CD-ROMs (for read-only data).

## 2.2 Accessing medical equipment information

Users 'information needs change as a consequence of electronic documents, whose content is available for all users. These information needs are only expectations of library users, depending on the librarians 'needs to re-orientate their collections and services, while the user feedback is considered as particular factor in measuring the usefulness and efficiency of every library. In order to document, they need to define their requirements, to formulate key-questions, and, of course, to know how to locate, assess and use information from several electronic sources

Most people connect to the Internet from home, work, or public access sites like libraries, schools, and community centers using personal computers, e-mail stations, interactive digital televisions, game stations, or web kiosks.

### 2.2.1 Medical Equipment Management system (MEMIS)

Medical Equipment Management system (MEMIS) is designed by Pharmaceutical and Medical Equipment Directorate (PMED) and Health Information Technology Directorate (HITD) for the systematic record-keeping system of medical equipment information which can help to manage medical equipment assets in the health facility. The software is simple and user friendly that help to establish precise management of medical equipment at national, regional and health facilities level. The system is interconnected between ministry of health, regional health bureaus, and health facilities.

MEMIS is an application software tool for Registering, Requesting and analyzing Report of installation, inventory, maintenance, request, disposal and other related information of medical equipment. MEMIS have auto filling parameters, radio buttons, drop down lists, searchable engines and have selectable report analyzing tool. The MEMIS consists of Dashboard, Registration, Setting, Request, Report modules, users, setting, alert alarm and each modules have its own parameters and setups.

The web-based MEMIS setting module defined settings for uniformity name and report style at the level of the facility and organization. The system provides user privileges for each levels to access their specific hospital information. The hospital can't access other hospital information as well as the regional health bureaus also access their hospitals which found only in the region. The system have dashboard which display alert alarm which indicates the request, the statues, standard and preventive maintenance of medical equipment in their specific health facility , total health facility in the region and total hospital in the ministry level. The system also consists of exporting and importing mechanism for easily use the data and either printing in PDF, Excel and other formats

Generally, the system provides information exchange regarding medical equipment statues, report and request between health facilities, regional health bureaus and ministry of health. The

user guide presents an overview of the application's features and gives step-by-steps instructions for completing a variety of tasks in the MEMIS modules.

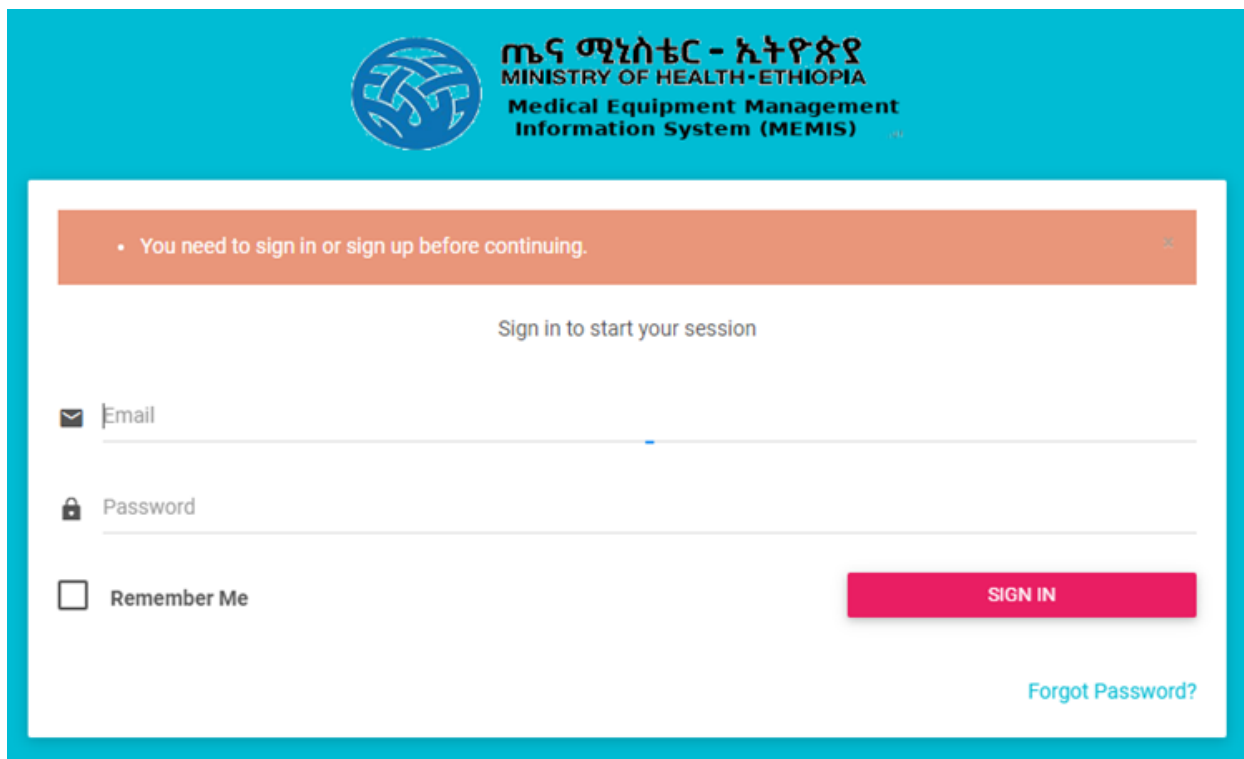


Figure 2.2: MEMIS Login form

## 2.3 Producing output data

### 2.3.1 Data processing

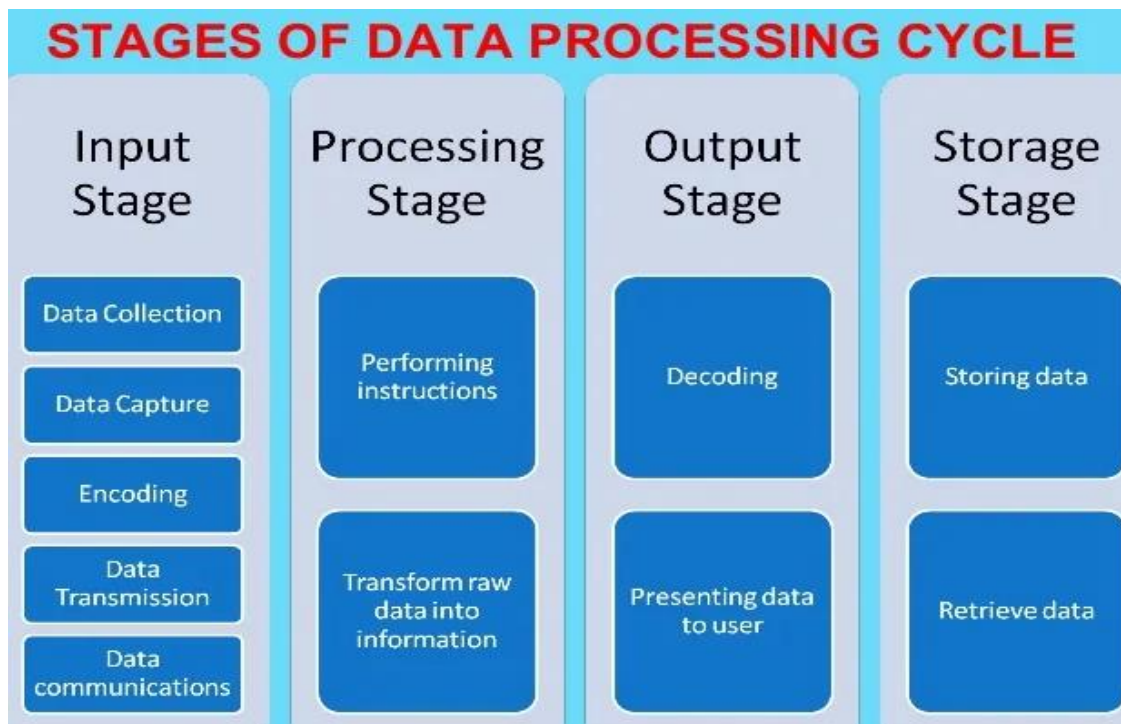
Data procesing refers to the transforming raw data into meaningful output. Data can be done manually using a pen and paper, mechanically using simple devices eg typewriter or electronically using modern dat processing toolseg computers.

**Data collection** involves getting the data/facts needed for processing from the point of its origin to the computer

**Data Input-** the collected data is converted into machine-readable form by an input device, and send into the machine.

**Processing** is the transformation of the input data to a more meaningful form (information) in the CPU

**Output** is the production of the required information, which may be input in future.



Figureure: stages of data processing

Electronic data processing or EDP is the modern technique to process data. The data is processed through computer; Data and set of instructions are given to the computer as input and the computer automatically processes the data according to the given set of instructions. The computer is also known as electronic data processing machine.

This method of processing data is very fast and accurate. For example, in a computerized education environment results of students are prepared through computer; in banks, accounts of customers are maintained (or processed) through computers etc

## 2.4 Ergonomic guidelines for Computer Workstations

Ergonomics is the practice of fitting the job to the worker. It is concerned with how our environment interacts with our work. It also looks for ways to adjustour environment to decrease the risks of injury and illness, enhance productivity and improve the quality of our work life.

Ergonomics is important for health reasons. When a body works in a way that is not ergonomically friendly, it can create stress through awkward postures, extreme temperatures, or repeated movements. This can lead to discomfort, fatigue, pain, and over time can cause musculoskeletal disorders.

As we all know, being a student or working in a lab requires many hour of sitting in front of the computer. While most people believe it is relaxing, sitting is actually hard on the back because it transfers the full weight of the upper body onto the buttocks and thighs. Sitting, especially for long periods of time, can also cause increased pressure on the intervertebral discs- the springy, shock-absorbing parts of the spine. It's also hard on the lower extremities since gravity pools blood in the legs and feet and creates a sluggish return of blood to the heart.

Ergonomics seeks to combat these problems. The easiest and lowest-cost way to improve ergonomics is likely by making improvements to computer work stations.

**1. Elbow measure:** Begin by sitting comfortably as close as possible to your desk so that your upper arms are parallel to your spine. Rest your hands on your work surface. If youelbows are not at a 90-degree angle, adjust your office chairup or down.

**2. Thigh measure:** Check that you can easily slide your fingers under your thigh at the leading edge of the office chair. If it is too tight, you need to prop your feet up withan adjustable footrest. If you are unusually tall and there is more than a finger width between your thigh and the chair, you need to raise the desk or work surface so that you canraise the height of your office chair.

**3. Calf measure:** With your bottom pushed against the chair back, try to pass your clenched fist between the back of your calf and the front of your office chair. If you can't do that easily, then the office chair is too deep. You will need to adjust the backrest forward, insert lower back support(such as a lumbar support cushion, a pillow or rolled-uptowel), or get a new office chair.

**4. Lower back support:** Your bottom should be pressed against the back of your chair, and there should be a cushion that causes your lower back to arch slightly so that you don't slump forward or slouch down in the chair as you tire over time. This low back support in the office chair is essential to minimize the strain on your back.

**5. Resting eye level:** Having the monitor directly in front of you prevents you from twisting your head and neck while viewing the screen. When you are seated comfortably, your eyes should be in line with a point on the screen about 2 to 3 inches below the top of the monitor casing.

**6. Arms while typing:** Have the keyboard tilted so your arms remain straight from the forearm through the hand during the typing process, not bent at the wrists.

**7. Close environment:** Arrange your desk so the items you use most frequently are within easy reach without having to stretch or bend for them.

**8. Talking on the phone:** Avoid holding the phone with your neck. If you use the phone frequently, consider getting a headset to reduce the stress on your neck muscles.

**9. Movement:** No matter how comfortable one is in an office chair, prolonged static posture is not good for the back and is a common contributor to back problems.

To avoid keeping the back in one position for a long period, remember to stand, stretch and walk for at least a minute or two every half hour. In general, moving about and stretching on a regular basis throughout the day will help keep the joints, ligaments, muscles and tendons loose, which promotes an overall feeling of comfort, relaxation and the ability to focus productively.

<b>Self-check 2</b>	<b>Written test</b>
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**Direction: answer the following question**

**Test 1: say true or false**

1. Medical Device Data Systems (MDDS) are hardware or software products intended to transfer, store, convert formats, and display medical device data.
2. Data processing refers to the transforming raw data into meaningful output.
3. Storage medium is a physical device that receives and retains electronic data for applications and users and makes the data available for retrieval.
4. Ergonomics is the practice of fitting the job to the worker

**Test 2: Fill the blank space**

1. \_\_\_\_\_ involves getting the data/facts needed for processing from the point of its origin to the computer.
2. \_\_\_\_\_ the collected data is converted into machine-readable form by an input device, and send into the machine.
3. \_\_\_\_\_ is the transformation of the input data to a more meaningful form (information) in the CPU
4. \_\_\_\_\_ is the production of the required information, which may be input in future.

**Test 3: short answer**

1. What is MEMIS?
2. List computer storage media types?
3. Describe Ergonomic guidelines for Computer Workstations

**Note: Satisfactory rating – 10 points**

**Unsatisfactory - below 5 points**

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### Unit three: Functions of technology for management of medical device

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

- Mobile technology skills
- Mhealth techniques
- Mobile/Smart phones and tablets
- New or upgraded equipment

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:

- Apply existing knowledge as a basis for developing new skills
- Acquire and using mobile technology skills to enhance learning and provision of standard healthcare
- Identify and use MHealth techniques to enhance efficient utilization of resources
- Identify, classify and use new and/or upgraded equipment for the benefit of customer and healthcare system
- Use mobile/smart phones and tablets for solving organizational problems
- Apply the functions of technology to assist health and related data collection, organization, analysis and interpretation
- Test new or upgraded equipment
- Apply features of new or upgraded equipment
- Access, use and interpret sources of information relating to new or upgraded equipment

### 3.1 Mobile technology skills

Mobile technology is a type of technology in which a user utilizes a mobile phone to perform communications-related tasks, such as communicating with friends, relatives, and others. It is used to send data from one system to another. Portable two-way communications systems, computing devices, and accompanying networking equipment make up mobile technology.

Mobile technology is largely employed in cellular communication systems and other related areas. It employs a network architecture that allows multiple transmitters to deliver data on a single channel at the same time. Because it reduces the potential of frequency interference from two or more sources, this platform allows multiple users to use single frequencies. The channel has evolved over time.

This is fast expanding; its applications are getting increasingly broad over time, and it is gradually replacing other similar sources of communication on the market, such as post offices and landlines. Mobile technology has progressed from a simple phone and texting device to a multi-tasking system that can be used for GPS navigation, internet browsing, gaming, and instant messaging, among other things. With the rise, experts claim that the future of computer technology is dependent on wireless networking and mobile computing.

Through tablets and small PCs, mobile technology is becoming increasingly popular. This smartphone system has since been improved to a big multitasking computer that can be used for GPS navigation, gaming, internet browsing, and instant messaging. Tablets and portable laptops have increased the adoption of mobile technology. The mobile networks that connect these devices are referred to as wireless systems. They allow speech, data, and (mobile) apps to be shared between mobile devices.

Mobile technology is becoming increasingly prevalent. Smartphone users have surpassed 3 billion, and the global mobile workforce is expected to reach 1.87 billion by 2022. Any gadget with internet capabilities that can be accessed from anywhere is referred to as mobile technology. Smartphones, tablets, some iPods, and laptops already fall within this category, but this list will undoubtedly grow in the future years.

#### 3.1.1 Types of Mobile Technologies

Followings are the few famous mobile technologies:

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- SMS, MMS, 4G, 3G, GSM, CDMA, Wi-Fi

**SMS:** “SMS” stands for “Short Message Service.” It is now the most widely used and oldest text messaging service. SMS are also sent over cellular networks, therefore you’ll need a wireless plan and a wireless carrier. SMS is fast gaining popularity in the world as a low-cost messaging medium. Every text message delivered to a cell phone has become known as SMS. Messages can usually be up to 140 characters long. SMS was originally developed for GSM phones, although it is now supported by all major cellular phone networks.

Although SMS is most commonly used for text messaging between friends or coworkers, it also has a variety of additional uses. For example, SMS subscription services can send weather, news, sports updates, and financial quotes to consumers’ phones. Employees may also be notified of sales requests, service stops, and other business-related information via SMS.

Fortunately, text messages sent via SMS do not require the receiver’s phone to be turned on in order for the message to be delivered. The message will be kept in the SMS service until the receiver switches on his or her phone, at which point it will be transmitted to the recipient’s phone. Most cell phone providers enable you to send a specific amount of text messages per month for free.

**MMS:** MMS (Multimedia Messaging Service) messaging is a standard method of delivering multimedia material, including messages.

MMS, as opposed to SMS, can send up to forty seconds of video, one picture, a multi-image slideshow, or audio. MMS texting will be supported by the majority of contemporary devices. MMS capability is typically embedded within the text message interface and is turned on automatically when needed. If you enter in a text-only message, for example, it will be transmitted by SMS. If you include a graphic or video, the multimedia part will be sent via MMS. Similarly, if someone sends you a multimedia message, your phone will automatically receive the file via MMS.

An MMS message can convey rich media content to mobile devices at any time and from any location. It is a powerful and effective tool that assists businesses in reinforcing and deepening client loyalty by providing crucial information about their products and services. Because MMS texts are packed with photographs and videos, they are a significant marketing communication tool. As well as other audios. MMS is a cutting-edge method of

communicating with others via mobile devices. Text messages are more successful because they deliver valuable information and services to the recipient. The more a corporation approaches its customers, the more probable it is to form a long-term brand partnership.

**3G:** The third letter in the designation 3G stands for third-generation access technology, which allows mobile phones to connect to the internet. Every new technology introduces new frequency bands and data transmission rates.

The first generation emerged in the 1980s. First-generation uses large phones that had to be mounted on top of cars because they were too heavy to hold. Text messaging was made possible by the second-generation network, which became available in the 1990s. This huge and game-changing advancement also provided a more secure network and laid the path for today's ubiquitous 3G and 4G technology.

The development of 3G connection-based networks in 2001 marked the start of mainstream Internet use on mobile phones. Soon after, smartphones were introduced, bringing all of the capabilities of a device into the palm of your hand. The signals are transmitted by a network of telephone towers, ensuring robust and relatively rapid long-distance communication. The user's mobile phone is receiving data from the tower nearest to it. Although it may not appear complicated, 3G technology was revolutionary at the time it was introduced.

Upload speeds of up to 3 Mbps are possible on 3G networks. For example, about 15 seconds for uploading a 3-minute MP3 song. The fastest 2G phones, on the other hand, may get up to 144Kbps. For example, about 8 minutes to download a 3-minute song. 3G systems are intended for digital phones with a full-screen display and better connectivity.

**4G:** The fourth generation of mobile networking technology is known as 4G, which comes after the 2G and 3G networks. Although it's commonly referred to as 4G LTE, this isn't exactly right because LTE is just one sort of 4G. Most mobile network service providers use it now since it is the most developed technology.

However, as you may have heard, 5G is becoming operational alongside current 3G and 4G mobile networks. When it initially came out, 4G revolutionized how we use the mobile internet. Despite the fact that 3G networks were relatively limited, 4G network connectivity

allowed consumers to browse the internet and watch HD films on their mobile devices, thereby turning smartphones into laptops.

Premium 4G offers download speeds of around 14 Mbps, which is over five times quicker than the 3G network's predecessor. 4G networks can currently attain speeds of up to 150 Mbps, allowing users to download gigabytes of data in minutes, if not seconds, rather than hours as with 3G networks. Uploading data is also significantly faster with 4G – normal upload speeds are over 8 Mbps, with theoretical rates of up to 50 Mbps, whereas 3G upload speeds are under 0.5 Mbps.

**Global System for Mobile technology:** The (GSM) is an acronym for Global System for Mobile Communication. GSM is a cellular technology that is open and digital and is used for mobile communication. It operates on the 850 MHz, 900 MHz, 1800 MHz, and 1900 MHz frequency ranges. It employs a hybrid of FDMA and TDMA.

**Code Division Multiple Access:** (CDMA) is an acronym for code division multiple access. It is a channel access mechanism that also serves as an example of multiple access. Multiple access simply means that data from multiple transmitters can be delivered onto a single communication channel at the same time.

**Wi-Fi (Wireless Fidelity):** Wi-Fi is a wireless networking technology that allows us to connect to a network or to other computers or mobile devices across a wireless channel. Data is delivered in a circular region over radio frequencies in Wi-Fi. Wi-Fi (Wireless Fidelity) is a generic acronym for a communication standard for a wireless network that functions as a Local Area Network without the use of cables or other types of cabling.

### 3.1.2 Use of Mobile technology

The incorporation of mobile technology into business has aided telecollaboration. Now, people could connect from anywhere using mobile technology, and access the papers and documents they need to complete collaborative work.

Work is being redefined by mobile technologies. Employees are no longer confined to their desks; they can work from anywhere in the world.

Mobile technology can help your company save time and money. Employees who work from home save thousands on a regular basis. Mobile phones eliminate the need for costly technology like landline carrier services. Cloud-based services are less expensive than traditional systems. Technology can also help your company become more flexible and productive.

Mobile technology has the potential to boost productivity significantly. Mobile application integration saves an average of 7.5 hours per week per employee. Workers can also become more productive with the use of smartphones and mobile gadgets.

The popularity of cloud-based services has skyrocketed in recent years. Cloud-based mobile technology applications have been seen to be more useful than any smartphone, particularly in terms of available storage space.

### **3.1.3 Advantages of Mobile technology**

Through a variety of applications, we can now stay in touch with our friends and family members anytime we choose. We may now communicate or video visit with anybody we want by just using our cell phone or cell phone. Aside from that, the portable keeps us informed about the rest of the globe.

Today's mobile phones have made our day-to-day activities much more natural. Today, one may check the current traffic situation on their phone and make appropriate decisions to arrive on time. The weather is also a factor.

With the advancement of mobile technology, the entire gaming world is now under one roof. When we are tired of monotonous work or during breaks, we can listen to music, view movies, watch our favorite shows, or simply watch a video of our favorite song.

Mobile phones are being used for a variety of legitimate tasks, including meeting schedules, sending and receiving documents, providing introductions, warnings, and job applications, among others. Cell phones have become an indispensable tool for all working people.

These days, mobile phones are also used as a wallet to make payments. Utilities might be used to send money to friends, relatives, and others right now.

### 3.1.4 Disadvantages of Mobile technology

The modern family has become reliant on mobile phones. In any case, when we don't have to travel, we surf the internet, play around, and create a genuine junkie.

Because of the widespread use of mobile technology, people nowadays don't meet in person but rather tweet or comment on social media sites.

Because of the widespread use of mobile devices, there is a major risk of losing one's protection. By efficiently reading through your web-based social networking account, anyone may now easily obtain data such as where you reside, your loved ones, what you do for a living, where you live, and so on.

Mobile phone prices have risen in tandem with their worth. People nowadays spend a significant amount of money on cell phones, which could be better spent on more useful things like education or other beneficial items throughout our lives.

## 3.2 Mhealth techniques

MHealth (or m-health) is short for mobile health, the practice of medicine and health care over mobile devices, tablets, PDAs, and computers. As an industry, the mHealth field has seen exponential growth in recent years thanks to widespread use in developing nations and increasingly accessible mobile technology. Many people are familiar with eHealth, the branch of healthcare that makes use of computers, emails, satellite communications and monitors. mHealth technology performs similar functions, such as obtaining vital signs, delivering information to doctors and allowing remote exams, on tablets, cell phones and other portable devices.

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MHealth focuses on obtaining information immediately to diagnose illnesses, track diseases and provide timely information to the public in underserved countries. Mobile health (mHealth) is especially important in remote areas where doctors and nurses may not be present to provide treatment. Doctors and nurses working in these remote areas rely on mHealth for timely information on handling diseases, and can also obtain actionable health information to pass on to others near them. This mobile health technology also speeds training and education relative to health issues to medical students and interns working in remote communities.

At the end of 2014, it is estimated that millions of patients around the world were making use of home monitor services, which were all based on mobile connectivity. These devices are not the same as traditional computer connections or cell phones. They have their own cellular communication systems and fixed modem connections dedicated for their use. As health technology changes, so does our digital health lexicon. For example, if a person looks up a symptom on the Internet using their computer, it isn't considered as practicing mHealth. Years ago, however, this was a revolutionary healthcare practice, not just an everyday task. Now, programs and devices dedicated specifically to remote health are further advancing what we consider "everyday" technology. Remote care will eventually be considered as commonplace as in-office visits or research at a computer.

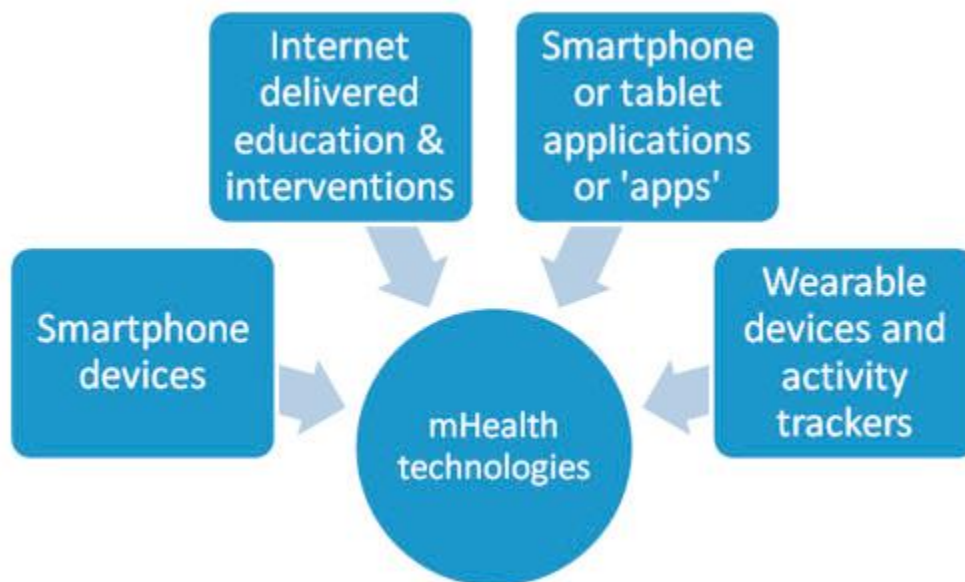


Figure 3.1 mHealth technologies

**Health Management Information Systems (HMIS)** are one of the six building blocks essential for health system strengthening. HMIS is a data collection system specifically designed to support planning, management, and decision making in health facilities and organizations.

**District health information system:** The purpose of District Health Information Systems (DHIS) is to document data that are routinely collected in all public health facilities in a country using the system. DHIS2 is an open source, web-based platform most commonly used as a health management information system (HMIS). DHIS2 is used to aggregate statistical data collection, validation, analysis, management, and presentation. This data analytics and management platform is completely web-based and boasts great visualization features and the ability to create analysis from live data in seconds.

### 3.3 Mobile/Smart phones and tablets

The use of mobile devices by health care professionals (HCPs) has transformed many aspects of clinical practice. Mobile devices have become commonplace in health care settings, leading to rapid growth in the development of medical software applications (apps) for these platforms. Numerous apps are now available to assist HCPs with many important tasks, such as: information and time management; health record maintenance and access; communications and consulting; reference and information gathering; patient management and monitoring; clinical decision-making; and medical education and training.

Mobile devices and apps provide many benefits for HCPs, perhaps most significantly increased access to point-of-care tools, which has been shown to support better clinical decision-making and improved patient outcomes. However, some HCPs remain reluctant to adopt their use. Despite the benefits they offer, better standards and validation practices regarding mobile medical apps need to be established to ensure the proper use and integration of these increasingly sophisticated tools into medical practice. These measures will raise the barrier for entry into the medical app market, increasing the quality and safety of the apps currently available for use by HCPs.

#### 3.3.1 Use of mobile devices by health care professionals

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The introduction of mobile computing devices (personal digital assistants [PDAs], followed by smartphones and tablet computers) has greatly impacted many fields, including medicine. Health care professionals now use smartphone or tablet computers for functions they used to need a pager, cellphone, and PDA to accomplish. Smartphones and tablets combine both computing and communication features in a single device that can be held in a hand or stored in a pocket, allowing easy access and use at the point of care. In addition to voice and text, new mobile device models offer more advanced features, such as web searching, global positioning systems (GPS), high-quality cameras, and sound recorders. With these features, as well as powerful processors and operating systems, large memories, and high-resolution screens, mobile devices have essentially become handheld computers

One major motivation driving the widespread adoption of mobile devices by HCPs has been the need for better communication and information resources at the point of care. Ideally, HCPs require access to many types of resources in a clinical setting, including:

**Communication capabilities**—voice calling, video conferencing, text, and e-mail

**Hospital information systems (HISs)**—electronic health records (EHRs), electronic medical records (EMRs), clinical decision support systems (CDSSs), picture archiving and communication systems (PACSs), and laboratory information systems (LISs).

**Informational resources**—textbooks, guidelines, medical literature, drug references

**Clinical software applications**—disease diagnosis aids, medical calculators

### 3.3.2 Medical apps for health care professionals

#### Information Management

Evernote                      Note-taking and organization

Notability                      Note-taking and organization

iAnnotate	PDF viewer
GoodReader	PDF viewer
Box	Cloud storage and file sharing
Dropbox	Cloud storage and file sharing
Google Drive	Cloud storage and file sharing

### **Communication and Consulting**

Doximity	Social networking site for MDs
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### **Reference and Information Gathering**

Epocrates	Drug and medical reference
Dynamed	Drug and medical reference
Skyscape/Omnio	Drug and medical reference
Micromedex	Drug reference

### **Patient Management and Monitoring**

Diagnosaurus	Differential diagnosis
Pocket Lab Values	Laboratory reference
Lab Pro Values	Laboratory reference
Archimedes	Medical calculator
MedCalc	Medical calculator

Mediquations Medical calculator

Calculate Medical calculator

AHRQ ePSS Screening and prevention tool

## Medical Education and Training

MedPage Today Continuing medical education

QuantiaMD Continuing medical education

## 3.4 New or upgraded equipment

### 3.4.1 Using new features of new technology

New technologies are expected to have a positive influence on the **business** performance. In is not realistic to have this expectation unless users are willing to use the features of new technology to improve the business performance. For new or upgraded equipment to be used to its optimum capacity to meet business objectives, we must continuously verify that advanced features and functions are used and that they are providing the promised performance.

Some users might find the new technology overwhelming, and therefore only use the features of the new technology that they are comfortable with. Consider the following situation:

Your organisation has been using a spreadsheet package version 1. Recently you upgraded to version 3 of this package as the technology committee found that it will definitely increase the business productivity. There are a number of very important advanced features available in version 3 of the spreadsheet package. However, you find that most users are not using any of the added features because they are already familiar with the way version 1 performs and they can perform all version 1 functions using version 3.

### 3.4.2 Integrating new equipment into the existing workflow

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The existing infrastructure must be taken into consideration when implementing new technology. Measures must be adopted to ensure that the new equipment will integrate well with the current workflow.

Many department managers are very comfortable with the manual paper-based system and are not very keen to change their well-established system.

What can you do to ensure that your investment in the new Shift Management System is justified? Unless appropriate strategies are followed to promote the use of the new system, your investment will not produce the desired results.

### 3.4.3 Skills to explore changing technology

What stops people from using new technology? It is the fear of the unknown.

At this point in your study of computing, you no doubt realise that you will not destroy the world if you press the wrong key. In other words, you have already learned a number of skills that allow you to confidently approach any new technology. From your numerous experiences, you will have built confidence in your own knowledge and skills with computers. When faced with a new piece of software or hardware, you'll probably find yourself asking questions like:

- What does the software do?
- How can I use it?
- What happens if I do that?
- Where can I find out how to use that?
- Why does this work but that doesn't?
- How can this program/equipment make my work easier and more productive?
- How can I apply its new features to my work?

### 3.4.4 Testing new features of new technology

Once the new features of the technology are identified, you must build a variety of tests to ensure that these features continue to meet the business goals even after implementation. In order to test the effectiveness of the new technology you can use the following process:

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- **Test case** — state clearly the features you are testing.
- **Test procedure** — identify the specific tasks that are involved in using each feature.
- **Test plan** — develop a test plan to determine whether the features of the new technology are used to improve business performance.
- **Conditions** — select the conditions under which the test will be conducted.

Remember to focus on the features that are most important to the organisation's performance.

## Classifications of testing

### Level 1

These tests are used to test the major functions of the equipment and usually this is done during the equipment selection process.

### Level 2

These test the major as well as minor functions of the equipment and ensure that they can work together in a variety of situations. This type of testing is usually conducted in the prototype phase.

### Level 3

These tests target the performance, stability and reliability under heavy loads, usability, error handling, recovery and compatibility. Level 3 tests could start very close to the implementation phase and a substantial period after the introduction of the new technology. At this stage of testing, the IT professional will work with the users to test the solutions to ensure the upgraded equipment's features and functions work as expected. You may also engage a series of test cases to gauge the upgraded equipment's stability under various conditions. The IT team must resolve any issues discovered during the testing process.

## Strategies for testing

It is good practice to use two different groups of users and test various methods of doing the same task using the technology. This will enable you to identify the most productive method of performing a task and confirm the operation of advanced features and functions.

In most cases, as the technology is new to the organisation, testing must be conducted with a few competent people, unless the purpose of the test is to identify problems for all users. Therefore, it would be a great help to identify one or two ‘power users’ from each area being tested to eliminate incorrect use of software due to poor training. In fact, an individual with proven in-depth technical skills must lead the group in testing.

When selecting participants for testing you must include:

- users for whom the new technology is an integral part of their work
- representatives from IT personnel supporting the new/upgraded equipment
- Individuals who understand the business objectives and the rationale behind the implementation of the new equipment.

<b>Self-check 3</b>	<b>Written test</b>
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**Direction: answer the following question**

**Test 1: say true or false**

- HMIS is a data collection system specifically designed to support planning, management, and decision making in health facilities and organizations.
- MHealth is the practice of medicine and health care over mobile devices, tablets, PDAs, and computers.
- SMS messaging is a standard method of delivering multimedia material, including messages.

**Test 2: Multiple choice**

- GSM operates at \_\_\_\_\_ ?  
A. 850 MHz    B. 900 MHz    C. 1800 MHz    D. all
- \_\_\_\_\_ is a channel access mechanism that also serves as an example of multiple access.  
A. CDMA    B. WIFI    C. GSM    D. MMS
- \_\_\_\_\_ is a wireless networking technology that allows us to connect to a network  
A. CDMA    B. WIFI    C. GSM    D. MMS

**Test 3: short answer**

- Write at list 5 Medical apps for health care professionals
- What stops people from using new technology?

**Note: Satisfactory rating – 10 points**

**Unsatisfactory - below 5 points**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

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## Unit four: Maintenance of computer accessories and systems

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

- Minor maintenance of computer system
- Security of data on a computer system
- Basic file maintenance on a computer system

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:

- Apply minor maintenance operations and replacement of consumables
- Implement procedures for ensuring security of data of a computer system
- Perform basic file maintenance procedures

## 4.1 Minor maintenance of computer system

Computer maintenance means keeping your computers and laptops in good condition through regular cleanings, hard drive updates, and virus prevention. Doing so can lengthen the lifespan of your devices and it can also help you browse the web more safely.

### 4.1.1 Preventive Maintenance

Preventive maintenance can be the key to keeping computer systems from experiencing serious problems, such as data loss and hardware failures, and it also helps systems have a longer life span. In this section, you study the need for preventive maintenance of a computer system. Following a good preventive maintenance plan can keep computer problems from being too troublesome.

*Preventive maintenance* is the regular and systematic inspection, cleaning, and replacement of worn parts, materials, and systems. Effective preventive maintenance reduces part, material, and system faults and keeps hardware and software in good working condition.

Regular preventive maintenance reduces potential hardware and software problems, computer downtime, repair costs, and the number of equipment failures. It also improves data protection, equipment life, and stability and saves money.

The following are considerations to keep dust from damaging computer components:

- Clean/replace building air filters regularly to reduce the amount of dust in the air.
- Use a cloth or a duster to clean the outside of the computer case. If using a cleaning product, put a small amount onto a cleaning cloth and then wipe the outside of the case.
- Dust on the outside of a computer can travel through cooling fans to the inside.
- Accumulated dust prevents the flow of air and reduces the cooling of components.
- Hot computer components are more likely to break down.
- Remove dust from the inside of a computer using a combination of compressed air, a low-air-flow ESD vacuum cleaner, and a small lint-free cloth.
- Keep the can of compressed air upright to prevent the fluid from leaking onto computer components.

- Keep the compressed air can a safe distance from sensitive devices and components.
- Use the lint-free cloth to remove any dust left behind on the component.

## CAUTION

When you clean a fan with compressed air, hold the fan blades in place. This prevents overspinning the rotor or moving the fan in the wrong direction.

This is a basic list of components to inspect for dust and damage:

- CPU heat sink and fan assembly: The fan should spin freely, the fan power cable should be secure, and the fan should turn when the power is on.
- RAM modules: The modules must be seated securely in the RAM slots. Ensure that the retaining clips are not loose.
- Storage devices: All cables should be firmly connected. Check for loose, missing, or incorrectly set jumpers. A drive should not produce rattling, knocking, or grinding sounds.
- Screws: A loose screw inside the case can cause a short circuit.
- Adapter cards: Ensure that adapter cards are seated properly and secured with the retaining screws in their expansion slots. Loose cards can cause short circuits. Missing expansion slot covers can let dust, dirt, or living pests inside the computer.
- Cables: Examine all cable connections. Ensure that pins are not bent or broken and that cables are not crimped, pinched, or severely bent. Retaining screws should be finger-tightened.
- Power devices: Inspect power strips, surge suppressors (surge protectors), and UPS devices. Make sure the devices work properly and that there is clear ventilation.
- Keyboard and mouse: Use compressed air to clean the keyboard, mouse, and mouse sensor.

Follow these guidelines to help ensure optimal computer operating performance:

- Do not obstruct vents or airflow to the internal components.
- Keep the room temperature between 45 and 90 degrees Fahrenheit (between 7 and 32 degrees Celsius).

- Keep the humidity level between 10% and 80%.
- Temperature and humidity recommendations vary by computer manufacturer. Research the recommended values for computers used in extreme conditions.

Verify that installed software is current and follow the policies of the organization when installing security updates, operating system, and program updates.

Create a software maintenance schedule to:

- Review and install the appropriate security, software, and driver updates.
- Update the virus definition files and scan for viruses and spyware.
- Remove unwanted or unused programs.
- Scan hard drives for errors and defragment hard drives.

## 4.2 Security of data on a computer system

### 4.2.1 Computer System Security

Computer security, also called cybersecurity, is the protection of computer systems and information from harm, theft, and unauthorized use. Computer hardware is typically protected by the same means used to protect other valuable or sensitive equipment—namely, serial numbers, doors and locks, and alarms.

Data security is the practice of protecting digital information from unauthorized access, corruption, or theft throughout its entire lifecycle. It's a concept that encompasses every aspect of information security from the physical security of hardware and storage devices to administrative and access controls, as well as the logical security of software applications. It also includes organizational policies and procedures.

When properly implemented, robust data security strategies will protect an organization's information assets against cybercriminal activities, but they also guard against insider threats and human error, which remains among the leading causes of data breaches today. Data security involves deploying tools and technologies that enhance the organization's visibility into where its critical data resides and how it is used. Ideally, these tools should be able to apply protections

like encryption, data masking, and redaction of sensitive files, and should automate reporting to streamline audits and adhering to regulatory requirements.

#### 4.2.2 Types of data security

##### Encryption

Using an algorithm to transform normal text characters into an unreadable format, encryption keys scramble data so that only authorized users can read it. File and database encryption solutions serve as a final line of defense for sensitive volumes by obscuring their contents through encryption or tokenization. Most solutions also include security key management capabilities.

##### Data Erasure

More secure than standard data wiping, data erasure uses software to completely overwrite data on any storage device. It verifies that the data is unrecoverable.

##### Data Masking

By masking data, organizations can allow teams to develop applications or train people using real data. It masks personally identifiable information (PII) where necessary so that development can occur in environments that are compliant.

##### Data Resiliency

Resiliency is determined by how well an organization endures or recovers from any type of failure – from hardware problems to power shortages and other events that affect data availability. Speed of recovery is critical to minimize impact.

#### 4.2.3 Data security strategies

A comprehensive data security strategy incorporates people, processes, and technologies. Establishing appropriate controls and policies is as much a question of organizational culture as it is of deploying the right tool set. This means making information security a priority across all areas of the enterprise.

### **Physical security of servers and user devices**

Regardless of whether your data is stored on-premises, in a corporate data center, or in the public cloud, you need to ensure that facilities are secured against intruders and have adequate fire suppression measures and climate controls in place. A cloud provider will assume responsibility for these protective measures on your behalf.

### **Access management and controls**

The principle of “least-privilege access” should be followed throughout your entire IT environment. This means granting database, network, and administrative account access to as few people as possible, and only those who absolutely need it to get their jobs done.

### **Application security and patching**

All software should be updated to the latest version as soon as possible after patches or new versions are released.

### **Backups**

Maintaining usable, thoroughly tested backup copies of all critical data is a core component of any robust data security strategy. In addition, all backups should be subject to the same physical and logical security controls that govern access to the primary databases and core systems.

### **Employee education**

Training employees in the importance of good security practices and password hygiene and teaching them to recognize social engineering attacks transforms them into a “human firewall” that can play a critical role in safeguarding your data.

### **Network and endpoint security monitoring and controls**

Implementing a comprehensive suite of threat management, detection, and response tools and platforms across your on-premises environment and cloud platforms can mitigate risks and reduce the probability of a breach.

#### 4.2.4 Data security trends

##### AI

AI amplifies the ability of a data security system because it can process large amounts of data. Cognitive Computing, a subset of AI, performs the same tasks as other AI systems but it does so by simulating human thought processes. In data security, this allows for rapid decision-making in times of critical need.

##### Multicloud security

The definition of data security has expanded as cloud capabilities grow. Now organizations need more complex solutions as they seek protection for not only data, but applications and proprietary business processes that run across public and private clouds.

##### Quantum

A revolutionary technology, quantum promises to upend many traditional technologies exponentially. Encryption algorithms will become much more faceted, increasingly complex and much more secure.

### 4.3 Basic file maintenance on a computer system

The process of inspecting files for the purposes of replacing worn files folders, mending torn documents, removing duplicate copies, locating possible misfiles, and ensuring proper sequence of contents.

The routine changes, updates, copying, moving, or deleting of files on a computer. Usually, **file maintenance** is performed on computers or servers that are serving a vast amount of files.

#### 4.3.1 Folder and File

Folder (or directory) – a virtual storage space used to store and organize computer files.

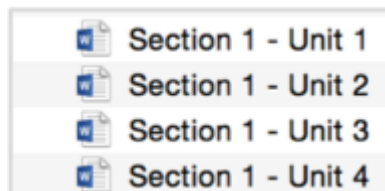
- A folder can also contain additional folders (known as subfolders).
- A folder has a name and is represented by an icon.



Figure 4.1: folder

File – a storage unit on a computer that stores information, data, etc. (such as a document, an image, etc.).

- Folders contain files
- Files have names and are represented by various icons



Filename – a unique name given to a file to identify it. A filename can contain letters, symbols, numbers, spaces, etc.

### Right-click to create a new folder (Windows 10)

1. Go to the location where you want to create the folder (Desktop, Documents, or anywhere on your computer).
2. Right-click on a blank space (don't right-click on an existing item in the folder).
3. Click or hover over **New**.
4. Click **Folder**.
5. Type a name for the new folder and press **Enter** (on the keyboard).

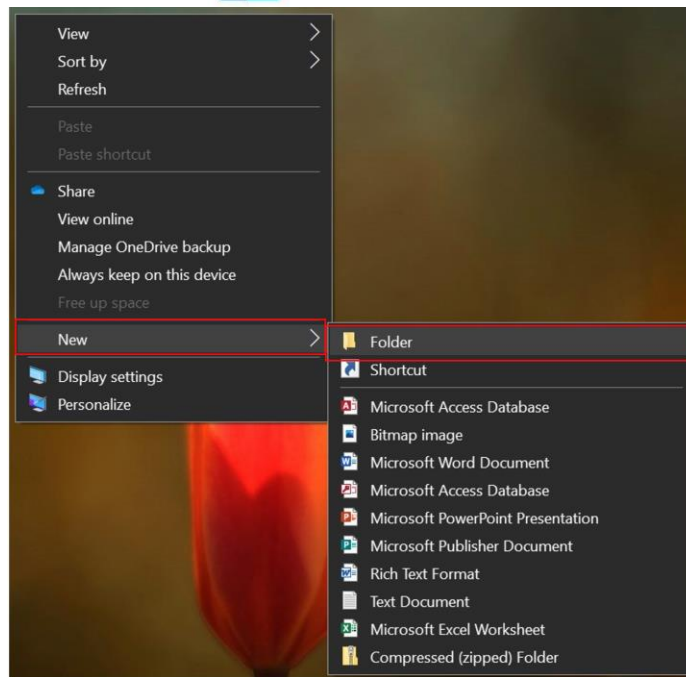


Figure 4.2: Creating new folder

## Ribbon

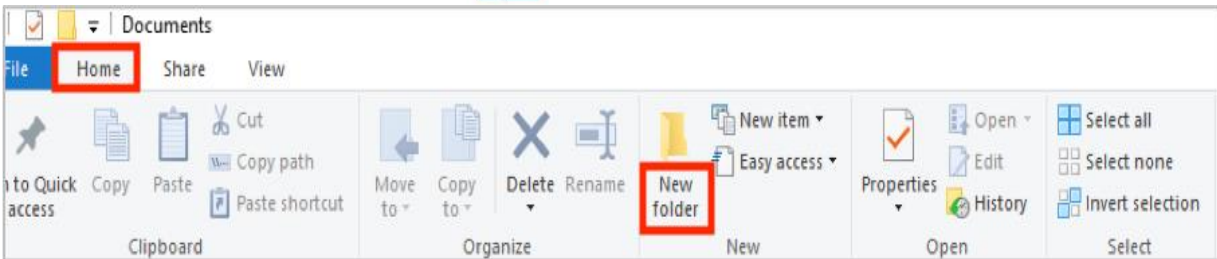
Ribbon – a group of buttons and icons (tabs) at the top of the window that allows users to access the commands that they need to complete a task.



Figureure; ribbon

### Create a new folder from the ribbon menu (Windows 10)

1. Go to the location where you want to create the folder (e.g., Documents).
2. Click **Home**.
3. Click **New folder**.
4. Type a name for the new folder and press **Enter** (on the keyboard).



Figureure: creating new folder from ribbon

### 4.3.2 Basic File Management Skills

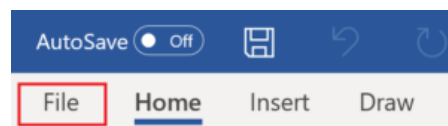
Basic file management refers to a way to name, save, backup, organize files/folders and keep track of files on a computer.

#### Some file management tips

- Create folders/subfolders to organize files.
- Save your work frequently in folders/subfolders (organize by category).
- Save your files on a backup disk regularly (back up your files).
- Give files and folders short, but meaningful names.

**Save a file for the first time or save a file with a different name or location (Microsoft Word)**

1. Click the **File** tab in Microsoft Word.



Figureure: File tab in Microsoft Word

2. Click the **Save As** command.



Figureure: Save As command

3. Choose a location on your computer (e.g., USB drive or hard disk drive) to save your file.
4. Type a name for your document in the **File Name** box.
5. Click the **Save** button.

#### **Save an existing file in its current location (Microsoft Word)**

1. Click the **File** tab.
2. Click the **Save** command.
3. Or click the Save button icon.

<b>Self-check 4</b>	<b>Written test</b>
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**Direction: answer the following question**

**Test 1: say True or False**

1. Effective preventive maintenance increases part, material, and system faults and keeps hardware and software in good working condition.
2. Computer security, also called cybersecurity, is the protection of computer systems and information from harm, theft, and unauthorized use
3. **File maintenance** is performed on computers or servers that are serving a vast amount of files.

**Test 2: fill the blank space**

1. \_\_\_\_\_is virtual storage space used to store and organize computer files.
2. \_\_\_\_\_refers to a way to name, save, backup, organize files/folders and keep track of files on a computer

**Test 3: Give short answer**

1. Write types of data security?
2. Write the basic list of components to inspect for dust and damage?

**Note: Satisfactory rating – 10 points**

**Unsatisfactory - below 5 points**

Score = \_\_\_\_\_

Rating: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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## Operation Sheet - 2

**Operation Title: Creating user account and password**

**Instructions: create your own user account/password**

**Purpose:** To setup users account on the new computer

**Required tools and equipment:** windows operating system computer,

**Precautions:**

- ✓ Place the computer in safe and ventilated area
- ✓ Never touch the inside of the computer to avoid electric shock
- ✓ Do not expose the monitor to water

**Procedures:**

1. Click the start button, then click Control panel
2. Click User account
3. Click create new account
4. To name your user account type in your name, then click next button.
5. There are two types of window xp user account. To pick an account type, click either Computer administrator or Limited user.
6. You will be sent back to the user accounts window where your new account will appear.

**To create a user password**

1. Open user account in control panel
2. On the users tab, click the name of the user for whom you want to create a password and then click reset password.
3. In new password and confirm new password, type the password, and then click ok

**Quality criteria**

<b>LAP Test</b>	<b>Practical Demonstration</b>
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Name: \_\_\_\_\_

Date: \_\_\_\_\_

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

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

**Instruction I:** Given necessary templates, tools and materials you are required to perform the following tasks within 10 hours.

**Task 1:** Setting up and connecting a desktop computer

**Task 2** Creating user account and password

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